

## **Annual Audit of Work Package 2: Beam Physics June 13, 2014**

Attendees: M. Conlon, C. Darve, M. Eshraqi, S. Molloy, R. Miyamoto, M. Munoz, E. Sargsyan, D. McGinnis, R. De Prisco, J. G. Weisend II (Chair)

### **1) General Comments**

Work Package 2 has made significant progress over the past year, particularly in the development of error studies and other responses to the ESS Project Review of November 2013. Progress has also been made in the area commissioning planning with the development of a proposed commissioning strategy. Recently the magnets work unit has been moved to this work package as a reflection of the tight connection between beam physics and magnets. While additional work needs to be done, see recommendations below, the work package is making very good progress and no technical showstoppers were found. The work package is within cost and schedule.

### **2) Response to Charge**

- Has the work package reached a level of technical maturity consistent with its current status on the schedule?

*Yes*

- Are there any technical concerns regarding the work package?

*No*

- Is any additional development or testing required for the work package to meet its goals?

*No*

- Are the requirements for the work package well understood and documented?

*Yes*

- Are all the interfaces between the work packages and other work packages and products properly defined, understood and agreed upon?

*No. Interfaces between beam physics, the normal conducting front end (WP3) and Beam Diagnostics (WP7) need further clarification*

- Have all safety issues in the work package been properly identified and dealt with?

*Yes*

- Are there sufficient resources (funding, staff) assigned to the work package to allow the goals of the work package to be met?

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*There is a desire to have an in house expert on ion sources added to the BP team. Additional computing resources appear to be needed and should be acquired as soon as practical*

- Are there decisions that need to be made in order to allow the work package to meet scope, cost and schedule?

*No*

- Are there any outstanding procurements or personnel actions that are limiting the progress on the Work Package?

*No*

- Is the Work Package on track to meeting its milestones?

*Yes*

- Are there any adjustments to the schedule and milestones that should be made? Optimization of commissioning schedule needs to be done.

*No*

- Are there any changes to the work package scope that should be made?

*No*

- Are additional reviews warranted before the next annual audit?

*No*

### **3) Recommendations**

1. Clarify the RF requirements to ensure that they are understood by the RF engineers for procurement specifications.
2. Consider adding a Ion Source Expert to the Beam Physics Group staff plan
3. Improve simulations of the Ion Source
4. Gather information required by WP2 on the Ion source and LEBT This should be done by the WP3 Deputy Work Package Leader.
5. Review beam physics requirements on NCFE and clarify these with WP3
6. Examine MEBT chopper design in terms of fail safe behavior and machine protection. (lead engineers and MPS group)
7. Procure additional computing resources as needed to carry out the WP scope.
8. Consider as the baseline commissioning plan that entire linac is installed.
9. Ensure that Beam Physics drives the requirements for beam loss coverage for the beam protection system.
10. Identify and recommend what beam characteristics and effects need to be measured for beam commissioning and operations. Let this drive the minimum needs for beam diagnostics.
11. Assist WP3 (NCFE) and WP7 (Beam Diagnostics) in determining the optimal set of beam diagnostics for the MEBT.