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Regulatory Change

• New facility applicants after 8/20/1997
• Describe how design and operations will, to the extent practicable
  – Minimize contamination of the facility
  – Minimize contamination of the environment
  – Facilitate decommissioning
  – Minimize the generation of radioactive waste
Supporting Activities

Rulemaking on Legacy Sites
September 21, 2007

Guidance for New Facilities

Tech Basis Development

Industry Initiatives
License Termination Rule

- 10 CFR 20, Subpart E
- Establishes requirements for termination of an NRC license
- Criteria for restricted & unrestricted release
- For all new facilities – amendments likely
- Language extends applicability to design and operation
Contamination of Facility - General

• Structures, components, operations
• Dynamic inspection & maintenance
• Procedures for early detection & recovery
• Isolate key systems and structures
• Clean-up facilitation / repair access
Contamination of Facility - Specific

- Separate piping for “clean” from “dirty”
- Avoid replacing—match design life to facility
- Avoid pressurized liquid waste lines
- Provide drains - collection and processing
- Reusable components
- Avoid traps / dead spaces in components
- Avoid stagnant legs / provide drains
Contamination of Facility – cont’d

- Optimize containment during transfer
- Buried systems / monitor or verify containment
- Radiation-damage-resistant-materials in high radiation areas
- Cleanable surfaces where applicable
- Separate clean from contaminated drains
- Design for removal of large components
Contamination of Environment - General

• Double boundaries to environment
• Capable of inspection, monitoring, repair
• Subject to periodic inspection & verification of integrity
• System and environmental monitoring
• Early identification, containment, correction
Environmental Contamination - Specific

- Characterize site / consider feasibility of mitigation / design excavation and backfill for retention and extraction / protect integrity
- Understand / model ground-water system (CSM)
- Avoid contact with permeable confined layers
- Establish background / avoid collateral leakage
- Identify potential contamination pathways
- Verify and assess changes due to construction
Environmental Contamination - Specific

- Establish phased approach to monitoring: confirm, detect, extract (sentinel stations)
- Phased implies utilize as needed
Environmental Contamination – cont’d

- Tanks, pools, transfer lines corrosion resistant, leak tight – detect & correct
- Design to detect, contain, remove
- Detection sensitivity consistent with REMP
- Minimize embedded pipes consistent with ALARA (complicate decommissioning)
- No bypasses of waste treatment systems
Environmental Contamination – cont’d

• Line sumps and retention ponds / monitor overflow / grout fractures
• Avoid underground piping (use chases) – provide for inspection to verify integrity
• Eliminate floor drains where possible
• Design seals for periodic maintenance and visual inspection
• Berms by all doors to outside
Environmental Contamination – cont’d

- Seal wall penetrations of buildings containing radioactive material
- QA program for grouted seams, joints, fissures
- Clear separation between containment and spent fuel pool
- Design GW levels below waste systems
- Monitor for clogs / design for flushing
Environmental Contamination – cont’d

- Use performance based materials designs to mitigate cracking, adverse chemical reactions and other concrete degradation mechanisms
- Design to facilitate monitoring
- Confirm, retain, find, remove, repair
Environmental Contamination - Specific

• Create response plan to detection / monitoring, evaluation, remediation

• Plan specific to SCM
Facilitate Decommissioning - General

• Develop clear history of plant operations
  – Maintain complete plant records
  – Establish program to document all operational events involving radiological contamination or clean-up
Facilitate Decommissioning - Specific

• Videotape as built and equipped areas of high radiation fields before operation
• Consider ease of remote access (robots) for inspection, maintenance, surveys, sampling
• Accurately locate & document all buried components
• Anticipate decommissioning needs / plan
Facilitate Decommissioning – cont’d

- Plan to upgrade areas not originally intended for radiological work if needed
- Minimize replacement of contaminated components; provide for decontamination
- Remove all field-run piping used during construction
- Dispose construction debris off site before operation
- Design for removal of equipment
Minimization of Waste - General

• Develop life cycle plan for each waste stream to minimize collective dose and volume
• Plan to train workers to detect leakage and execute containment / clean-up
• Plan to ship waste off site promptly
• Plan for on site decontamination and storage facilities
Minimization of Waste - Specific

- Stay current on volume reduction techniques and systematically implement
- Consider trade-offs between continuous pours and modular construction as a waste reduction / leak prevention balance
Look Forward

- Regulatory Guide is under development for implementation of 10 CFR 20.1406.
- Many of the issues discussed in this talk will be addressed in the Guide.
- Look for the Federal Register Notice.