NAC International’s Project Perspectives and Priorities

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The Skills and Experience to Deliver Nuclear Excellence
NAC Corporate Overview

Wholly-owned subsidiary of Hitachi Zosen USA since 2013

52 Years in the Nuclear Industry - Fuel Cycle Consulting and Used Fuel Packaging and Transport

Eleven (11) Nuclear Fuel Cask Systems Licensed in the U.S.

U.S. Leader in Used Fuel Transportation – NAC-LWT Fleet

More than 500 Storage and Transport Systems Delivered

Pioneers in Dry Storage Ultra-High Capacity Systems HLW Dry Storage

Teamed with WCS and Orano to license the first Consolidated Interim Storage Facility

Delivered More than 65% of Dry Storage Casks Deployed at Decommissioned Locations
Used Fuel Management Future in Perspective

2020 NAC Priorities:

• Technology Advancements
• Nuclear Plant Decommissioning Dry Storage (TMI-1)
• Long-term Storage (License Renewals, Aging Management)
• Centralized Interim Storage Facilities (CISF) Support
• Integrated Waste Management Solutions
• Spent Fuel and Radioactive Waste Transportation System Applications
• International Programs
MAGNASTOR – Raising the Bar in Decommissioning Defueling Amendment 11 – Next Innovation in Cask Performance

High Heat (42kW), High Performance Basket
- Less than 2.5 yr cooled fuel

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

Efficient operations
- Less than 3 days pool-to-pad

Optimize shielding
- Effective shielding meeting under hook weight limits

MAGNASTOR Amendment 11 – NAC continues to pursue higher heat capacity, additional optimized loading patterns and operational efficiencies to meet current and future defueling needs without jeopardizing dose and transportability.
Three Mile Island, Unit 1

- Plant shutdown in September 20, 2019
- Commitment: Pool defueled 2 Years, 10 Months after shutdown
- Exelon Awarded Contract to NAC for:
  - Engineering, Licensing
  - ISFSI Construction
  - Forty-six (46) MAGNASTOR Dry Storage Systems
  - Pool to Pad Operations.
Active License Renewals

- NAC UMS Certificate 72-1015 (March 2020)
- NAC MPC Certificate 72-1025 (Dec. 2019)

Details:

- Time Limited Aging Analyses (TLAA):
  - Developed appropriate analyses using MAPS NUREG and EPRI Aging Management guides

- Aging Management Programs (AMP):
  - Developed applicable AMPs using MAPS NUREG and EPRI Aging Management as guides

- License Renewal Approvals
  - Performed in-service inspections, improved inspection technologies with OE
  - Developing storage system service life enhancements to support potential renewals beyond 60 years
ISP Consolidated Interim Storage

- NAC MPC, UMS and MAGNASTOR storage technologies included in the ISP’s CISF license submittal
- NAC is supporting Licensing application and review
- NAC continues development of innovative receipt ancillaries, methodologies and solutions required for effective implementation of NAC systems at ISP.
Integrated Waste Management

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

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

OPTIMUS-H and OPTIMUS-L

- 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
- High- and Low-Level Waste Transport packages
- Modular design allows configurations for maximum shielding
- Fleet of packagings recently selected for a large D&D project in Canada
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/confine system for storage/transport
  - Licensing for storage under 10CFR830 – DOE safety case
  - Final Design Complete, fabrication in progress.
NAC-Deep Isolation Collaboration

- Deep Isolation and NAC have a Memorandum of Understanding to cooperate on the design, development, and manufacturing of Deep Isolation’s Used Nuclear Fuel (UNF) and High-Level Waste (HLW) storage and disposal canister technology.

- Deep Isolation brings innovative technology to dispose of UNF assemblies and HLW. The technology covers a broad range of activities including site assessment, drilling technology and emplacement of corrosion-resistant canisters containing fuel assemblies that are ideal for deep geologic disposal.

- NAC brings years of industry-leading experience in canister technology, licensing, and manufacturing. By leveraging NAC’s dry fuel storage technologies, the two companies will collaborate to advance the technical, safety, and quality aspects of Deep Isolation’s solution for canister design, licensing, fabrication, storage, and disposal; and equipment for canister handling and the transportation of UNF and HLW from existing storage areas to a Deep Isolation repository.
In 2019 NAC completed the delivery of 10 NAC-STC Casks to 2 Chinese customers. Now performing routine shipments of High Burnup bare fuel, leveraging NRC HBU Amendment approved in 2017.
Packaging and Transport Project Developments

NAC-STC Transport of High Burnup UNF in China
Transport Cask Integration - MAGNATRAN®

- CoC Approved in August 2019
- Transport Overpack for MAGNASTOR Systems
- Designed with Universal Transport Capabilities of NAC Canisters
- Revision 1 (Oct 2019) – As loaded storage contents (e.g., Zion).
- Revision 2 (Aug 2020) – Optimized Transport Features (Proprietary)
International Progress

Taiwan - Kuosheng (MAGNASTOR), Chinshan (UMS)

Korea – Working with Doosan Cask Development (MSO)

China – Support HBU Bare Fuel Transportation Cask Deployments

Supporting Japan Spent Fuel Cask and High Level Waste Projects with Hitachi Zosen
Summary: Pursuing Engineering Solutions for the Future of Spent Fuel & HLW Management

• Continue to develop more efficient used fuel and waste management strategies to support both commercial and government facilities
• Complete license renewal applications for both MPC and UMS (dry spent fuel storage once viewed as interim, is now “longer” term storage)
• 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 & future transportation objectives
• Initiate deployment of OPTIMUS cask fleet in Canada
• Remain flexible to adapt to changing spent fuel disposition strategies (political, regulatory, etc.) including participation in promising new initiatives to address industry challenges
Questions?