

Shielding Evaluations for the HI-STORM UMAX Storage System

a generation ahead by design

A Pre-Submittal Briefing to the SFST

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HI-STORM UMAX SYSTEM - Shielding

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- Spent fuel storage acceptance criteria – 10 CFR 72
 - Site specific
 - Dose limits for controlled area boundary
- Same Principal Shielding Materials as in HI-STORM 100 U
- Same General Approach as for HI-STORM 100 systems
 - SAS2H/ORIGENS (Scale 5) Source Term Calculations
 - MCNP (MCNP5) Shielding Calculations

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- Two different canisters with different outer diameters, MPC-37 and MPC-32, are analyzed, since there is no substantial difference in dose rates between the various basket models
 - Shielding Analyses use a representative Burnup/Enrichment/Cooling time combination
 - Uniform fuel loading is considered
 - Representative dose rates
- Maximum Burnup same as in HI-STORM FW
 - 45,000 MWd/mtU (Also representative in nature)
- All calculations performed for design basis (reference) fuel assembly
 - PWR: Westinghouse 17x17 (same as in HI-STORM FW)

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- Dose rates at the surface and at 1 meter from the above ground portions of the HI-STORM UMAX are calculated
- Dose vs. distance calculations are also performed for the HI-STORM UMAX
- Dose rates inside the adjacent UMAX cavity are analyzed
- MCNP Models
 - Representative axial burnup profile (from HI-STORM FW)
 - 5% Fresh fuel

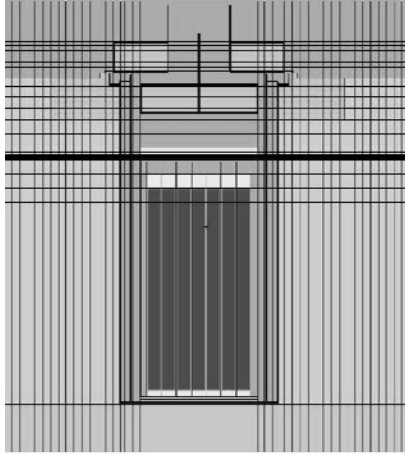
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- HI-STORM UMAX Operational procedures essentially identical to above ground HI-STORM systems
 - MPC loaded in HI-TRAC
 - MPC sealed in HI-TRAC
 - MPC transferred from HI-TRAC to HI-STORM
- Since procedures are similar, the expected occupational doses are similar.

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- Exposed surfaces of the HI-STORM UMAX show dose rates lower than HI-STORM FW system
- At the site boundary, dose rates from the HI-STORM UMAX are also Lower than HI-STORM FW system

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- Enhanced underground spent fuel storage system compared to HI-STORM 100 U
- Improved shielding performance – That is dose rates for storing same number of assemblies are lower compared to HI-STORM FW system

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