C-AD

Radiation Safety Committee

Issued: March 13, 2014

Minutes of RSC Subgroup Meeting of March 13, 2014

Subject: Review of ERL Dump Prints

Present: D. Beavis, D. Phillips, G. Mc Intyre, and J. Fite

The shielding prints for the ERL beam dump were reviewed. Most of the prints have been signed earlier in the year as QA-3. The steel shielding around the beam dump is being used as area shielding so all the prints relevant to the shielding need to be changed to QA-1. Assembly prints that show the integration of the beam dump and the shielding can remain QA-3.

Extraction line assembly views are given at the bottom of these minutes to aid in understanding of the discussion. A full set of large prints was used for the review.

There is a steel shield between the dipole and the beam dump. The original purpose of this shield was to provide for equipment protection from the back-shine from the beam dump. However, portions of the beam dump are struck by electrons that are at the same elevation as the horizontal seams in the concrete wall. The x-ray transmission through the seams is very sensitivity to the source elevation. In addition, the analysis of interlocks and faults has not been completed for the transport at and beyond the first dipole. An incorrect set-point of the last dipole or if the magnet turns off will cause the beam will strike the Pb shield. It was decided that the Pb shield should be considered as area shielding and the prints for the Pb shield be upgraded to QA-1.

The RSC Chair noted that he is not a fan of stacking small Pb bricks to make shields and would encourage projects in the future to make such shields out of larger blocks that cannot be moved by hand. Naturally, there are economic and schedule issues associated with such construction biases. The bricks are overlapped in one dimension but not the other. This was not considered to be a problem. However, the Pb assembly will need to be banded and posted.

Guidance to the project was provided by K. Yip on the Pb shield design to protect the equipment. The details of the calculation or at least the results need to be archived.

There are two three-inch diameter holes with associated plugs. The plug on the six-inch thick plate was recommended to be changed so that it completely fills the hole rather than the last three inches. The plugs can be made flush with the outside of the steel surface rather than a large protrusion. Tack welding the plugs in place was considered acceptable in case the ports are needed for future use.

The project would like to change the design of the end steel. A cast-iron B block will be centered about the beam dump in both vertical and horizontal directions. This will eliminate in the shield materials near beam height. The final design needs to consider whether the cast-iron B block needs shielding on top. It was noted that the block serves to shadow the labyrinth wall from both losses in the beam lines and from the radiation generated in the beam dump.

Finally, it was noted that the 22 MeV beam transport downstream of the first dump bending magnet may not be in place. The configuration for beam operations must be determined and analyzed before beam is taken to the beam dump.

ATS-ERL-May 1, 2104-(Beavis & Mc Intyre)

Complete beam dump items:

1. Update appropriate prints to QA-1 including the Pb shielding
2. Band and post the Pb shield.
3. Archive the results of the Pb analysis
4. Modify plug and attach both
5. Finalize end shielding design
6. Determine configuration past first dump dipole and analyze.

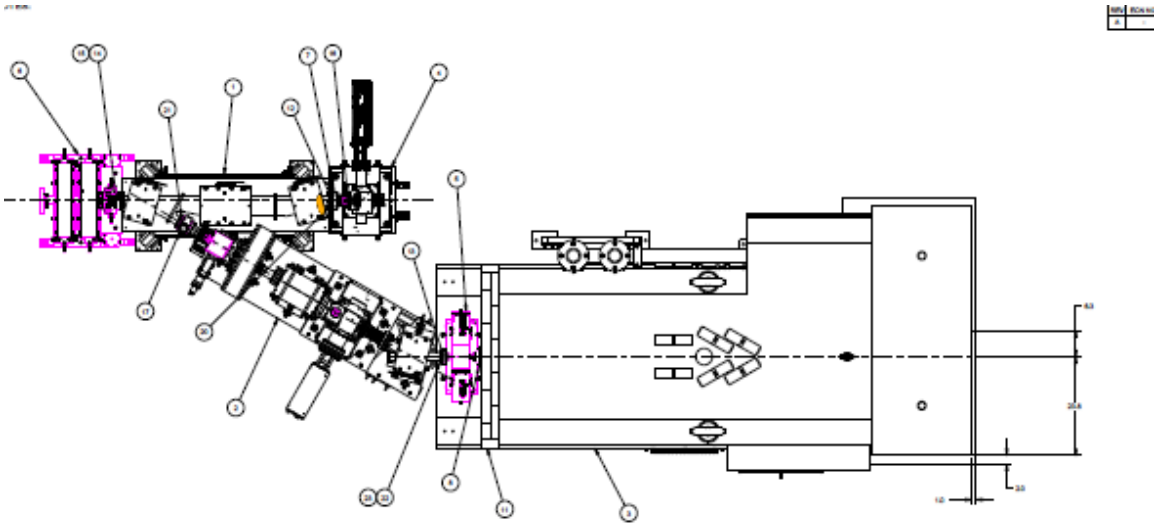

Figure: Plan view of shield and dump area, drawing 010606213.

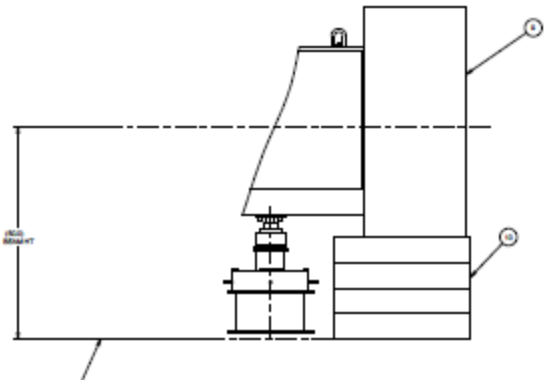

Figure: Side view of beam dump end and cast ion B block, drawing 010606213.

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RSC minutes file
RSC
Attendees
W. Xu
I. Ben-Zvi
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