

Second Target Station Project: Acquisition Strategy for the Moderator Reflector Assembly



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SECOND TARGET STATION (STS) PROJECT

Acquisition Strategy for the Moderator Reflector Assembly

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1. PURPOSE

This document describes the acquisition strategy for the Moderator Reflector Assembly. The intent of this document is to show that the acquisition strategy is reasonable for purchasing the Moderator Reflector Assembly.

2. ACQUISITION STRATEGY

2.1 GENERAL STRATEGY

The Moderator Reflector Assembly (MRA) will be acquired in a series of design to print subcontracts with an estimated value of \$4.7 million, as seen in Figure 1. The acquisition of the MRA will be broken into many subtasks due to the diverse nature of the capabilities required to build an MRA, as seen in the MRA Fabrication Strategy [1]. The expected duration of MRA procurements is slightly over 3.5 years. Due to funding limitations, the MRA procurement has been delayed as late as possible, resulting in only 16 days of float off the STS critical path for the MRA procurement where the earlier sub procurements are integrated. Due to the high risk nature of the MRA fabrication and history of delays with similar procurements at SNS, procurement oversight will be critical to maintain schedule. The MRA has a significant oversight budget of \$0.9 million to mitigate this risk. Also, the MRA is near the top of the list for early procurement if contingency funds become available.

Activity ID	Activity Name	RD	Start	Finish	TF	Budgeted Material Cost	Budgeted Total Cost
▢	Moderator Reflector Assembly (MRA)	1693	02-Feb-26 A	02-May-33	129	\$4,742,284.70	\$5,938,970.99
▢	Moderator Reflector Assembly	1693	02-Feb-26 A	02-May-33	129	\$4,742,284.70	\$5,938,970.99
▢	Final Design	13	02-Feb-26 A	19-Aug-26	802	\$0.00	\$280,065.44
▢	Procurement Prep	457	07-Aug-29	03-Jun-31	49	\$0.00	\$55,363.98
▢	Procurement/Fabrication	902	25-Sep-29	02-May-33	129	\$4,742,284.70	\$5,603,541.57
▢	Procurement	902	25-Sep-29	02-May-33	129	\$4,742,284.70	\$5,603,541.57
▢	MRA Weld Development Samples	189	25-Sep-29	28-Jun-30	114	\$52,775.62	\$62,779.01
	TS8011210 Award MRA Weld Development Samples	0		25-Sep-29	183	\$0.00	\$0.00
	TS043524 Manufacture MRA Weld Development Samples	60	21-Dec-29	20-Mar-30	183	\$52,775.62	\$62,779.01
	TS04IPL491 IPL> Start Moderator Reflector Assembly Fabrication	0	28-Jun-30		54	\$0.00	\$0.00
▢	MRA EB Welding	562	29-Mar-30	24-Jun-32	342	\$95,626.90	\$349,133.58
	TS162415 Award MRA EB Welding	0		29-Mar-30	344	\$0.00	\$0.00
	TS043525 Manufacture MRA EB Welding	500	28-Jun-30	24-Jun-32	342	\$95,626.90	\$349,133.58
▢	Moderator Procurement	440	02-Apr-30	05-Jan-32	462	\$1,580,767.25	\$1,831,453.69
	TS162525 Award Moderators - MRA	0		02-Apr-30	54	\$0.00	\$0.00
	TS043520 Manufacture Moderators - MRA	375	28-Jun-30*	26-Dec-31	59	\$1,580,767.25	\$1,831,453.69
	TS162565 Ship Moderators to site - MRA	5	29-Dec-31	05-Jan-32	462	\$0.00	\$0.00
▢	MRA Beryllium Procurement	335	05-Mar-30	03-Jul-31	54	\$1,245,222.58	\$1,286,555.77
	TS162725 Award MRA Beryllium Manufacture	0		05-Mar-30	74	\$0.00	\$0.00
	TS043521 Manufacture MRA Beryllium	250	28-Jun-30	26-Jun-31	54	\$1,245,222.58	\$1,286,555.77
	TS162765 Ship MRA Beryllium to site	5	27-Jun-31	03-Jul-31	54	\$0.00	\$0.00
▢	MRA Transfer Line and Piping Procurement	330	12-Mar-30	03-Jul-31	474	\$142,044.94	\$183,378.13
	TS162825 Award MRA Transfer Line and Piping Manufacture	0		12-Mar-30	74	\$0.00	\$0.00
	TS043522 Manufacture MRA Transfer Line & Piping	250	28-Jun-30	26-Jun-31	59	\$142,044.94	\$183,378.13
	TS162865 Ship MRA Transfer Line and Piping to site	5	27-Jun-31	03-Jul-31	474	\$0.00	\$0.00
▢	MRA Procurement	480	03-Jun-31	02-May-33	129	\$1,625,847.40	\$1,890,241.40
	TS162625 Award MRA Manufacture	0		03-Jun-31	16	\$0.00	\$0.00
	TS043528 Manufacture MRA	375	28-Aug-31	25-Feb-33	16	\$1,625,847.40	\$1,890,241.40
	TS162665 Ship MRA to site	5	28-Feb-33	04-Mar-33	16	\$0.00	\$0.00
	TS043530 Conduct MRA Receipt and Acceptance	40	07-Mar-33	02-May-33	16	\$0.00	\$0.00
	TS04IPL540 IPL> Complete Moderator Reflector Assembly Fabrication	0		07-Mar-33	169	\$0.00	\$0.00

Figure 1. MRA Procurement Subtask List

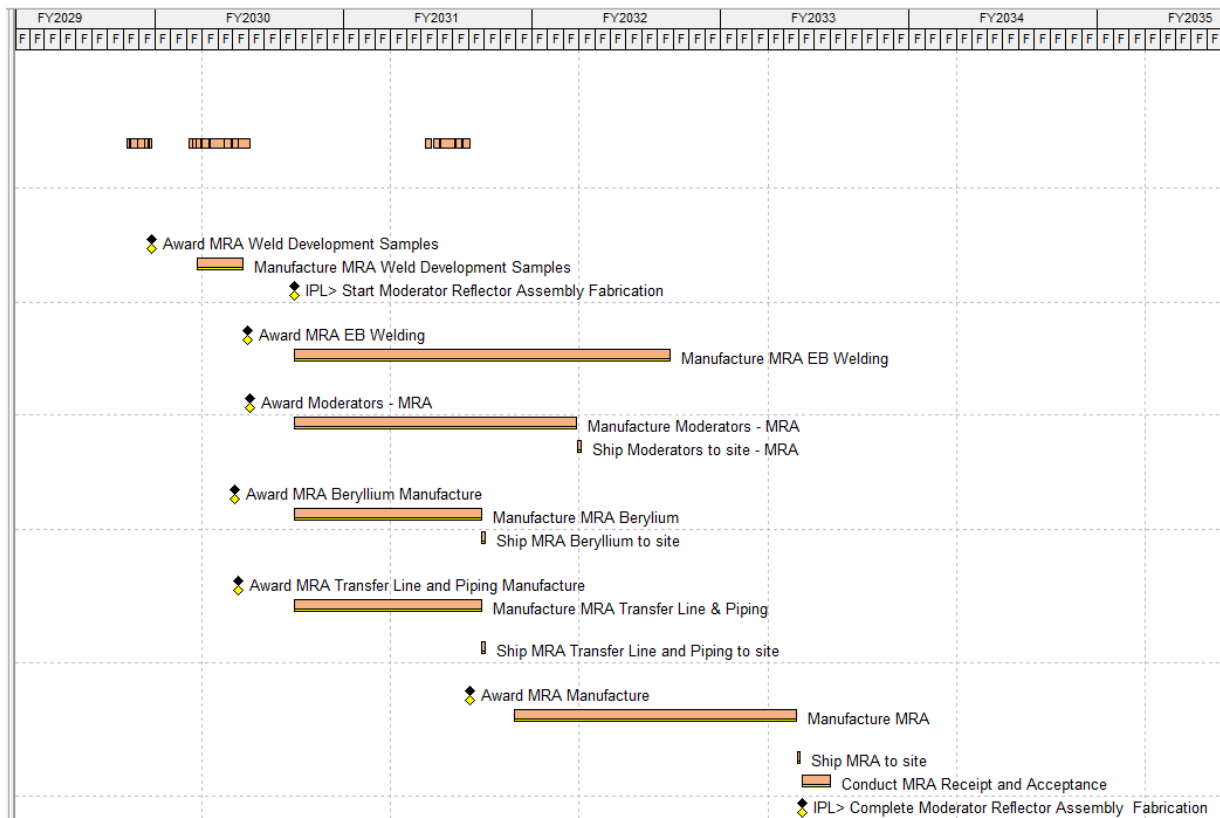


Figure 2. MRA Procurement Subtask Gantt Chart.

2.2 MANUFACTURE MRA WELD DEVELOPMENT SAMPLES

In order to develop the EB welding procedures that will be required for the subsequent MRA manufacturing, EB weld samples must be available for weld development. These samples are simplified versions of the MRA EB weld joints. These are small, high precision aluminum parts which should have a large available vendor pool both local to Oak Ridge and nationally.

2.3 MANUFACTURE MRA EB WELDING

The electron beam (EB) welding is critical to the success of the MRA manufacturing, as rework of these welds is risky, expensive, and time consuming. This contract will include development of all necessary EB welds as well as execution of welding for the Moderator and MRA manufacturing. This procurement is planned to be executed as a sole source procurement due to successful vendor experience with the moderator prototypes.

2.4 MANUFACTURE MODERATORS

The moderator fabrication involves high precision complex machining and assembly of small aluminum components. Post weld machining including set ups on complex datums will be necessary for success. The moderator fabrication will utilize a vendor with high precision complex machining capabilities and extensive project management and testing experience. Due to the critical nature of the welding, all weld inspection will be performed at ORNL. This procurement is planned to be competitively bid.

2.5 MANUFACTURE BERYLLIUM

The beryllium fabrication options are extremely limited due to limited producers and limited machine shops capable of dealing with the hazards of machining beryllium. The only domestic source of beryllium material is Materion. Materion also is well integrated with vendors capable of machining the beryllium shapes required for the MRA. In order to reduce risk, the beryllium fabrication will utilize Materion as the vendor for the finished beryllium product. This strategy will require a sole source procurement and additional time must be allocated for placement of the contract.

2.6 MANUFACTURE MRA TRANSFER LINE AND PIPING

The MRA piping fabrication is relatively straightforward other than the hydrogen transfer line, which requires invar tubing surrounded by a vacuum jacket. The vendor for the piping fabrication should be experienced in fabrication for cryogenic applications and have welding and helium leak checking capabilities in house. The tolerances for the piping are critical and quite tight, so the vendor must be capable of meeting tolerances for tube bending and welded piping assemblies. This procurement is planned to be competitively bid.

2.7 MANUFACTURING MRA

The manufacturing of the MRA will require precision machining, assembly, welding, and helium leak checking capabilities in order to machine the MRA reflector vessel, backbone, and shield block and integrate them with the moderators, beryllium, and piping into a completed MRA. STS will manage the electron beam welding vendor but the MRA vendor will need to be heavily involved in coordination of several rounds of EB welding. Some of the helium leak checking will be quite complex and require extensive temporary sealing of cavities. The total mass of the assembly is approximately 2000 kg, so no heavy lifting is required. This procurement is planned to be competitively bid.

3. REFERENCES

Ref	Document Title	Document Number
[1]	Moderator Reflector Assembly Fabrication Strategy	S03040000-MFP10000