

C-AD

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Radiation

Safety

Minutes of RSC Subcommittee of November 17, 2009

Committee

Subject: AGS J7 Jump Target

Present: D. Beavis, C. Gardner, L. Ahrens, C. Theisen, V. Schoefer, J.W. Glenn, T. Satogata, E. Lessard, I. Blacker, P. Sullivan, M. Minty, J. Tuozzolo, and A. Etkin.

A stripping foil is being placed at J7 to strip the Au ions for 77^+ to 79^+ which provides an orbit change from J7 to J10 where the beam dump is located. Used in conjunction with the internal beam dump orbit bump the stripped beam will strike the front face of the beam dump rather than scrap the side of the beam dump.

The committee recommended that this system be used. The action items are not required to be completed before operational use.

A description of the system and how it functions was provided before the meeting with a series of notes (see references 1-3).

The Tungsten foil is 1 mil thick and the edge moves into the circulating ion beam. The temperature at the edge of the foil has been calculated to be with 1000° C of the melting temperature for tungsten when four bunches of 1.5×10^9 Au ions are stripped by the foil. The committee mainly addressed the concerns if the foil was damaged. The foil is inside the vacuum chamber and could deposit activated products on the inside of the local vacuum system.

Either a procedure needs to be developed for access to the vacuum or it is demonstrated that existing procedures remove the risk of spreading contamination should it exist inside the vacuum system due to a foil failure. **(Ck-FY2010-all-AGS-637)**

A calculation for potential soil activation must be done since this is upstream of the J10 soil cap. The interaction rate on the foil is 0.1%. **(Ck-fy2010-all-AGS-638)**

Air activation calculations were not considered necessary with this small of a beam loss. Also shielding calculations were not considered necessary.

An energy deposition calculation of the ion beam into the beam dump must be provided to the engineers for a thermal analysis of the beam dump. **(Ck-fy2010-all-AGS-639)**

The analysis is not required to be complete prior to startup but should be done promptly.

No interlocks are required for the device. The drive system will be synchronized to the beam with a reference function. Some tuning of this system and the orbit bump will be necessary for optimal operation. Interlocks were considered unnecessary to prevent the device from being in the beam aperture during injection. The system will generate alarms for the operators after the commissioning.

The foil may become pitted along the edges with time. The foil can be visually monitored with a video camera. If the foil becomes thin enough in small regions a small portion of the beam can be stripped to charge 78^+ rather than 79^+ . This may show up as a change in the loss pattern around the ring. A procedure to monitor the loss pattern around the ring should be established (also for other operating conditions). **(Ck-fy2010-all-AGS-640)**

Curves of the stripping efficiency as a function of foil thickness have been calculated and should be given to the committee. **(Ck-fy2010-all-AGS-641)**

A measurement of the induced activity of the stripping foil in the AtR line should be attempted. **(Ck-fy2010-all-AGS-642)**

An analysis of what the energy and intensity limits for the device should be established based on the thermal response of the foil and the beam dump. Present analysis is based on full energy gold ions. **(Ck-fy2010-all-AGS-643)**

References

1. L. Ahrens, "[Description of the J7 Plunging Stripping Foil](#)", Oct. 27, 2009
2. L. Ahrens, C. Gardner, and P. Thieberger, "[Using the Jump Target to Put Au⁷⁹⁺ ions into the AGS Dump](#)", Oct. 28, 2009.
3. L. Ahrens, "[AGS J7 Plunging Stripping Foil](#)", presentation to RSC, Nov. 17, 2009.

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