Engineering Change Request/Notice	Number	E	038-0006

Number of attached pages	3
Project	MACS
Originator	Collin Broholm
Date	August 23, 2004

Affected Release Number(s):					
I	038-xxxx	S	038-0008	R	038-xxxx
I	038-xxxx	S	038-xxxx	R	038-xxxx

Scope

WBC Spec updated to add White Beam Dump shielding configuration: Size & Materials

Purpose

To Specify the thickness, composition, and location of the White Beam Dump. Total thickness is increased from approximately 1200 mm to 1500 mm.

Description

See WAS, IS, and ADDED sections (attached)

Impact (add more sheets if necessary)

Performance	Schedule	Budget
Per J.C. Cook calculations (Report attached) required for ALARA.	Allows completion of White Beam Dump Design	Added new materials (^{6}LiF & Lead) as well as increase in shot & wax requirements.

Change Board (from Release)			Disposition		☐approved ☐disapproved
1	C.L. Broholm		6	D.J. Brown	E
2	J.C. Cook		7		038-0006
3	P K Hundertmark		8		
4	T D Pike		9		
5	D J Pierce		10		

WAS:

2.6 Get Lost Pipe

The Get Lost Pipe is an extension of the WBC general shields. The get lost pipe is designed to be sufficiently long to reduce the reflection of the neutron beam from the inner surface of the beam dump. The beam dump shields on the Guide hall tube side of NG-0 are a continuation of the WBC general shields. The rear face of the Get-lost pipe is positioned at the 10600mm datum, with the inner surface of the beam dump at the 9600mm datum. Accommodations within the Beam dump shall be made for a removable helium liner. The rear of the Beam Dump shall have a removable "Sighting Plug" for instrument alignment. The interlocking sighting plug shall be designed to minimize the Neutron Flux at the rear external face of the Beam Dump. Design details are shown in figure 8.

2.6.1 Mechanical Performance

The Get Lost Pipe is a fully passive device. The only requirement for performance is that helium leak rate is less than **0.04 cuft/hr.**

2.6.2 Access and Mechanical Positioning

The Get Lost Pipe rests on an element of the WBC shielding directly beyond the DFM Cask. The Get Lost Pipe is kinematically mounted with a minimum total adjustment range of 12 mm along each axis. The Get Lost Pipe kinematic mounting locations are shown in figure 9.

3 System Interfaces

The following are…

IS:

2.6 Get Lost Pipe

The Get Lost Pipe is an extension of the WBC general shields, which allows for transport of the direct beam to the beam dump further down stream. The get lost pipe shall contain a removable helium liner. Design details are shown in figure 8.

2.6.1 Mechanical Performance

The Get Lost Pipe is a fully passive device. The only requirement for performance is that the helium leak rate of the helium liner is less than 0.04 cuft/hr. The get lost pipe shielding shall reduce external radiation levels to be in accordance with the ALARA policy.

2.6.2 Access and Mechanical Positioning

The helium liner rests on an element of the WBC shielding directly beyond the DFM Cask. The helium liner is kinematically mounted with a minimum total adjustment range of 12 mm along each axis.

2.7 Beam Dump

The Beam Dump closes the northern end of the Get Lost Pipe. The Beam Dump is designed to be sufficiently thick to reduce to safe levels the transmission of the neutron beam, as well as core gamma rays, from the inner surface of the beam dump to the exterior. The rear face of the Beam Dump is located at the 11130 mm datum, with the inner surface of the beam dump at the 9620 mm datum. Thus, the net length of the neutron absorbing materials is 1510 mm.

The following material sequence is employed:

1) 2mm ^{6}LiF in a sealed aluminum shell across the entire face opposing the rearmost surface of the helium liner.
2) 1428 mm of steel shot (55% by volume) in wax (45% by volume) within a 10 mm wall welded steel enclosure;
3) 50 mm lead fully contained in a 5mm steel shell across the entire rearmost surface.

The Beam Dump assembly shall include a configuration that allows for an external view parallel to the MACS beam line for alignment purposes during a standard source maintenance shutdown. Design details are shown in figure 9a.

2.7.1 Mechanical Performance

The Beam Dump is a fully passive device. The only requirement for performance is that of radiation ALARA. Documentation of the simulated performance is contained in the NCNR internal report: MCNP Simulations of the MACS Beam Dump, J.C.Cook, 8/11/2004

3 System Interfaces

The following are…

ADDED:

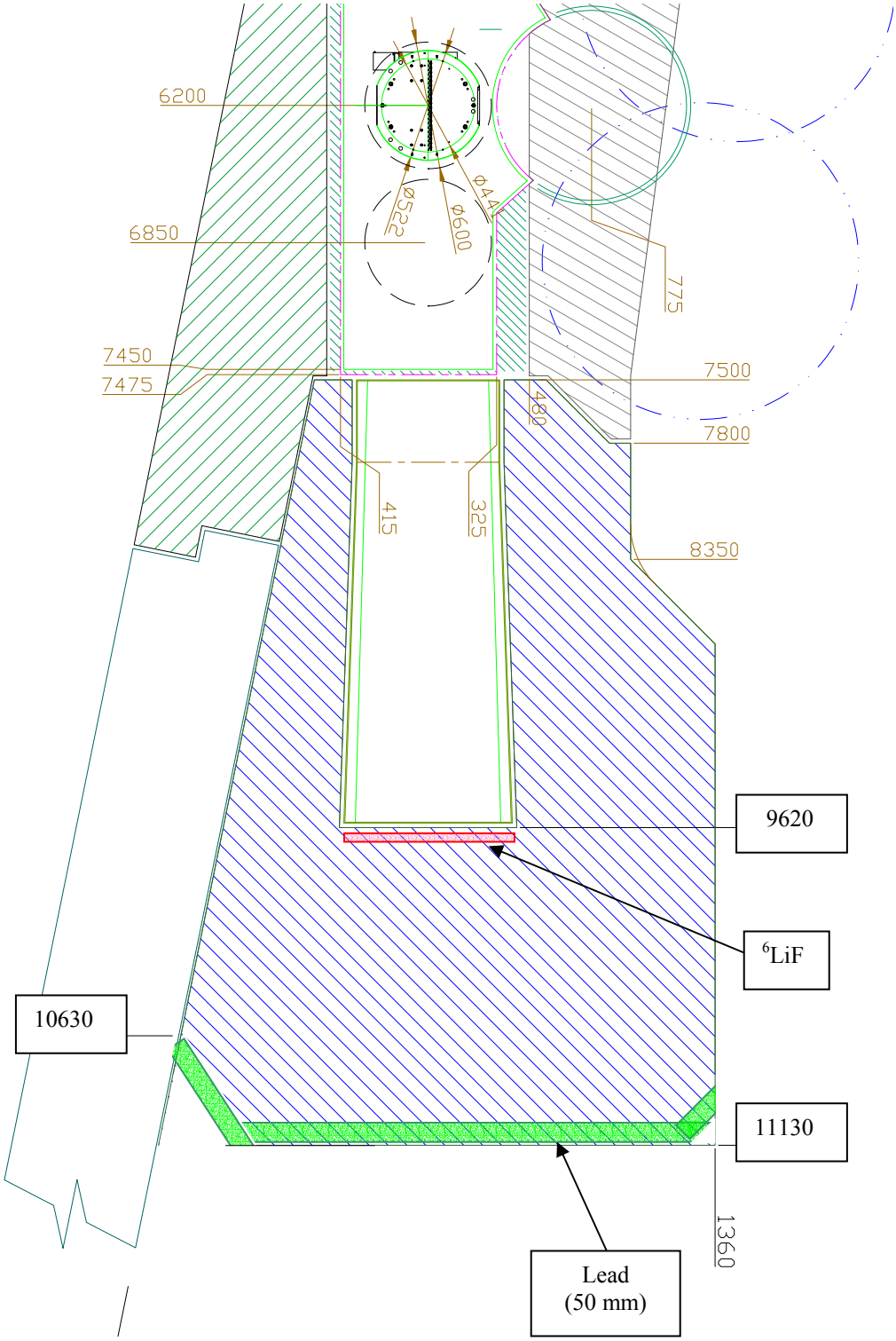

Figure 9a. Beam Dump Details