

Decommissioning San Onofre

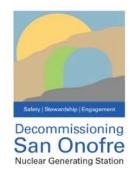
Nuclear Generating Station

Ory Cask Storage of Used Nuclear Fuel September 15, 2016

Tom Palmisano

Vice President Decommissioning & Chief Nuclear Officer





DRY CASK STORAGE INITIATIVES





Defense In Depth

Definition

- Philosophy to protect public health and safety
- Multiple, independent, and reinforcing layers of defense
 - Design
 - Fabrication
 - Long-term monitoring
 - Remediation





Focus of Defense in Depth

Containing radioactive materials

Long-term integrity of canisters



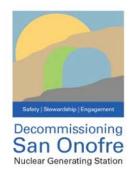


Multiple Layers of Defense

Dry Storage System Principal Functions Analysis

Principal Function	Prevention	Detection
Maintaining sub-criticality	Robust Basket designCanister integrity	Fabrication inspectionsMaterial selectionCanister inspection
Preventing radiation exposure from exceeding regulatory limits	Robust designCanister integrityShielding via UMAX structure	Canister inspectionRadiation surveys
Preventing release of radioactive materials from exceeding regulatory limits	Robust designCanister integrityUMAX structure	Canister inspectionRadiation surveys



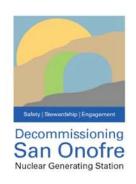


Improvements

Meeting & Exceeding Regulatory Requirements

- Design
- Fabrication
- Long-term monitoring
- Remediation





Canister Design Improvements

- SCE / Holtec Initiatives:
 - Bolstered seismic criteria
 - Upgraded 316L material
 - Selected 5/8" thickness
 - Advanced basket composite for durability
 - Canning damaged fuel assemblies
 - Removable test coupons used for periodic checks
 - Spare canister for inspection tool development
 - Spare cavity enclosure container for future use

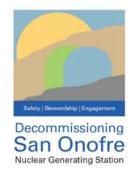




Canister Fabrication Improvements

- SCE / Holtec Initiatives:
 - Enhanced fabrication methods to improve canister life
 - Improved welding techniques
 - Improved plate rolling methods
 - Improved weld testing methods during fabrication
 - Expanded area of "weld penetrant" testing
 - Improved visual inspection methods





DEVELOPMENT OF INSPECTION METHODS





Aging Management Program NRC Requirements

- 1. Scope of program
- 2. Preventive actions
- 3. Parameters monitored or inspected
- 4. Detection of aging effects
- 5. Monitoring and trending
- 6. Acceptance criteria
- 7. Corrective actions
- 8. Confirmation process
- 9. Administrative controls
- 10. Operating experience

Per NUREG-1927





Aging Management Programs (AMPs)

Two San Onofre AMPs in Development

- AREVA: Development of AMP is a condition of license renewal for existing NUHOMS system
 - Renewal of CoC for sister NUHOMS system provides preview of likely AMP for San Onofre NUHOMS system
 - License for AREVA system at San Onofre expires 2023
- Holtec: Maintenance & Inspection program for new Holtec system required by 2022
 - Coastal Commission commitment



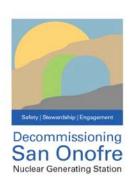


Industry Initiatives

SCE Participation

- NEI / NRC / DOE meetings
- EPRI Sub-Committee on NDE Methods
- EPRI Sub-Committee on CISCC Analysis
- ASME Sub-Committee on Rules for Inspection
- EPRI Sub-Committee on Repair Methods
- Holtec Users Group
- AREVA Users Group





Development of Inspection Methods

- EPRI tests at Palo Verde, Maine Yankee, McGuire
 - Robot navigates canister axially and circumferentially
 - Camera provides view of canister surface, capability to detect precursors to stress corrosion cracking
 - Tested robot-deployed eddy current array and electromagnetic-acoustic transducer probes
 - First application on loaded canister planned for 2018
- Cask vendors developing inspection equipment to complement EPRI efforts





Inspection MethodsRobotics Field Testing

Courtesy of
Palo Verde
Nuclear Generating Station

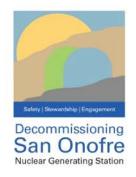




Development of Remediation Methods

- Repair mechanisms
 - Degradation mechanisms
 - Analytical methods of crack growth rates, flaw evaluation
 - Remote tool delivery
 - Repair methods
 - Coordination of DOE research
- Housing canister with a larger canister
 - Evaluating option





MONITORING & SECURITY





ISFSI Monitoring & Security

- Operations
- Maintenance
- Radiological Environmental Program
- Radiation Protection
- Security

