

Industry Perspectives on Transportation, Aging, and Disposal (TAD) Canisters for Used Nuclear Fuel

Nuclear Waste Technical Review Board

May 9, 2006

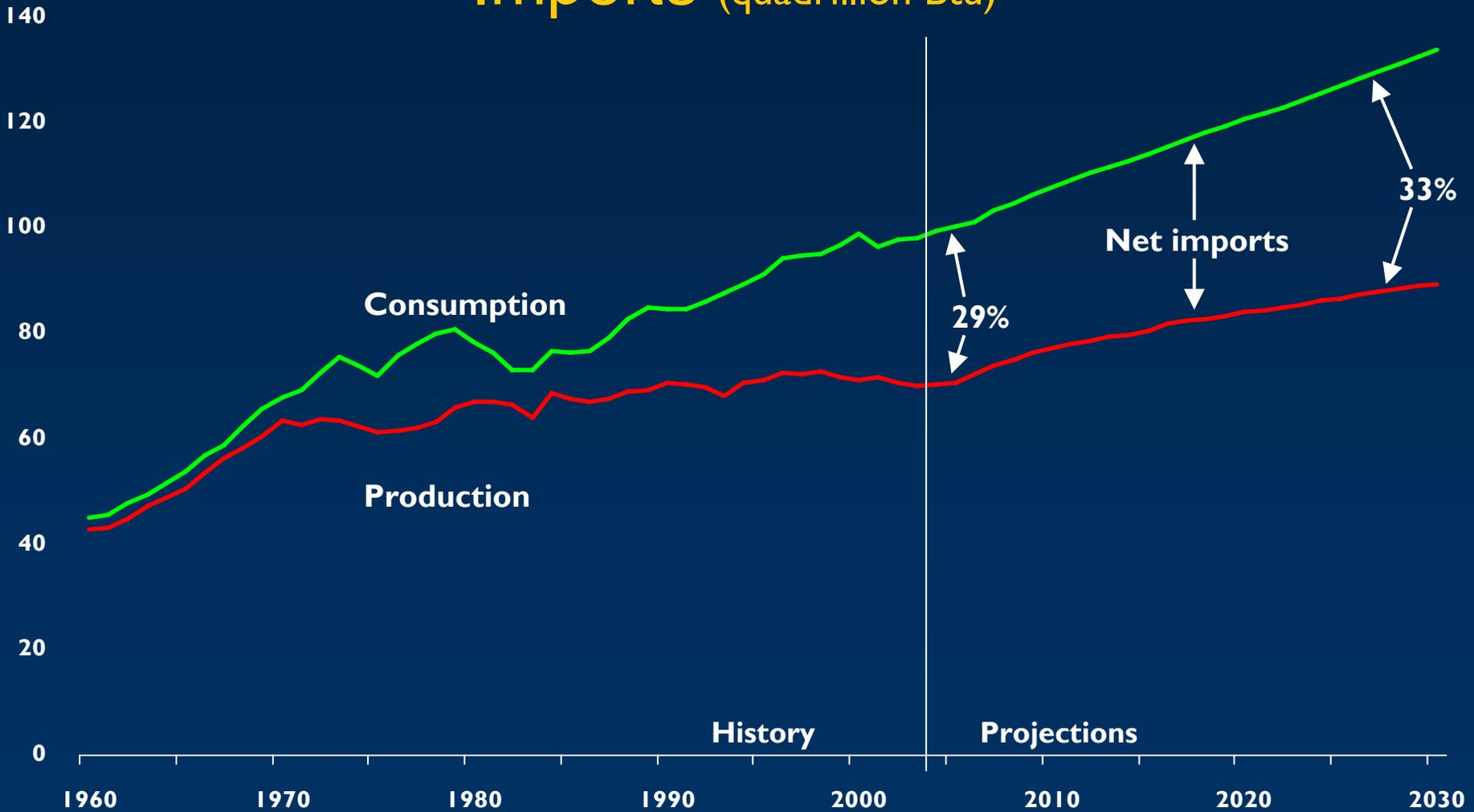
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Industry Perspective

- Progress at Yucca Mountain is vitally important to the national interest
- DOE's TAD initiative is pivotal to assuring progress at Yucca Mountain
- Industry is committed to working proactively to facilitate the success of the the TAD initiative

U.S. Energy Production, Consumption, and Net Imports (quadrillion Btu)



Source: Energy Information Administration
Updated: 4/06



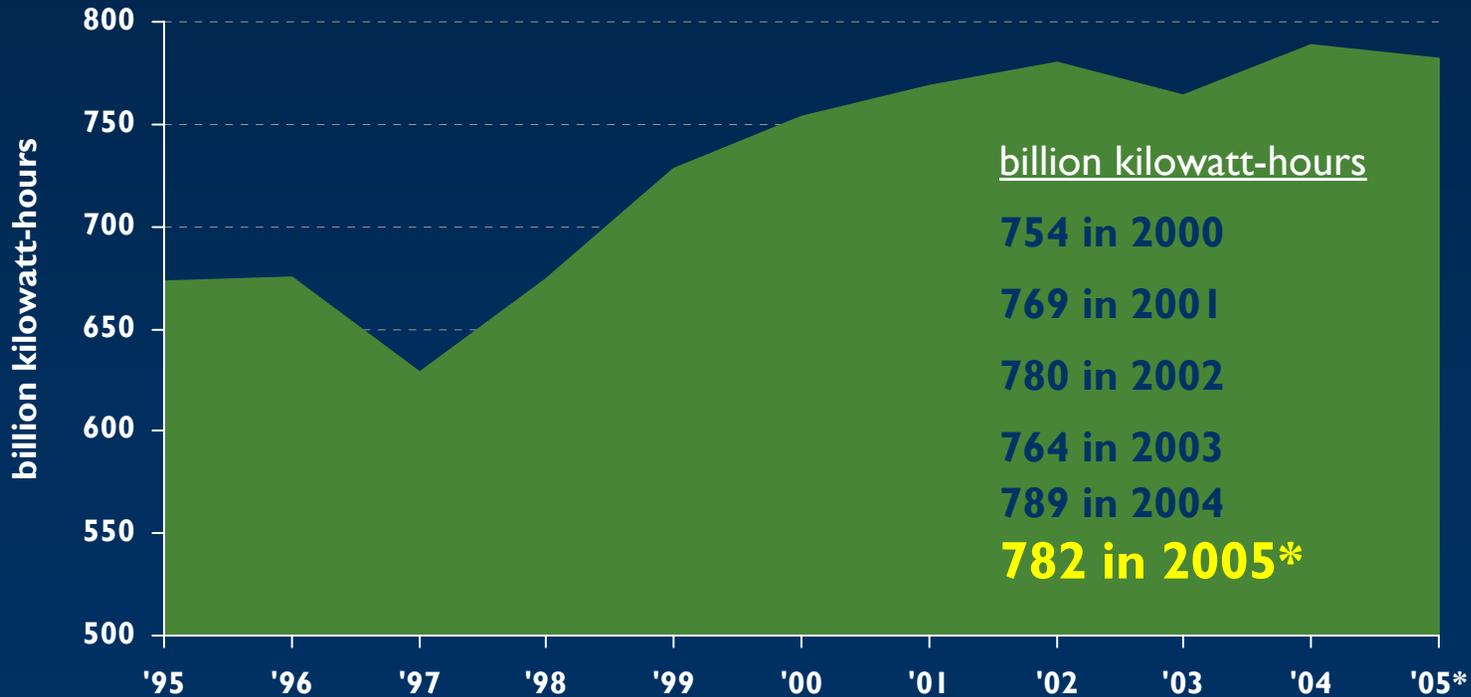
Growing Need for Additional Base-load Capacity

- Electricity demand in 2030 will be 45% greater than today
- To maintain current electric fuel supply mix would mean building:

| | |
|------------|------------------------------------|
| 50 | Nuclear reactors (1,000 MW) |
| 261 | Coal-fired plants (600 MW) |
| 279 | Natural gas plants (400 MW) |
| 93 | Renewables (100 MW) |

Source: 2006 Annual Energy Outlook, Energy Information Administration

Nuclear Output Remains Near Record Levels



Source: Energy Information Administration

* 2005 Preliminary

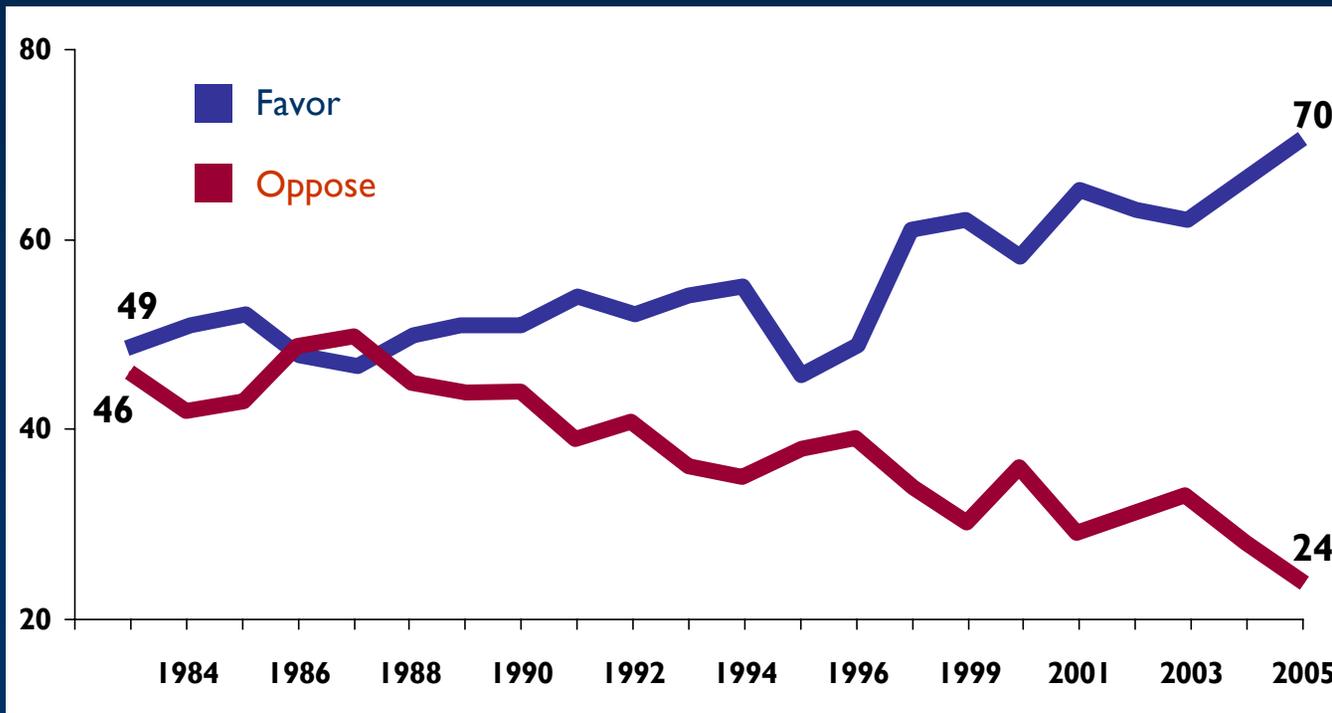


New Nuclear Plant Status

| Company | Site | Early Site Permit | Design, # of Units | Construction/Operating License |
|-------------------------------|---|---|-----------------------|---|
| Dominion | North Anna (VA) | Under review, approval expected late 2006 | ESBWR (1) | COL application in 2007 |
| NuStart (TVA) | Bellefonte (AL) | Likely straight to COL | AP1000 (1) | COL expected to be developed for 2007 submittal |
| NuStart (Entergy) | Grand Gulf (MS) | Under review, approval expected early 2007 | ESBWR (1) | COL expected to be developed for 2007/2008 submittal |
| Entergy | River Bend (LA) | Likely straight to COL | ESBWR (1) | COL application in 2008 |
| Southern Company | Vogtle (GA) | Under development, to be submitted mid-2006 | Not yet determined | COL preparations to start 2006 with a submittal date of 2008 |
| Progress Energy | Harris (NC) | Will go straight to COL | Not yet determined | COL preparations started, submittal in 2008 |
| South Carolina Electric & Gas | Not yet determined | Will go straight to COL | Not yet determined | Preliminary work and evaluation; may announce end 2005 |
| Duke | Not yet determined | Will go straight to COL | AP1000 (2) | Will start COL preparation in 2005 |
| Exelon | Clinton (IL) | Under review, approval expected mid-2007 | Not yet determined | Not yet determined |
| UniStar | Calvert Cliffs (MD) or Nine Mile Point (NY) | Will go straight to COL | EPR (1) | 2008 (COL and EPR design certification conducted in parallel) |

Record Support for Nuclear Energy

“Overall, do you strongly favor, somewhat favor, somewhat oppose or strongly oppose the use of nuclear energy as one of the ways to provide electricity in the United States?”



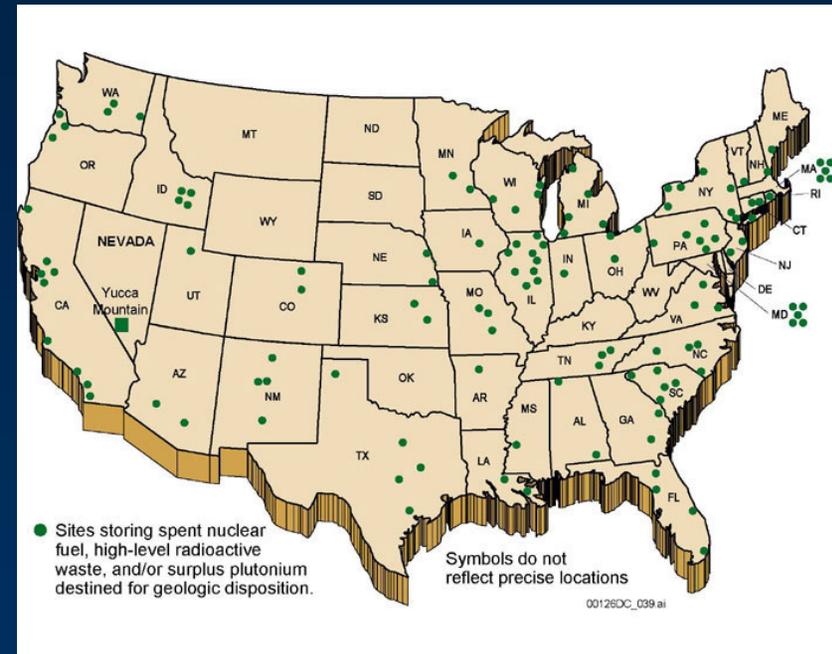
Source: Bisconti Research Inc.

May 2005 poll of 1,000 U.S. adults



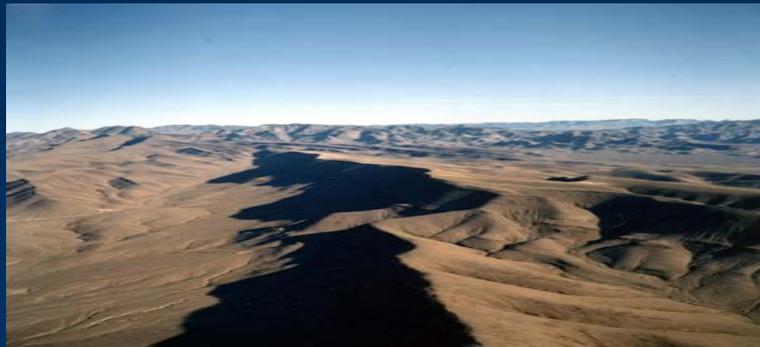
The Vital Importance of Yucca Mountain

- Current commercial used fuel inventory
 - Approximately 53,400 MTU
- Current dry storage inventory
 - 8,590 MTU
 - 29,000 Assemblies
 - 792 casks/canisters loaded
 - At 34 sites
- Future dry storage inventory by 2010
 - Estimating 15,600 MTU
 - 1,200 casks/canisters loaded
 - At 52 sites for 81 plants
 - ~ 1000 MTU/year to be loaded



Moving Forward with Yucca Mountain

- A high level waste repository is essential to meet US energy, environmental, and national security needs under all scenarios.
- Yucca Mountain can serve as a scientifically sound geologic repository.
- The Yucca Mountain licensing process can provide adequate assurance of public health and safety.
- Advanced reprocessing technologies can and should be deployed in the future in conjunction with the repository to improve future inventory management



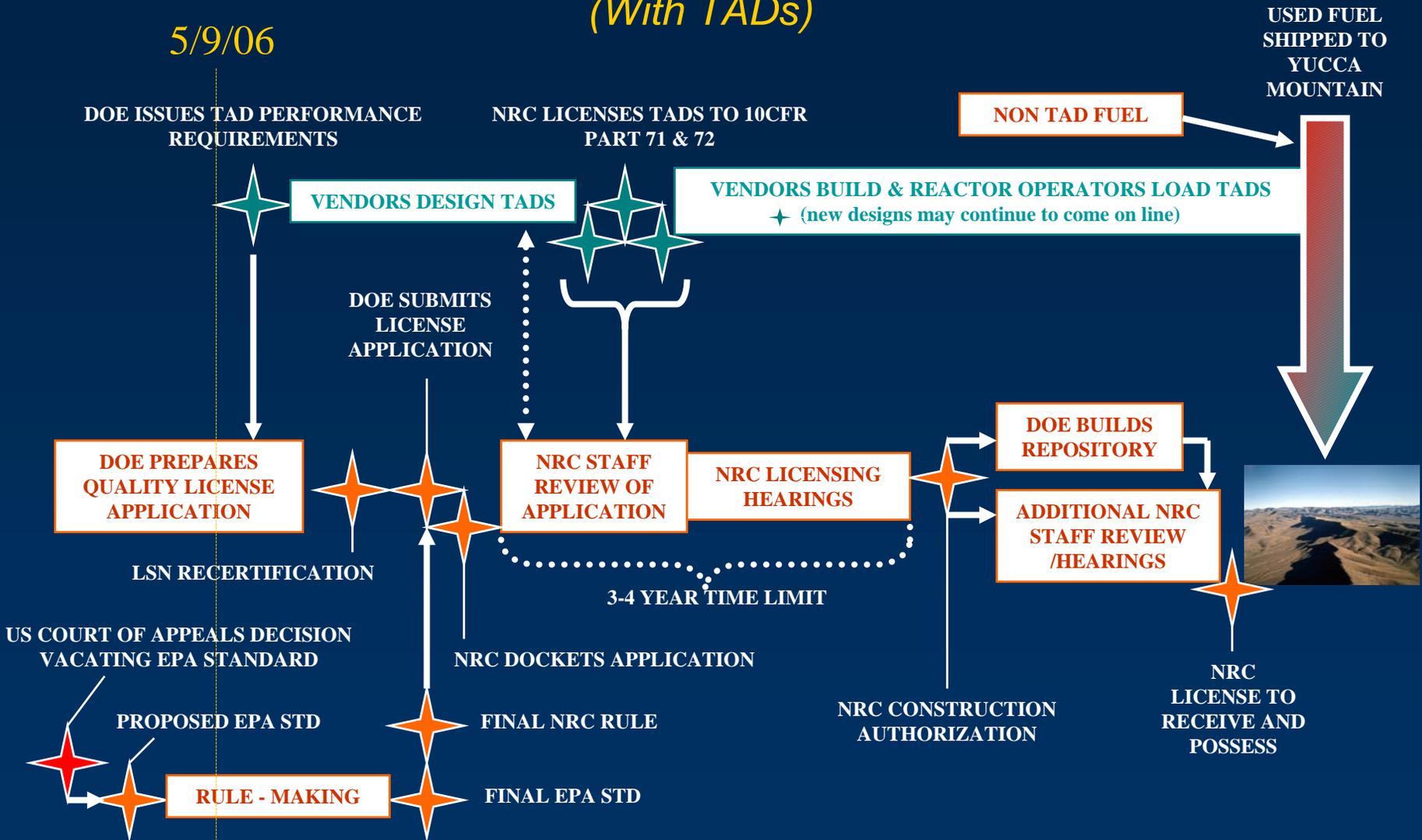
The nation must actively support the successful licensing of a geologic repository at **Yucca Mountain**.

A successful TAD initiative is key to both a successful Yucca Mountain project and a growing nuclear industry

- The TAD will greatly simplify the design of surface facilities at Yucca Mountain
 - Significantly reduces amount of fuel handling at the repository
- A simpler repository design is a more licensable design
- Loading TADs at reactor sites has potential advantages
 - Reduces disposal and waste acceptance uncertainty
 - Increases stakeholder confidence in linkage between on site storage and Yucca Mountain
 - Advantages counterbalance inefficiencies of smaller, potentially costlier, container

Yucca Mountain Licensing Process (With TADs)

5/9/06



Industry Commitment to supporting the TAD initiative

- The nuclear industry has a vested interest in seeing DOE make demonstrable progress on the Yucca Mountain Program, especially when such progress offers the potential to simplify future spent fuel handling operations by DOE and utilities, while at the same time offering the potential to mitigate future impacts of DOE's delay in accepting commercial spent fuel. Industry believes that maximum utilization of the private sector to facilitate early development and licensing of the TAD is essential to achieving this goal. To that end, NEI and USTC have jointly convened a group of experts to provide technical input to DOE TAD development efforts. This group includes representatives from most US reactor owner/operators and major storage system vendors in the US market.



Goals - Industry Interactions with DOE

- Providing DOE with technical input for TAD development
- Encouraging and facilitating the resolution of technical issues pertaining to TADs in a timely manner, such that DOE can be in a position to issue performance requirements in mid-2006.
- Assuring that these performance requirements are reasonable and adequate to support the timely development and straightforward storage and transport licensing of TAD designs by the private sector
- Maintaining focus on TAD technical performance issues notwithstanding commercial or contractual issues which can be addressed once the technical performance requirements have been issued this Summer.
- Also, providing technical input relating to the design of surface facilities at Yucca Mountain that will handle both TADs and whatever fuel is shipped to the site in other types of containers.



Key Challenges being addressed

- Managing the timeline
- Managing the performance requirement content
- Material selection
- Criticality control
- Avoidance of over-conservative design inputs
 - (i.e. shielding, cask drop, etc.)
- Achieving appropriate scale of test inputs
- Solving local issues locally

Looking Ahead

- While TAD commercialization has been on the back-burner to date, this issue is critical to the ultimate success of the TAD
- Issuance of a TAD Performance Specification is only a first step towards realizing the full potential of DOE's clean, canisterized approach to the repository.
- It is our opinion that “market forces” will not trigger the design/licensing/fabrication of TAD canisters. We believe DOE will have to incentivize the industry to make TAD a reality as well as address utility contract issues.
- To this end, DOE issued a Notice of Program Interest on April 26 to identify qualified companies for the next phase of the TAD's development.
- The next step should be the establishment of contractual mechanisms to design/license/fabricate “generation one” TADS, at least until such time that the market is ready to begin to drive the development and sales of future generation TADs.

DOE Industry dialogue on TADs

- DOE and industry experts have met on four separate occasions to discuss TADs
- A significant amount of technical information has been exchanged
- Questions are being answered and issues are being resolved
- Considerable progress has been made
- The TAD performance requirements are still a work in progress
- Additional interactions are planned



Dialogue Summary

| Topic | Discussion Summary |
|--|---|
| Materials to be allowed & prohibited | DOE appears to be developing a workable materials list. |
| Use of carbon steel | Industry has communicated that use of bare carbon steel in pools is unacceptable. Industry has also provided information on coatings. DOE is reassessing its need for carbon steel for repository performance (the most likely success path). |
| Shielding requirements | Industry has encouraged DOE to “solve local problems locally” and minimize requirements for built-in shielding. |
| Criticality and reactivity control requirements | The proposal to require Ni-Gd has generated concern for Part 71/72 licensing, particularly w/respect to the absence of benchmarks and fabrication experience. Industry has devoted considerable effort toward understanding DOE’s position in this area. Discussions are ongoing. If Ni-Gd is required, it will most likely be used to perform post-closure function only |
| Thermal requirements | It appears unlikely that DOE will not be imposing repository thermal limits on TADs. Part 71/72 requirements are likely to be more limiting. TADs will be aged at Yucca to meet repository thermal requirements. |
| Canister handling | Industry has provided canister handling principles to DOE and encouraged the department to “solve local problems locally” – meaning minimizing the extent to which facility design problems become TAD design problems. DOE has been responsive to this concern. Industry is providing additional info on crane reliability. |

Dialogue Summary (continued)

| Topic | Discussion Summary |
|--|--|
| Aging pad seismic requirements | DOE to specify. This is not seen as a problematic issue. |
| Overpacks and transfer casks | DOE appears to be taking a reasonable approach to overall system design. |
| Package closure and seal integrity | DOE appears to be taking a reasonable approach in this area |
| Regulatory interfaces (between different Parts of NRC regulations) | Vendors will seek Part 71 and 72 licenses for TADs with iterative in-line review by DOE to assure performance specification is met. DOE will subsequently add licensed TADs to the Part 63 docket. |
| ASME code compliance | Weld design/fabrication/examination likely to be ASME Div 3 |
| Transportation issues | Transportation issues have been discussed. DOE appears to be taking a reasonable approach to addressing these issues. |

Summary

- The TAD initiative has the potential to be a value added contributor to nuclear fuel cycle management, progress at Yucca Mountain, and the future of nuclear energy
- Industry is committed to working to facilitate the full potential and success of the TAD initiative
- Industry/DOE dialogue is successfully addressing technical challenges to date and ensuring timely progress
- The need to focus on the next phase of the TAD development process – commercial incentives and contractual issue resolution – is near-at-hand. This should be addressed with the same urgency as has been the development of technical performance requirements

