Introduction

• Outline
  – US experience base
  – Current experience – Zion D&D
  – Global outlook – a few thoughts

"Those who cannot remember the past are condemned to repeat it."
  - George Santayana, Spanish philosopher
EnergySolutions US Track Record

- Big Rock Point 1998 – 2005
- Yankee Rowe 2003 – 2005
- Connecticut Yankee 1999 – 2005
- Fermi 1 2007- 2012
- SMUD 2007- 2011
- Zion 2010 - 2020

Experience & lessons learned from all major reactor D&D’s for over a decade

Vertically Integrated Nuclear Services

Provide a broad range of nuclear services within a single platform that provides greater flexibility to manage risk

- Nuclear power plant operations
- Specialized nuclear services
- Design & engineering
- Applied engineering & technology
- Proprietary facilities and technology
- Spent fuel management
- Onsite waste management services
- Transportation and logistics
- Waste Processing & Disposal
- Decontamination & decommissioning
Waste Management Infrastructure – Facilitates Risk Management

- Largest waste processing capability in the US
- 2 major Disposal Facilities
- 2+ comprehensive processing facilities
- Full control of Logistics Operations

Clive Disposal
Bear Creek Operations
Barnwell Processing
Chem-Nuclear Disposal

Current Experience – Zion Nuclear Station

- Two Unit Pressurized Water Reactor (PWR) Site
  - 1080 megawatts each
- Located 40 Miles North of Chicago in Zion Illinois
- Located immediately between North and South Portions of Illinois Beach State Park
- Both Units were Licensed for Operation in 1973
- Permanently Shut Down in January 1998
- Placed in SAFSTOR Status until September 1, 2010
Zion Approach – Different by Design

- EnergySolutions acquired the Zion plant on September 1, 2010
  - 10 CFR 50 Licenses transferred from Exelon to EnergySolutions (wholly owned subsidiary)
  - NDT funds transferred to ES/ZS Trustee
- 10-Year Maximum Completion Schedule
  - 12 years earlier than Exelon’s previous schedule
  - Current plan is to finish in 8 years

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<thead>
<tr>
<th></th>
<th>Exelon’s Schedule</th>
<th>ZionSolution’s Schedule</th>
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<tbody>
<tr>
<td>D&amp;D Planning Start</td>
<td>2013</td>
<td>2010</td>
</tr>
<tr>
<td>D&amp;D Operations Start</td>
<td>~2015</td>
<td>2010</td>
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<tr>
<td>Site Restoration Complete</td>
<td>2032</td>
<td>2018 2018</td>
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Zion Approach – Different by Design

Why is the Zion plan the best model in the industry……..

- Utilities want to focus on core business of electricity generation, not Decontamination and Decommissioning (D&D)
- Transfer risk for D&D – not the same old failed contract model
- SAFSTOR is not a low risk model
  - Disposal space is finite
  - Regulatory baselines can change (Fukushima)
  - Plants continue to need managing – cost money
  - Stakeholders do not like “mothballing” the problem
- We have demonstrated that accelerated cleanup can be safely achieved at a much lower cost
- For ES it provides a long term projects order book and early waste management and disposal – a good fit with our skills and aspirations
**Major Phases of Work:**

- **Phase 1 - Spent Fuel Transfer from Fuel Pool to Dry Storage**
  - 2,226 fuel assemblies
  - 61 canisters
- **Phase 2 - License Termination (D&D)**
  - Reactor vessel removal
  - SSC removal
  - Building dismantlement
  - License termination
- **Phase 3 - Non-Rad Site Restoration**
  - Landscaping, grading, etc.

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**Preparations for Fuel Loading**

- SNF inspections, repair, and loading plans
- Crane upgrades and facility mods
- New ISFSI construction
- Storage cask construction
Zion’s First Fuel Canister In Processing

Transfer Cask Being Lowered into Spent Fuel Pool

Robotic Welding on First Fully Loaded Fuel Canister

Zion ISFSI – A Model in Action

ISFSI on 9-9-14 with 37 of 61 Dry Storage Casks in Place
Spent Fuel Loading is 100% Complete as of 8 Jan 2015!
Unit 1 and Unit 2 internals finished Dec 2014
Unit 2 Greater Than Class C Waste (GTCC) is currently being processed. First of Two GTCC TSCs is installed in its cask and at the ISFSI
Reactor vessels will be thermally cut after water is removed
Reactor Vessel Segmentation is scheduled for completion by Dec 2015
Onsite Waste Handling and Shipment

Safely and Efficiently Handling Segmented Reactor Vessel Internal Components for Future Shipment

Internal Building Preparations/Legacy Equipment Removal

<table>
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<tr>
<th>592’ Level</th>
<th>542’ Level Auxiliary Building Area – North End</th>
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<tbody>
<tr>
<td>Auxiliary Building Area</td>
<td>Main Steam Room</td>
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Before

After
Zion Project – End State

- End State Conditions Include:
  - All structures removed to 3 ft below grade
  - Lake Intake and Discharge Piping abandoned in place
  - All Class A, B & C waste disposed off site
  - Spent Fuel & GTCC in Dry Storage on ISFSI
  - ISFSI, switchyard, roads, rail & fences remain
- Land restored to allow unrestricted use of the site IAW NRC criteria with the exception of the ISFSI
- The NRC License revised for ISFSI only and transferred back to Exelon
- Land returned to Exelon for future beneficial re-use

Summary

- ZionSolutions is going well !!
  - High risk project areas close to completion
  - Opportunity for savings in traditional D&D area going forward
  - We will deliver for the value of the trust fund as agreed
- EnergySolutions is committed to the “risk transfer” model
  - Uniquely qualified and focused nuclear company
  - Vertically integrated with expertise in all areas of reactor D&D
  - Track record of success & innovation
- We are in a position to help customers optimize the path forward using Zion “real time” baseline information
Global Decommissioning Outlook

• Each reactor decommissioning and site decontamination / remediation project is a significant, long term program
  – Knew it would happen “someday,” but political, economic, and natural events drivers have accelerated the timeline in many instances
  – The long term nature of the work, along with the fact that this work is not what the utilities are in business to do, makes the programs challenging and point to a different way to do this business

Global Decommissioning Outlook

• Issues and concerns
  – Relatively little experience
  – Rapidly expanding market
  – Adequacy of decommissioning funding
  – Availability of disposal for LLW & ILW, and SNF
• Wide variation in approaches
  – Turnkey
  – Piecemeal
  – Innovative vs. structured
• No lack of market opportunities for those companies interested and willing
  – Opportunities to excel
  – Opportunities to ???