



technical services group

# ***Fukushima Daiichi Recovery How Can the U.S. Help?***

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# **U.S. Participation Year 1**

## **Organizations**

- Institute of Nuclear Power Operations (INPO)
- U.S. Department of Energy – National Labs
- U.S. Nuclear Regulatory Commission
- U.S. Companies
- U.S./Toshiba Consortium – Focus of this Presentation

## **Accomplishments**

- Recovery Roadmap
- Stabilization Support
- Accident Water Treatment
- Data Acquisition
- Spent Fuel Removal Concept

# Toshiba/U.S. Consortium

**TOSHIBA**  
Leading Innovation >>>

**B&W**

 **Westinghouse**

  
**Shaw**<sup>®</sup>

**Exelon**<sup>®</sup>

Toshiba constructed and maintains Fukushima 1 (1F) from its early stage. Maximizing the project experience, Toshiba devotes all its efforts to the 1F recovery planning.

Over 60 years experience in nuclear operations and leadership in uranium fuel cycle design, fabricating, and processing.

As a Toshiba group company, Westinghouse is experienced in construction and maintenance of nuclear power plants, and provides emergency response equipment, interim spent fuel cooling systems, and chemical decontamination devices.

Shaw is an industry leader in nuclear decommissioning, environmental restoration, and natural disaster services. Shaw is Toshiba's partner in construction of the AP1000 and ABWR plants.

Exelon Corporation is one of the nation's largest electric companies. Exelon Generation has one of the industry's largest portfolios of electricity generation capacity. It is the largest owner/operator of nuclear plants in the United States.

# Application of Three Mile Island Lessons



- Similarities and differences
- Selective fission product retention
- Role of data acquisition in recovery planning
- Recovery organization and sequence
- Defueling tooling – Core Bore Machine
- Debris packaging and long-term storage

# Water Management/Containment Leakage\*

- Locate and stop leaks – focus on Unit 2 containment vessel
- Upgrade water treatment system and piping for long term operation
- Locate and seal leak paths between buildings
- Eliminate communication with groundwater and prevent groundwater transport of contamination

\* Under discussion

# Spent Fuel Removal/Core Material

- Many used and new fuel assemblies in Unit 1-4 spent fuel pools
- Units 1, 3 and 4 reactor buildings severely damaged
- Units 1, 2 and 3 cores partially melted and relocated
- Japanese government directed TEPCO to begin removing fuel within two years; initiate removal of damaged core materials within 10 years
- Idaho National Laboratory evaluating remote core location techniques, focusing on low volatility fission products
- Fuel removal equipment being designed now

# Waste Management\*

- Process modeling and optimization
- Characterization
- Processing technology
  - Decontamination
  - Volume reduction
  - Stabilization
- Storage
- Disposal



\*Developing proposal.

# Challenges Ahead

- Characterize, treat, volume reduce, store and dispose of waste – large volumes, no off-site shipments, must segregate transuranic contamination
- Clear debris from fuel pools and remove stored fuel assemblies
  - clarification of fuel condition
- Seal containment and reactor buildings to allow flooding of core cavity
- Locate, remove, process and store core material