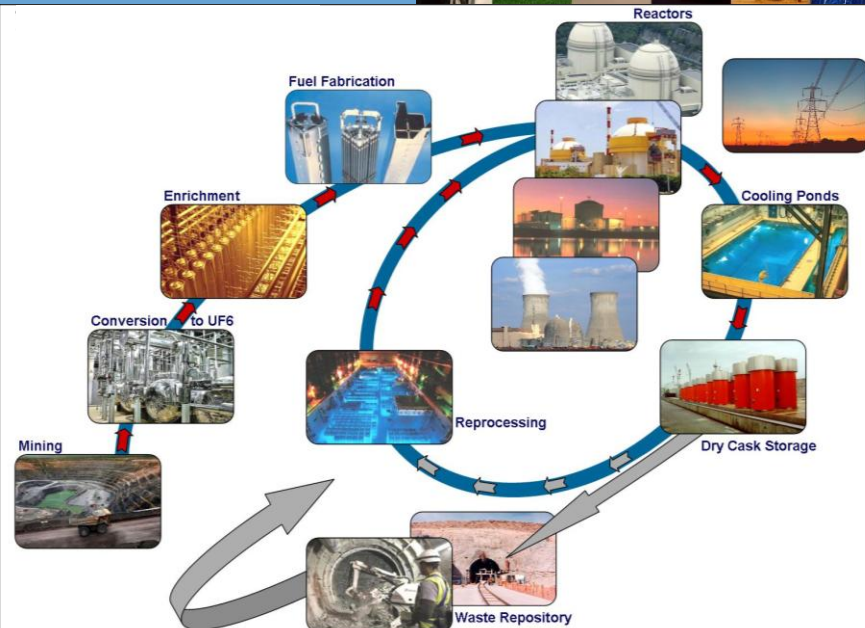


Lessons-Learned for a U.S. Nuclear Waste Repository



Roundtable / Dinner



Nuclear Energy Insider:
U.S. Used Fuel Strategy Conference
Charlotte, NC

--November 28, 2012

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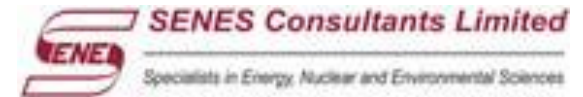
Roundtable Participants



L. Barrett Consulting, LLC



U.S. Nuclear Infrastructure Council



MN Public Utilities Commission

WINSTON
& STRAWN

Linton Consulting

Why Are We Here?



- ◆ Knowledge exchange
 - Focus on Used Fuel Repository
 - Waste Management
- ◆ Share insights / perspectives
 - Government
 - Vendors & Contractors
 - Operators / Licensees
 - Associations, consultants
- ◆ Discuss timely issues
 - Future of a U.S. Repository
 - BRC Recommendations
 - Other key developments

Situation Analysis



- ◆ Nuclear waste has become a key issue for the nuclear power industry in the 21st Century.
- ◆ Problem of nuclear waste: *Important, but not urgent?*
 - Technically the urgency for disposition of spent fuel and nuclear waste is still decades into the future
 - “We have 100 years of space at plant sites”
- ◆ Cancellation of Yucca Repository after 30 years and \$15 Billion spent has created:
 - Anger in communities impacted by military waste
 - Consternation within the commercial nuclear industry



Situation Analysis



- ◆ There are currently 120 nuclear waste storage facilities in 39 states containing some 70,000 mt of radioactive material
 - Spent fuel is growing at about 2,000 mt/year
 - 3/4s in spent fuel pools
 - 1/4 in dry casks
- ◆ Has Fukushima has impacted our thinking about used fuel storage?
- ◆ There is also a significant amount of government / military nuclear waste that was to be sent to Yucca that requires a repository

Situation Analysis



- ◆ Recent court “waste confidence” ruling, a wake-up call for private sector
 - Yet politics has elevated the urgency issue
 - Now a driver for the future?
- ◆ No new licenses will be issued by the NRC until there is confidence that waste stored at sites is not a problem
 - Could further delay U.S. nuclear revival
 - Loss of momentum to the industry
 - May be an opportunity to bring Repository issue to a head

There may be a year or two delay in getting the NRC license for Duke’s Lee plant because of the “recent wrinkle with the waste confidence rule.”
--Duke Energy Executive

Key Questions



- ◆ What is the path forward for a nuclear waste and a repository in the U.S.?
 - What about various lawsuits underway?
- ◆ What have we learned from the Blue Ribbon Commission study and recommendations?
- ◆ How urgent is the issue of a waste repository and what are the schedule requirements? Does the “waste confidence” ruling increase the urgency for a waste management strategy?
- ◆ Is Yucca Mountain off the table as an option? What other locations are possible?

Key Questions



- ◆ What is the potential for interim waste storage?
- ◆ What are the lessons from Yucca Mountain?
- ◆ What are the lessons from WIPP and others?
- ◆ What lessons can be drawn from the experience of countries such as Sweden, Finland, France, Canada and others?
- ◆ What about spent fuel recycling?
- ◆ How long will it take and how much will it cost?
- ◆ What is the market opportunity for leaders in the waste management field?

Commercial Nuclear Industry



- ◆ The Blue Ribbon Commission analyzed the problem for many months and recommended:
 - Take the decision out of the political arena
 - Create an independent organization, congressionally-chartered corporation, empowered to succeed
 - Create a “consent based” site selection process
 - Create an interim, central storage plant for dry casks
 - Others

Government Nuclear Industry



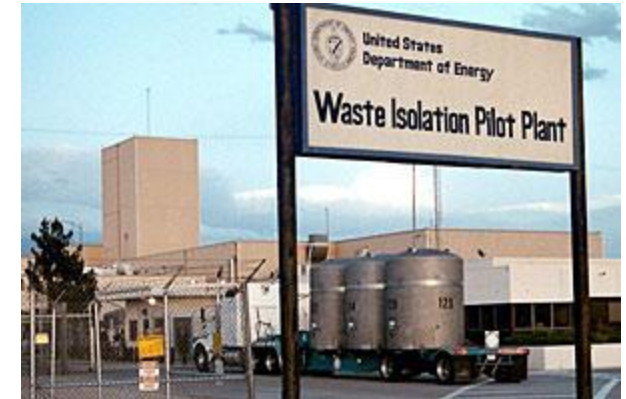
- ◆ Large quantities of plutonium and various HLW, ILW, LLW wastes housed at numerous sites. Leading sites include:
 - Hanford Reservation
 - Savannah River Site (SRS)
- ◆ The Waste Isolation Pilot Plant (WIPP) is considered a success story and is the destination for significant amounts of military/government radioactive waste
 - Focus is TRU, from research & weapons
 - Does not take HLW or spent fuel
- ◆ However, a repository is still required for disposition of some government wastes



Keys to Successful Siting of WIPP



- ◆ Recognized national need
- ◆ Clear benefit for citizens, state & local jurisdiction
- ◆ Solid local support
- ◆ Competent technical oversight by NM
- ◆ Intense and early outreach
- ◆ Rigorous QA early
- ◆ Reliable & powerful local support prior to licensing and construction is worth any cost
- ◆ Credibility is paramount



International Programs



- ◆ Most nuclear countries are planning waste repositories and some are further along in implementation than the U.S.
 - Finland
 - Sweden
 - France
 - UK
 - Switzerland
 - Ukraine (considering)



- ◆ However, no country has a functioning waste repository
- ◆ Most are targeting operational dates well beyond 2025

International Programs



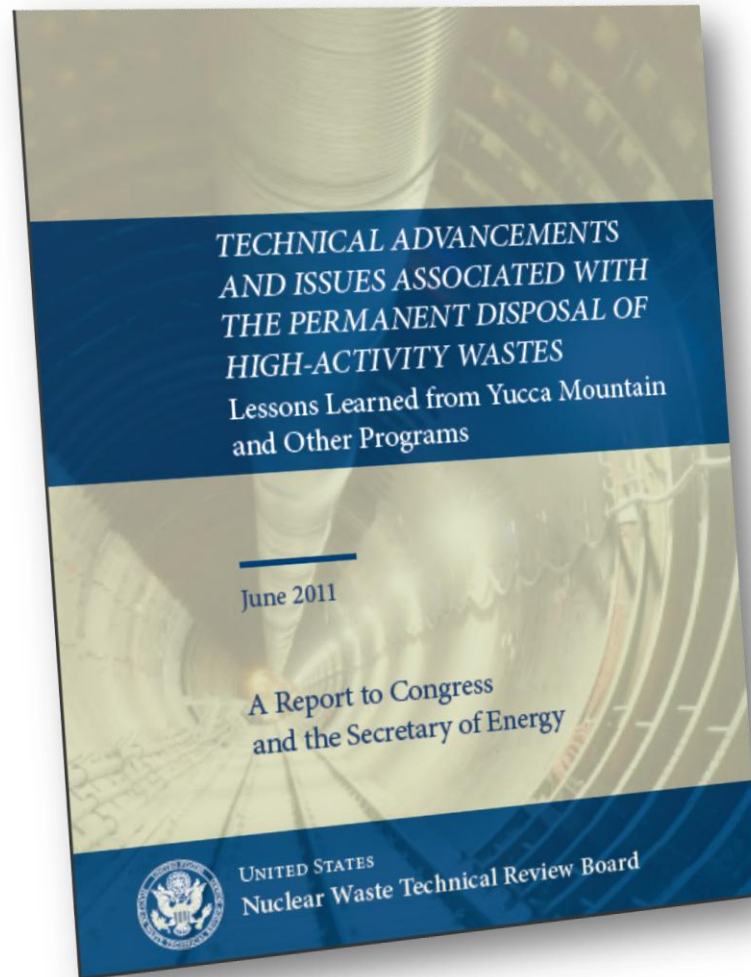
- ◆ It has been popular in Europe to site a repository using a “bottom up” siting process in which *interested* communities apply
 - Successful community must meet scientific and technical requirements
 - Gets communities on board to assure a willing host
 - Reduces risk of opposition

What About Recycling?



- ◆ Used Fuel recycling has been ongoing in the UK, France, Russia and anticipated in Japan
 - This has been touted by AREVA as a profitable business and recommended for the U.S.
 - Does reprocessing reduce the volume of waste?
 - Reprocessing has been avoided in the U.S. for decades based up proliferation fears
 - What would be the benefits?
- ◆ The UK is studying GE Hitachi’s PRISM and Advanced Candu technology for “burning” plutonium and radioactive waste
 - What is the status?
 - Should the U.S. consider these technologies?
 - Is the Astrid Project in France similar (burns actinides & reduces LC)

A Few Lessons Learned



3 Panels' Views Summarized:

1. Yucca Mtn Project Personnel
2. State & Local Governments
3. Other Countries

...and other in depth analysis

A Few Lessons



- Decisions should be made on the bases of science, economics, and public safety, not on politics
- YM experience would facilitate the characterization of another site because implementers know better what kind of questions to ask
- Future repository programs should use existing system model and fine-tune it for specific site
- Perception: local and state participation was resisted by the implementer (DOE) and comments by affected governments ignored
- Lack of state and community support helped determine the fate of YM
- State and local governments not invited to be part of NEPA process, which reduced confidence
- Benefits of repository were not adequately presented to the public
- If host state opposes site, nothing will satisfy objections until project is terminated

A Few Lessons (Continued)



- When a project (repository) is stopped, it is difficult to move ahead in the future; may take 10 years to restart
- Adopting an approach of “decide, announce, defend” can foment strong local opposition
- The “government,” not the implementer, should lead the effort to find a repository site
- Countries that recycle have many different kinds of nuclear waste
- When efforts fail, maintaining a core of competencies, data, and information produced by the program is important
- In U.S. program the implementer is a government entity, but in Sweden it is a private corporation owned by nuclear power plants
- In some countries, opposition to a repository is a way to oppose nuclear activities in general

Linton Consulting

Insights for Industry and Government



Who Is Linton Consulting?



- ◆ A professional practice providing independent facilitation, insights and advice to industry and government
- ◆ Enable: Business strategy, diversification, market development, trend analyses, informed scenarios and visioning
- ◆ Focus: Energy, Power, Nuclear
- ◆ Buyer-Seller / Peer introductions & relationship development
- ◆ Strategic View process
 - High level interactions and interviews
 - Ongoing analyses and insights
- ◆ Industry Partners provide depth: UxC, *Nuclear Energy Insider*, *InnovaNet*

What is *Strategic View*?

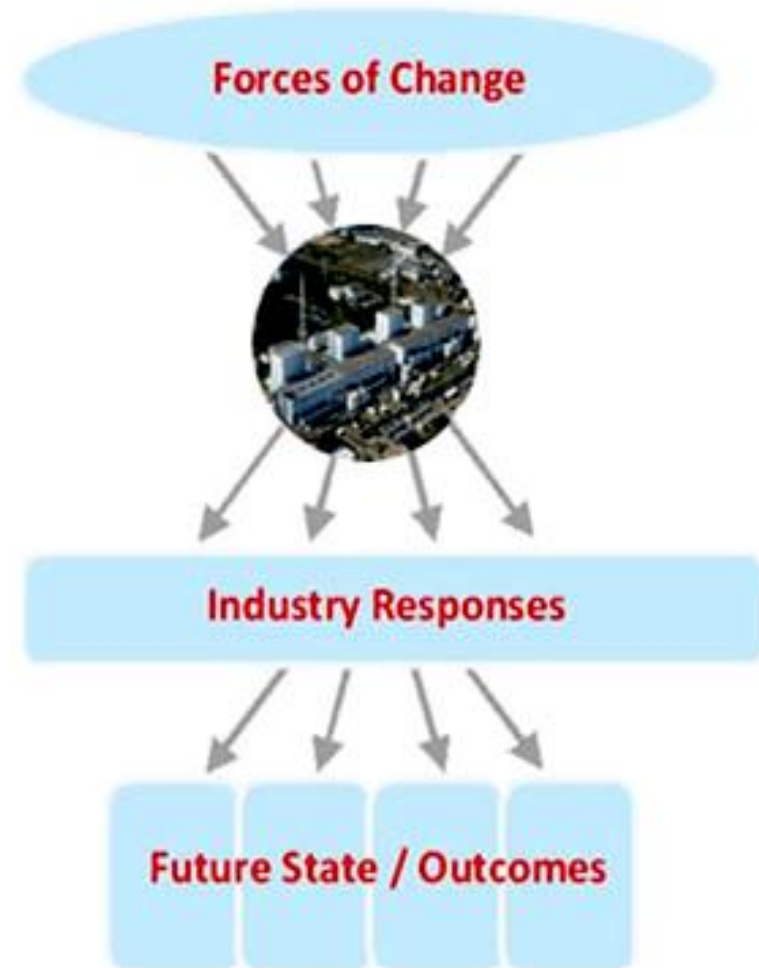


◆ Research Model Driving Organizational Change

- Used 15 years; 5 in energy
- Forces affecting the future of the energy industry
- Industry responses
- Where it is leading – the future state/outcomes

◆ Process

- Interviews with executives and thought leaders
- Research & analysis
- Executive Roundtables
- Follow up & plan integration



Executive Roundtables



◆ Common purpose

- Convene executives and thought leaders for knowledge exchange
- Expand understanding
- Share perspectives
- Confirm/challenge paradigms
- Advise leadership
- Uncover ideas and opportunities for your organization
- Explore Future – trends and challenges
- Establish practical, realistic path forward
- Drive organizational change

Executive Roundtables



◆ Rules of Engagement

- Linton introduction – experience in Roundtables, Facilitation
 - You know the topic best – we respect that
 - I have facilitation skills – please respect that
- Must maintain order: topic and schedule
- Talk to me; you may talk to others, but not lose control
- Roundtable is like fission
 - OK to get heated
 - Not OK to lose control
 - Needs a moderator / control rods



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