
USING NRC DESIGN CRITERIA for NEW DOE CONSTRUCTION PROJECTS, A Summary from the January 2000 AB Workshop

Carl Smith
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Basis for Using NRC Design Criteria



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- Congressional budget guidance sent to DOE with the FY1999 Appropriations Bill
 - Guidance was for new (after 2000) construction to be in accordance with NRC licensing standards
 - Intent was in anticipation of external (NRC) regulation, to facilitate NRC licensing of new DOE facilities
 - A cost effective approach is needed

Experience Based Presentations at AB Workshop in January 2000



Guy Bishop
Safety Analyst
DOE-RL

Application of NRC
Regulation Equivalency to
Spent Nuclear Fuel Project

Lew Miller
Safety Review Manager
DOE-RL

DOE's Approach for the
TWRS-P Regulatory Unit

Don Edwards
ESH Manager
BNFL Inc. RPP-WTP

Selection of NRC
Requirements for RPP-WTP,
(formerly TWRS-P)

Hanford Spent Nuclear Fuel Project



Move 2100 metric tons of spent nuclear fuel elements left over from plutonium production into semi-permanent storage at Hanford

SNFP Requirements Selection Process



- DOE requirements were retained, e.g., DOE Order 6430.1A, 10 CFR 820/830/835, etc.
- The contractor selected additional, “NRC equivalent,” requirements from 10CFR’s, Standard Review Plans, Reg. Guides, Generic letters, and NRC inspection and enforcement bulletins and notices.
- DOE used a three tier approval process for contractor selected requirements, including an independent technical review panel.
- The results were a set of DOE and NRC requirements, many of which are nuclear-power-reactor based

SNFP Selected NRC Requirements



- SNFP selected 29 groups of NRC requirements:
 - RG 1.76 - Design Basis Tornado for Nuclear Power Plants
 - RG 1.61 - Damping Values for Seismic Design of Nuclear Power Plants
 - 10 CFR 50.49 - Electrical Equipment Qualification
 - RG 1.26 - Quality Group Classifications and Standards for Water, Steam, and Radioactive Waste Containing Components of Nuclear Power Plants
 - 10 CFR 50.48 - Fire Protection
 - 10 CFR 50, Appendix R - Fire Protection
 - 10 CFR 72.122(c) - Protection against Fires and Explosions
 - etc.

SNFP - Impact of NRC Requirements



- NRC requirements are not always consistent with DOE requirements, leading to potential design criteria incompatibilities, e.g., the NRC term “containment” and the DOE term “confinement”, while similar in intent are not identical.
- Not all citations of a particular regulation were properly invoked in a timely manner, leading to “back-fitting” the design to meet NRC requirements, which led to cost increases.
- The selected NRC requirements contain references to other NRC requirements that lead to additional direction, interpretation or guidance. Implementation of such “stealth” requirements can lead to significant issues.
- The SNFP schedule is “fast track” which requires timely decision making, but properly overlaying two sets of regulatory requirements requires time.

DOE - RL Regulatory Unit



DOE established the Office of Radiological, Nuclear, and Process Safety Regulation (Regulatory Unit) to:

- Permit privatization on a basis:
 - ◆ That is timely, predictable, and stable
 - ◆ With attention to safety consistent with NRC
- Accommodate an emerging technology in US
- Experiment with new organizational concept for potential future application

Hanford RPP-WTP



Clean up approximately 10% of the 54 million gallons of radioactive wastes (25% of radioactivity) stored in 177 underground tanks at the DOE Hanford Site by pretreatment, LAW Vitrification and HLW Vitrification

WTP Requirements Selection Process



- Contract requires 10 CFR 820/830/835 and selection of regulatory basis from the universe of DOE and NRC requirements.
- Contractor selected DOE and NRC requirements, and national consensus standards
- The selection process used a rigorous application of the ISM process, including hazards analysis and substantial documentation to fully justify requirement selections. The radiological source term for treatment of spent fuel processing waste is smaller than that for a nuclear power plant.
- An independent review team was used for review of the selected requirements.
- Formal submittal of requirements, “Safety Requirements Document,” is reviewed by the RU, including support from NRC and consultants, prior to approval.

WTP Selected NRC Requirements



- WTP has selected 14 NRC requirements:
 - SRP 3.7.2, Inelastic Energy Absorption
 - RG 1.61, Damping Values (& ASME cc 411)
 - 10 CFR 50.49 - Electrical Equipment Qualification
 - RG 1.145, Atmospheric Dispersion Modeling
 - RG 1.3, Radiological Consequence Evaluation
 - 10 CFR 70, Exposure Limits
 - RG 1.145, Accident Analysis Methods
 - SRP 6.4, Control Room Habitability
 - etc.
- WTP has selected 47 national consensus standards and codes

WTP - Impact of NRC Requirements



- The selection process required considerable time and effort to 1. Identify the work, 2. Evaluate the hazards, 3. Develop control strategies, 4. Identify the standards, 5. Confirm the selected standards, and perform the multiple iterations to reach closure on this 5-step process.
- Documentation of the selection process is considerable, including hazards analyses, safety analyses and justification of the selected requirements.
- The selection process has progressed through preliminary design and confirmation of preliminary design. The process will continue through detail design, procurement, construction and mechanical checkout. Revision may occur during startup and operation.

Conclusions



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- Both projects concluded that:

A systematic process must be used to select safety requirements for any project

The key to a safe facility lies with rigorous and competent implementation of a set of sound safety requirements

- SNFP concluded that no safety improvement resulted from using NRC requirements
- RPP-WTP concluded there was no facility cost increase due to using NRC requirements
- Appropriate NRC experience is required for selecting NRC requirements
- Only one set of requirements should be used, i.e., no overlay, but a combination of DOE and NRC is doable
- Time and effort is required to select the requirements
- An improved safety analysis can be prepared