

LIEBE Target Design Review

Schedule

This comment is no longer valid as the schedule has been postponed and the beam permit will be requested for Q1 2016.

Dry runs for the installation and de-installation of all components as well as for placement into and retrieval from an intermediate storage should be integrated into the planning. → **CERN**

LIEBE Target

- The reviewers consider it to be misleading to refer to “double confinement” in the risk analyses. A different terminology should be used.
→ **Double vacuum vessel?**
- The CFD studies should consider the influence of shock-waves during beam impact as it may influence the final design.
- Handling, storage and final disposal of the target should be studied in detail. In particular, it should be clarified soon if the final waste disposal requires separation of the Lead-Bismuth from its containment. A draining of the target volume and filling tank is not foreseen at the moment but may have to be implemented for waste conditioning if required by the final depository.
- The choice of construction material must be optimized using available tools (e.g., ActiWiz). → **Not adequate for the present application**

LBE pump

The RP is partly divided on the specifications of the pump with regards to its role in the system and suggests that further research be done in the possibility of procuring a more appropriate pump. However, the RP recognises that finding a more efficient pump that maintains the required temperature in the LBE circuit is challenging.

HEX design

Establish tests to benchmark the cooling design prior to installation on-line.

→ **Tests foreseen in February as presented by Melanie**

LBE loop

- Provide a filling procedure and fully test the filling process on a simplified model (and consequences of solidification) before applying it to the final target. → CERN
- Stability of LBE flow in Y-divider (if it is really important for the target operation) should be checked experimentally.
→ CERN
- It is important to be convinced that on the pump inlet or in other places of the loop there are no conditions for cavitation: calculations of hydraulic pressure distribution and vapor pressure should be done. Experiments should be done if necessary. → CERN

Frontend compatibility

- A full integration of the target and Frontend system should be performed and should include all the above-mentioned points. Also the detailed installation and removal procedure should be optimised according to ALARA principle. A document should be provided that lists all modifications that need to be implemented in the GPS target area.

→ CERN

Operation and control

- Consider the possible failure scenarios and their impact on operation or on the target itself. → CERN
- The risk analysis should consider the performance of sensors under realistic operational conditions and must include details on interlocks. → CERN
- Calculations of residual dose rates should be performed in order to optimize any manual intervention as well as to assess the impact of technical difficulties on the operation of ISOLDE. → CERN (performed by R. Augusto)
- The handling tests should be done, if possible, after a realistic liquefaction and solidification of the Lead-Bismuth loop as it alters the centre-of-gravity of the target which may have an impact on handling properties. → CERN

Operation and control

- Confirm that the target can be stored as radioactive waste and eventually be dismantled in the appropriate hot cell. Waste conditioning as a whole has to be defined in collaboration with the waste treatment services at CERN as this may affect the design.
- For example, the LBE may have to be separated from the target container in which case some a drainage system should be foreseen.
- The total number of protons received by the target, the duration of the experiment and the total volume of Lead-Bismuth in the loop and its density should be indicated in the relevant documentation. → [CERN](#)