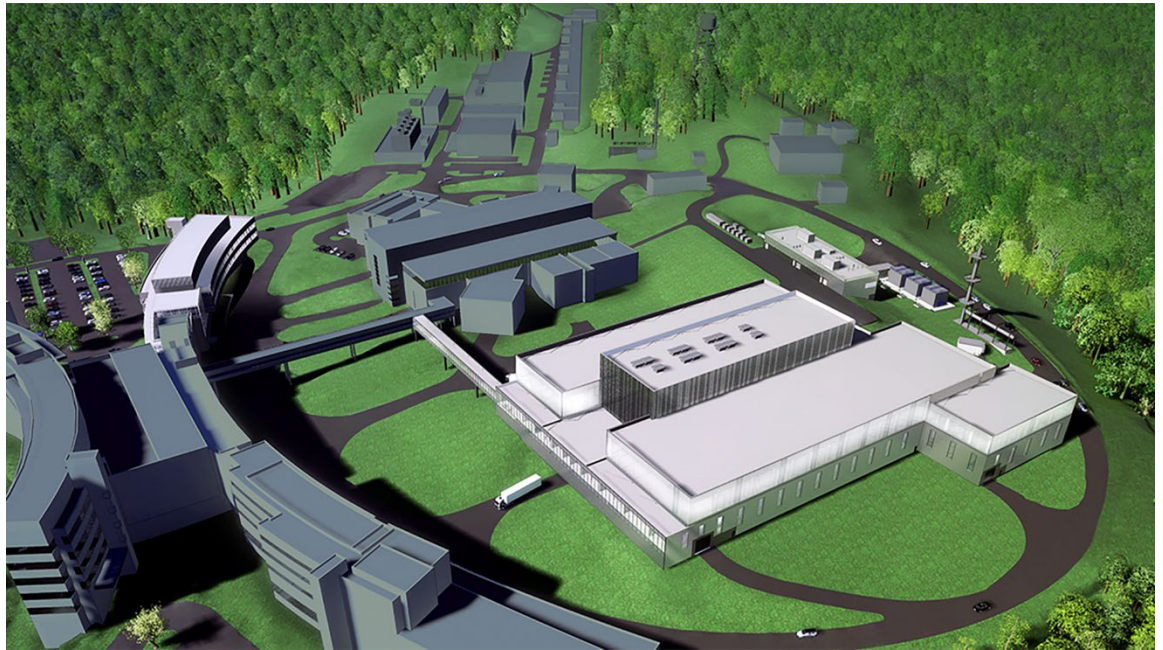


# Second Target Station Project: Interface Sheet – Target Station Shielding (S.03.07) to Process Systems (S.03.09)



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**March 2025**



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Second Target Station Project

**INTERFACE SHEET – TARGET STATION SHIELDING (S.03.07) TO PROCESS  
SYSTEMS (S.03.09)**

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March 2025

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## 1. PURPOSE

This document defines the interface between Target System's Process Systems (PS) and Target Station Shielding (TSS). Requirements derived from this document will be included in the System Design Requirements for PS and TSS.

## 2. SCOPE

The scope of this document is the complete definition for the interface between PS and TSS.

### 1. INTERFACING PARTS OR COMPONENTS

No.	Components (PS)		Components (TSS)	
	Name	Functional reference Number	Name	Functional reference Number
1	Process Systems	S03090000-M8U-8800-A10000.asm	Target Station Shielding	S03070000-M8U-8800-A10000.asm
2				
3				
4				

### 3. ACRONYMS AND DEFENITIONS

ICD	Interface Control Document
IS	Interface Sheet
SSC	Structure, System or Component
STS	Second Target Station
WBS	Work Breakdown Structure
PS	Process Systems
VS	Vessel Systems
CV	Core Vessel
TSS	Target Station Shielding
TDR	Target Drive Room
HPV	Hot Process Vault

### 4. DOCUMENTS APPLICABLE TO THE INTERFACING SSCS

Ref	Document Titles	Document Control System Location
[1]	Target Process Systems P&IDs	
[2]	Target Systems Monolith Concrete drawing	S03060000-G8U-8800-A10000 on Windchill

## **5. INTERFACE DEFINITION**

### **5.1 TECHNICAL DESCRIPTION OF THE INTERFACE**

Target Station Shielding consists of the bulk shielding, removable shielding, core vessel base plate, bulk shielding liner and pipe pans. Process Systems consists of Activated cooling loops, Low Level Liquid Waste system, Leak Collection systems, and Helium/Nitrogen Gas Distribution Systems. The TSS components that interface with PS include the core vessel base plate, pipe pan and removable shielding. The subsequent sections define the interfaces of relevant TSS systems with PS.

### **5.2 INTERFACE DATA**

#### **5.2.1 Pipe Pan Interface**

The pipe pan is constructed of stainless steel sheet metal that wraps around the top portion of the core vessel exterior and defines the space below the target drive room (TDR) floor elevation where the process systems piping is run into the target drive room. The physical configuration of the pipe pan is an interface between TSS and PS, as the pipe pan geometry defines the space available to route process piping within the pipe pan. The pipe pan layout can be seen in drawing S03060000-G8U-8800-A10000 [2].

The primary function of the pipe pan is to provide leak collection for any water pipe leaks that occur within the pipe pan. The pipe pan has a 1 degree slope that drains out the east side of the target drive room and eventually down to the hot process vault. Currently the pipe pan extends to the edge of the TDR, however the stainless steel structure needs to continue through the pipe chase to the east of the TDR up to the opening in the hot process vault (HPV). The pipe pan design will be extended through the pipe chase space once the geometry of this area is determined.

Pipe supports contained within the pipe pan are contained within Process System's scope and have not yet been designed. The pipe supports are expected to be supported and/or connected to the pipe pan. There are currently no features within the pipe pan for securing pipe supports.

#### **5.2.2 Pipe Pan Covers**

In order to maintain a flat floor within the TDR and provide radiation shielding above the PS water pipes within the pipe pan, 100 mm thick removable shield blocks are placed over the pipe pans. Several PS utility lines need to exit the pipe pan around the CV in order to connect to components on top of the CV. The following connections need to exit through openings made in the removable shield blocks:

- TVP water cooling supply line
- TVP water cooling return line
- TVP helium gas line
- Target blow-out gas line (If air is used for this line, it will not come from the pipe pan)
- Target blowout liquid line
- Target seal purge nitrogen gas line
- Core vessel vent condenser inlet gas line
- Core vessel vent condenser outlet gas line
- Core vessel vent condenser liquid drain line
- Core vessel vent condenser helium interstitial pad

The openings required in the pipe pan covers to accommodate these utility lines will be documented in this interface sheet once the utility routings are designed.

### **5.2.3 Bulk Shielding Liner Drain**

The bulk shielding liner and core vessel baseplate form a leak containment structure at the bottom of primary pit in the monolith concrete. Any leaks in the CV beltline water circuits or proton beam window assembly will be collected by this assembly and directed to a drain pipe located in the center of the core vessel baseplate. Process Systems will design the drain pipe, which consists of a 3'' SCH40 inner pipe surrounded by a 4'' SCH40 outer pipe, and the drain pipe will be provided and installed by Conventional Facilities. These pipes will be embedded in the monolith concrete floor and protrude vertically from the center of the monolith. TSS will provide a set of adapter plates that allow the core vessel base plate to be welded to both the 3'' and 4'' lines. The drain pipes should be left long as they will be trimmed, weld prepped and welded in the field once the core vessel baseplate is in place within the monolith.

### **5.2.4 Target Supply and Return Water Pipe Supports**

The Target supply and return water lines run above the floor near the ceiling of the target drive room. These water lines will need to be structurally supported. The design and procurement of the pipe supports is in Process Systems scope. These supports have not yet been designed and may require anchoring to the target station shielding. Once a design of the pipe supports has been developed, any required anchor features will be added to TSS and described in this section.

### **5.2.5 Core Vessel Drain Line Clearance**

The Core Vessel drain line connects to an outlet nozzle on the lower CV and travels across the target station shielding and through the monolith concrete into the bunker. Target station shielding blocks shall be designed to provide 20mm of clearance around the nominal position of the CV drain line. Target Station Shielding design must also allow sufficient clearance to allow for field welding of the drain line to the CV during monolith installation.