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Division of Spent Fuel Management (DSFM) Regulatory Conference December 11-12, 2018

NAC's Focus on the Future

George Carver
Vice President,
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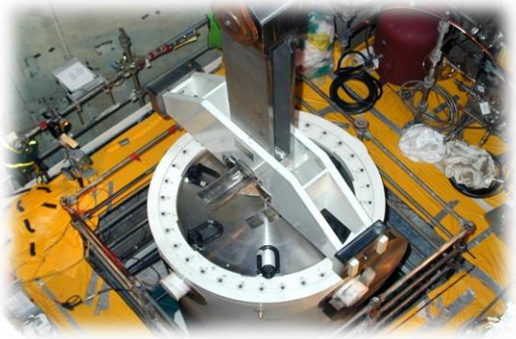



Used Fuel Management Future in Perspective

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2019 NAC Priorities -

- Nuclear Plant Decommissioning Dry Storage Technology
- Long-term Storage (License Renewals, Aging Management) and Centralized Interim Storage Facilities (CISF)
- Integrated Waste Management – High Level/Low Level Waste Management
- Spent Fuel and Radioactive Waste Transportation System Applications
- International Programs

NAC's Spent Fuel Technology Development Drivers:

- ✓ **Maintain safe operations with low occupational dose**
- ✓ **Meet Nuclear Power Plant Operational or Decommissioning Fuel Storage needs**
- ✓ **Provide effective long term used fuel storage and transportation solutions that all stakeholders can support**

Decommissioning Continues to Demand High Performance Dry Cask Storage Systems

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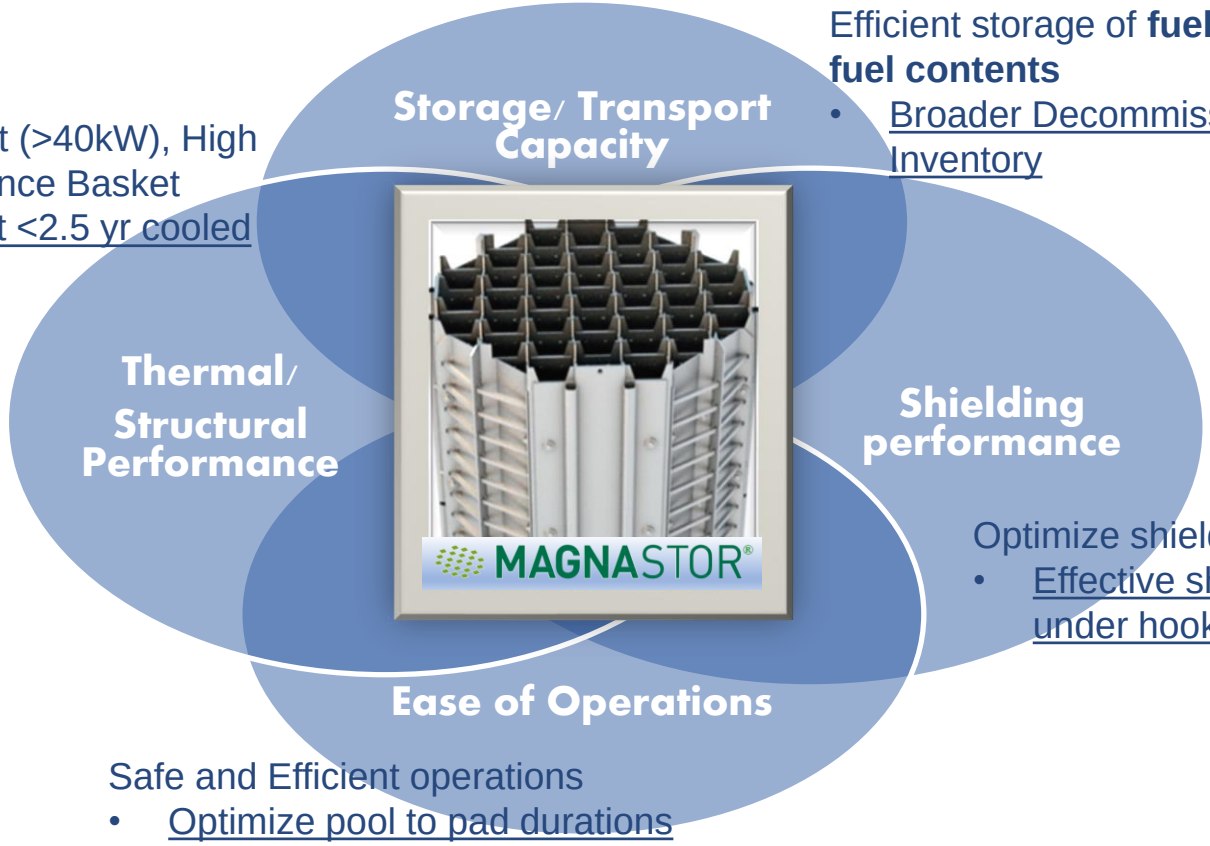
Efficient storage of **fuel and non-fuel contents**
- Broader Decommissioning Inventory

High Heat (>40kW), High Performance Basket
- Target <2.5 yr cooled fuel

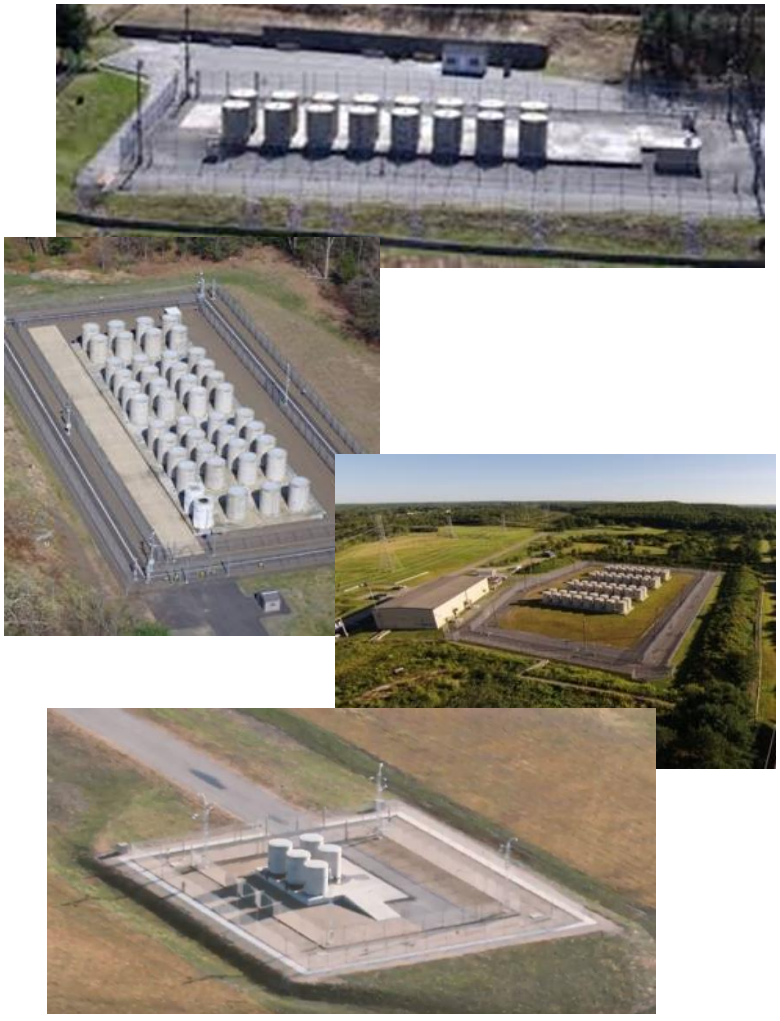


Optimize shielding
- Effective shielding meeting under hook weights

Safe and Efficient operations
- Optimize pool to pad durations

NAC has decommissioned sites using regionalized loading patterns at less than 30kW (good balance of reduced time to pad with low occupational exposure) – NAC continues to pursue higher heat capacity, additional optimized loading patterns and operational efficiencies to meet current and future defueling needs without jeopardizing future transport options.

Long-term at-site Storage



Yankee Rowe, Connecticut Yankee,
Maine Yankee and Dairyland LaCrosse

Active License Renewals (Submittal by 2020):

- NAC UMS Certificate **72-1015**
- NAC MPC Certificate **72-1025**

Details:

- Time Limited Aging Analyses
  - Developed appropriate analyses using MAPS NUREG and EPRI Aging Management guides
- Aging Management Programs
  - Developed applicable AMPs using MAPS NUREG and EPRI Aging Management as guides
- License Renewal Application
  - Completed pre-submittal in-service inspection at Maine Yankee
  - Complete and submit License Renewal Application
- Future Long Term Storage Focus
  - Develop storage system service life enhancements to support potential renewals beyond 60 years
  - Improve inspection technologies
  - Prepare for transport to off-site storage facility (CISF)

Consolidated Interim Storage

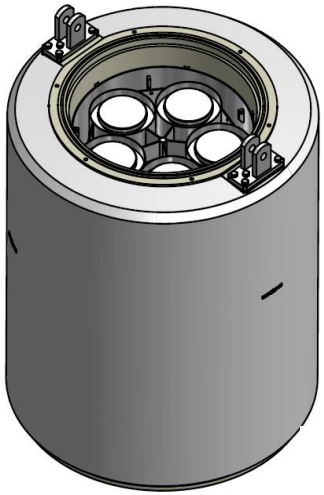
ISP Consolidated Interim Storage Facility (CISF)

- NAC storage technologies (MPC, UMS & MAGNASTOR) are included in the ISP's CISF license submittal
- NAC continues development of innovative operations technologies and transportation solutions required for effective implementation of a CISF

Integrated Waste Management

NAC remains engaged in the operation and package development of High-Level Waste Management leveraging existing and new technology development.

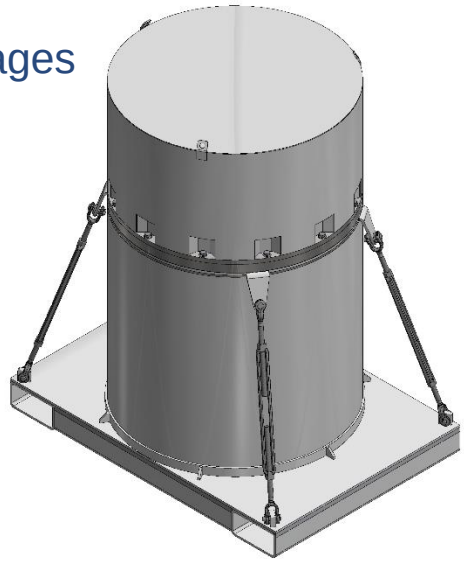
West Valley Demonstration Project (WVDP), West Valley, NY

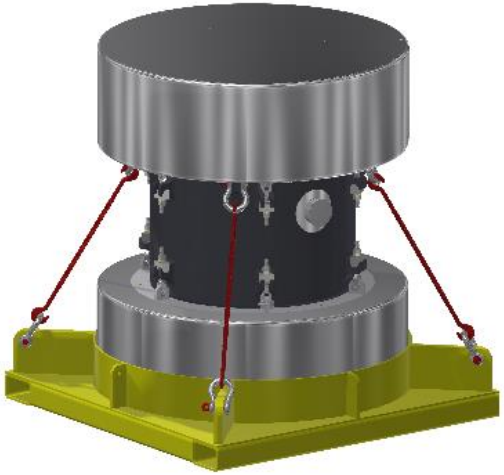


- 56 NAC-MPC systems Deployed
- Utilized commercially available dry cask technology for DOE HLW
- Licensing under 10CFR830 – DOE safety case for the site
- Licensed for transport in the NAC-STC

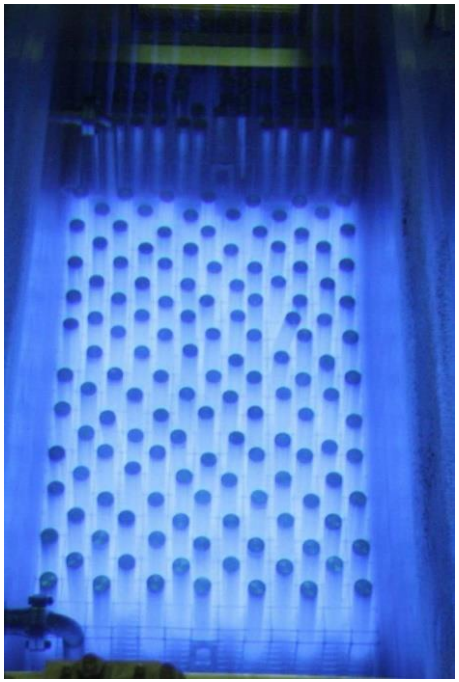
Optimus-H and Optimus-L

- High- and Low-Level Waste Transport packages
- Modular design allows configurations for maximum shielding





Integrated Waste Management



Hanford Waste Encapsulation and Storage Facility (WESF) Dry Storage

- Adaptation of the NAC-MPC system for dry storage of the Hanford Cs/Sr capsules
- Total of 1,936 Capsules will be stored on an ISFSI type facility
- Multiple capsules are loaded into “Universal Canister Sleeves” which are then loaded into a “TSC” type containment/confinement system for storage/transport
- Licensing for storage under 10CFR830 – DOE safety case

Packaging and Transport Project Developments

Currently 4 NAC-STC Casks in operation in China, with 8 more pending deployment. Now performing routine shipments of High Burnup bare fuel, leveraging NRC HBU Amendment approved in 2017.

International Progress

Taiwan - Kuosheng (MAGNASTOR), Chin-shan (UMS)

Korea – Working with Doosan Cask Development

China – Bare HBU Fuel Cask Deliveries

Supporting Japan Spent Fuel Cask and High Level Waste Projects with Hitachi Zosen

NAC - Pursuing Engineering Solutions for the Future of Spent Fuel & HLW Management

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Spent Fuel and High-Level Waste Management

- Remain flexible to adapt to changing spent fuel disposition strategies (political, regulatory, etc.)
- Continue to develop more efficient used fuel and waste management strategies to support both commercial and government facilities
- Dry spent fuel storage once viewed as interim, is now “longer” term storage
  - Complete license renewal applications for both MPC and UMS
- Implement effective Aging Management Programs and design options supporting further utilization of Consolidated Interim Storage Facilities
- Continue to advance a robust spent fuel transportation program – consider transport cask design features to meet near term and future transportation objectives
- Work with our regulator to develop more efficient and effective licensing processes, leverage current research activities in areas of material performance, thermal analysis and shielding performance

Recent industry trends suggest extended storage, transportation and CISF options are key considerations for used fuel/HLW management and decommissioning strategies absent a predictable repository program timeline.

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