

Panel 56: New Nuclear Power Plant - Radioactive Waste Systems and Design

2008 Waste Management Symposium

Phoenix, Arizona

Panel Co-Chairs:

Jay Maisler, ENERCON Services, Inc.

Sean Bushart, Electric Power Research Institute

Nuclear Power Renaissance

- Power Generation to Meet Energy Demand
 - Nuclear Plants Produce 20% of U.S. Electricity
 - DOE Estimates Annual Demand to Increase by 1.8% per Year Through 2030
 - Large Base Load Capacity Needed
 - Coal
 - Nuclear
- Energy Policy Act of 2005
 - Production Tax Credits
 - Loan Guarantees and Risk Protection
 - Extends Price-Anderson Act Insurance Framework
 - Nuclear Energy Research and Development

Nuclear Power Renaissance

- 6 Applications Received
- 1 Partial Application Received

Company	Design Type	Site	State
Duke	AP1000	William S. Lee (2 units)	SC
NuStart Energy	AP1000	Bellefonte (2 units)	AL
Dominion	ESBWR	North Anna (1 unit)	VA
NRG Energy	ABWR	South Texas Project (2 units)	TX
Progress	AP1000	Shearon Harris (2 units)	NC
Unistar	U.S. EPR	Calvert Cliffs (1 unit)	MD
Entergy	ESBWR	Grand Gulf (1 unit)	MS

Licensing Nuclear Power Plants

- Current Fleet of Nuclear Plants
 - Most Were Licensed in the 1960s and 1970s
 - Two-Step Licensing Process:
 - Construction Permit Based on Preliminary Design
 - Safety Issues Not Fully Resolved Until the Plant Was Essentially Complete
 - Public Did Not Have Details on Design Until Construction Was Nearly Complete
 - Operating License Issued When Construction (Design) Was Complete

Licensing Nuclear Power Plants

■ New Licensing Process

■ Moves Licensing and Safety Issues to the Beginning of the Process:

- Approval of Standard Designs
- Early Site Permits
- Combined Construction Permits and Operating Licenses
- Greater Opportunity for Public Involvement Through *ITAAC*

■ Benefits of Standardization

- Reduce Construction and Operating Costs
- Lead to Greater Efficiencies and Simplicity in Nuclear Plant Operations, Such as Maintenance, Training, Spare Parts Procurement
- Stability and Certainty in Licensing Process

Design Certification

- Provides Reactor Designers Advanced NRC Approval of Standard Plant Design
- Four Advanced-Plant Designs Certified
 - General Electric Advance Boiling Water Reactor
 - Westinghouse AP1000
 - Westinghouse AP600
 - Combustion Engineering System 80
- Three Designs Under Review
 - General Electric ESBWR
 - AREVA U.S. EPR
 - Mitsubishi US-Advance Pressurized Water Reactor

Radioactive Waste Systems

- Design Control Document (Tier 2, Chapter 11)
 - Source Terms
 - Liquid Waste Management System
 - Gaseous Waste Management System
 - Solid Waste Management System
 - Process Effluent Radiation Monitoring and Sampling Systems
- Final Safety Analysis Report (Chapter 11)
- Combined License Application Approach
 - NEI Templates for Process Control Program and Offsite Dose Calculation Manual

Panel Discussion

- Sean Bushart, Electric Power Research Institute
 - Approach to Radioactive Waste Processing
- Dale McCullough, GE - Hitachi
 - Advanced Boiling Water Reactor
 - ESBWR
- Tim Meneely, Westinghouse
 - AP1000
- Richard Frank, AREVA
 - U.S. EPR