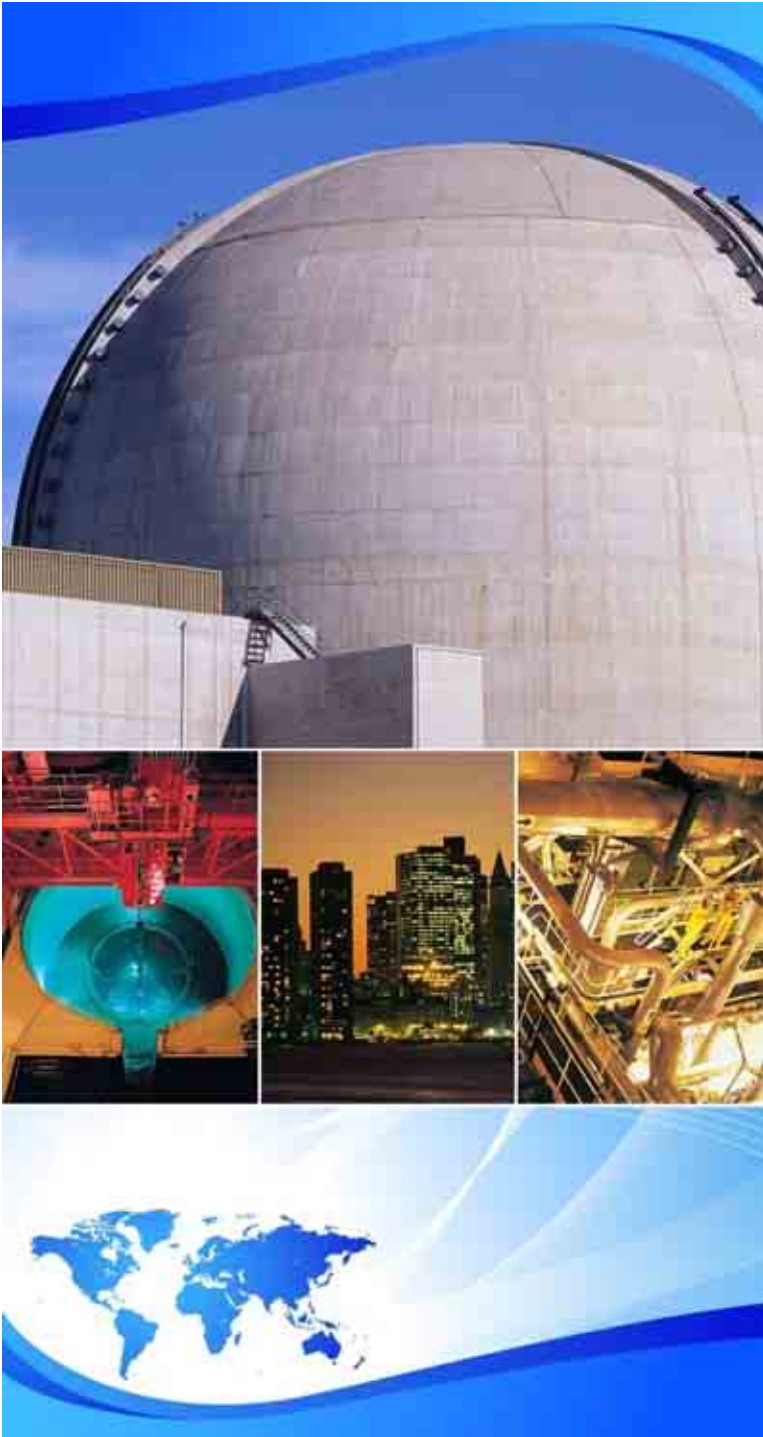




Radwaste Processing for Advanced Nuclear Plants

WM '09
March 4, 2009
Karen Kim
Sean Bushart



EPRI LLW Advanced Nuclear Plants Activities

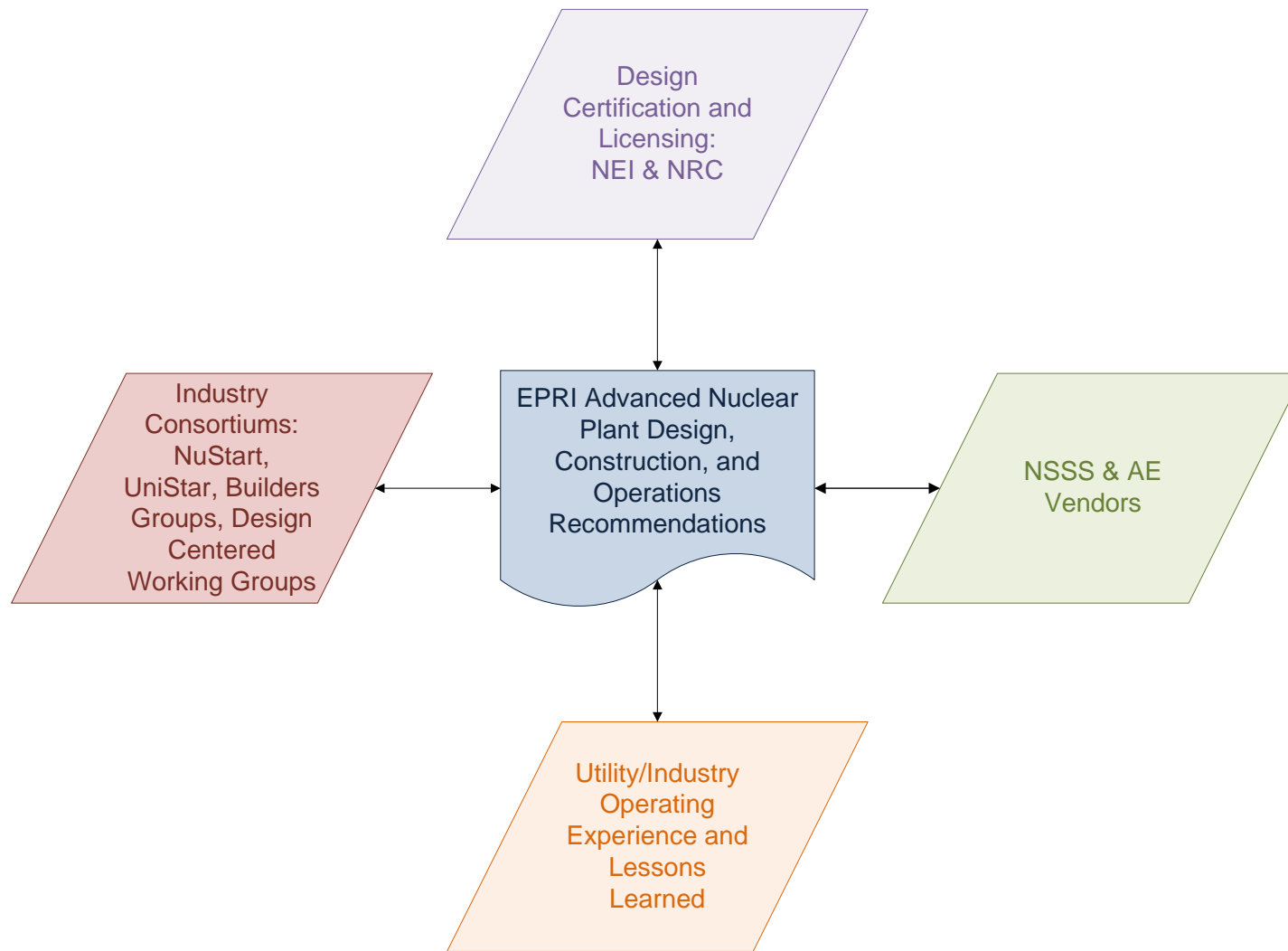
Objectives

- Implement operating experience, lessons learned, and advanced technologies in the design, construction, and operation of new NPPs
- Liquid processing strategy flexibility and solid waste minimization

Benefits

- Improved operations
- Dose exposure reduction
- Waste volume reduction
- Environmental protection
- Cost savings

EPRI Advanced Plant Interactions



EPRI Radwaste Committee Participants

- Ameren UE
- AREVA, GE, Westinghouse
- Arizona Public Service Company
- Constellation Nuclear Services, Inc
- Detroit Edison
- Dominion Resources Services, Inc.
- Duke Energy Corporation
- Electricite de France (EDF)
- Entergy
- Exelon
- FENOC
- Florida Power & Light Company
- INPO
- Nuclear Management Company
- NEI
- Ontario Power Generation
- Pacific Gas & Electric Company
- Progress Energy
- South Carolina Electric & Gas
- Southern California Edison
- Southern Nuclear Operating Company
- STP Nuclear Operating Company
- Tennessee Valley Authority
- TXU Electric
- Wolf Creek Nuclear Operating Company

EPRI Advanced Nuclear Plants Reports Related to LLW Management

- **Westinghouse AP1000:**

- Review of Westinghouse AP1000 LLW Management Program (TR-1008016, 2003).
- AP 1000 Radioactive Waste Management – Utility Position Report (TR-1008129 , 2004)
- Mobile Processing and Treatment Systems (2005)

- **GE ESBWR:**

- Technical Support for GE ESBWR Radwaste System Design (TR-1013503, Nov. 2006 Blue Chip Deliverable)

Study Results Captured in EPRI Utility Requirements Document Chapter 12: Radwaste Management – **Completed Jan. 2007**

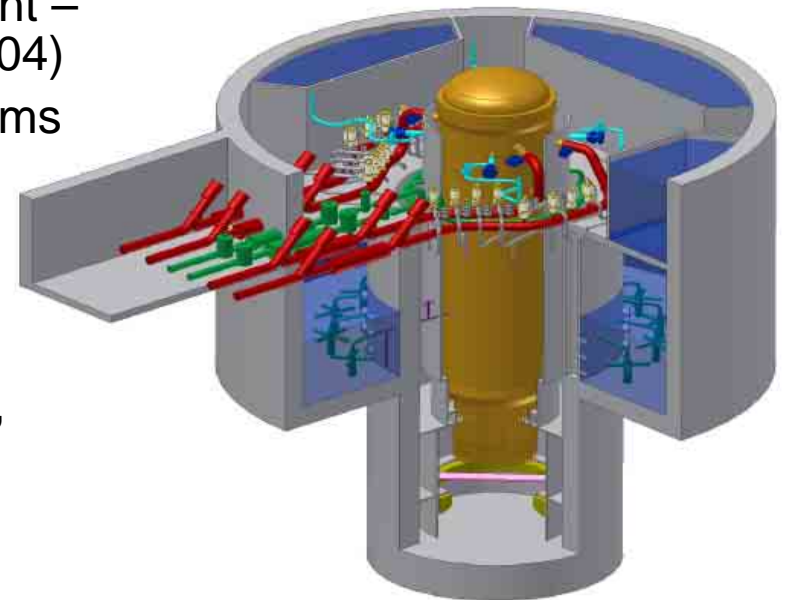


Image: GE ESBWR

Key Radwaste Recommendations for ANP Designs

1. Effluents and Site Compatibility
2. Radwaste System Processing and Storage Capacity
3. Staff Optimization
4. System Flexibility: Mobile Processing Systems
5. Segregation of Waste Streams and Waste Reduction...

...To support efficient and cost effective waste processing over the 60+ years life of the plant.

Access the EPRI URD Online: <http://urd.epri.com>

Volume III, Chapter 12: Radwaste Management (Rev. 9)

Key Radwaste Recommendations for ANP Designs

1) Effluents and Site Compatibility

- **Recommendation:** Plants shall be designed to support, but not dictate, 100% recycle of processed liquids
- **Potential System Upgrades:**
 - Hold up and monitoring tank capacity
 - Permanent piping and related components
 - Operational Strategies
- **Rationale:**
 - Plant must be suitable for most available sites in the U.S.
 - i.e. discharge limitations due to availability of cooling water source or proximity to groundwater aquifers
 - Reduce radwaste effluents as part of “Good neighbor Policy”

Key Radwaste Recommendations for ANP Designs

2) Staff Optimization and Operational Flexibility

- **Recommendation:** Radwaste systems should be designed to support 5 days/8 hours a day, single shift staffing for routine operations
- **Potential System Upgrades:**
 - Audio and visual remote monitoring equipment
 - Remote equipment for process control and monitoring
 - Increased system capacity and margins
 - Increase input collection tank and sample tank capacities
- **Rationale:**
 - Major savings in labor costs over the life of the plant
 - Support multiple unit operation and outages (planned, unplanned, forced.)

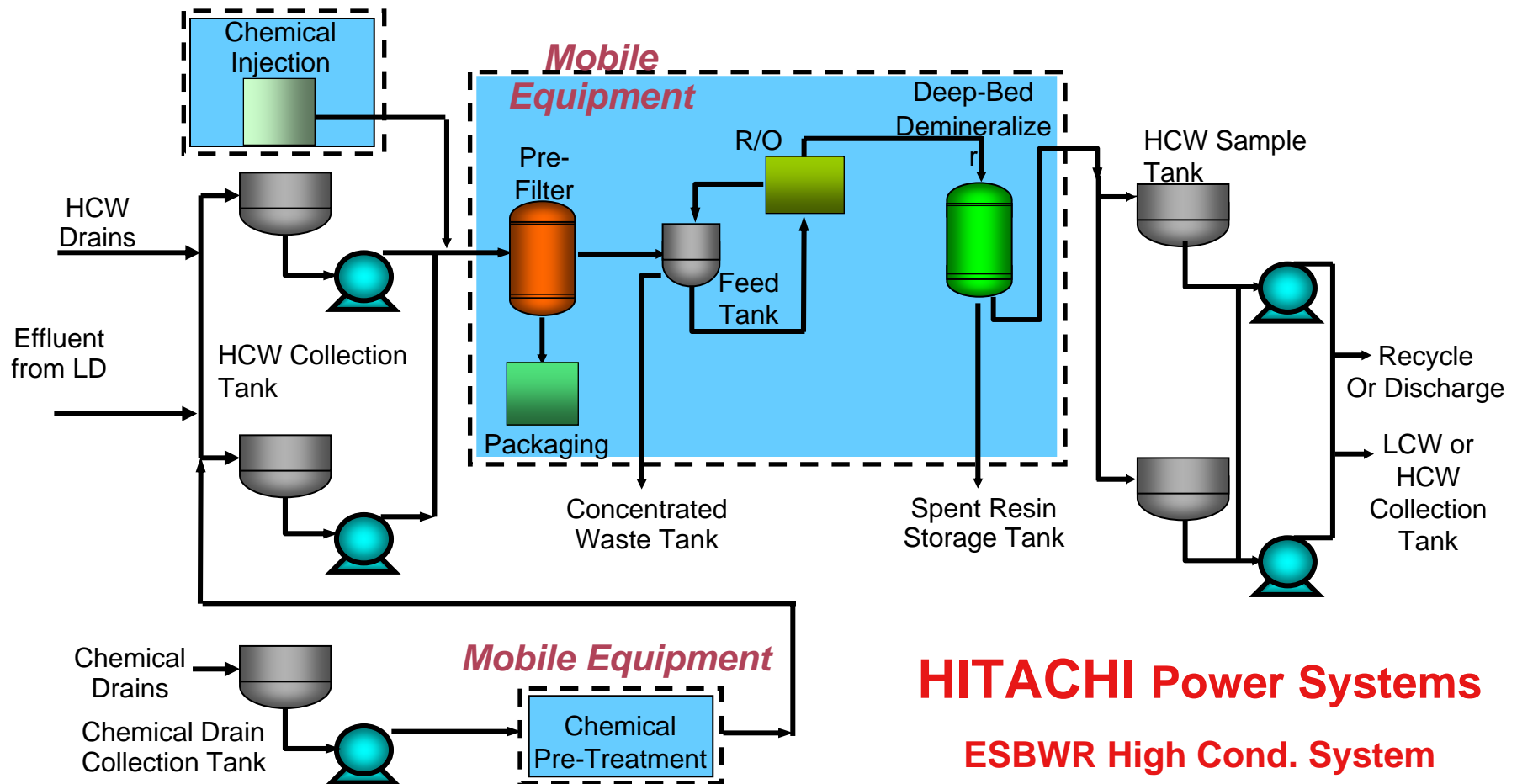
Key Radwaste Recommendations for ANP Designs

3) System Flexibility: Mobile Processing Systems

- **Recommendation:** Radwaste Processing System will be composed of mobile/skid Mounted components
- **Potential System Upgrades:**
 - Permanently installed collection and distribution systems including: tanks, pumps, piping, instrumentation, and utilities.
 - Permanent systems shall be designed for easy removal and replacement.
- **Rationale:**
 - Facilitate the maintenance and upgrade of systems with respect to:
 - Advanced technologies for radwaste processing
 - Changing operating challenges
 - New processing strategies



Example of Waste System using EPRI Design Input



HITACHI Power Systems
ESBWR High Cond. System

Path Forward – Future Projects

