

ISIS Target Station 2 Horn Moderator

Target Station 2 at the ISIS Neutron source utilises a series of moderators to slow and condition neutrons for experimental applications, the media used within the moderators vary and include: liquid hydrogen, solid methane and water. Continual monitoring of moderator parameters ensure the safe and efficient operation of the entire TRaM system (Target, Reflector & moderator).

During the 2022/02 ISIS user cycle, the Target Operations Group (TOG) became aware an increase in moisture levels detected by the Residual Gas Analyser within the TRaM Void Vessel, this was reinforced by an indicated decrease in header tank levels for the Light Water Cooling Circuit (LWCS) - the water cooling system which serves, amongst other components, the Horn Pre-moderator.

Following the completion of the user cycle, the TRaM was withdrawn from its operational position into the Remote Handling Cell (RHC) to enable the TOG to investigate the source of the LWCS leak. Remote manipulator arms were used to disassemble TRaM components to allow for flying lead camera access, and the system was pressurised to assist in identifying the origin of the leak.

The team quickly established the cause to be a return pipe from the Horn water moderator, situated within the West half of the beryllium reflector.

With guidance from Leslie Jones and Dan Coates of the Target Design Group, the TOG further disassembled the TRaM assembly, and removed the defective component. A replacement Horn Moderator assembly was pressure tested and prepared for installation, as this component had never before been changed, a bespoke remote lifting equipment was produced and trialed using the full scale TRaM mock-up. The new component was then installed and tested, further details of the processes used will be discussed.

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