Enclosure 3

THE CHARACTERISTICS OF HI-STORM 100U GERMANE TO TO ENVIRONMENTAL ASSESSMENT

A Presentation to the SFST, USNRC

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The "HI-STORM" Family of VVMs

1. HI-STORM 100U is the fifth vertical ventilated module configuration to be certified in the HI-STORM 100 storage system under Docket No. 72-1014; the others are:

- HI-STORM 100 (upper ventilation ducts in the cask body)
- HI-STORM 100S (upper ventilation ducts in the cask lid)
- HI-STORM 100A (anchored version of "100")
- HI-STORM 100SA (anchored version of "100S")

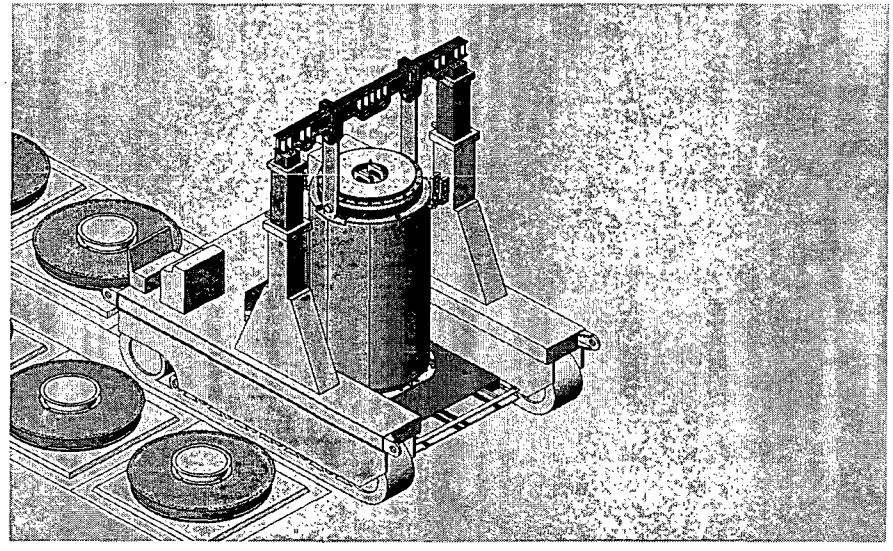
The "HI-STORM" Family of VVMs

1. All VVMs are certified under 10CFR72 Subpart L under Docket No. 72-1014.
2. HI-STORM 100U stores the same MPCs and utilizes the same transfer cask and same ancillaries (i.e., lifting, welding, purging, drying, loading, and handling equipment) as other HI-STORM VVM models.

The "HI-STORM" Family of VVMs

3. The transfer modalities for transferring the MPC into the HI-STORM 100U are identical to the other HI-STORM modules.

- All MPC transfer operations performed at ground level.
- Crawler transports loaded HI-TRAC transfer cask with MPC to ISFSI.
- Crawler performs MPC Transfer, as shown below.



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The "HI-STORM" Family of VVMs

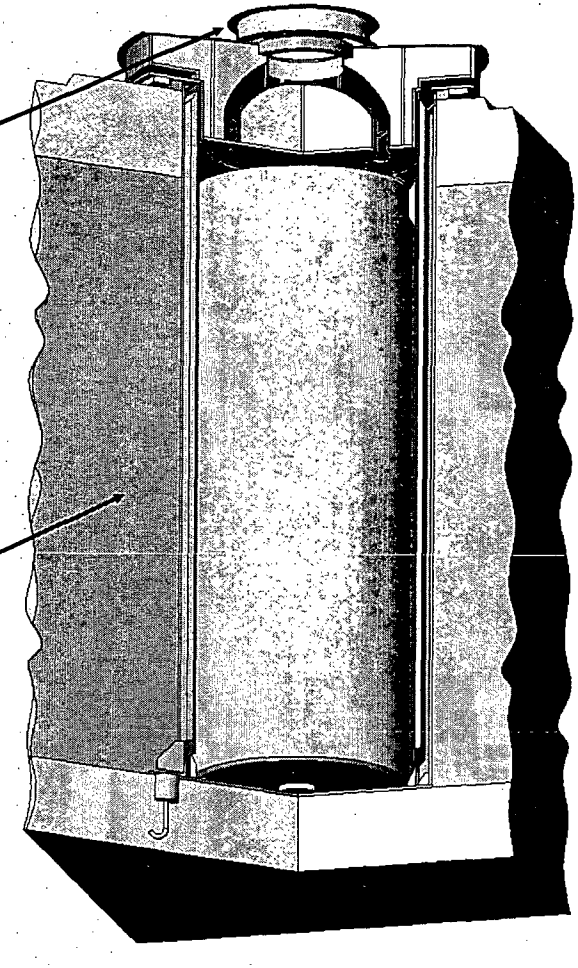
4. "100U", as befits the latest VVM model in the HI-STORM 100 system, has the minimum environmental footprint of any HI-STORM model.

   In virtually all aspects, "100U" has been designed to have a substantially reduced effect on the "quality of human environment" under *all* conditions of storage than all other HI-STORM models.

The "HI-STORM" Family of VVMs

7. Like its aboveground counterpart, there are two major components of the 100U VVM

- Closure Lid
- Main body, also referred to as Cavity Enclosure Container (CEC)



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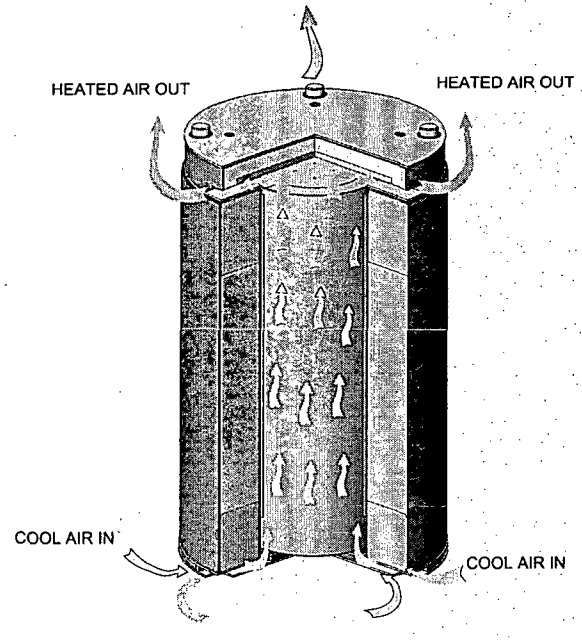
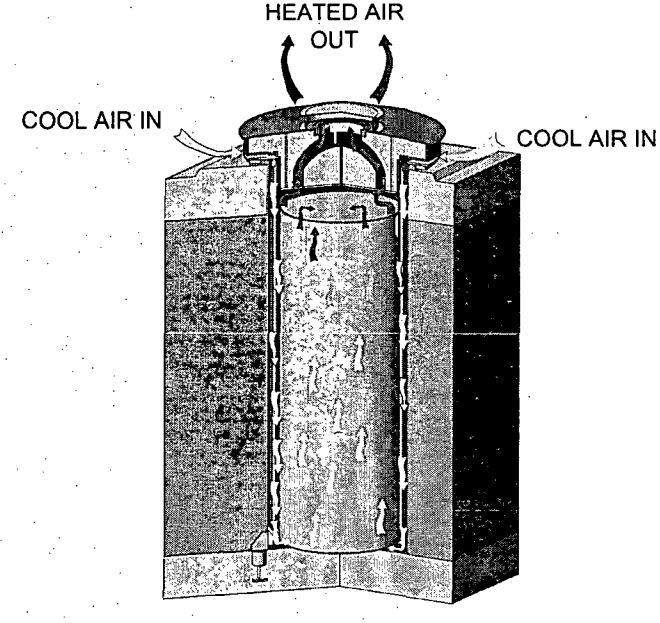
HI-STORM 100U's Attributes Relevant to the Environment

1. Like its aboveground counterpart, "100U" relies on the ventilation air drawn from the ambient for heat rejection from the canister's surface of convection.





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HI-STORM 100U's Attributes Relevant to the Environment

2. The MPC *storage cavity space* is separated from the surrounding subgrade by a *one-inch thick* cylindrical shell made of steel with a welded bottom made of a thick steel plate. There are no penetrations in the steel shell.

   It is estimated that it will take over 400 years of direct exposure to a most aggressive soil environment (such as salt water laden soil) for the subgrade to establish a communication with the storage cavity space if *no* corrosion mitigation measure were utilized in "100U's" construction.

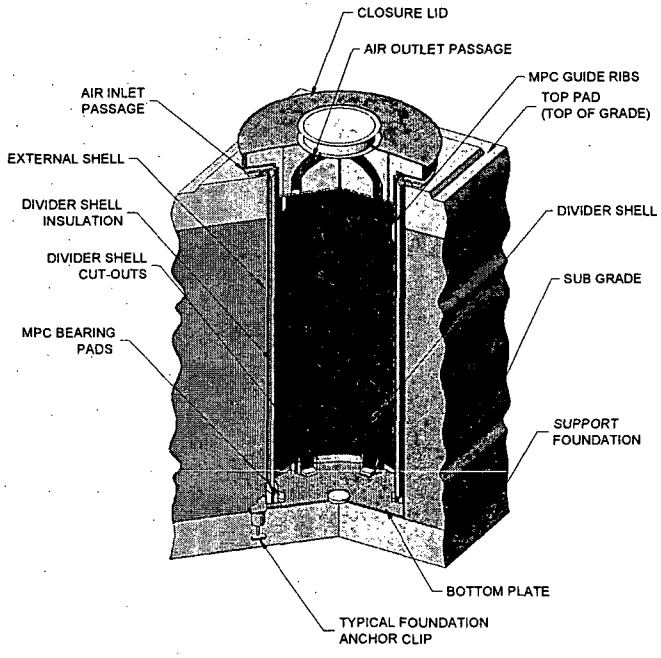
   In reality, the "100U" FSAR prescribes an array of corrosion prevention measures to render the potential of metal wastage in a "100U" improbable (Such as application of proven preservatives, installation of a concrete buffer layer around the CEC, and use of a cathodic protection system when soil conditions so warrant.

HI-STORM 100U's Attributes Relevant to the Environment

3. Like all cask systems, HI-STORM 100U requires excavation of the "pad area" and replacement of any incompetent native soil by an engineered fill.
4. Like aboveground cask systems installed at ISFSIs with deep, poor soil subgrade columns, it may be necessary to buttress the foundation pad with pilings or soilcrete™ columns to support the weight of the massive canisters.

HI-STORM 100U's Attributes Relevant to the Environment

5. Fully compatible with all other Holtec dry storage components (MPCs, HI-STAR overpack, HI-TRAC transfer cask, etc.) such that both underground and aboveground HI-STORMs can be deployed at the same ISFSI site using nearly identical loading equipment.
6. Unlike other HI-STORM models, MPCs stored underground and thus made essentially inaccessible to threats and hazards of any kind.
7. Unlike other aboveground casks, storage cavity in "100U" engineered to self-extinguish combustion of any flammable material that is introduced (inadvertently or deliberately) in the MPC storage space.



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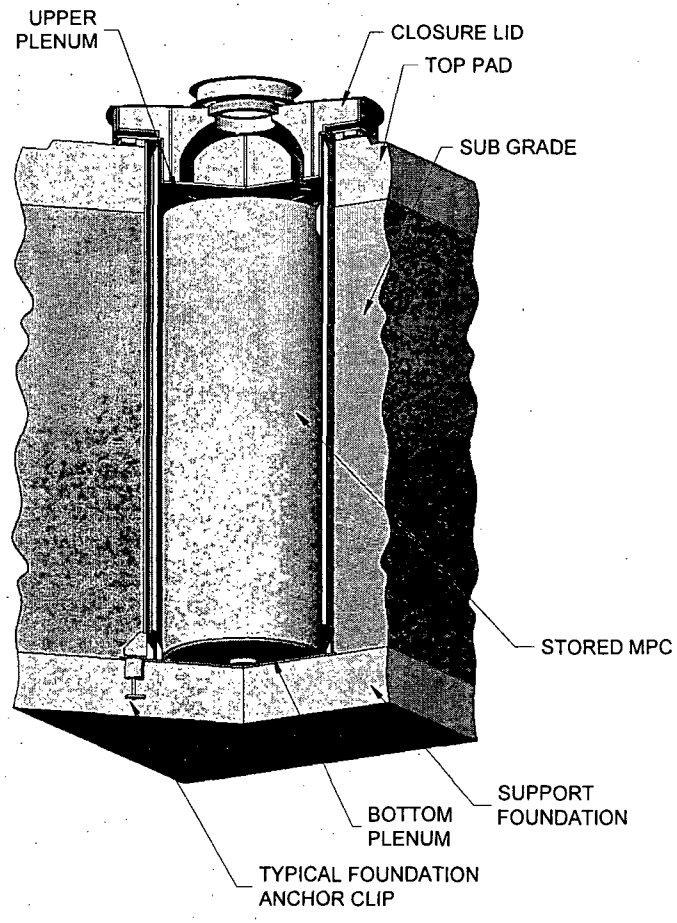
8. HI-STORM 100U is difficult to flood, but if flooded, is flood-friendly.
9. Flood level must rise at least 8.25 inches above ISFSI pad surface to reach inlet ducts.
10. MPC transfer occurs in the vertical configuration, eliminating any concern of binding or galling due to friction, even after decades of storage (not true for some ventilated systems).
11. Loaded MPC can be placed in storage or removed from storage in the matter of a few hours (ALARA-friendly).



HI-STORM 100U FULFILLS "NEGLIGIBLE ENVIRONMENTAL IMPACT GOALS OF "FOUR ZEROES", NAMELY

1. Virtually zero site boundary dose.

2. Zero risk of radioactivity release.

3. Zero risk of damage from extreme environmental phenomena such as fire, flood, earthquake, tsunami, and the like.

4. Zero risk of physical instability.

HI-STORM 100U FULFILLS "NEGLIGIBLE ENVIRONMENTAL IMPACT GOALS OF "FOUR ZEROES", NAMELY

1. Vanishingly Small Dose in the Vicinity of the Storage Site:

- The depth of HI-STORM 100U can be increased virtually without limit. Even at its shallowest storage, the dose from a HI-STORM 100U loaded with extremely "hot" fuel (69 GWD/MTU, 5-year cooled) is only about one thousands of a milli-rem per hour at a distance of 100 meters. As the depth is increased, this infinitesimal dose rate reduces to incalculaby miniscule values.

HI-STORM 100U FULFILLS "NEGLIGIBLE ENVIRONMENTAL IMPACT GOALS OF "FOUR ZEROES", NAMELY

2. Zero Risk of Release of Radioactivity at any Storage Site:

- Release of radioactivity from the HI-STORM 100U by any mechanical means (crashing aircraft, missile, etc.) is virtually impossible. The only access path into the cavity for a missile is vertically downward, which is guarded by an arched, concrete-fortified steel lid weighing in excess of 10 tons. The lid design, at present configured to easily thwart a crashing aircraft, can be further buttressed to withstand more severe battlefield weapons, if required in the future for homeland security considerations. The lid is engineered to be conveniently replaceable by a later model if the potency of threat is deemed to escalate to levels that are considered non-credible today.

HI-STORM 100U FULFILLS "NEGLIGIBLE ENVIRONMENTAL IMPACT GOALS OF "FOUR ZEROES", NAMELY

3. Zero Risk of Damaged from Fire, Flood, Earthquakes, Hurricanes, Tsunami, and the Like:

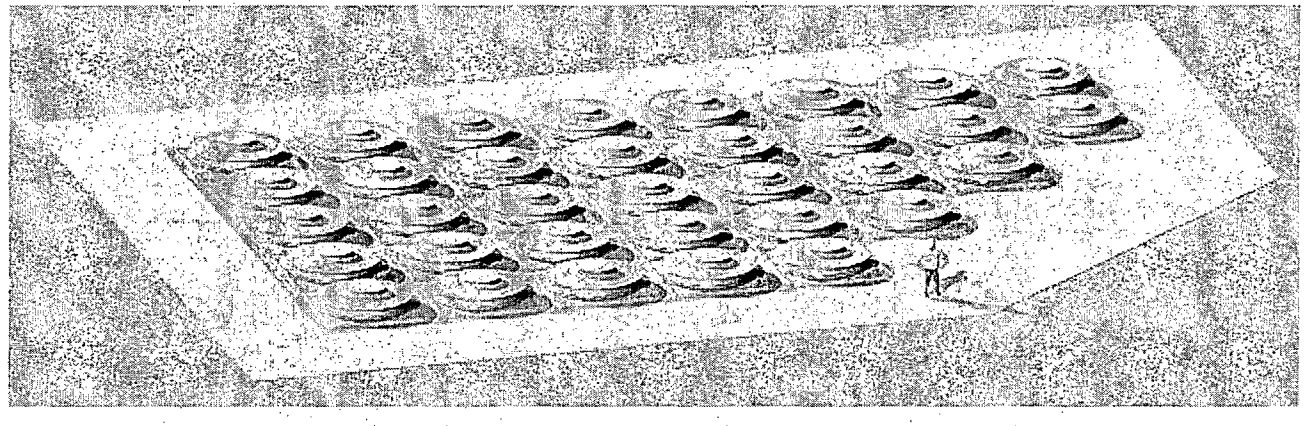
- Combustible materials, if introduced in the storage cavity, cannot sustain combustion.
- HI-STORM 100U will continue to maintain the MPC in a cooled state for as long as necessary, even if the site is completely flooded.
- Margins of safety computed under most severe, seismic events are in double digits.

HI-STORM 100U FULFILLS "NEGLIGIBLE ENVIRONMENTAL IMPACT GOALS OF "FOUR ZEROES", NAMELY

4. Zero Risk of Physical Instability:

   Unlike an aboveground system, a "100U" module will not slide or tip over under any impactive or impulsive event, thus providing a complete decoupling from its physical environment.

Efficient Utilization of Land and Operational Flexibility



A HI-STORM 100U ISFSI is:

- Physically inconspicuous and essentially inaccessible to an aggressive aircraft.
- Dimensionally compact (center-to-center spacing = 12 feet (min.)).
- Can have a planform to suit the shape of the area available.
- Each storage location is readily accessible by the cask crawler from either of the two orthogonal directions, thus, an MPC can be loaded into or withdrawn from any location in the ISFSI without affecting others.

Principal Considerations in Environmental Assessment of a Dry Storage System*

- Use of Natural Resources (i.e. Steel, Concrete,...)
- Land Use
- Radiological Impacts
- Decommissioning

* "Requirements for the Independent Storage of Spent Fuel ands High Level Radioactive Waste", NUREG-1092, August 1984.

Use of Natural Resources

- Equivalent or Less than Above Ground Storage
  - 100U uses less concrete due to shielding effects of the soil.
- Very Little Impact
  - Steel, Lead, Concrete, Plastic

Land Use

- Storage on Reactor Site
- Requires less land area than an aboveground HI-STORM ISFSI and far less than a horizontal storage system.
- May Require More On-Site Construction

Radiological Impacts

- 100U Dose Rates Reduced to Negligible Values
- Less Occupational Dose During Transfer to Storage Cask
- Less Occupational Dose During Inspection, Surveillance and Monitoring

Decommissioning

"100U" has been engineered to be most decommissioning friendly.

- All CEC internals are readily removed for decommissioning; no weld cutting or bolted joint dismemberment required.
- The Canister Storage Cavity can be removed or Filled and Left In-place

Summary

- HI-STORM 100U is engineered to be completely benign to its host environment and substantially decoupled from it.

- The environmental effects of 100U are equivalent to or better than peer aboveground systems in respect of all major environmental impact criteria such as:

  - Land Use
  - Geology/Seismology
  - Ecology
  - Transportation
  - Physical Stature
  - Shielding and Radiological Characteristics
  - Resistance to beyond the design basis threats.