

AREVA Inc.

**U.S. Technology Solutions for
the Fukushima Site and Region**

David C. Jones
Senior Vice President
Back End Business Group

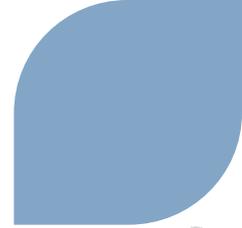
AREVA Inc.

April 9th, 2015



AREVA Inc. Locations

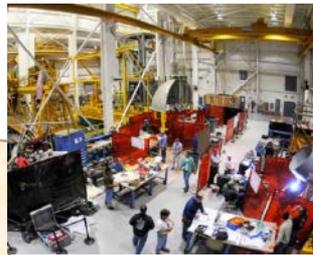
Across the U.S. with over 3,800 Employees



Canberra
Meriden, CT



AREVA TN
Columbia, MD



Operational Center of Excellence for Nuclear Products and Services
Lynchburg, VA



AREVA Inc. Headquarters
Charlotte, NC



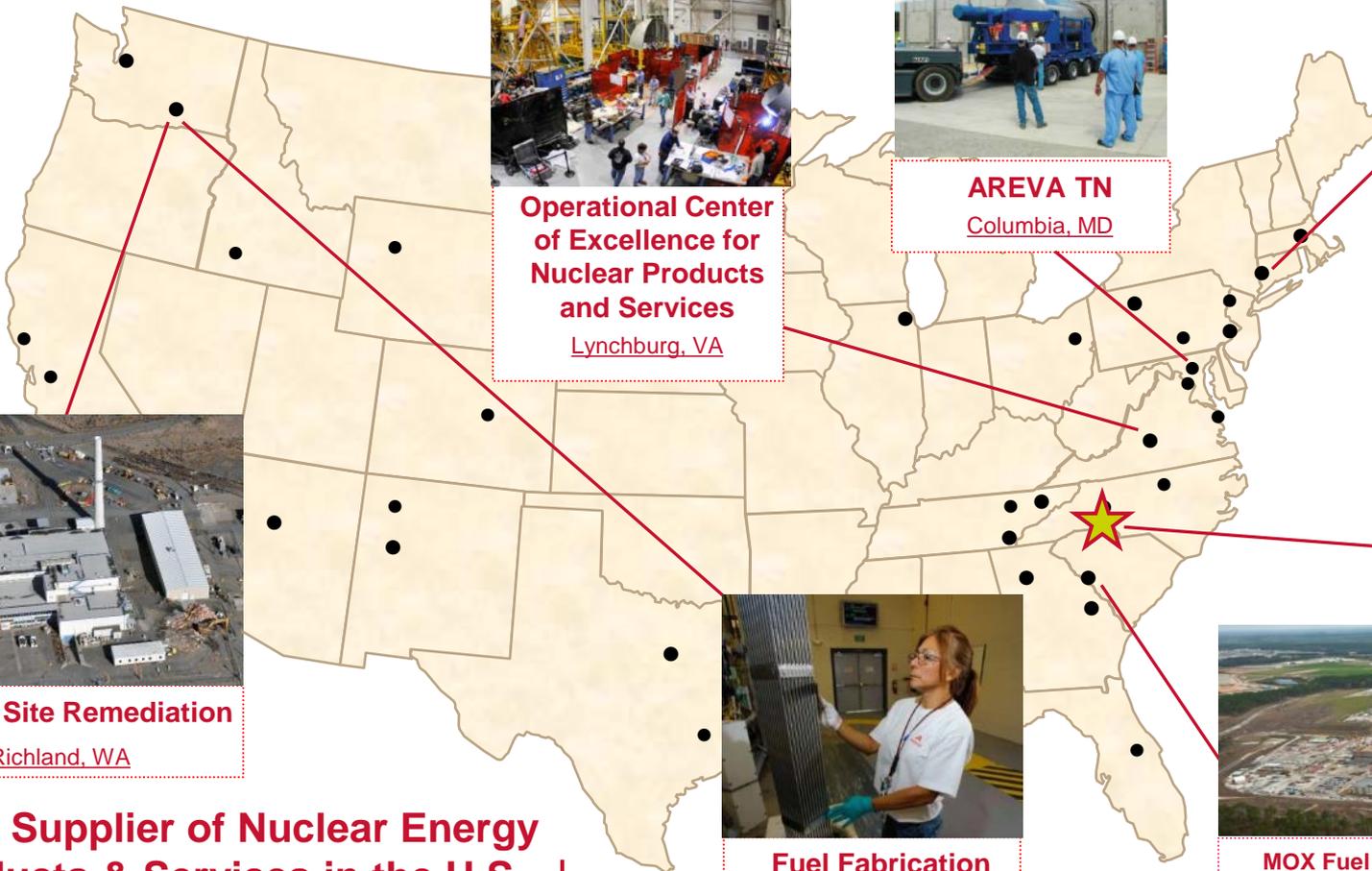
Hanford Site Remediation
Richland, WA



Fuel Fabrication
Richland, WA



MOX Fuel Fabrication Facility
Aiken, SC



No. 1 Supplier of Nuclear Energy Products & Services in the U.S.



Back End BG Organization in the US

AREVA Inc.
Back End
Business
Group



Comm.
Nuclear
D&D



AREVA
TN



AREVA
Federal
Services

Commercial Plant D&D

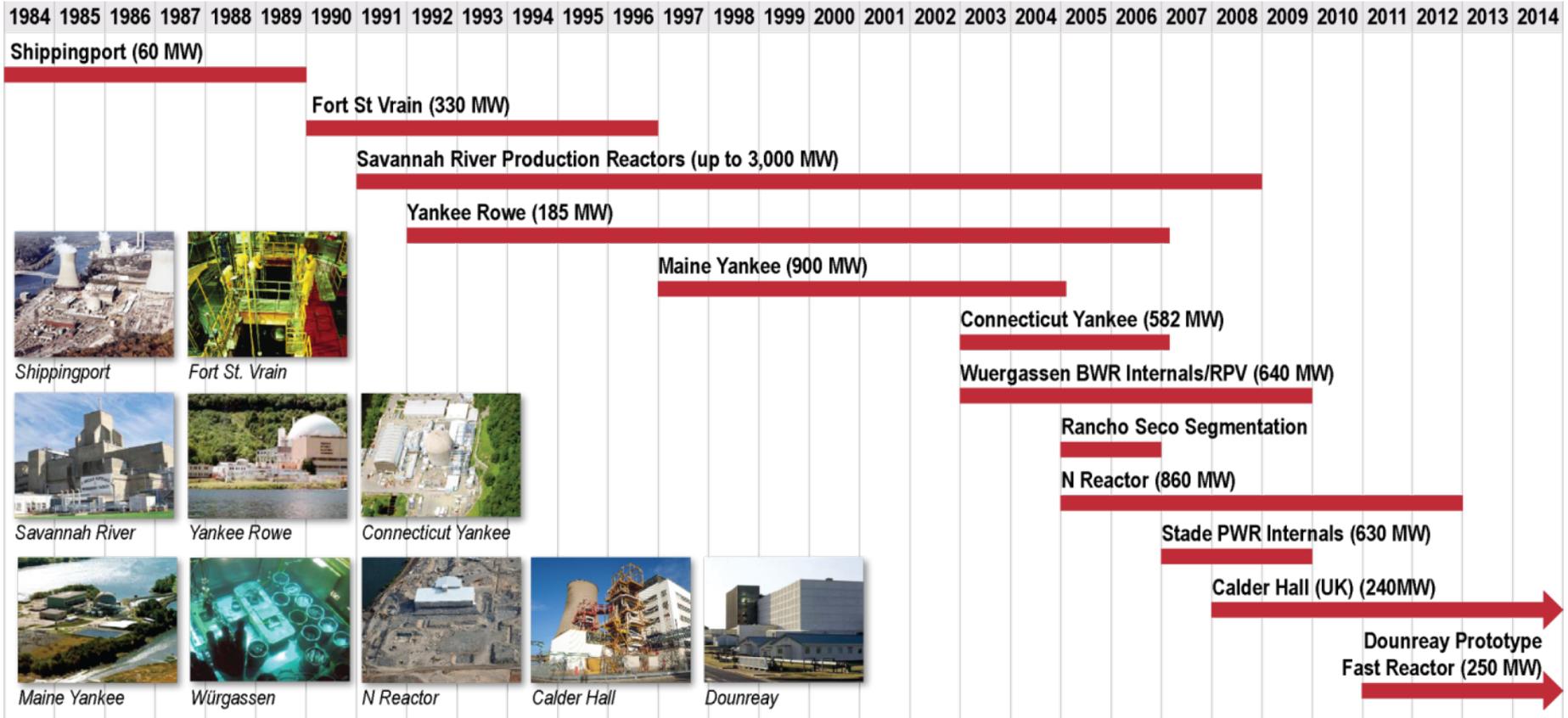
AREVA and its Team

- ▶ **AREVA combines its expertise with that of other American companies to form a strong team to cover all aspects of commercial nuclear plant decommissioning**
 - ◆ **Decontamination, Removal, Packaging, Transport, and Disposal of the NSSS, Plant Systems, Buildings, and Subsurface Site Materials**
 - ◆ **D&D Planning and Cost Estimation**
 - ◆ **SNF Management and Radwaste Disposal**
 - ◆ **Site Restoration**



Commercial Plant D&D

AREVA Team Experience of 30 Years



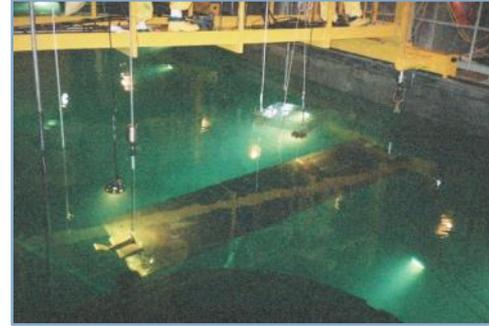
» **AREVA and its Partners have a Combined Total of More Than 150 Years of Reactor Decommissioning Experience**

Commercial Plant D&D

	Yankee Rowe	Millstone-1	Conn Yankee	Maine Yankee	Rancho Seco	Kewaunee	CP-5 (Argonne National Lab)	UTR-10 (Iowa State Univ.)	Omega West
Project Management	✓	✓	✓	✓	✓		✓	✓	✓
Engineering	✓	✓	✓	✓	✓		✓	✓	✓
Decommissioning Cost Estimate	✓	✓	✓	✓			✓	✓	✓
PSDAR Preparation	✓	✓	✓	✓					
Decommissioning Planning	✓	✓	✓	✓			✓	✓	✓
Used Fuel Dry Storage System					✓	✓			
ISFSI Design and Construction	✓		✓	✓	✓	✓			
Pool-to-Pad Service	✓		✓	✓	✓	✓			
Primary System Decontamination	✓		✓	✓					
Decommissioning General Contractor	✓	✓	✓	✓			✓	✓	✓
Management of site HP, Safety, Security and QA Programs	✓	✓	✓	✓			✓	✓	✓
Dismantlement and Disposal of Plant Components	✓	✓	✓	✓	✓		✓	✓	✓
Demolition	✓	✓	✓	✓			✓	✓	✓
Waste Management – Hazardous, Mixed and Radioactive	✓	✓	✓	✓	✓		✓	✓	✓
RPV/Internals Segmentation and Packaging	✓	✓	✓	✓	✓		✓	✓	✓
GTCC Waste Packaging for Storage	✓	✓	✓	✓	✓				
Final Survey and Remediation	✓		✓	✓			✓	✓	✓
Site License Modification	✓		✓	✓			✓	✓	✓
Post-Release Monitoring & Security	✓		✓	✓					
Used Fuel Inspection	✓		✓	✓					
Used Fuel Repairs	✓		✓	✓					

» ***Demonstrated Capabilities and Experience in All Aspects of Nuclear Reactor Decommissioning***

Commercial Plant D&D



**Commercial Reactors:
Rancho Seco & Millstone Unit 1**

Waste Management

Packaging for Storage and Transport

▶ TN RAM Cask Plus

- ◆ Combines full scope of service and equipment for non-fuel irradiated hardware for shipment off-site
- ◆ Volume reduction techniques, such as flattening control blades
- ◆ Expertise and experience to ensure safety, low dose, and efficient removal



▶ NUHOWS Radwaste Canisters

- ◆ Uses horizontal concrete modules for on-site storage with minimal dose and maximum heat rejection
- ◆ Designed for transport in licensed transportation cask
- ◆ Designed for packing control blades, jet pumps, and other irradiated hardware

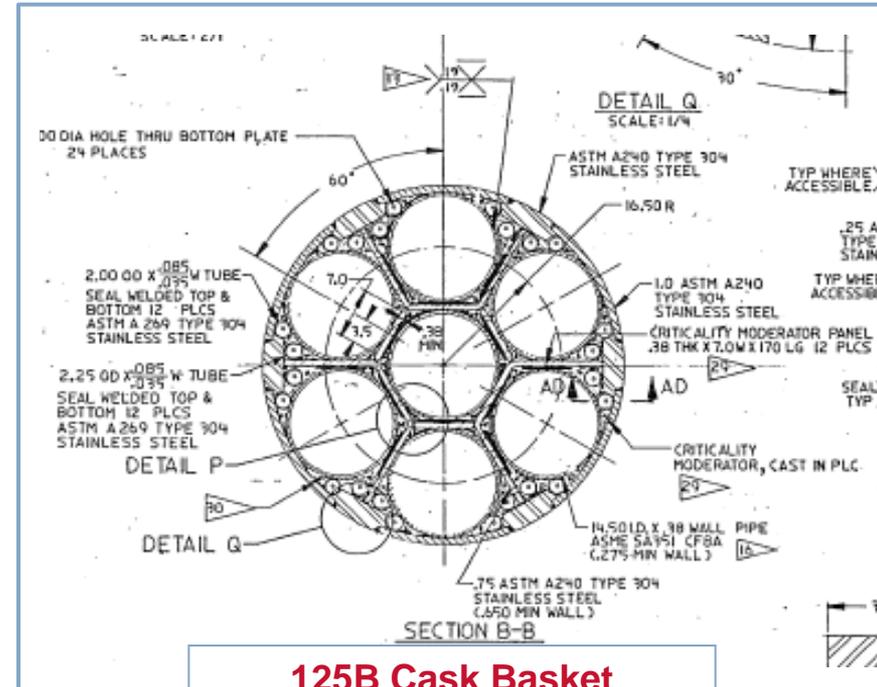
Waste Management

Damaged Fuel Package for Three Mile Island - 2



**TMI-2 Final Fuel Debris Shipment
April 15, 1990**

125B - TMI-2 Fuel Debris Shipping Package



**125B Cask Basket
Canister Transportation**

» **AREVA Inc has the needed experience and technology for high, medium, and low level wastes**

Turn low/medium level radwaste solids and liquids into homogeneous cemented product

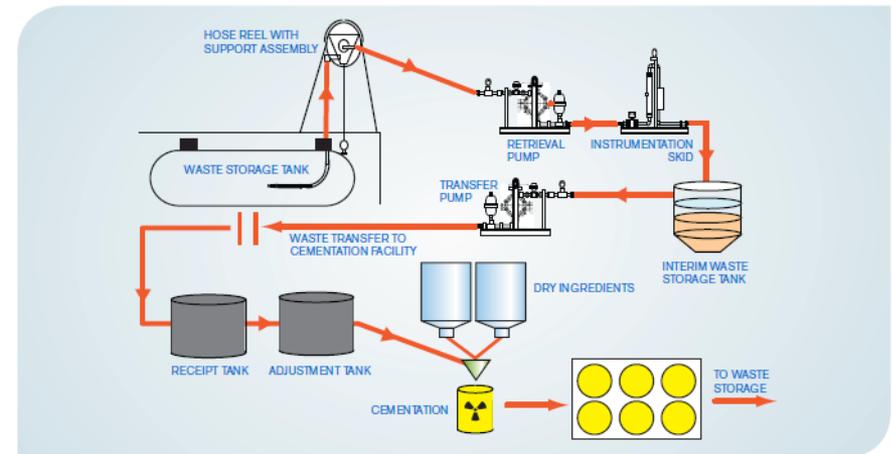
Waste Management Cement Solidification

▶ Batch Mixer

- ◆ Customizable system for mobility needs and operating capacity
- ◆ High performance and easy operation
- ◆ Low maintenance and operating costs using commercially available components
- ◆ Well suited for evaporative concentrates, spent ion exchange resins, and sludges

▶ Continuous Flow

- ◆ High throughput system, up to 480 liters/hour from a single line
- ◆ Enhance safety design features
- ◆ Flexibility of waste container geometry and greater volume use
- ◆ Adjustable liquid waste and binding agent flow and formulation



➤ **Flexible and proven technology for waste solidification**

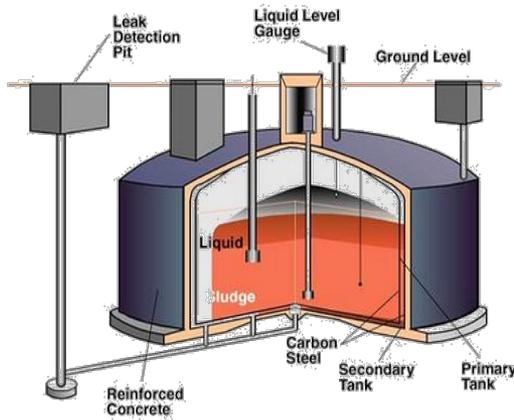
Building 324 Contaminated Soil

Hanford Site Remediation

- ▶ **Building 324 is one of the most contaminated sites on the Hanford complex**
 - ◆ During D&D preparation, the soil below the facility was discovered to be contaminated from radioactive materials that leaked out of a hot cell
 - ◆ Estimates put the amount of radioactive material at ~100,000 Curies [4×10^{15} Bq]
- ▶ **AREVA Federal Services is currently executing a project to:**
 - ◆ Design a remote system to dig into the floor of the leaking hot cell, remove soil, and transfer all material to adjacent hot cell for immobilization
 - ◆ Build and test with full-scale mockups



» ***Innovative experience in high contamination remediation***



AY-102 Tank Recovery

Hanford Site Remediation

- ▶ **4000 m³ Double Shell Tank declared leaking from the primary tank in 2012**
 - ◆ Contains 572 m³ of Cs/Sr sludge waste with high concentrations of sodium, aluminum, and iron oxides and hydroxides, topped with 3000 m³ of supernatant
 - ◆ Heat load from radioactive decay: ~30 kW
- ▶ **Mobilizing the solids using sluicing and supernatant, transfer slurry using a pump**
- ▶ **AREVA Federal Services scope:**
 - ◆ Project Management and Integration
 - ◆ Engineering and Construction Management
 - ◆ Lead Project Engineer, Electrical/I&C and Mechanical scope



Extended Reach Sluicer



Annulus Leak Site

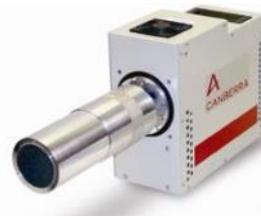


Slurry Pump

» ***Solutions and Execution for Tank Operation Challenges***

Canberra: World's Largest Maker of High Quality Nuclear Instrumentation

- ▶ Instruments for radiation monitoring and spectroscopy
- ▶ Supplier of Detectors, Electronics, Software, and Complete Systems
- ▶ More than 30 year presence in Japan
- ▶ Offices in Tokyo, Fukushima, and Osaka for customization, installations, training, and support
- ▶ Fukushima project examples:
 - ◆ Whole Body Counters for adults and babies
 - ◆ Food monitoring systems for the laboratory
 - ◆ Food monitoring systems for bags of rice, boxes of gaki, and feed for cattle
 - ◆ Contaminated soil measurements
 - ◆ On-line Sr90 measurement system for water cleanup operations
 - ◆ Continuous Sr90, Cs134/137, and H3 water measurement systems



Thank You

大変お世話になり
ありがとうございました

