OAK RIDGE National Laboratory | SECOND TARGET STATION

Vessel Systems/Target Station Shielding PDR - Remote Handling Overview

Steve Schrick

4/21/2025

U.S. DEPARTMENT OF ENERGY

ORNL IS MANAGED BY UT-BATTELLE LLC
FOR THE US DEPARTMENT OF ENERGY

Objective – Show RH features to meet VSS/TSS requirements

VS-Remote Handling Interface - **PASS**

1. Vessel Systems shall provide lifting interfaces for all removable Vessel Systems components per Interface Sheet S03000000-IST10006.
2. Vessel Systems shall provide power and control requirements for the gamma gate linear actuator to Remote Handling per Interface Sheet S03000000-IST10006.

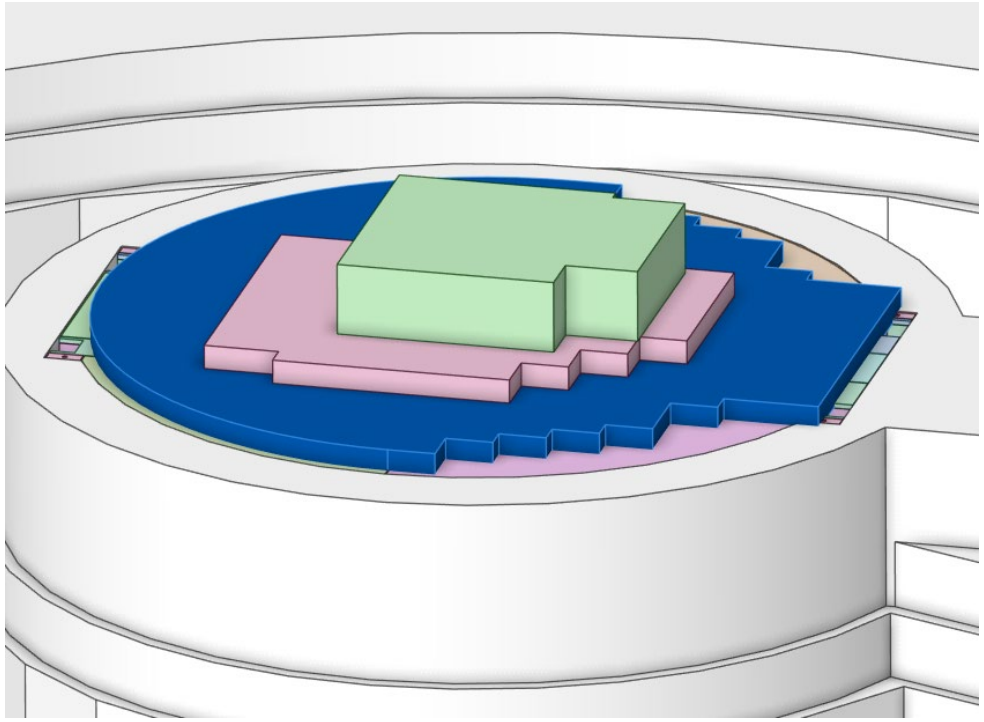
TSS-Remote Handling Interface - **PASS**

1. Target Station Shielding shall provide lifting interfaces for all removable Target Station Shielding components per Interface Sheet S03000000-IST10007.

Preliminary RH Procedure

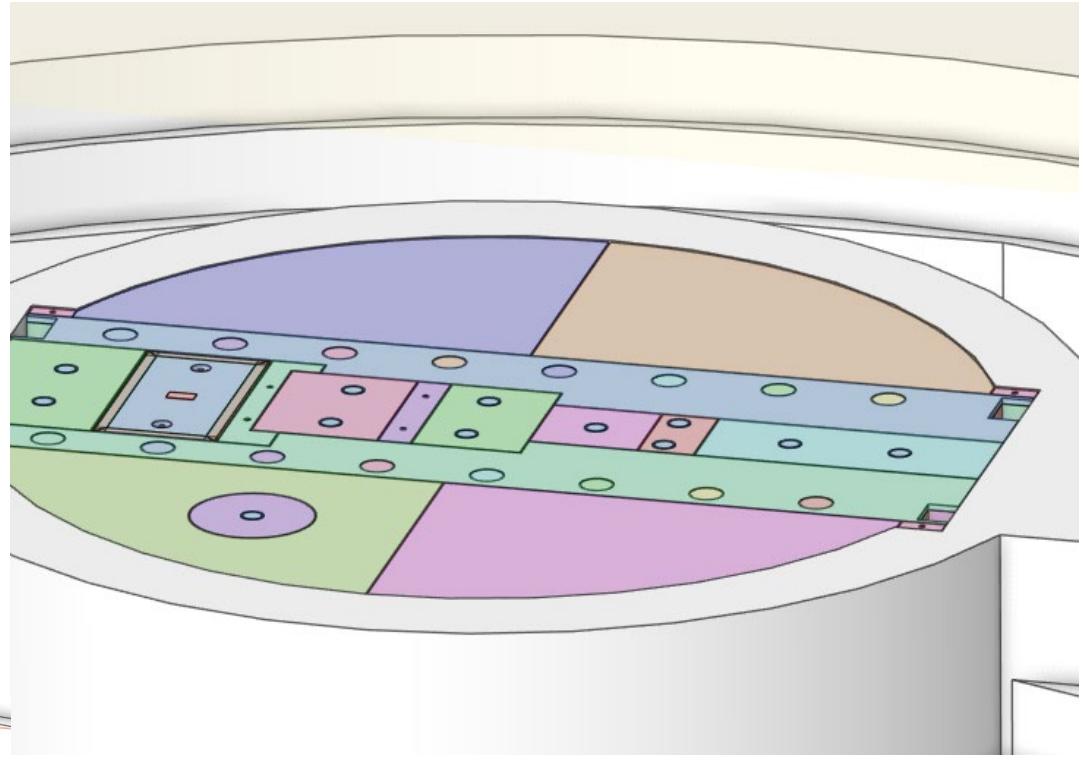
***Assumes beam-off conditions established. Entry into TDR after 8 hours of decay time.**

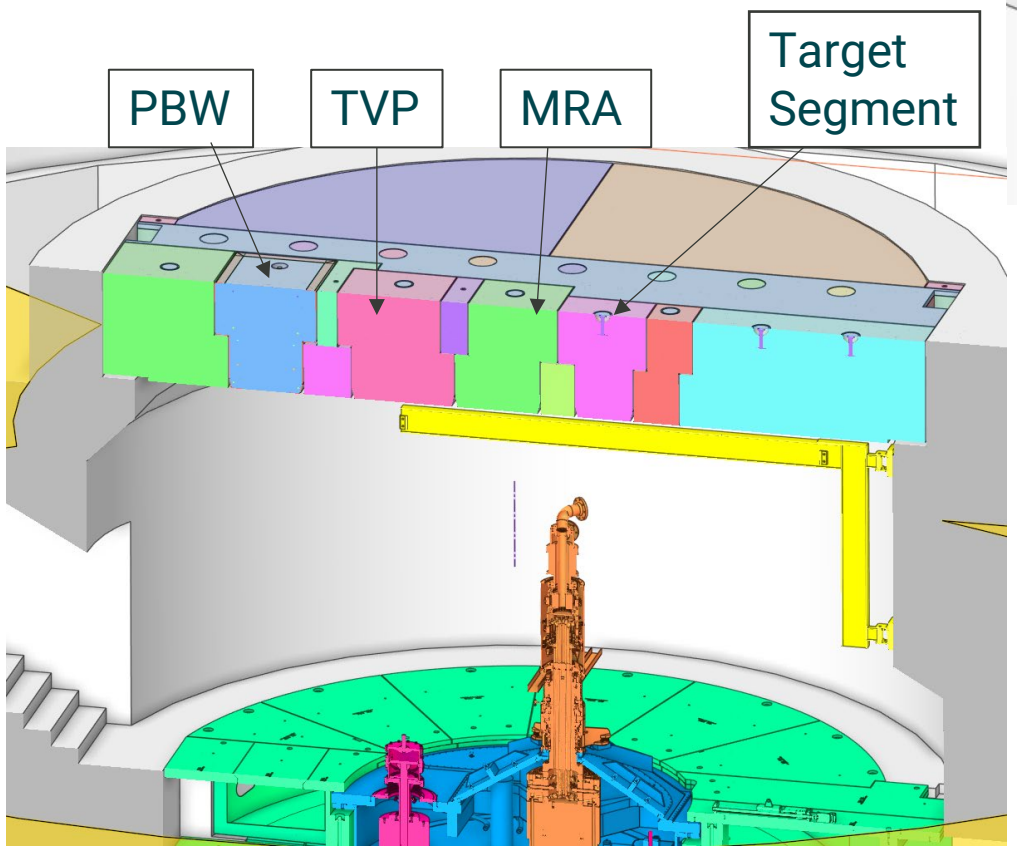
- Access into TDR from high bay during maintenance event
    - High bay crane removes TDR supplemental shielding



Preliminary RH Procedure

- Remove specific TDR roof hatch plug based on maintenance activity to be performed.
  - For removal/replacement of a core vessel component, only one TDR plug will be removed during that operation.

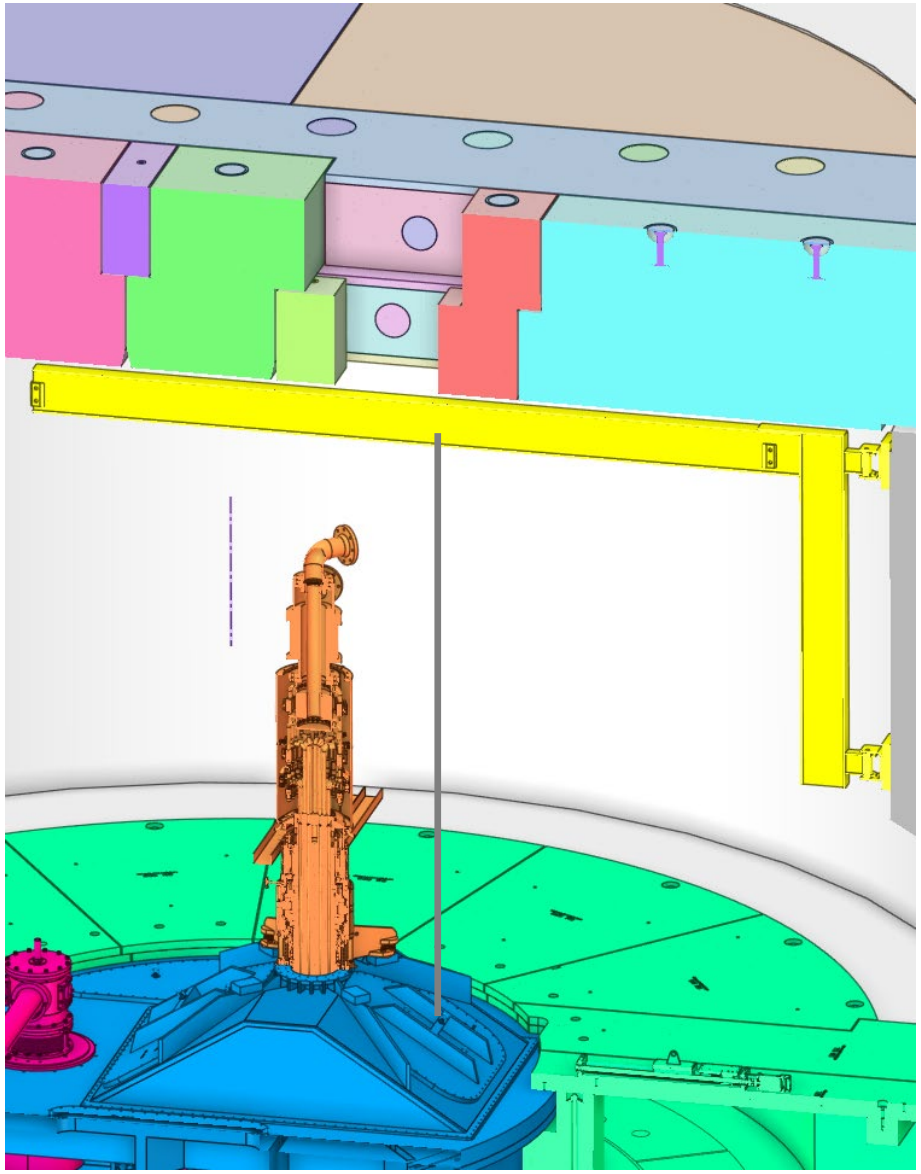




Preliminary RH Procedure

- Remove specific core vessel tent hatch cover (MRA or target segment) based on maintenance activity to be performed.
  - Use internal jib crane and chain hoist (not shown) to rig to hatch cover and lift off.
  - Transfer within TDR and place on floor.

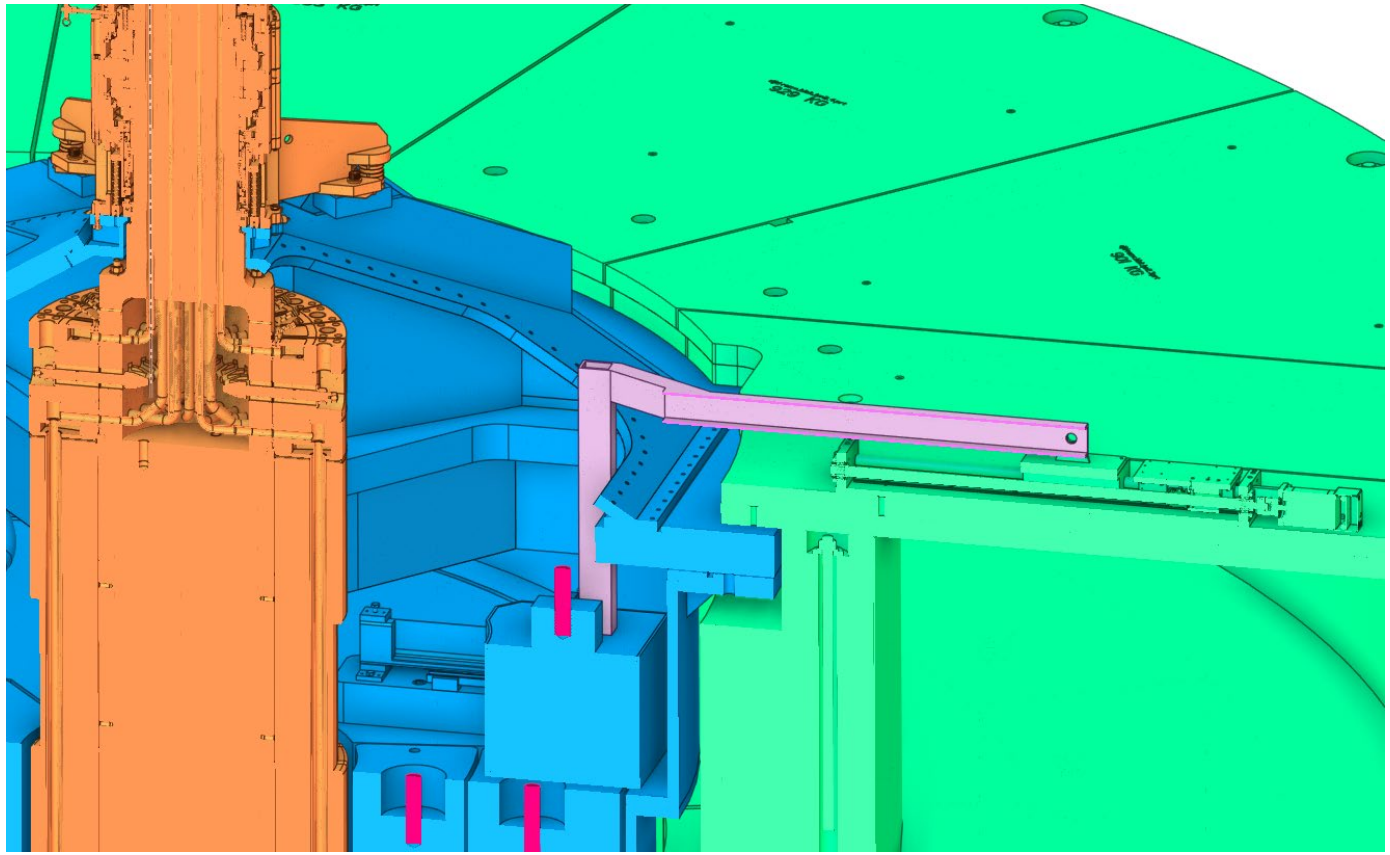
Personnel accessible



Preliminary RH Procedure

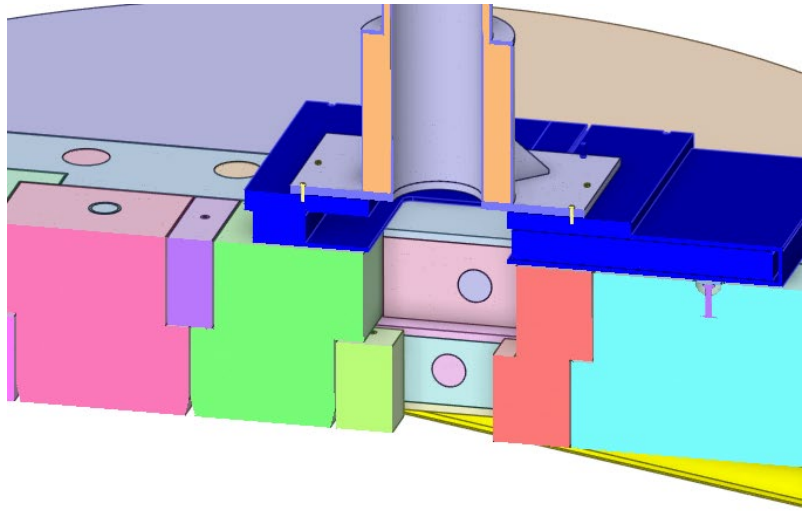
- Connect CV gamma door linkage to drive system

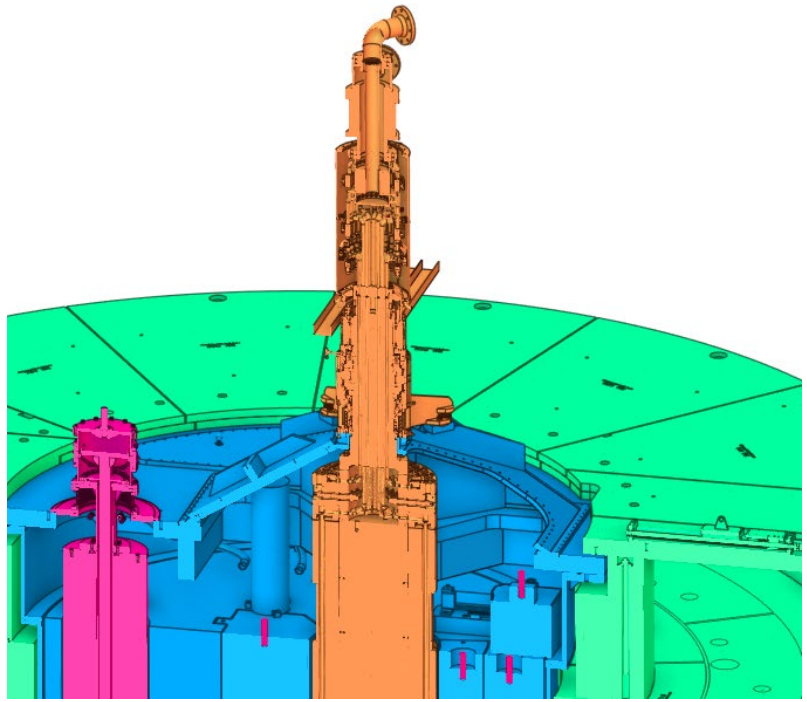
Personnel accessible



Preliminary RH Procedure

- Transfer and install gamma door onto TDR roof
- Transfer and install shield block cask onto gamma door
- Install portable hoist on top of cask

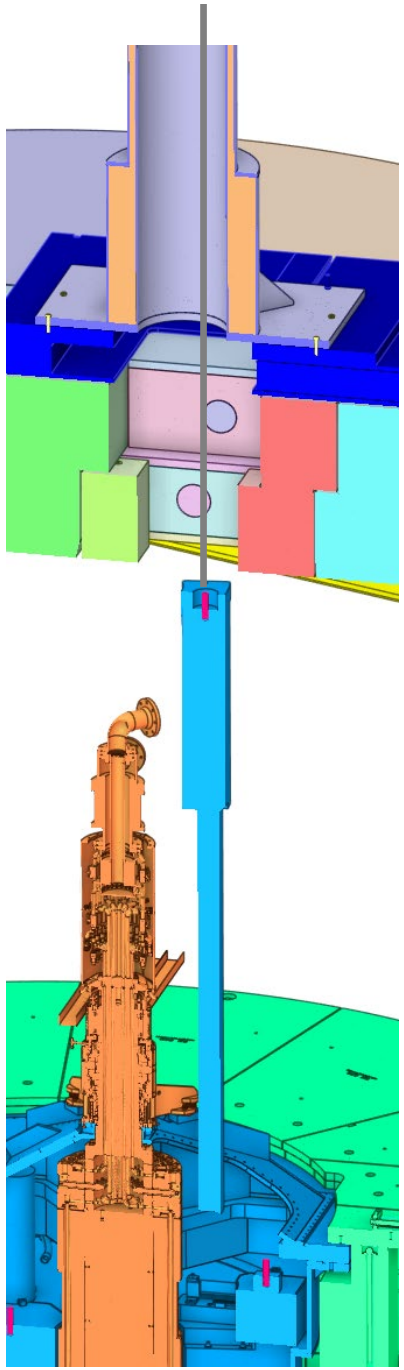




Preliminary RH Procedure

- Retract shield block up into cask using portable hoist.
  - Remote viewable (rad tolerant) cameras will be positioned within TDR to provide visual observation of lifting process.
  - Standard interface with core vessel removable shield blocks is the Ziplift grapple – 1.5” threaded stud

No personnel in TDR during lifting operations

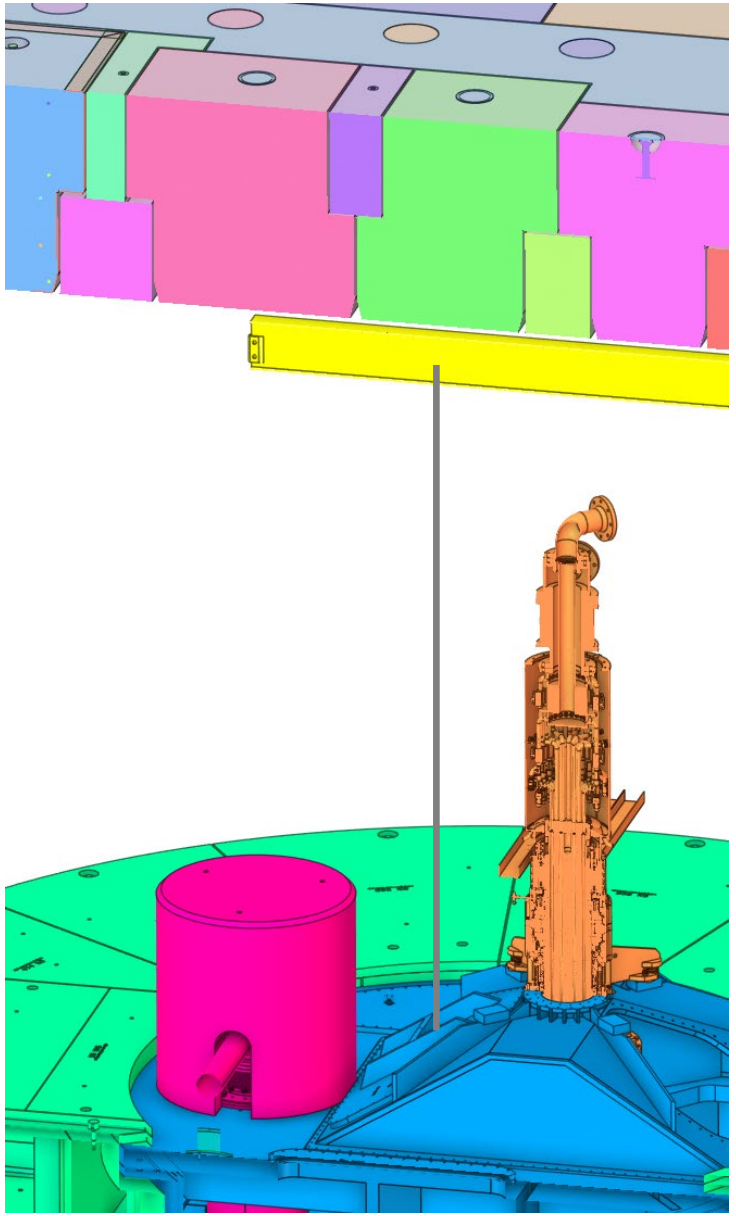


Preliminary RH Procedure

- Close CV gamma door
- Close TDR gamma door
- Pin shield block to cask
- Secure bottom closure on shield block cask
- Remove portable hoist
- Transfer cask + shield block to high bay temporary storage area.

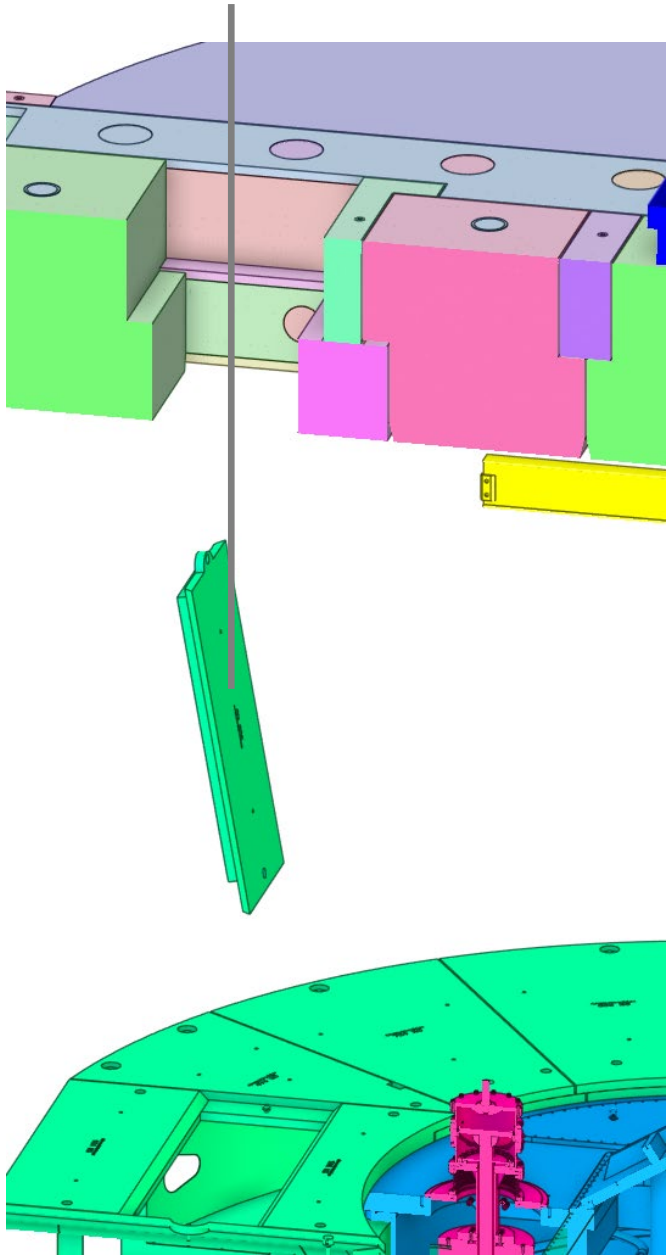
Preliminary RH Procedure

- MRA hatch access via jib crane. General removal operations similar process as for target segment
- TVP (doghouse) shielding removed thru TDR roof hatch via highbay crane



Preliminary RH Procedure

- PBW access requires multiple manipulations of pipe pan cover plate to extract from TDR using high bay crane.
- TDR jib crane cannot reach.
- Alternate portable lifting solutions within the TDR might be viable.



Conclusion

- Overall development of remote handling tooling and processes seems appropriate to support vessel systems and target station shielding preliminary design.
- All RH requirements are satisfied
- Additional planning, development, and testing will occur to support RH operations