

INTERFACE CONTROL DOCUMENT (ICD)	Doc. No. SP 391-001-73- R0	LUSI SUB-SYSTEM CXI
LUSI CXI Instrument to XCS Instrument Interface Control Document		
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1. Scope

This document defines the interface between LUSI CXI (WBS 1.3) and the Materials under Extreme Conditions (MEC) beamline that will utilize Hutch 6 in the FEH.

2. MEC Beamline

The LCLS beam will be delivered to Hutch 6 using a grazing incidence mirror which will split the MEC beamline from the main LCLS hard X-ray line. This mirror shall be placed as close to the entrance of the XRT as possible and have the largest incidence angle possible given the requirement to reflect the LCLS over the 2 to 25 keV range. This shall be done to maximize the distance between the main LCLS line and the MEC at the end of the XRT and in Hutch 5.

3. X-ray Transport Line through Hutch 5

The X-ray transport line to Hutch 6 through Hutch 5 is the responsibility of the MEC construction project and shall be subject to the approval of the CXI lead engineer. No components to the MEC line and instrument shall be placed in Hutch 5 without the written consent of the CXI lead engineer.

All support stands for the X-ray beamline to Hutch 6 shall be located on the South side of the MEC beamline to maximize the usable space in Hutch 5.

4. Laser Transport

The MEC instrument plans on transporting a pump laser through Hutch 5. The details of this laser transport line are not yet fully defined. However, this laser transport line shall also not be placed in Hutch 5 without the written consent of the CXI lead engineer.

All support stands for the X-ray beamline to Hutch 6 shall be located on the South side of the MEC beamline to maximize the usable space in Hutch 5.

5. Stay-Clear Zones in Hutch 5

Under no circumstance shall any MEC component (including the beam pipe and the laser transport line) be allowed to approach the CXI beam line to less than 550 mm over the entire length of Hutch 5.

The CXI instrument will also require space directly above and directly below the MEC beamline in some specific sections of Hutch 5. The stay-clear zones shown below shall not be violated by the MEC components without the written agreement from the CXI lead engineer. The support stands for the beam transport pipes shall be located outside of these stay-clear zones. The stay-clear zones are 6 feet wide along the beam axis around the two CXI interaction regions. The two sections shown define the stay-clear volumes.

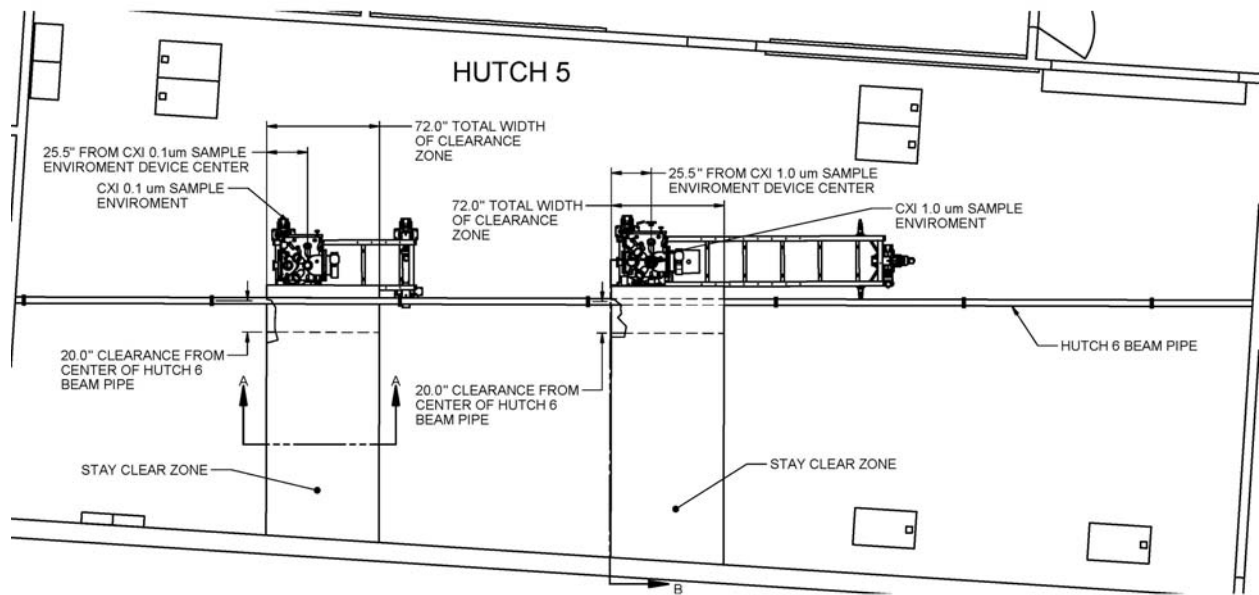


Figure 1: Stay-clear areas in Hutch 5.

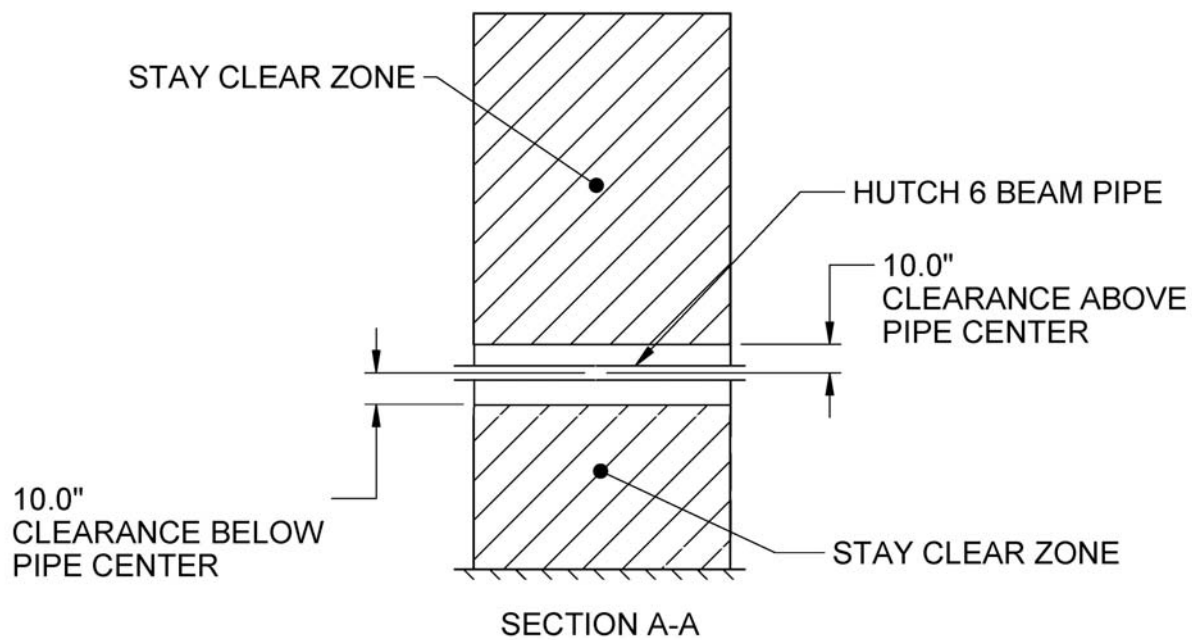


Figure 2: Section showing the stay-clear areas in the vertical plane. The MEC beam pipe and laser transport pipe must remain out of the stay-clear areas.

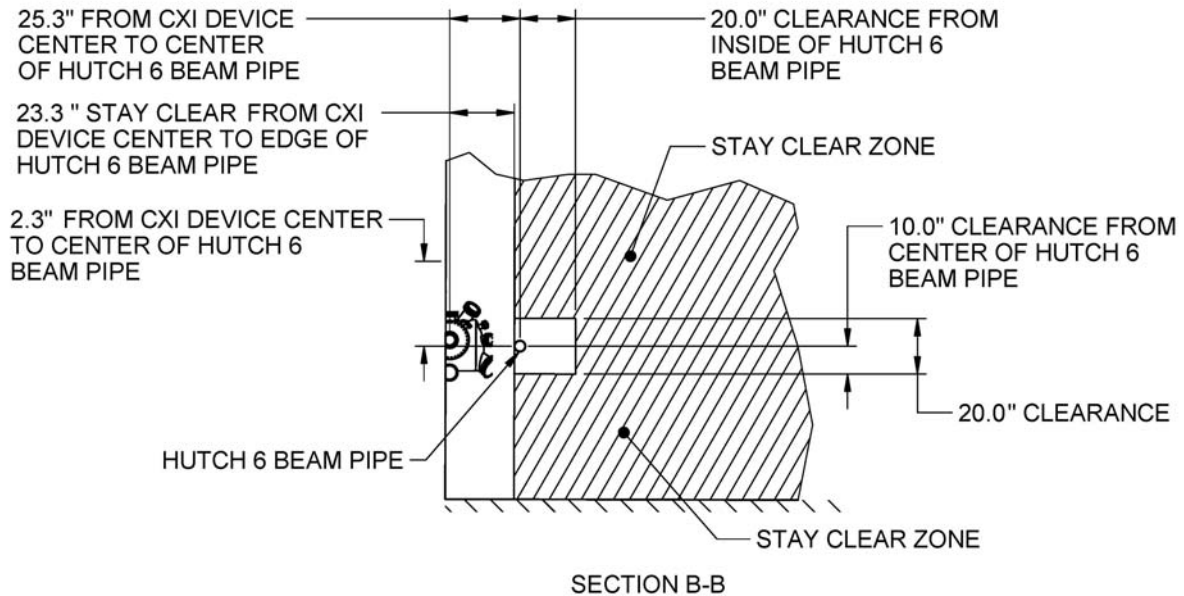


Figure 3: Section showing the stay-clear areas in the plane transverse to the LCLS beam.

6. Preferred Laser Transport Solution

The preferred solution for transporting the pump laser beam through Hutch 5 is for the laser pipe to be mounted at the same height as the LCLS beam pipe and on the South side of the LCLS beam, in the space outside the stay-clear zone shown on Figure 3. The pump laser beam pipe should preferably be located as close to the LCLS Hutch 6 beam pipe as possible.

7. Removable Beam Pipe Sections

It is conceivable that some experiments to be performed in Hutch 5 may require space on both the North and South side of the beamline. It shall be a design goal to make the MEC beam transport pipe sections next to the CXI interaction regions removable. The removable sections should line up with the stay-clear zones as shown on Figure 1.