WCS CISF NRC Pre-Application Meeting

Safety Analysis Report (SAR) Technical Items

October 7, 2015

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Presentation Overview

- **Open Meeting**
  - **Introductions**
  - **Site Layout for 5,000 MTU Facility**
  - **Operating Procedures and Part 71/72 Interface**
  - **Topics for Discussion in Closed Meeting**
  - **Public Questions & Comments**
- **Closed Meeting**
  - **Level of Detail for the Design of the Building/Crane and Canister Transfer System**
  - **CISF Receipt Inspection/Evaluation**
  - **Canister Washing**
  - **Summary and Closing Comments**

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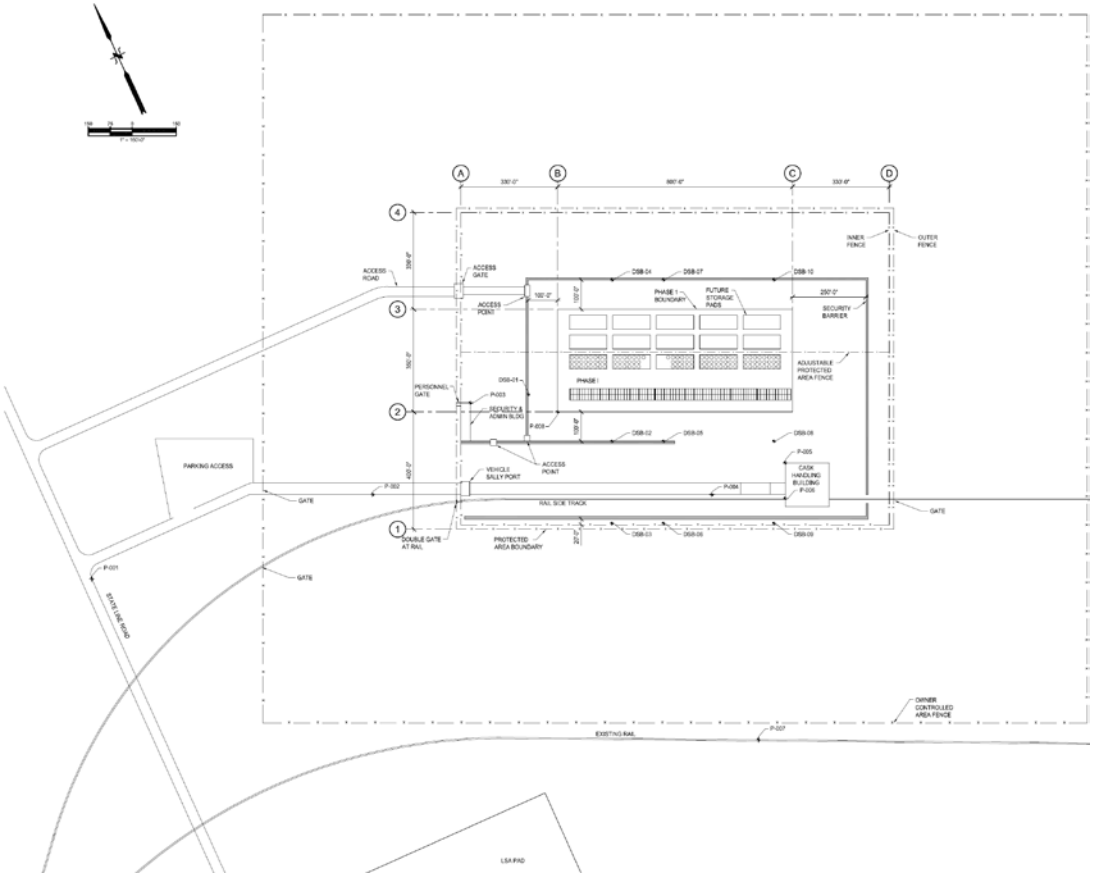
INTRODUCTIONS

SITE LAYOUT FOR 5,000 MTU FACILITY

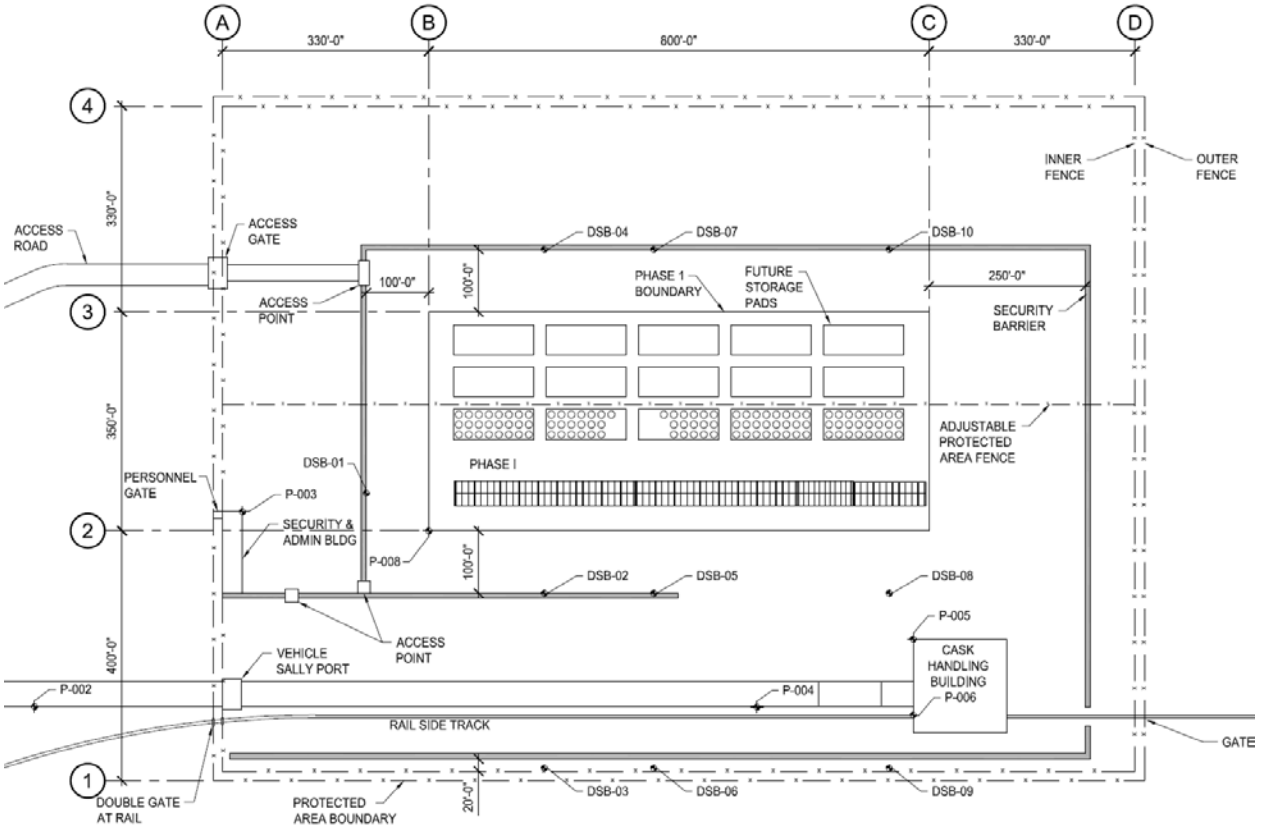
Only Canisterized Fuel Handled at the Facility

- **Cask Handing Building**
  - **NUHOMS® Cask lifts all less than 80” (not important to safety (NITS))**
  - **NAC Canister Transfer System (Important to Safety lifts (ITS)) inside NITS building**
- **Storage Area**
  - **NUHOMS® Pads are NITS**
  - **NAC VCC 128’ x 48’ Pads are ITS**
- **Security and Administration Building (NITS)**
- **Receiving Area (NITS)**

WCS CISF Site Layout



WCS CISF Site Layout



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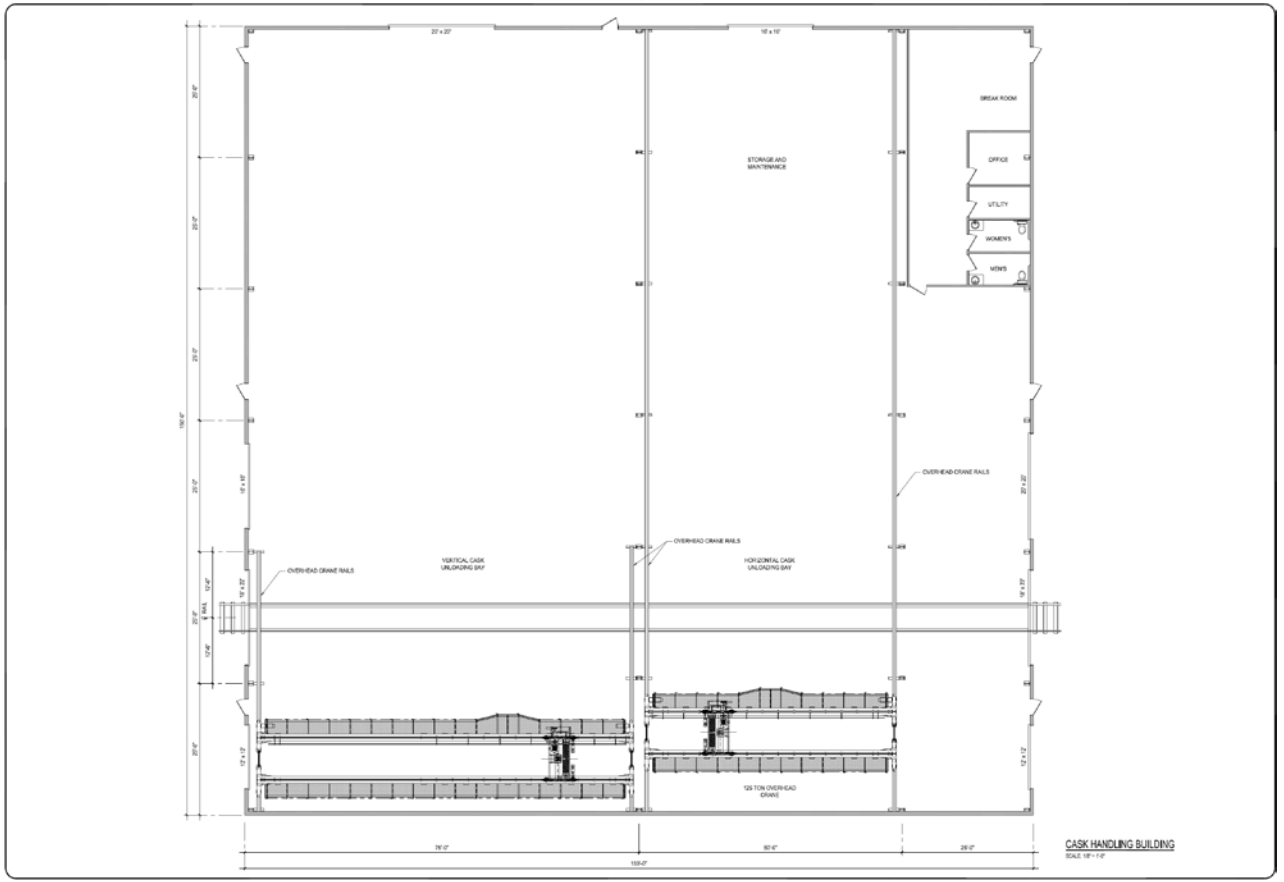
Cask Handling Building Layout



OPERATING PROCEDURES AND PART 71/72 INTERFACE

71/72 Interface at Receipt of Transport Cask

- **Part 71/72 Interface**
  - **Receipt of the Loaded transport Cask**
    - Governed by the Part 71 Certificate of Compliance (CoC) and described in Appendices to Chapter 5.
    - Example Statement in Draft SAR: “Procedures for receiving the loaded cask after shipment are described in this section. These procedures are taken from reference [A.5-1]. Any conflicts between the following steps and [A.5-1] shall be resolved, recognizing that a revision to the transport license may be required to alter any steps required by [A.5-1].”
    - Where reference A.5-1 is the CoC for Radioactive Material Packages, No. 9255, current Revision, including the TN drawings incorporated by Condition 5.(a)(3) of the CoC and SAR Chapters 7 and 8 incorporated by Condition 7 of the CoC.

Sample Operating Instructions for MP187 Cask

- Verify that the tamperproof seals are intact.
- Remove the tamperproof seals.
- Remove the impact limiter attachment bolts from each impact limiter and remove the impact limiters from the cask.
- Remove the transportation skid personnel barrier and skid support structure (closure assembly).
- Take contamination smears on the outside surfaces of the cask. If necessary, decontaminate the cask until smearable contamination is at an acceptable level
- Attach MP187 cask lifting device to cask top and bottom ends.
- Using the overhead crane, lift the cask from the railcar
  - Remove upper and lower trunnion plugs.
  - Inspect the trunnion sockets for excessive wear, galling, or distortion in accordance with the transport license requirements [A.5-1].
  - Install the upper and lower trunnions. Torque trunnion attachment bolts to at least 200 ft-lbs in accordance with the transport license requirements [A.5-1]
  - CAUTION to respect the TS limit of 80" lift height
- Place the cask onto the transfer cask skid trunnion towers.

Sample Operating Instructions for MP187 Cask

- Inspect the trunnions to ensure that they are properly seated onto the skid.
- Remove the lifting device.
- Install the cask shear key plug assembly.
- Install the onsite support skid pillow block covers.
- Any time prior to removing the TC top cover plate or the bottom ram access cover plate, sample the TC cavity atmosphere through the vent port. Flush the TC interior gases to a radwaste system if necessary.

TOPICS FOR DISCUSSION IN CLOSED MEETING

Closed Meeting Topics

- **Level of Detail for the Design of the Building/Crane and Canister Transfer System**
- **CISF Receipt Inspection/Evaluation**
- **Canister Washing**
- **Summary and Closing Comments**

LEVEL OF DETAIL FOR THE DESIGN OF THE BUILDING/CRANE AND CANISTER TRANSFER SYSTEM

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Transport Package Receipt and Unloading of NAC Systems

- **Vertical Cask Transporter unloading and staging of the Transport Cask**
  - **Shipping Package has personnel barrier, impact limiters and hold downs removed**
  - **Railcar is parked and retained in position for unloading**
  - **VCT is used to remove the Transport Cask from the railcar**
  - **VCT positions the transport cask in the Canister Transfer System**

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Transport Package Receipt and Unloading of NAC Systems

- **Storage Cask Utilization of the Vertical Cask Transporter (VCT)**
  - **The VCT is used to carry and position the empty Vertical Concrete Cask in the Canister Transfer System**
  - **Following the canister loading sequence, the VCT is used to carry and position the loaded vertical concrete cask in it's storage pad position**

Package Receipt and Unloading of NAC Systems

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Vertical Cask Transporter - Description

- The vertical cask transporter (VCT) is self-propelled and utilized to vertically lift a loaded Transport Cask (TC) or loaded Vertical Concrete Cask (VCC) and move them to the required positions
- The VCT will engage and lift the VCC through lifting lugs embedded in the top of the VCC
- The VCT will engage and lift the TC through lifting trunnions mounted in the sides of the TC

Vertical Cask Transporter - Details

- **VCT capacities and work envelope**
  - **Minimum rated capacity of 185 tons**
  - **Tare weight of 167,000 lbs**
  - **Fully loaded weight of 537,000 lbs with a design basis MAGNASTOR VCC weighing a maximum of 360,000 lbs.**
  - **VCT will interface with a maximum 136“ outside diameter cask**
  - **VCT operational range of height is estimated at 218-114”**
  - **Lift beam shall interface with both the VCC and the TC through repositionable lift arms**

Vertical Cask Transporter - Design

- **VCT design**
  - **The VCT's header beam, lift links and lift link pins to be designed in accordance with ANSI Nl4.6**
  - **VCT welding to be in accordance with AWS Dl .1, Structural Welding Code**
  - **Load bearing welds and assemblies to be nondestructively examined by Level II qualified personnel using liquid penetrant and magnetic particle methods in accordance with ANST standards**
  - **VCT raw materials to be in accordance with ASTM or ANSI standards**
  - **VCT lift units to be evaluated in accordance with SAE J1078, "A Recommended Method of Analytically Determining the competence of Hydraulic Telescopic Cantilevered Booms."**

Vertical Cask Transporter - Design

- **VCT design (cont)**
  - **VCT lift units to be provided in accordance with ASME B30.l, "Hydraulic Gantries."**
  - **VCT vertical CG to be less than 75" with no load and hydraulic lift at maximum lift height**
  - **VCT to be operationally and functionally tested at 100% of rated load.**
  - **VCT to be factory load tested to 125% of rated load.**
  - **VCT maximum width to be 19'-0"**
  - **VCT maximum length between ends of front and rear tow eyes to be 24'-4"**
  - **VCT to be provided with a coating system including an epoxy base coat/primer and a polyurethane top coat**

Vertical Cask Transporter - Design

VCT Critical Performance Characteristics

- VCT fuel tank capacity shall be limited to a maximum of 50 gallons
- VCT travel speed under full load to be 0.5 mph on level ground
- VCT shall be capable to operate under full load with a maximum grade of 10%
- VCT shall be able to maneuver under full load with a roadway side to side slope of up to 4%
- VCT shall limit average ground bearing pressure under full load to less than 50 psi
- VCT to be capable of operating in rain or snow and a temperature range of 0^0F to 104^0F at 0% to 100% relative humidity

Vertical Cask Transporter - Design

VCT Critical Performance Characteristics (cont)

- Nil-ductility temperature criteria applies to ferritic plates only in the load path for operations down to 0^0F
- VCT under full load to have full autorotation capability
- VCT shall be provided with an Automatic Wedgelock System (e.g., a redundant drop prevention system replacing manual pins).
- VCT to be provided with a night lighting system (4 front and 4 rear lights).
- VCT to be provided with a Computer Assisted Remote Lifting (CARL) control system including radio remote controls
- VCT shall be provided with a mechanical or electronic stop to prevent a loaded VCC from exceeding cask license maximum lift height

Canister Transfer System - Description

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Canister Transfer System - Codes and Standards

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Canister Transfer System - Summary of Structural Analysis

- **Calculations**
  - Detailed structural evaluation of the crane system for normal and extreme (seismic) conditions per ASME NOG-1
  - Confirmed that crane maintains stability during DBE seismic
  - Evaluated Restraints for trolley beam & crane base
  - Evaluated Crane Base Module
  - Evaluated TSC adapter and clevis plate

Canister Transfer System - Summary of Structural Analysis (cont'd)

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Canister Transfer System - Summary of Structural Analysis (cont'd)

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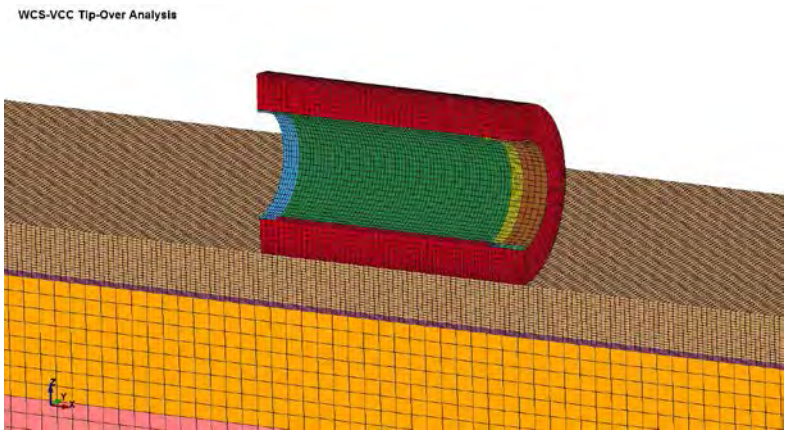
QA and Testing Requirements

- Hydraulic lift manufacturer supplies lifting booms
- Hydraulic lift manufacturer's QA Program will meet ASME NQA-1
- Balance of structural components (lift beams, trolley beams, cross bracing, etc) provided by manufacturer on NAC's AVL. Also performs system integration/assembly
- Same manufacturer performs NAC Specification defined operational and load testing of the crane
- ASME NOG-1 Table 7210-1 identifies required inspection and testing
- Load testing per ASME NOG-1 Section 7420

Site Specific Storage Pad Design and Cask Tip-over Evaluation

- **Single Pad Design for all NAC Vertical Storage Cask designs**
  - **Implements WCS site specific geotechnical attributes (soil) and seismic requirements (NUREG-0800)**
- **Each NAC storage system design will be evaluated for tip-over**
  - **Implements site specific pad design**
  - **Ensures current SAR bounds WCS site specific conditions**



CISF RECEIPT INSPECTION/EVALUATION

- **Preparation for Transport and Transport of the canisters is not part of this licensing action**
  - **Process will necessarily provide reasonable assurance that the canisters are acceptable for transport at the time of shipping**
- **Normal Part 71 and 49 CFR receipt inspections of the package will be performed at WCS site**
- **Records surveillance to verify "chain-of-custody" from canister fabrication through shipment to the WCS CISF**
  - **Verify canister was fabricated, loaded, placed into storage and maintained in storage (including any AMP), and shipped in accordance with applicable license and certificate requirements**

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- **Place suspect canisters back in a transportation cask**
  - **Transportation cask for each system provides confinement barriers that isolate any materials leaking from a canister**
  - **Develop recovery plan based on specific conditions**
  - **Upon evaluation and licensing actions**
    - Perform additional inspections
    - Obtain appropriate licensing revisions or amendments
    - In situ repair
    - Off-site shipment for repair or repackaging

CANISTER WASHING

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SUMMARY & CLOSING COMMENTS

Summary

- Site Layout has been “Finalized”
- Part 71/Part 72 Interface
  - Transportation not a part of this license application
  - 71/72 Interface at Receipt of Transport Cask
- Level of Detail for the Design of the Building/Crane and Canister Transfer System
  - NUHOMS® lifts less then 80” – NITS
  - NAC Transfer System fully analyzed and summary provided in SAR
- CISF Receipt Inspection/Evaluation

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