Implementation of 10 CFR 20.1406 – Life Cycle Planning

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March 28, 2007

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

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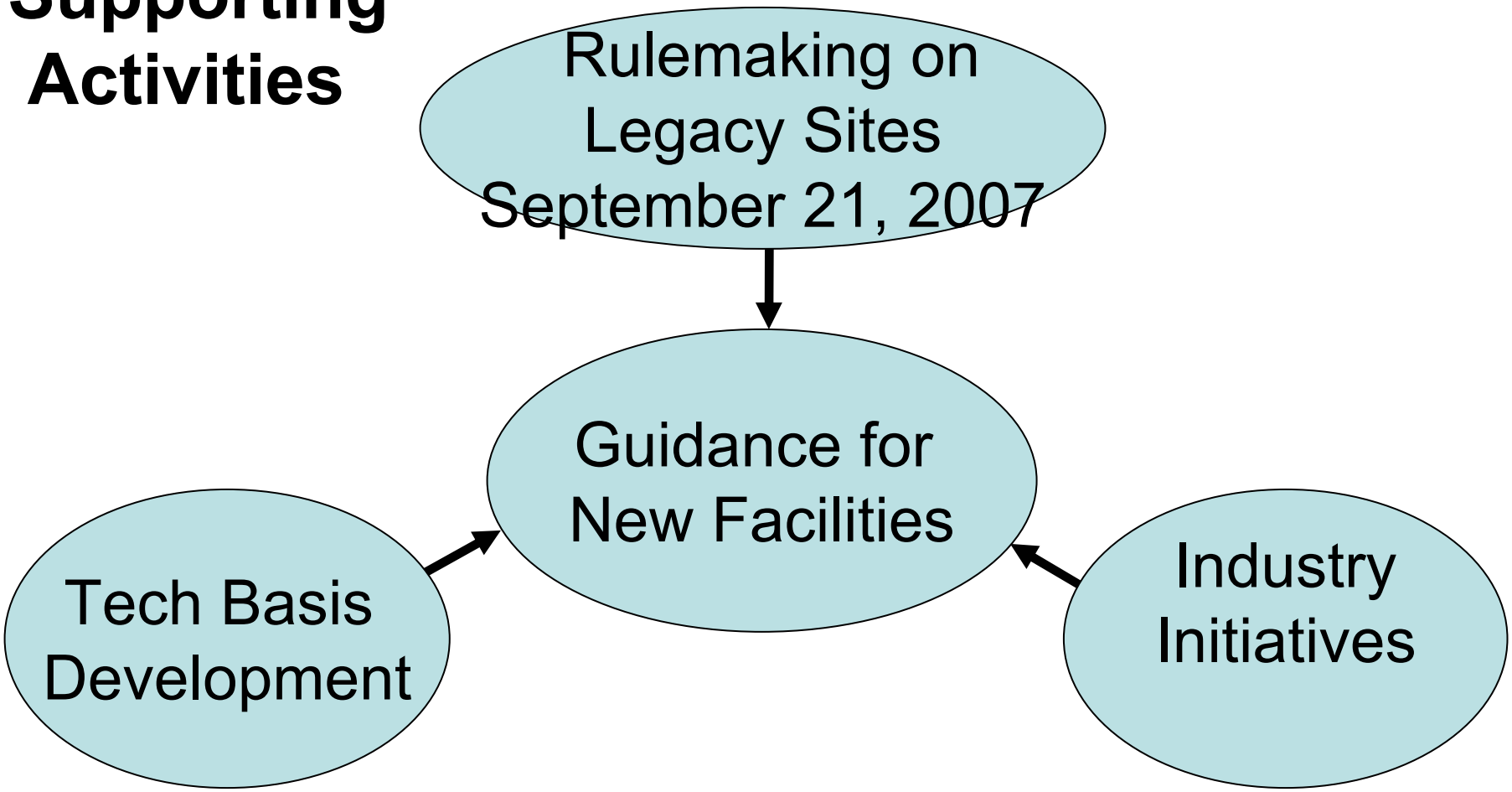
Supporting Activities



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

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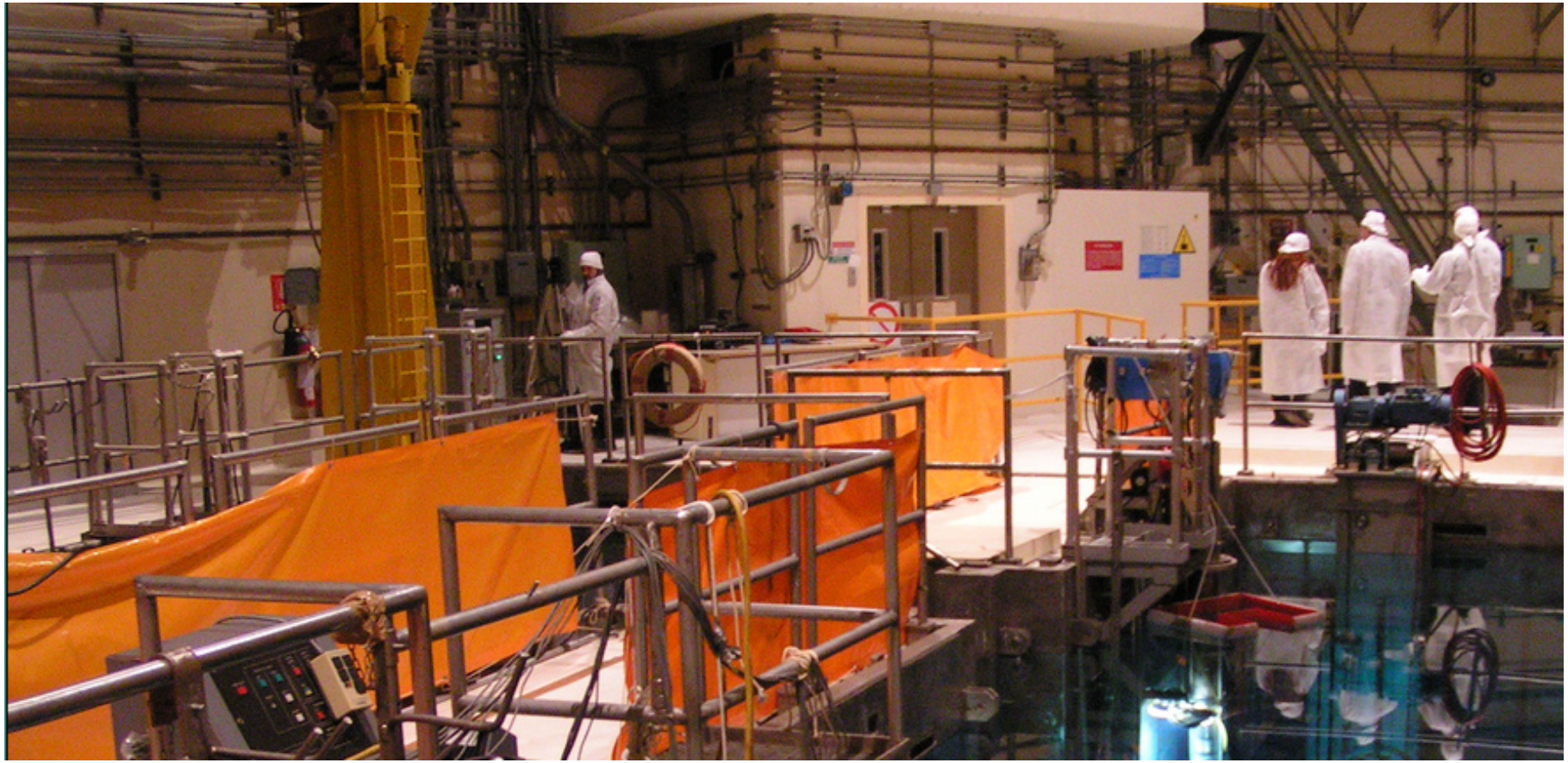

Contamination of Facility - General

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

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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

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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

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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

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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 equiped 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

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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

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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.
- Release of the draft Regulatory Guide for public comment is expected in July, 2007.
- Look for the Federal Register Notice.