

SECOND TARGET STATION (STS) PROJECT

Interface Sheet for Moderator Reflector Assembly and Target Process Systems



Jim Janney
Don Montierth

7/17/2026

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

SECOND TARGET STATION (STS) PROJECT

Interface Sheet for Moderator Reflector Assembly and Target Process Systems

Date Published: 7/17/2026

Prepared by
OAK RIDGE NATIONAL LABORATORY
Oak Ridge, TN 37831-6283
managed by
UT-BATTELLE, LLC
for the
US DEPARTMENT OF ENERGY
under contract DE-AC05-00OR22725

Approvals

Interface Sheet for Moderator Reflector Assembly and Target Process Systems

ISSUE DATE:
7/17/2026

PREPARED BY
Jim Janney

PROJECT
Second Target Station

DOCUMENT NUMBER:
S01020500-IST10186

	Signature / Date					
	Rev. 00	Date	Rev. 01	Date	Rev. 02	Date
Moderator Reflector Assembly Task Leader	Jim Janney	3/6/2024				
Target Process Systems Task Leader	Don Montierth	3/7/2024				
Target Systems Level 2 Manager	Peter Rosenblad	3/18/2024				
Neutron Production Systems Group Leader	Daniel Lyngh	3/7/2024				
Interface Systems Group Leader	Mike Strong					

Revision	Description
00	Initial Release
01	Update based on final MRA design and analysis

TABLE OF CONTENTS

TABLE OF CONTENTS	v
1. Purpose	6
2. Scope.....	6
2.1 Interfacing Parts or Components.....	6
3. Acronyms and Definitions	6
4. References.....	6
4.1 Documents Applicable to the Interfacing SSCs.....	6
5. Interface Definition.....	7
5.1 Technical Description of the Interface.....	7
5.2 Interface Data.....	7

1. PURPOSE

This document defines the interfaces between Moderator Reflector Assembly and Target Process Systems. The interface ensures coordination of cooling water supply parameters, component heat loads, and other component parameters for the water supplies to the Moderator Reflector Assembly. These parameters define boundary conditions that are critical for component analyses and heat loads and gas production rates that are required for process system sizing. The interface described in this document will provide guidance to the design of the Moderator Reflector Assembly and Target Process Systems.

2. SCOPE

The scope of this document is the interface between Moderator Reflector Assembly and Target Process Systems. No parent Interface Control Document exists since both systems are within Target Systems. This document describes cooling water supply parameters, component heat loads, and other component parameters for the water supplies to the Moderator Reflector Assembly.

2.1 INTERFACING PARTS OR COMPONENTS

No physical interface exists between the Moderator Reflector Assembly and Target Process Systems, as Vessel Systems controls the penetrations through the Core Vessel.

3. ACRONYMS AND DEFINITIONS

IS	Interface Sheet
MRA	Moderator Reflector Assembly
SSC	Structure, System or Component
STS	Second Target Station

4. REFERENCES

4.1 DOCUMENTS APPLICABLE TO THE INTERFACING SSCS

Ref	Document Titles	Document Control System Location
[1]	S03040000-SR0001-R02 System Requirements Document for MRA	/Neutron Sciences/Second Target Station (STS)/S03 – Target Systems/S0304 – Moderator Reflector Assembly
[2]	S03090000-SR0001-R00 System Requirements Document for Target Process Systems	/Neutron Sciences/Second Target Station (STS)/S03 – Target Systems/S0309 – Target Process Systems
[3]	S03090200-J8U-8800-10008, MRA and Core Vessel Cooling Loop 2 Core Vessel Cooling Piping and Instrumentation Diagram	
[4]	S03090200-J8U-8800-10010, MRA and Core Vessel Cooling Loop 2 Core Vessel Instrumentation Piping and Instrumentation Diagram	
[5]	S03090000-DES10000, Second Target Station (STS) Project Target Process Systems Process Control Description	

5. INTERFACE DEFINITION

5.1 TECHNICAL DESCRIPTION OF THE INTERFACE

The MRA-Target Process Systems Design Basis Table (Table 1) documents the neutronic heat load required to be removed from the component by each water supply, as well as the expected portion of that heat load deposited in the water, based on neutronic analysis, for each of the 5 MRA water supplies. The expected flow rate and inlet temperature for each supply is documented, as well as the resulting pressure drop for each leg based on CFD analysis of the MRA. Finally, the table notes that the 5 water supplies are combined into a single return.

It should be noted that the pipe sizes listed in Table 1 are the Process Systems pipe sizes external to the Core Vessel and are reduced in the Core Vessel MRA Water Jumpers as specified in the MRA-Core Vessel Interface Sheet.

5.2 INTERFACE DATA

Table 1. MRA-Target Process Systems Design Basis Table

STS Process Systems Design Basis 2.8 MW Beam / 700 KW @ 15 Hz to STS											
Target Systems Energy Deposition	Technical Component Design Values						Primary Cooling Loop				
	STS Design Basis Heat Load, Watts	Energy Deposited In Water Watts	Component Water Volume, cm ³	Component Pressure Drop, PSI	Component MAWP, PSIA	Component Material of Construction	Design Basis Flow GPM	Design Basis ΔT °F	Primary T Inlet °F	Supply Pipe Size, Inches	Return Pipe Size, Inches
Upper Premoderator	9,009	3,400	5,096	5.20	75.0	Al, Be, SS	7.5	10.7	90	1	2
Upper Reflector	9,894	470	4,590	9.65	75.0	Al, Be, SS	7.5	11.8	90	1	
Lower Premoderator	11,020	4,746	5,350	6.86	75.0	Al, Be, SS	7.5	13.1	90	1	
Lower Reflector	10,725	434	4,363	9.55	75.0	Al, Be, SS	7.5	12.8	90	1	
MRA Backbone	16,547	153	11,313	4.29	75.0	316L SS	15.0	9.9	90	1.5	