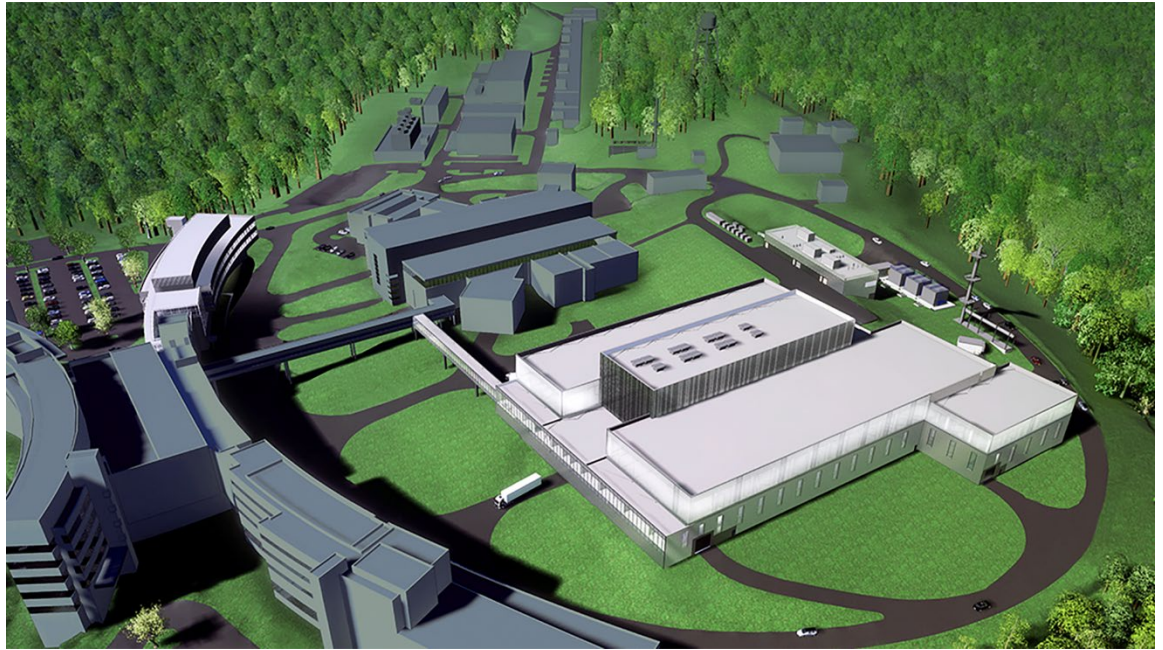


Second Target Station Project: Preliminary Moderator Reflector Assembly Installation Plan



Jim Janney

March 2024



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Jim Janney

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Prepared by
OAK RIDGE NATIONAL LABORATORY
Oak Ridge, TN 37831
managed by
UT-BATTELLE LLC
for the
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CONTENTS

CONTENTS.....	iii
1. Purpose	4
2. Installation Plan	5
2.1 Target Systems Installation.....	5
2.2 Moderator Reflector Assembly Installation.....	5
3. References.....	6

1. PURPOSE

The purpose of this document is to describe the installation plan of the Second Target Station (STS) Moderator Reflector Assembly (MRA). The required status of the Target Systems installation prior to MRA installation is described as well as the steps required for the installation of the MRA. At this preliminary stage, this document is not intended to comprehensively describe every detail, but to instead identify installation issues which would require changes to the MRA design.

2. INSTALLATION PLAN

2.1 TARGET SYSTEMS INSTALLATION

At this time, an SNS target systems installation outline has been created, but a detailed installation plan has not been developed. For the purpose of this document, we will simply describe the state of the target station installation that must be achieved prior to MRA installation.

The Vessel Systems Core Vessel, Core Vessel Nozzles, Core Vessel permanent shielding, and monolith shielding should all be fully installed. At this point, the majority of the mass of the target station monolith is in place, so elastic settling of the monolith should be nearly complete. The MRA installation can occur either before or after the installation of the Target Assembly Shaft and Target Viewing Periscope, as these components are relatively light compared to the overall Target System. The Core Vessel Lid should be installed in order to verify installation clearances for future MRA installations, although the MRA access port lid must not yet be installed.

At this point, the permanent MRA mounting features that are part of the Core Vessel Shielding, must be surveyed to define their “as installed” locations within the STS global coordinate system. This step is critical, as these mounting features are life of the facility components and their surroundings will become activated during early operations making later surveys extremely difficult. At the same time, the MRA cavity, along with the MRA utility chases formed by the Core Vessel Shielding should be surveyed in order to record as installed conditions. Note, the STS global coordinate system may need adjustment based on the “as installed” locations of the Instrument Systems Monolith Inserts, to best meet the moderator to neutron guide entrance alignment goals of the STS project.

2.2 MODERATOR REFLECTOR ASSEMBLY INSTALLATION

Due to the small moderator sizes, alignment of the MRA relative to the STS global coordinate system is critical to maximize neutron beam performance. Therefore, the kinematic mounts on the MRA must be adjusted relative to the “as installed” location of the mating features of the Core Vessel Shielding to position the moderators as close as possible to their nominal locations. Because this adjustment must happen on a nearly complete MRA, the kinematic mounts themselves will be custom machined, as described in the final assembly in the MRA manufacturing plan [1], in order to reduce schedule impact of the adjustment. Once the adjusted kinematic mounts are installed, the MRA will be surveyed to record its final “as built” condition.

The installation of the MRA itself is quite straightforward. If any Target Assembly Segments have been installed, a void of at least 3 segments must be rotated into the MRA installation location. The MRA will be installed lifted by the Ziplift grapple, as the Ziplift stud on the top of the MRA is designed for the MRA to hang level from this point for a pure vertical installation. The MRA should be lowered slowly into the MRA cavity of the Core Vessel Shielding, monitoring clearances between the MRA and piping to the Core Vessel Shielding and Lid. Once the MRA is landed on the kinematic mounts, another survey should be conducted to confirm desired as installed moderator locations and to check gaps to the Core Vessel Shielding for the MRA backbone shield block and utility lines. Once these locations and gaps have been confirmed, the removable Core Vessel Shield blocks which reside above the MRA should be installed.

Finally, the MRA utilities must be connected. The water lines should be mated up with the Core Vessel Jumpers to complete the connection to Process Systems. These flanges should be leak checked to the requirements of Process Systems connections within the Core Vessel. Next the connection to the Cryogenic Moderator System Hydrogen Transfer Line must be completed. The two hydrogen lines must be welded, cold shocked, pressure tested, and leak checked. Then, the vacuum line must be welded closed and subsequently cold shocked, pressure tested, and leak checked. At this point, any required transfer line supports within the Core Vessel Can be installed, completing the installation of the MRA.

3. REFERENCES

Ref	Document Titles	Document Number
[1]	Fabrication Strategy for the Moderator Reflector Assembly	S03040000-MFP10000