

SNS Mercury Target Status



2nd International High-Powered Target Workshop

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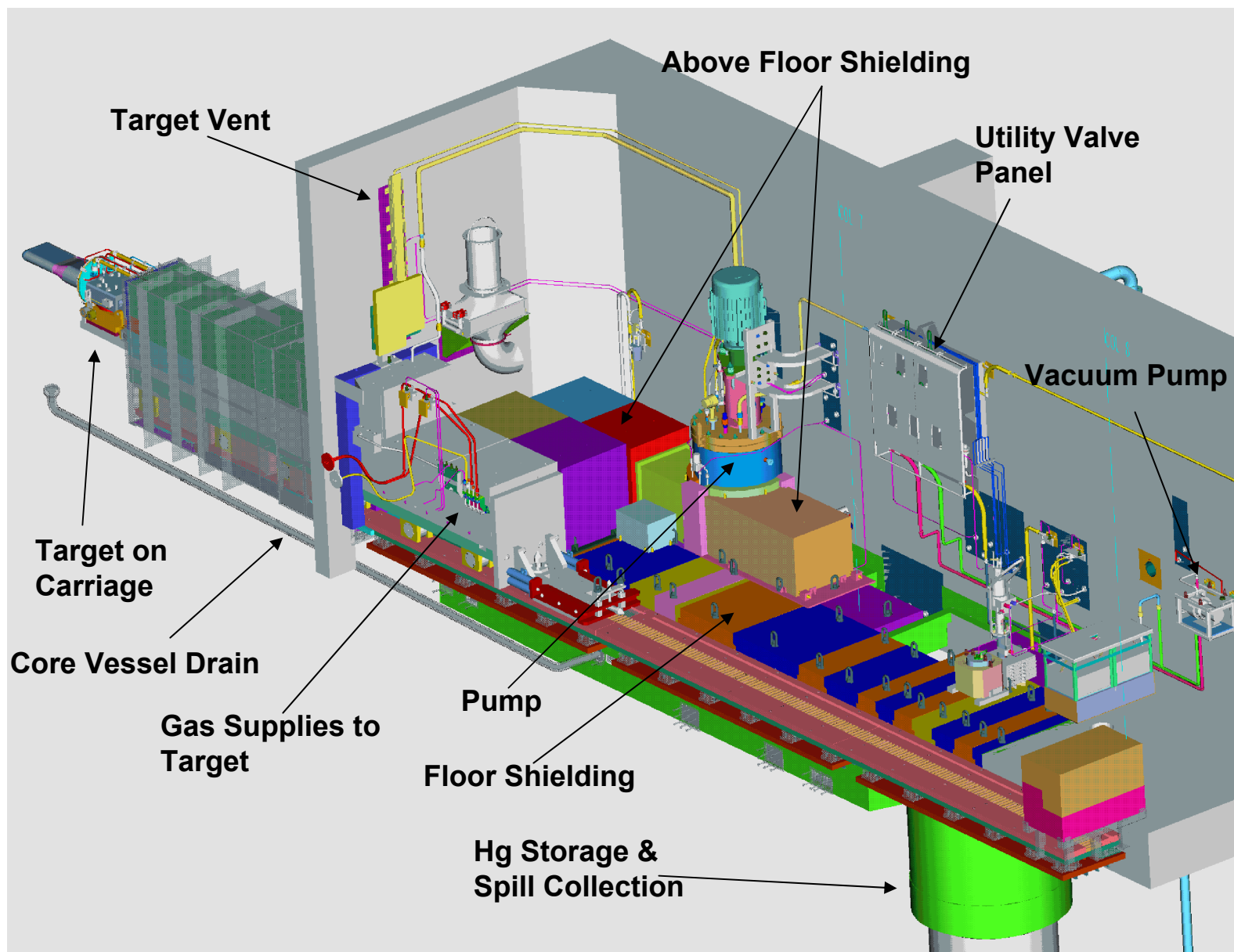
October 10, 2005

Status of SNS Target & Mercury System

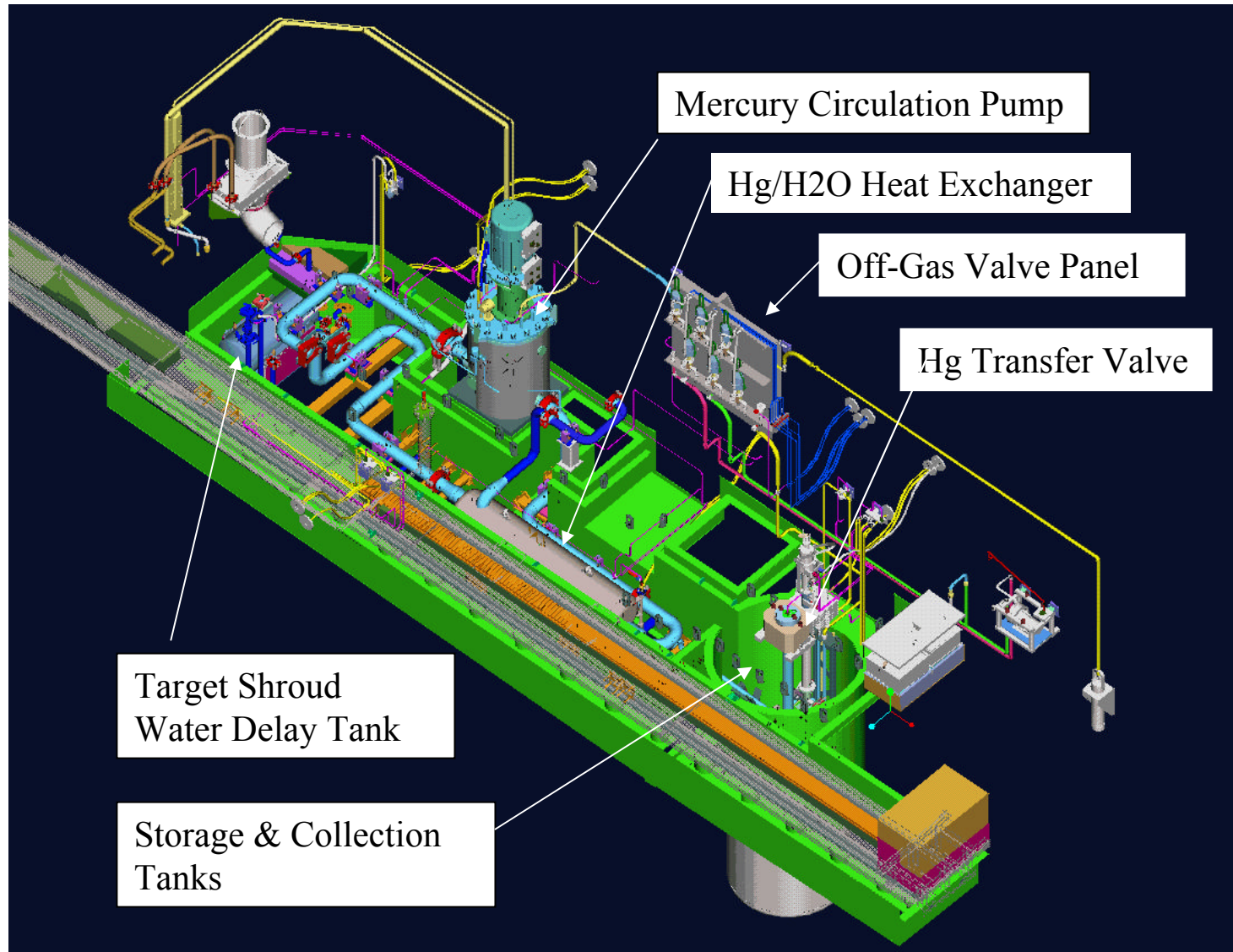


- The assembly of target carriage & mercury loop in the service bay was started in June 04 and was completed in February 05
- Target module was installed in June 05
- The target loop has been run with H₂O to verify flow parameters
- Remote Handling testing are currently being conducted
- Mercury will be loaded in November

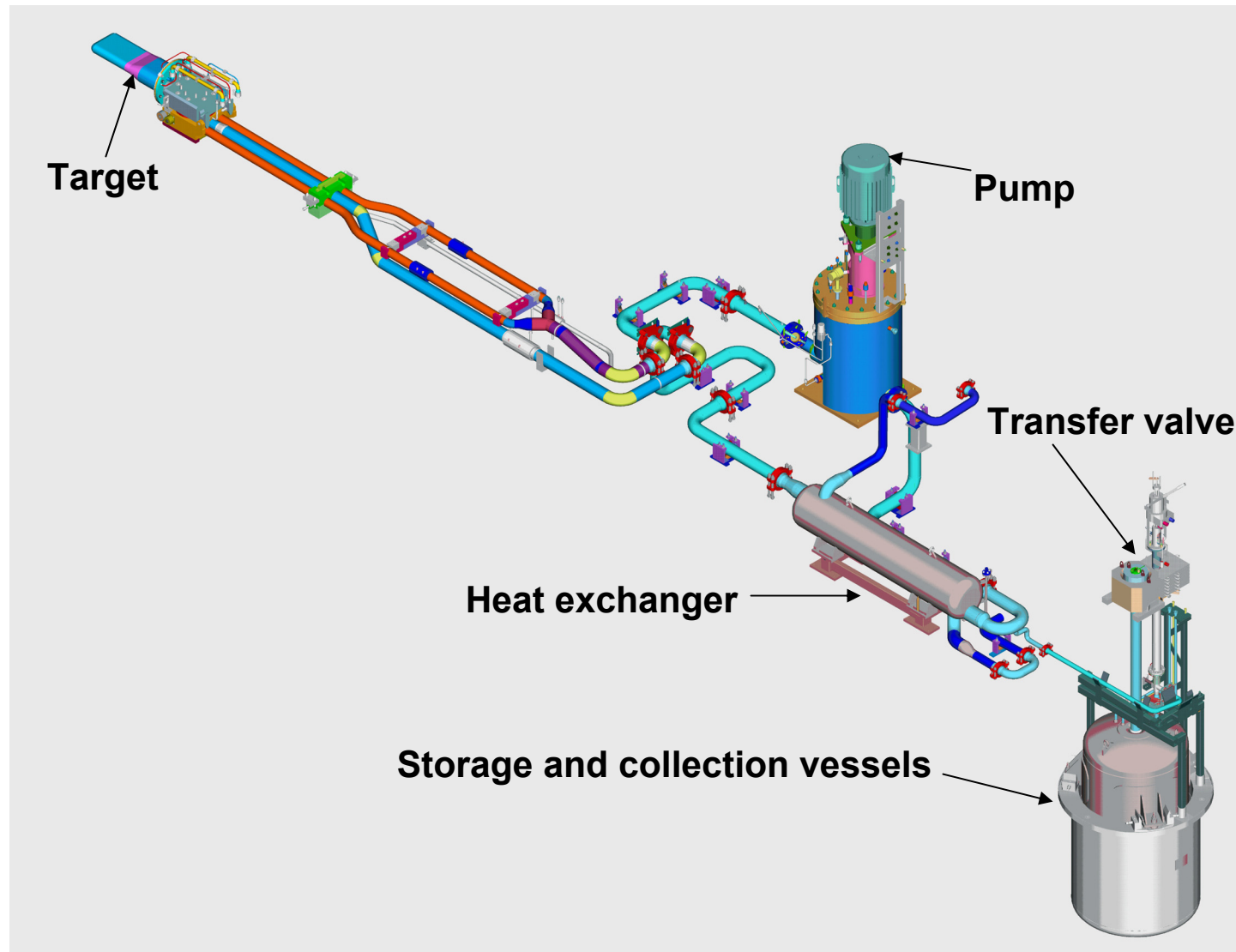
SNS Mercury Target System



Mercury Process Loop Components



Mercury Process Loop Isometric View

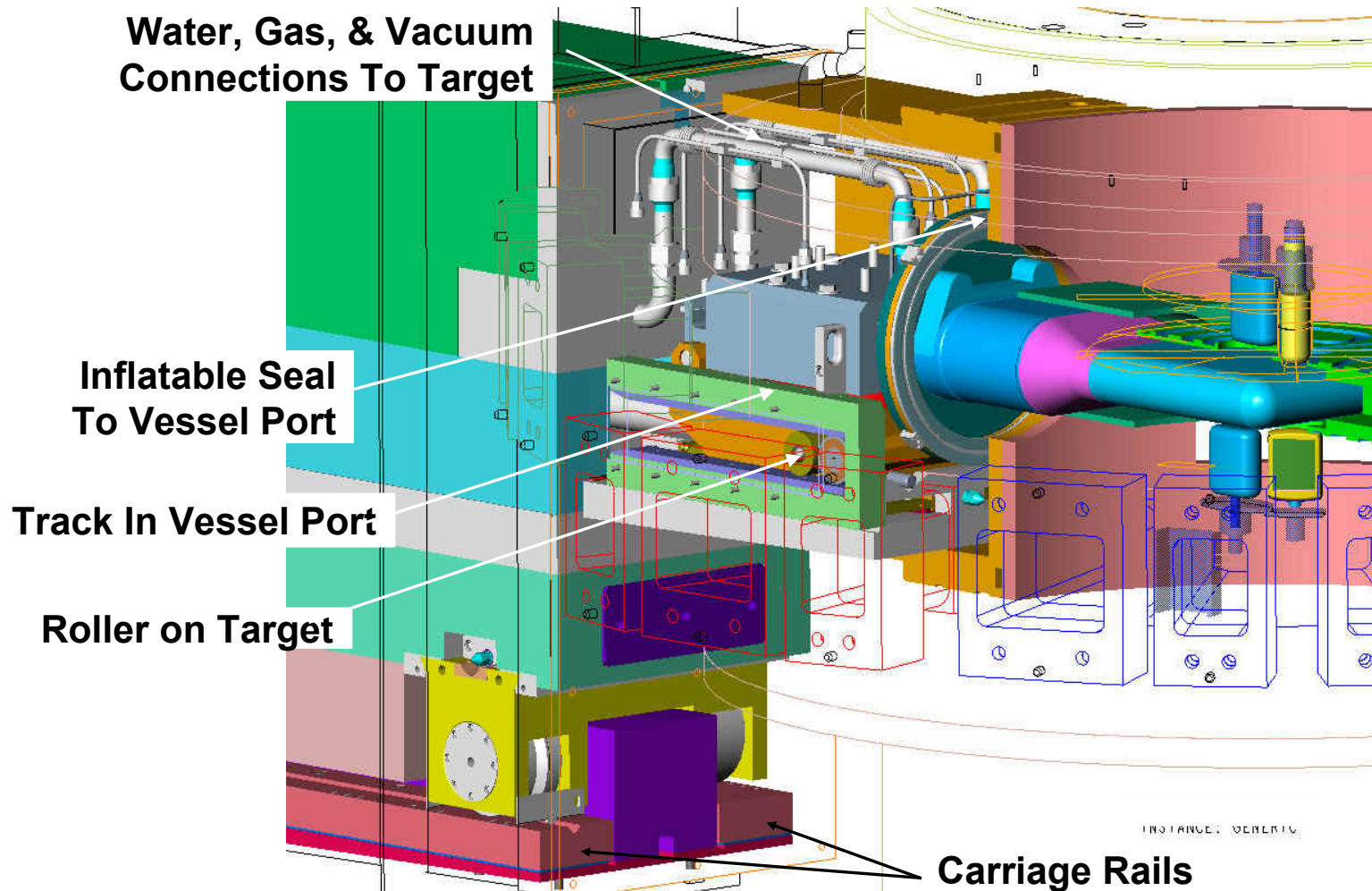


Mercury Flow Parameters

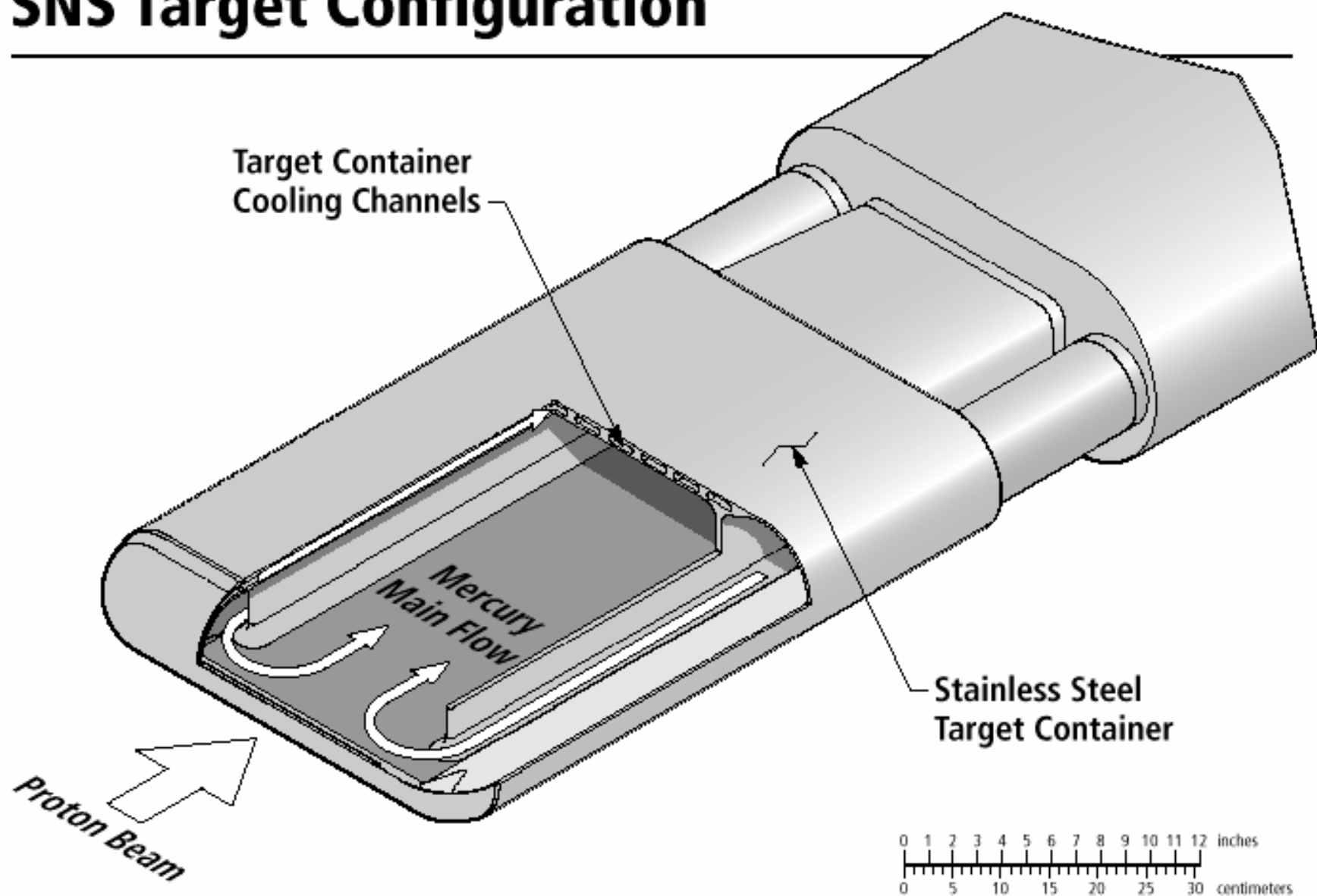
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Mercury volume	380 Gallons (1450 l)
Mercury Weight	21.5 tons
Pump speed	440 RPM
Total flow	380 GPM (24.5 l/sec)
Window flow	25 GPM (1.5 l/sec)
Pump nozzle pressure	65 PSIG (4.5 bar)
Bulk target pressure	45 PSIG (2.8 bar)
Window target pressure	42 PSIG (2.9 bar)
Average flow velocity	3 FPS (1 m/sec)
Maximum mercury temperature	195 °F (90 C)

Detail of Interface Between Target Carriage and Core Vessel



SNS Target Configuration



View of Service Bay At Start of Target System Installation, May 2004



A Pit In the Floor Contains the Hg Storage Tank and Spill Collection Basin



Collection Basin Installed in Pit



Storage Tank in Collection Basin

The Mercury is Circulated by a Centrifugal Pump

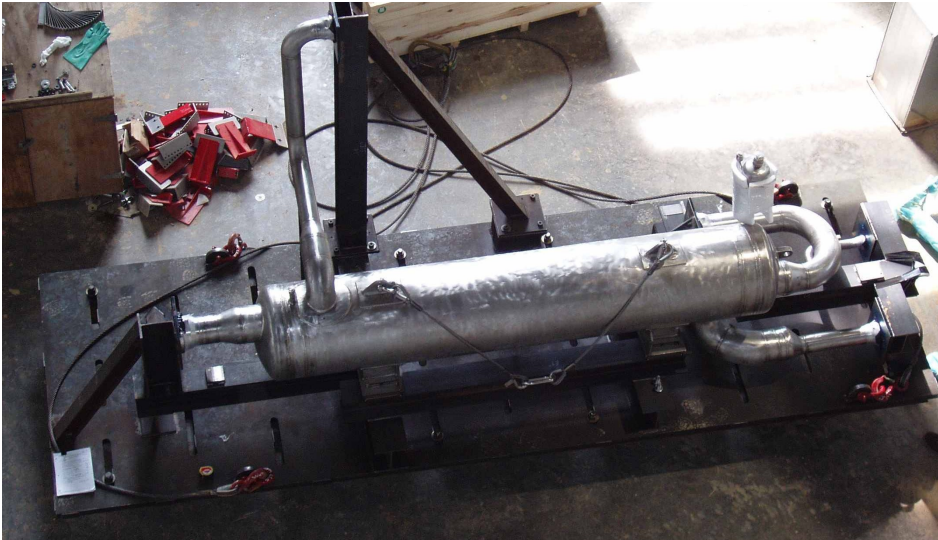


External View of Pump

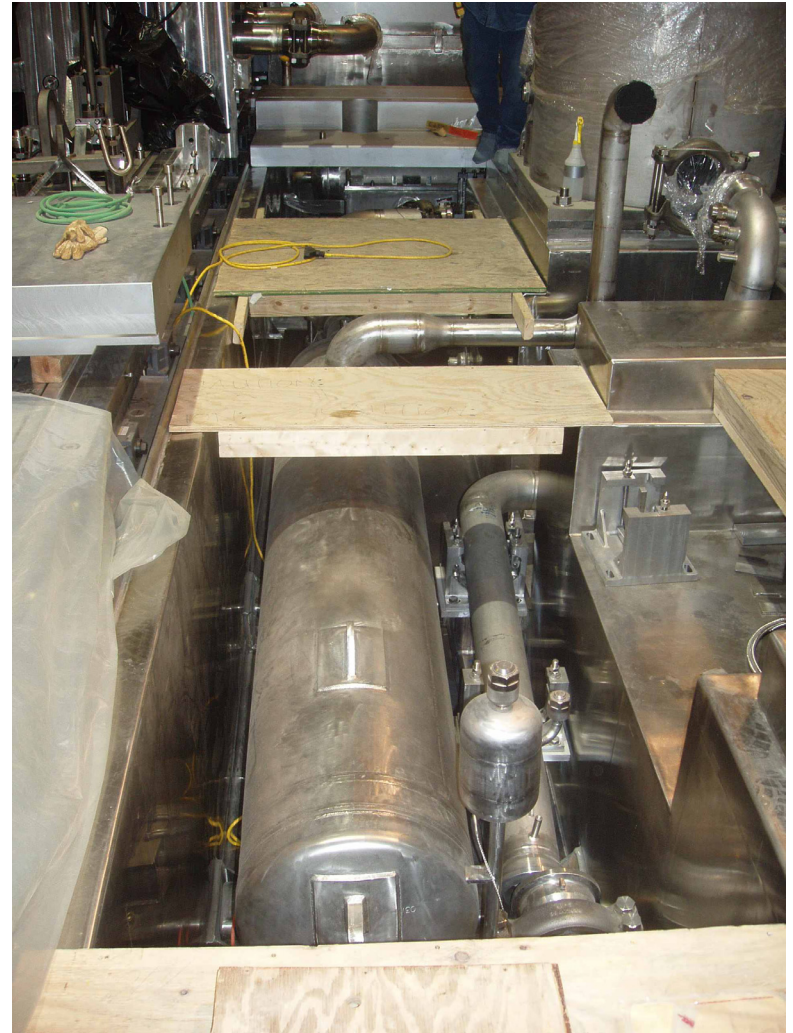


Pump Removed From Vessel

The Mercury Loop Contains a Double Wall Heat Exchanger

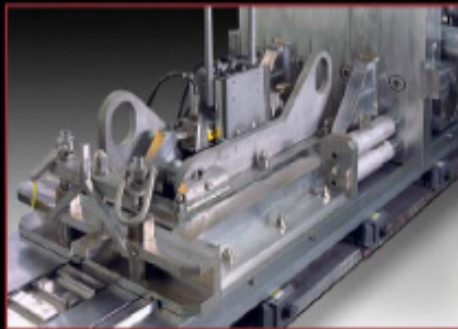
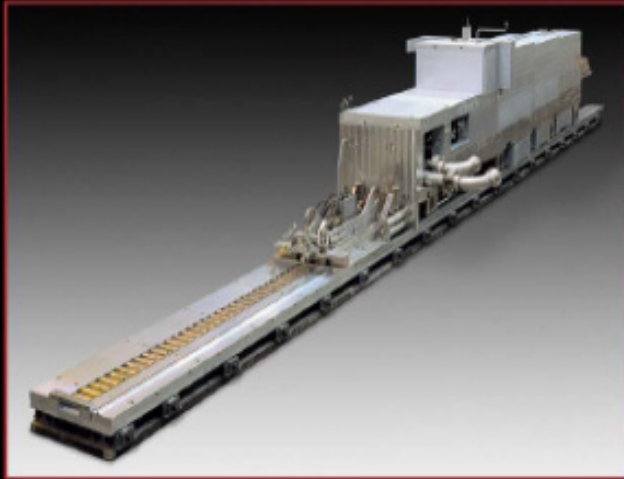


**The Heat Exchanger Was Fabricated
Using a Fixture to Locate The Nozzles
So That an Interchangeable Unit
Could be Built in the Future**

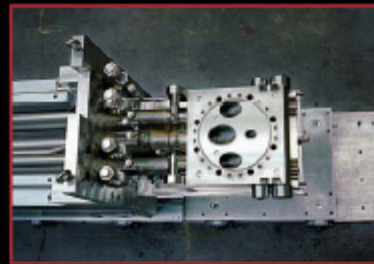
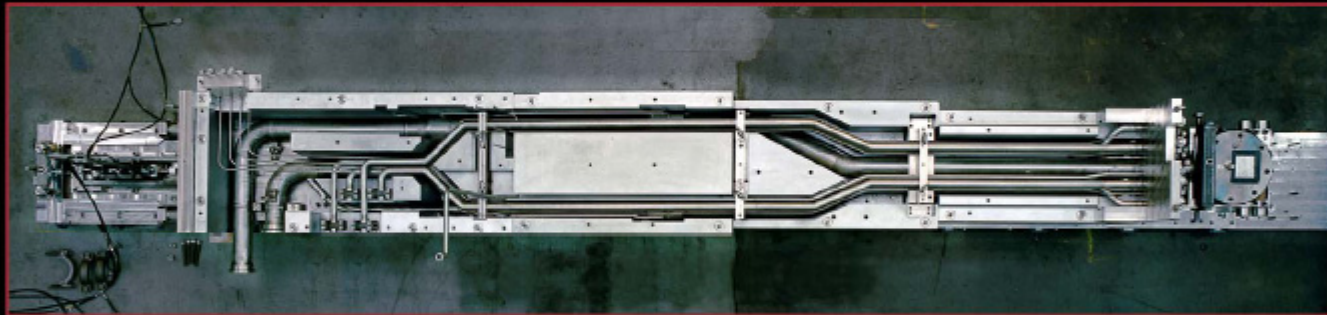
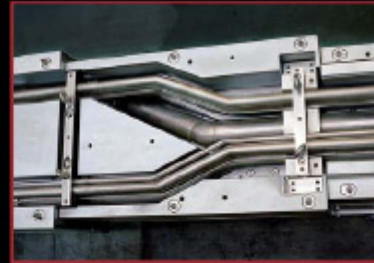
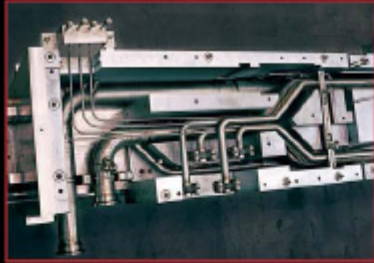


H.X. Installed in Service Bay

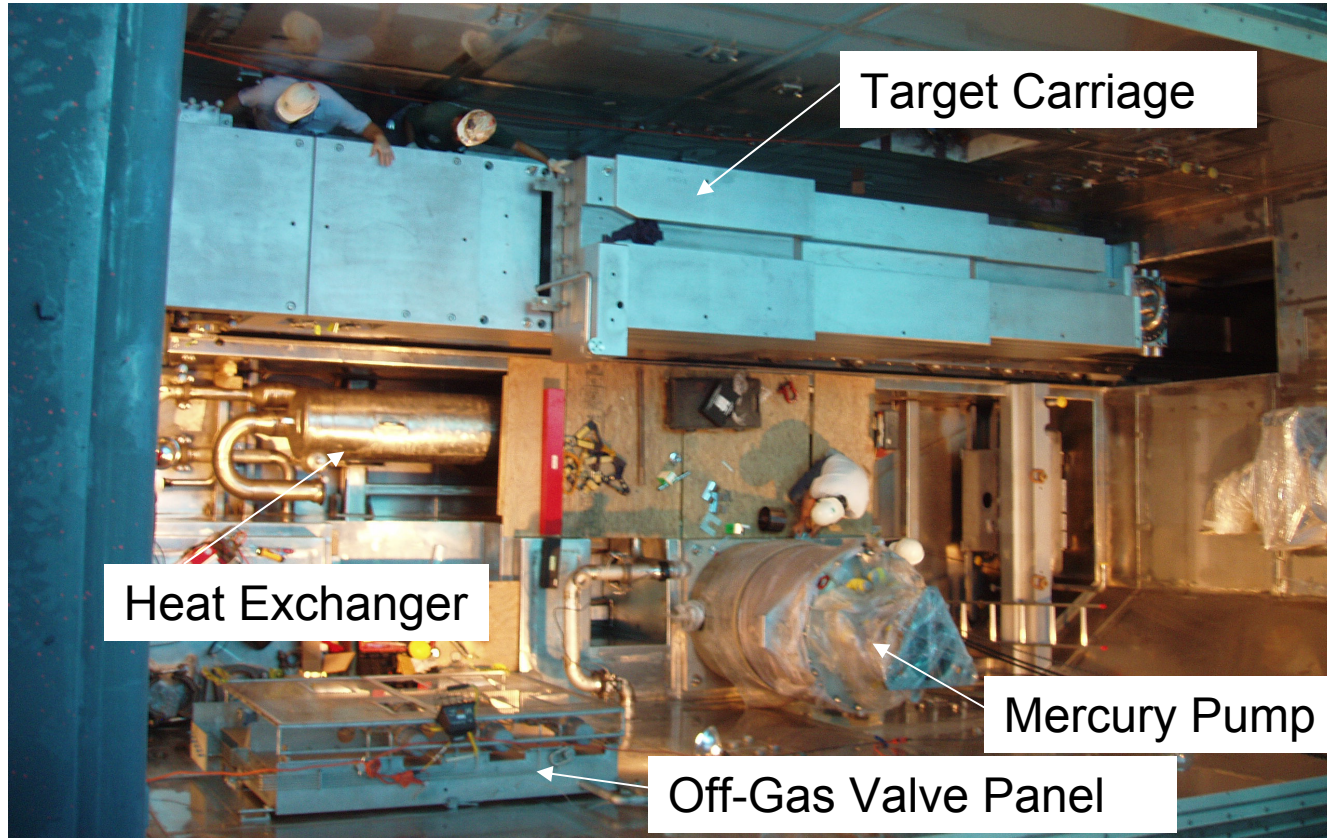
Target Carriage at Vendor in August 2004



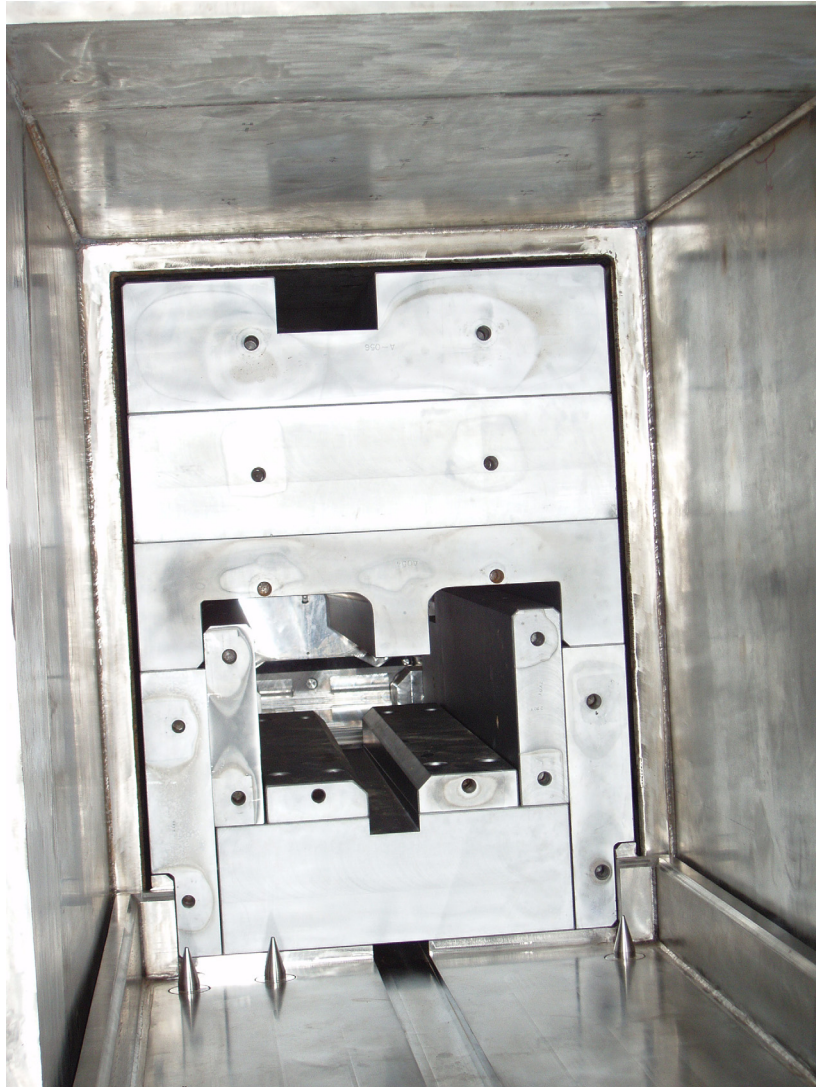
Target Carriage Piping



Overhead View of Installation In Service Bay – Sept '04



Very Good Alignment Achieved in Carriage Installation



Rail Flatness

2 Rails @ 63 Ft (19 M) long

+/- 0.003 in (0.07 mm)

Carriage to Tunnel Gap

Checked at 51 Places

Avg. = 0.44 in (11.2 mm)

Std Dev. = 0.07 in (1.8 mm)

Max = 0.53 in (13.5 mm)

Min = 0.28 in (7.1 mm)

Target Parallelism to Beam Horizontally

Offset = 0.005 in (.13mm)

Angle = 0.003 deg.

Vertically – 0.01 deg.

SNS Target Module

Weight: 2,490 lbs (w/o Hg) (1,130 kg)

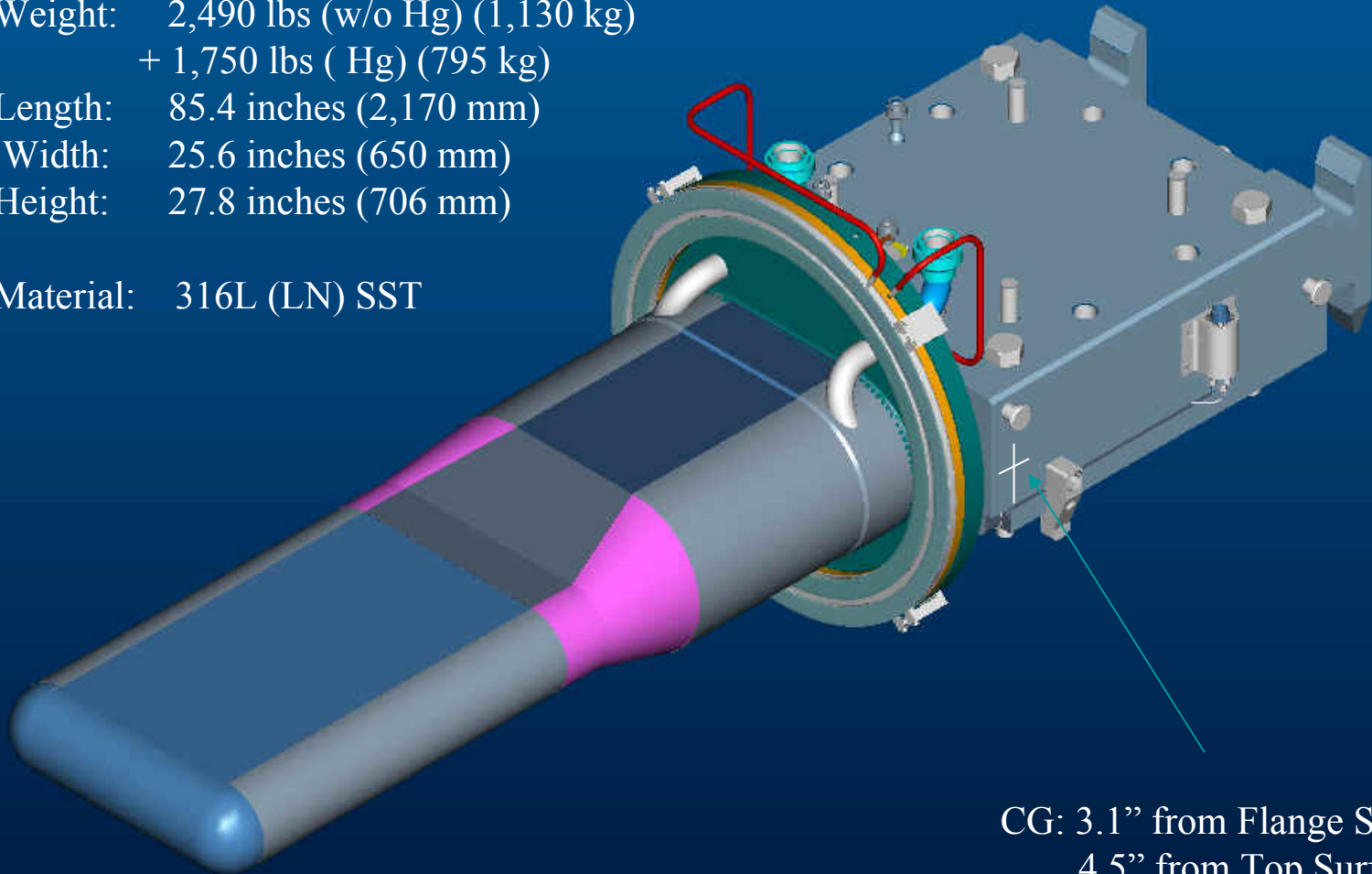
+ 1,750 lbs (Hg) (795 kg)

Length: 85.4 inches (2,170 mm)

Width: 25.6 inches (650 mm)

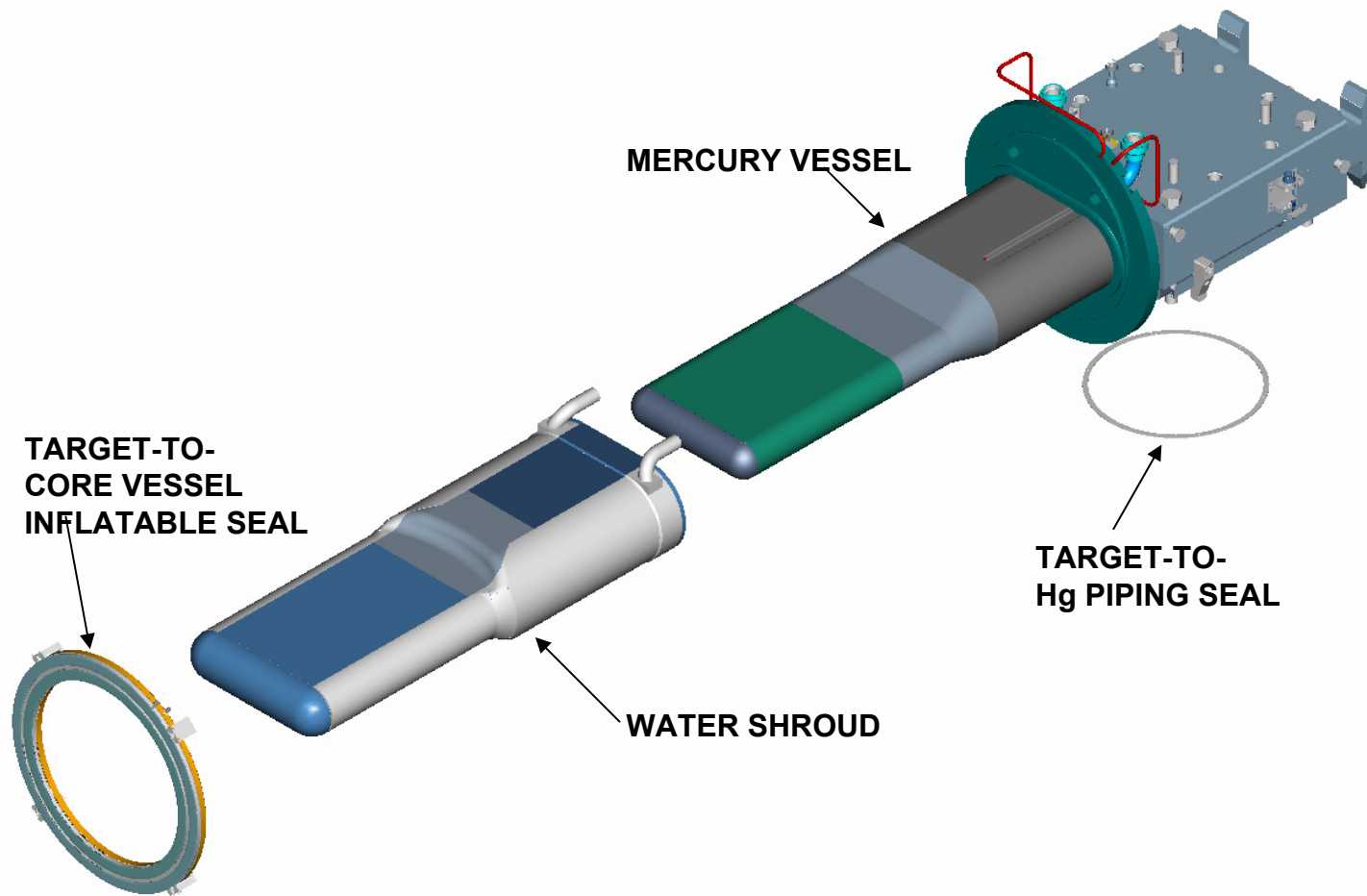
Height: 27.8 inches (706 mm)

Material: 316L (LN) SST

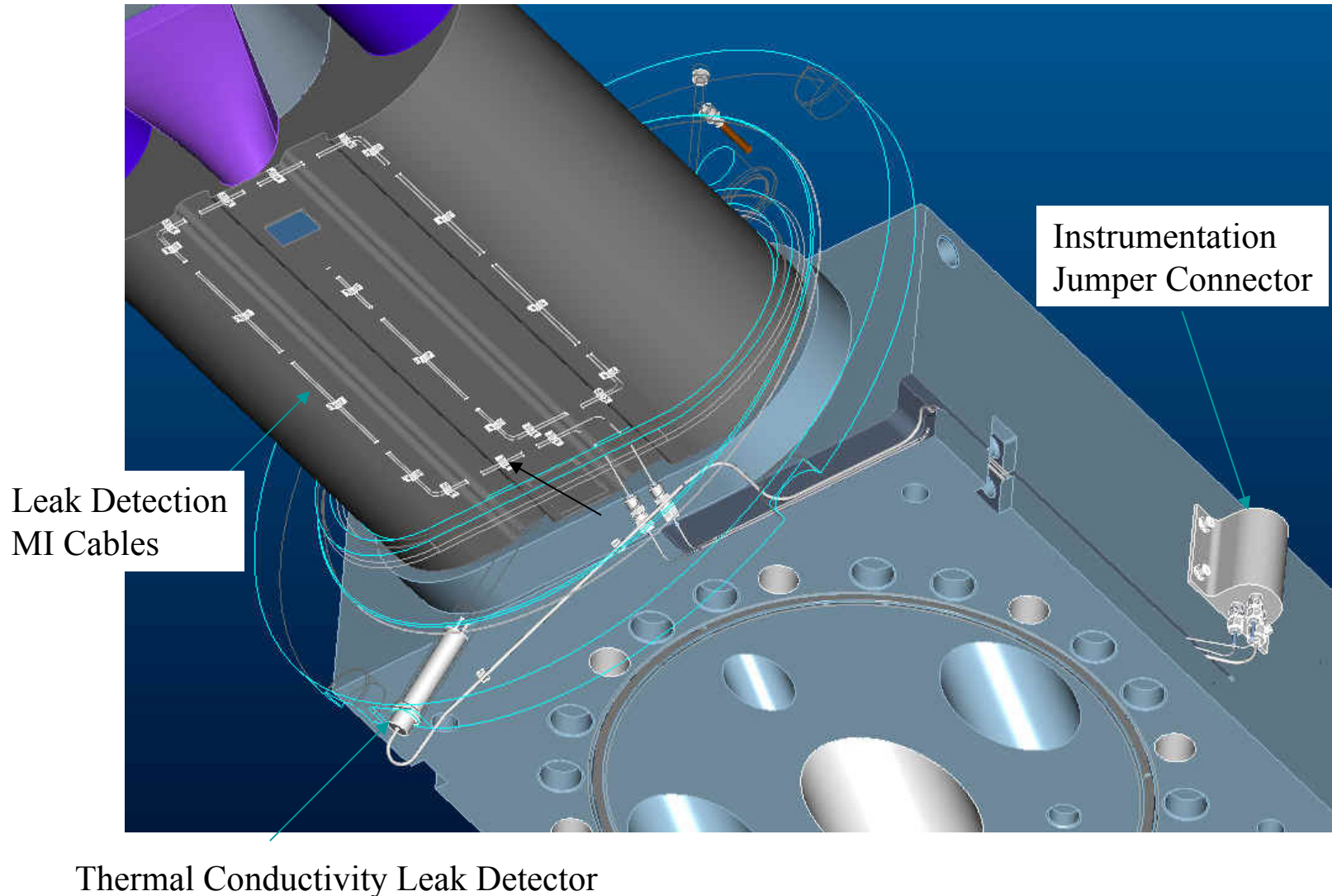


CG: 3.1" from Flange Surf
4.5" from Top Surf

Exploded View of SNS Target Module

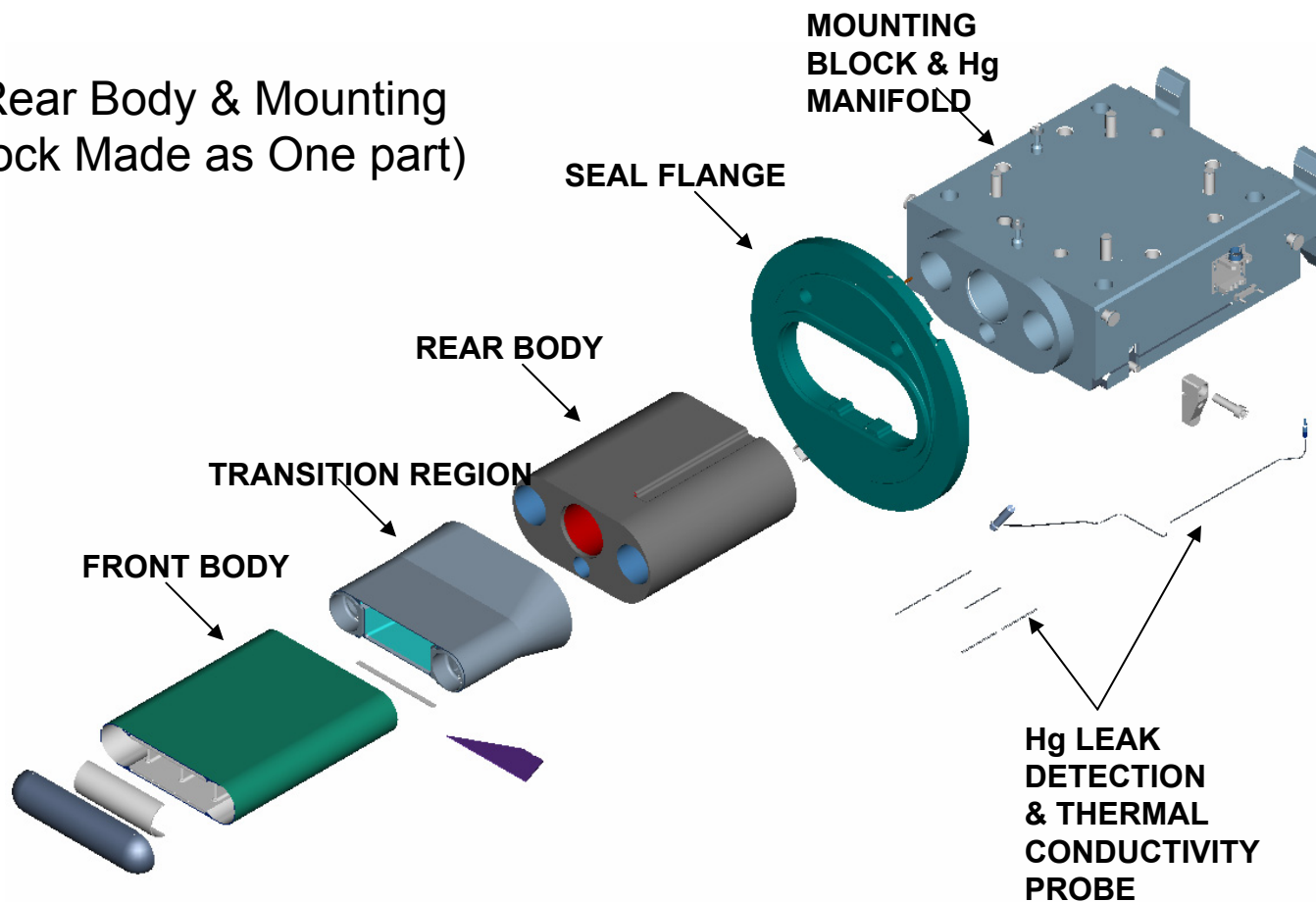


Hg Target Vessel Design



Mercury Vessel Fabrication Components

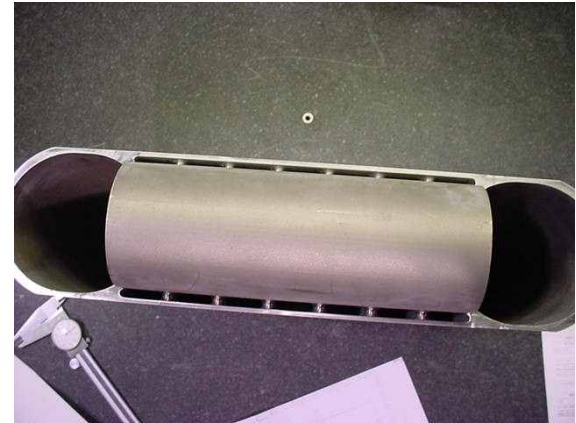
(Rear Body & Mounting Block Made as One part)



Fabrication of Front Body of Hg Vessel



EDM Machining of Front Body

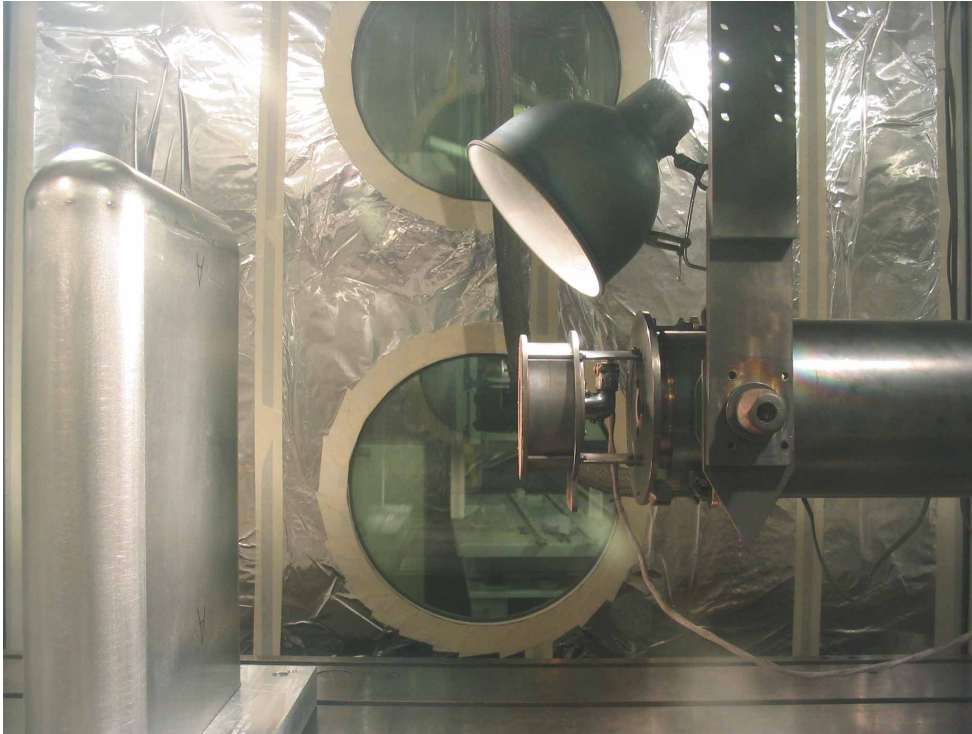


Inner Window Attached



The Front Body/Inner Window Assembly Was Kolsterized

E-Beam Welding of Outer Window To Hg Vessel

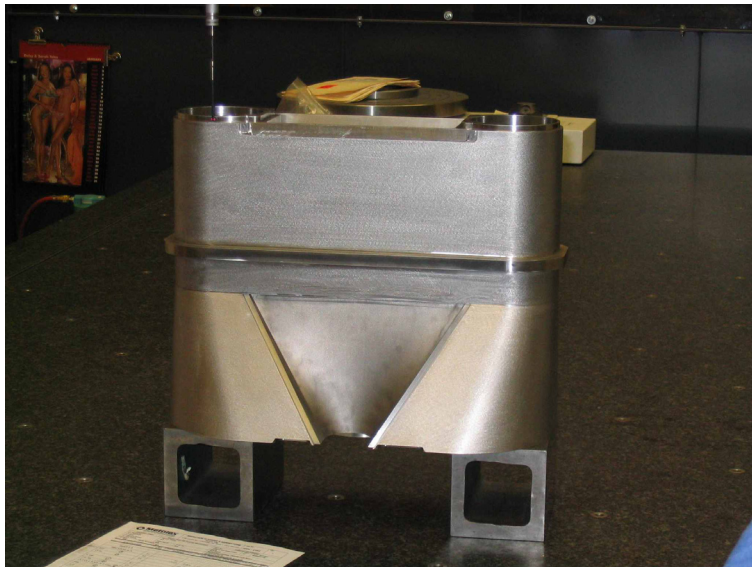


A second Kolsteizing Treatment Was Applied
After The Outer Window Was Attached

Fabrication of Components of Hg Vessel

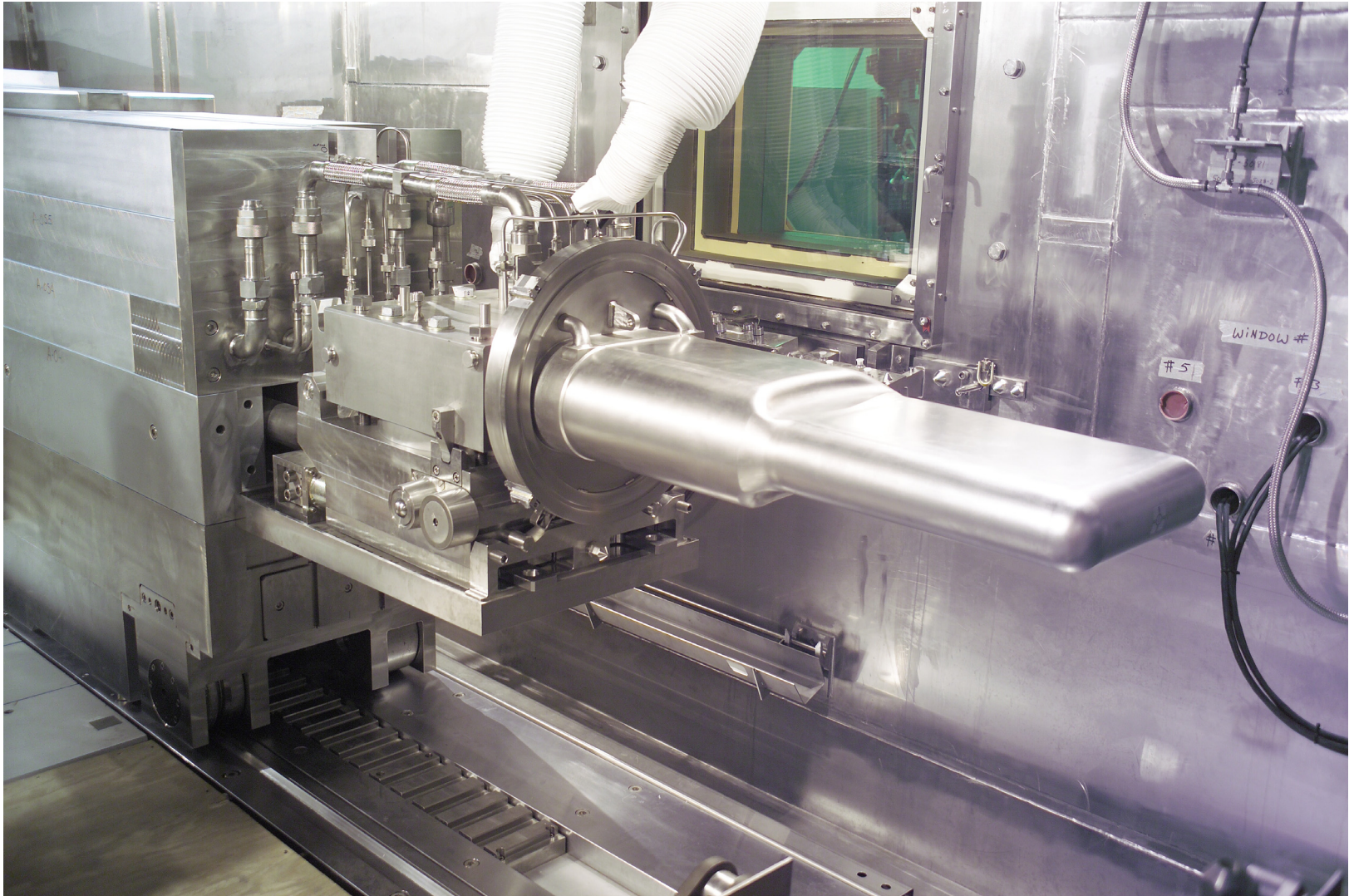


Transition Region

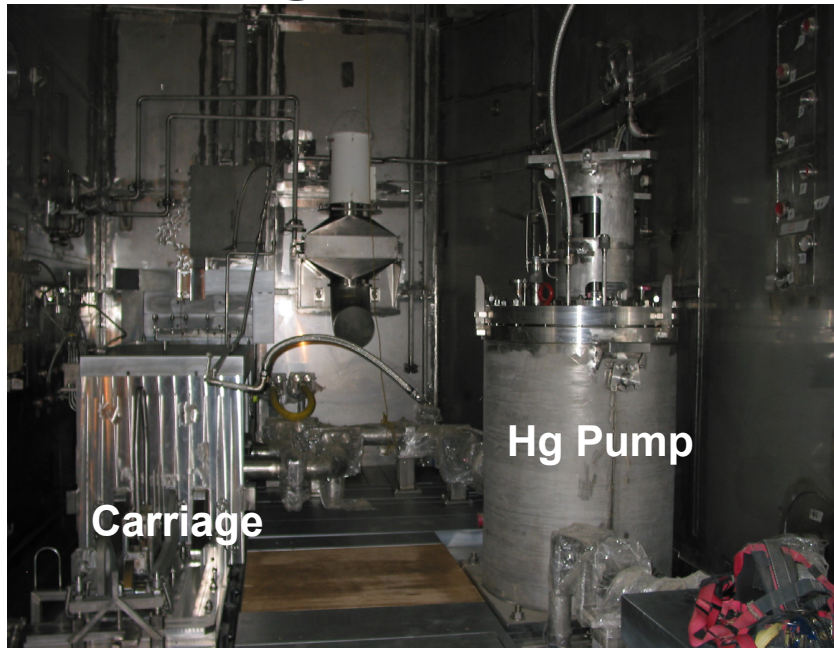


Rear Body with Mounting Block

Target Module Installed on Carriage In Service Bay



Target Service Bay – April 2005



Target Service Bay

- Stainless-steel lined
- 4 window workstations
- 8 through-the-wall manipulators
- 7.5 ton crane
- Pedestal mounted manipulator
- Shielded transfer bay
- XFD to complete installation and testing

