

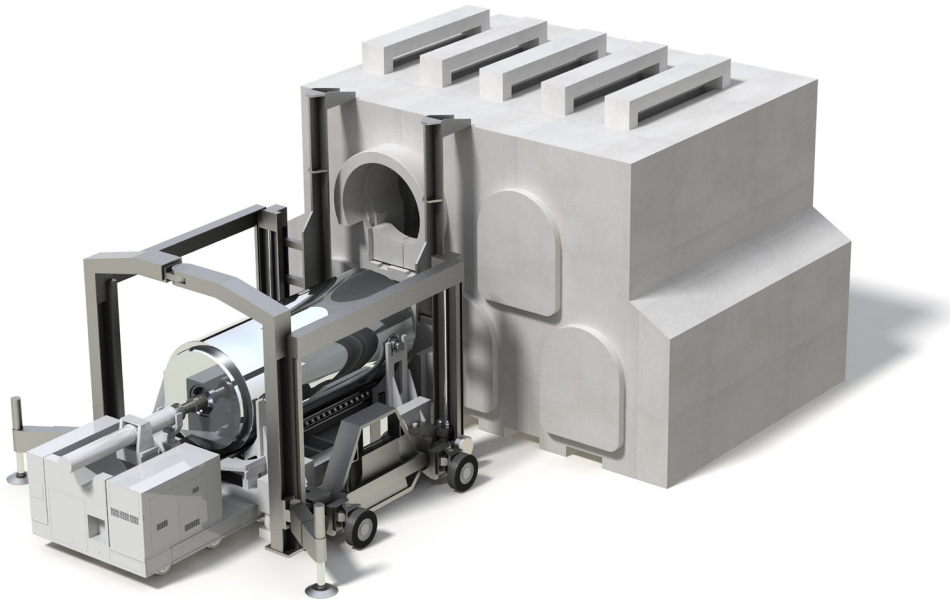
# HSM MATRIX

## (HSM-MX)

Orano TN's NUHOMS® MATRIX (HSM-MX) provides customers with an optimized dual-level horizontal storage system that enhances the proven stability of the horizontal transfer of used nuclear fuel.

The HSM-MX addresses these issues and provides a clear advantage to utilities by:

- 45% reduction in ISFSI footprint
- Shielding advantage of HSM array:
  - Monolith structure – no gaps and offers additional significant shielding
  - Sky-shine dose from HSM array roof is cut in half
  - Significant reduction in dose from the bottom HSM roof vents due to long chimney
  - Dose reduction hardware for inlet and outlet vent dose – improved dose performance



The development of the HSM-MX was based on industry input into the issues that the next evolution of the used fuel storage system should address, such as:

- Space is at a premium at the utilities
- Calculated onsite and offsite dose rates at the site boundary are reaching their upper limits
- Aging management concerns must be addressed
- Cost of the site excavation, engineered backfill, and cost of the pad is a concern
- Beyond Design Basis (BDB) events like floods, seismic, and extended storage will become larger issues that need to be addressed

In addition to its compact design the HSM-MX can safely accommodate a wide range of Dry Shielded Canister (DSC) designs to meet customer needs.

The transfer of a canister from the transfer cask is performed with a Retractable Roller Tray (RRT), which uses set of rollers inserted in the concrete module to optimize the insertion of the canister. The RRT eliminates the need for canister support rails.

The RRT's customizable rails inside MATRIX cavity facilitate the MATRIX's unique aging management capabilities because the insertion rollers can be easily swapped out for inspection tools. Since the canister is resting on concrete blocks, the RRT with the inspection tool can be easily inserted into the module underneath the canister. The turning roller rails lift and rotate the canister, while the inspection tool glides along the RRT's central track, slowly inspecting every inch

of the canister. This mechanism allows for the inspection of 100% of the canister surface without ever removing it from the HSM-MX.

## Design Parameters

**Maximum heat load:** 50 kW

**Maximum ambient temperature:** 117°F

**Minimum ambient temperature:** -40°F

**Seismic accelerations at site:** 0.37g

- Vertical: 1.0g loaded with two EOS 898BTH
- Horizontal: 2.0g target for high seismic

**Maximum flood:** 50 feet at 15 fps

**Tornado wind:** 360 mph

**Missile impact**

**Available under the 1042 license**

## Technical Features

**Payload:** EOS 37PTH, EOS 89BTH, 61BTH

**Materials of Construction:**

- Reinforced concrete
- Carbon steel
- Corrosion resistant coatings
- Stainless steel wire mesh screens

**Physical Data:**

- Width: 10'8"
- Length: 21'6"
- Height: 26'8"
- Adjacent modules are in contact with each other

**Maximum canister length:** 198.5 inches

**Weight (empty):** 405,000 lbs

## Benefits

No critical lifts at the ISFSI

Enhanced shielding performance

Superior seismic capabilities

Increased heat rejection capabilities

Enhanced ruggedness for resisting acts of sabotage including BDB events

Easy and quick recovery from BDB events

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