

## Minutes PSB Upgrade WG Meeting 23<sup>rd</sup> February 2016

**Participants:** C. Bertone, F. Boattini, J. Coupard, L. De Mallac, J. Devine, G.P. Di Giovanni, A. Floriduz, V. Forte, R. Froeschl, G.M. Georgiev, G. Guidoboni, M. Haase, K. Hanke, J. Hansen, D. Hay, M.M. Morgenstern, A. Newborough, M. Paoluzzi, L. Soby, W. Weterings.

Agenda (<https://indico.cern.ch/event/497367/>):

- [1. Approval of Minutes](#)
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### 1. Approval of Minutes

- The minutes of the last LIU-PSB WG meeting #167, available [here](#), have been approved.

### 2. Communications

- **Consolidation day (11<sup>th</sup> February 2016):**
  - No news yet from the discussion at the closed session.
- **HB2016 Workshop:**
  - The meeting will be held in Malmo, Sweden, from 3<sup>th</sup>-8<sup>th</sup> July 2016.
  - The LIU project will support fellows and students, but not staff members.
  - Please communicate to K. Hanke your requests for support in the framework of LIU-PSB.
- **BTP Support:**
  - One open question is about the organisation and financing of the supporting structures for the equipment in the BTP line.
  - Due to the new quadrupole magnets design (which are larger), the old supports cannot be used anymore.
  - The new quadrupole magnets will have an independent support. Therefore the old structure, also supporting correctors and BPM, need to be modified. As a result, independent supports for the correctors and BPMs may be needed.
  - A meeting with the involved parties will be organized very soon.
- **Hardware commissioning in the PSB:**
  - Going well so far.
  - Only 1 cable out of ~2700 disconnected cables was found to be wrongly disconnected.
  - Thanks to all the equipment responsible for their excellent work.
- **Cabling during EYETS 2016-2017:**
  - A review was held the 22<sup>nd</sup> February to review the cabling activities to be carried out by EN/EL in the framework of LIU.
  - Minutes are available [here](#).

- The cabling requests for LIU-PSB have been clarified last year through a series of reviews within the LIU-PSB meeting.
- **The only remaining request could come from a possible change of the beam stopper for 2 GeV operation.**
  - This item is followed up by the EN-STI-TCD Group, under the supervision of M. Calviani.
  - The expenses are currently not budgeted anywhere → Open action for M. Calviani to follow up and report about the possible request.
- For LIU-PSB, the **purchase of cables should be made such that all the stock is available to meet the end-2106 deadline.**
  - This means that **some cables might have to be procured already now because they may take up to 12 months to arrive.**
  - A drawback is that some of these cables will be finally installed only in LS2, after the guarantee will be expired. The issue is currently being followed up by the LIU management.
- **The request done for LIU-PSB to meet the end-2016 deadline remain valid as a package.**
  - **By the end of March 2016 all the cabling needs in terms of volume and length should be provided.**
  - **Mainly BI installations depend on the availability of these new cables.**
  - **If EN-EL officially reports that all the activities could not be carried out on time, then the LIU-PSB project will work on a priority list.**
- G.M. Georgiev added that one issue to consider is how to dispose of the removed cables. This is currently being discussed with the RP Group.
- G.M. Georgiev made a remark about the additional complexity of having to pull new cables during the EYETS 2016-2017 on top of cables which should be removed afterwards in LS2.

Assigned to	Due date	Description
M.Calviani	2016-03-31	Verify the need for new cables in case of an upgrade of the beam stoppers in BTP line for the 2 GeV operation.

### 3. Follow-up of Open Actions

- F. Roncarolo on "Prepare a document for approval about the specifications for the H0/H-current monitor electronics." → The document has been submitted for approval, see <https://edms.cern.ch/document/1580006/0.1>. **Action Closed**
- J.M. Lacroix/B. Riffaud on "Perform an investigation of the BTP line to define the best strategy for the constructions of the supports for the elements of the line." → This action was already discussed in the [Communications Section](#). This action will be closed an another action opened to follow up the issue with the relevant experts.

Assigned to	Due date	Description
K.Hanke, B.Mikulec	2016-03-31	Clarify with all the relevant expert the need for new support for the equipment in the BTP line.

- K. Hanke on "Clarify the details about the readiness for Linac4 connection if this includes pulling and connecting cables or only the hardware has to be ready to be installed" → At the meeting organized to discuss the cabling work, M. Meddahi stated that the request for readiness for the end-2016 deadline includes the cabling as well. **Action Closed**
- The shaft to access the PSB tunnel is large 1500 mm and long 2950 mm. This poses few dimensional issues for the transport of BT.BHZ10 and BTM.BHZ10.
- **BT.BHZ10 width (1639 mm) is not compatible with the shaft width.**
- **BT.BHZ10 weights about 9200 kg which is at the limit of the crane lifting capacity (10000 kg). The lifting will be performed using the lifting points directly embedded on the top of the magnet.**
- **BTM.BHZ10 weights about 17.6 tons. This magnet would be too heavy for the crane capacity, but it was agreed with the TE-MSG Group to transport the magnet and assemble it in several pieces: The 2 halves, coils and vacuum pipe will be transported separately.**
- **BTM.BHZ10 width is 1476 mm, which makes the lifting difficult as only ~12 mm gap on each side of the current shaft is allowed.**
- **Proposed Solutions for BT.BHZ10:**
  - **Increase the shaft width by about 200 mm. Civil Engineering declared this option feasible:**
  - **It would require 4/5 days of work.**
  - **The cost, not budgeted anywhere, would be about 20 kCHF and taken from the LIU-PSB budget of the HE Group.** In case of issues with the pile-up of the costs, the situation will be re-assessed.
  - Increasing the shaft width will simplify the transport of BTM.BHZ10 as well.
  - **The work could be done during EYETS 2016/2017.**
  - **Integration is to be done first and J. Coupard will contact Y. Muttoni about this matter.**
  - **If the proposed work affects any equipment, then an ECR will be required.**
  - D. Hay and J. Coupard will look into the details of the schedule for EYETS 2016/2017 to decide if it is beneficial to perform the proposed work before LS2.
  - **Concerning the enlargement of the shaft, G.M. Georgiev reminded to consider in the whole picture the location of the power supplies of the septum, BI.SMV10, which are already agreed to be placed nearby the shaft.**
- **Transport of BT.BHZ10 and BTM.BHZ10:**
  - **BTM.BHZ10 will be installed before BT.BHZ10.**
  - **As soon as the magnet design is more advanced, especially in the lower part and jacks, the HE Group will start the studies of the trailers and transfer tools to the final position.**
  - A. Newborough mentioned that for both magnets the same supports installed today will be re-used for the new magnets.

## Detailed Description

- The shaft to access the PSB tunnel is large 1500 mm and long 2950 mm.
- BT.BHZ10 dimensional issues:
  - **The magnet width (1639 mm) is not compatible with the shaft width.**
  - The weight of the magnet is about 9200 kg and it is at the limit of the crane lifting capacity (10000 kg). The lifting will be performed using the lifting points directly embedded on the top of the magnet.
- BTM.BHZ10 dimensional issues:
  - **The magnet weights about 17.6 tons. This magnet would be too heavy for the crane capacity, but it was agreed with the TE-MSG Group to transport the magnet and assemble it in several pieces: The 2 halves, coils and vacuum pipe will be transported separately.**
  - **The magnet width of 1476 mm makes the lifting difficult as only ~12 mm gap on each side of the current shaft is allowed.**
  - The magnet will be lifted without the vacuum pipe, otherwise it is too long for the shaft.
- **Proposed Solutions for BT.BHZ10:**
  - Tilt the magnet during the lifting process. **Discarded:** the tilt would be of the order of 45 degrees and would pose issues with the lifting height of crane.
  - Replace the 2 screw rows by a welding. This would shorten the magnet width. **Discarded:** This choice would be source of concerns for any intervention to be done on the magnet, as every time the welding should be first cut and redone after the intervention.
  - Increase the shaft width by about 200 mm. **Civil Engineering declared this option feasible:**
    - It would require 4/5 days of work.
    - The cost (**not budgeted anywhere**) would be about **20 kCHF**.
    - The magnet could be transferred at the PSB level via the the shaft (wider corridor). Then the passage of the magnet from one side to the other will require **removing the vacuum chambers (and supports) between the equipment BTV30 and BPM30**. The reason of such choice is due to the corridor width between the shaft and the final destination which is not enough to pass such large magnet (cable trays, ionic pump). The transport will be done with the magnet suspended in air by the crane.
    - **Concerning the enlargement of the shaft, G.M. Georgiev reminded to consider in the whole picture the location of the power supplies of the septum, BI.SMV10, which are already agreed to be placed nearby the shaft.**
    - Increasing the shaft width will simplify the transport of BTM.BHZ10 as well.
    - **The money will be taken from the LIU-PSB budget of HE Group and, in case of issues with the pile-up of the costs, the situation will be re-assessed**
    - K. Hanke and D. Hay remarked that 4/5 days seems a short time given the amount of work to be done and probably additional constraints due to ALARA would need to be taken into account. C. Bertone replied that the estimation received by the Civil Engineering Department includes the protection from dust, but maybe some more details need to be sorted out.
    - C. Bertone reported that the work could be done during EYETS 2016/2017.
      - D. Hay replied that due to ALARA, it should be checked if the work could be done towards the end of EYETS 2016/2017.

- D. Hay asked if an **ECR will be prepared**. C. Bertone mentioned that generally an ECR is mandatory only for machine elements. J. Coupard replied that **the integration should be done first to evaluate the impact of the work. If this work affects any equipment, then an ECR will be requested. J. Coupard will contact Y. Muttoni about the integration of the proposed enlargement of the shaft.**
  - D. Hay and J. Coupard will look into the details of the schedule for the EYETS 2016/2017 to decide if it is beneficial to perform the proposed work before LS2.
- **Transport of BTM.BHZ10:**
  - **This magnet will have to be installed before BT.BHZ10.** The assembly will be done on the corridor via the crane in a wider zone.
  - The equipment and the supports in the surrounding area shall be installed after the magnet.
    - J. Hansen asked more details about the installation of the vacuum chamber. C. Bertone replied that the magnet will be installed piece-by-piece, meaning that first the bottom half of the magnet will be placed, then the coil and the vacuum chamber and finally the top half of the magnet.
  - The supporting of this magnet is not clear to the Transport Group.
    - A. Newborough replied that the same exact support present today will be re-used for the new BTM.BHZ10.
  - **Still remaining to study:** The construction of a roller (most probably towed by another tractor) which would allow to bring this magnet to destination and transfer to his final jacks. The final solution may depends mainly on the lower surface of the magnet.
    - A. Newborough mentioned that this magnet is similar to the ones installed in LHC and maybe some tooling already exists. C. Bertone replied that it has to be checked if it is indeed the case.
- **Transport of BT.BHZ10:**
  - First the installation will be done on the concrete support on the corridor and, only then, the rolling will be performed up to the final position.
  - **Still remaining to study:** A tiny roller, most probably towed by another tractor, to bring this magnet to destination. The issue there is the small distance between the concrete block and the ground.

## 5. Removal of CV Pipes in the PSB Injection Region

- N. Roget presented slides about the work done during the YETS 2015/2016 to remove pipes in the PSB injection region belonging to cooling and ventilation, see [here](#).

### SUMMARY:

- **About 120 m of pipes of type DN50 were removed during the YETS 2015/2016 in the area where the PSB injection and extraction lines cross.**
- The initial reason to start the removal of these pipes was to free the space in the PSB injection area to ease reaching the alignment screw of the elements in this region. **Moreover, the general philosophy is that all the pipes which are not used should be removed and any work which could be carried before LS2 should be anticipated.**

- The pipes were running on drinking water, but their valves have been closed since more than 10 years. **Indeed, removing the stagnant water was one of the major difficulties.**
- **There are still about 650 m of pipes to remove. They belong to the PSB ring and in the area towards PS, the PSB dump and in the line towards ISOLDE.**
- The remaining pipes could be dismantled during EYETS 2016/2017 and the work should require about 2 weeks. D. Hay and J. Coupard will verify the schedule and see when the work could be done.
- **The work was perfectly planned and in fact the dose accumulated was about 178  $\mu$ S, much lower than the estimated one of 604  $\mu$ S.**
- J. Coupard asked if 3D models of the pipes installation are available and in case recommended to update the models with the changes done during the YETS 2015/2016. **N. Roget replied that there is no 3D model available of the cooling pipes in the area.**

## 6. AOB

- The next meeting is planned for the 8<sup>th</sup> March 2016.
- **J. Coupard reported that at the last LIU-PLI meeting the list of ECR and SRR expected for the PSB for EYETS 2016/2017 have been reviewed. The presentation is available [here](#) and the evolution of the status of the documentation is available [here](#).**
- A. Newborough reported that the design of the BT.BHZ10 and BTM.BHZ10 is almost completed.
- L. Soby took the occasion to stress the need for cabling for BI during EYETS 2016/2017. If the work in BI has to be prioritized, an high priority should be given to the cabling of the BPMs for the turn-by-turn orbit measurement as the main expert (J. Belleman) is close to his retirement date.
- F. Boattini reported that the approval of a document about the power converters for the injection and extraction trim windings for the PSB has been launched, see <https://edms.cern.ch/document/1584162/0.1>. The remaining documents concerning the MPC and the quadrupole magnets should be ready in March 2016 and December 2016, respectively. → Open action updated.
- **W. Weterings reported that the latest design of the BSW magnets (J. Borburgh) now foresees a symmetric magnet and does not require RF contacts for the connection between BSW1-BSW2-BSW3-BSW4.**
  - **This modification requires an extra 25 kCHF for non-insulated flanges, not yet budgeted.**
  - **The modification should be beneficial for ALARA principles, requiring something like 24 RF contact less than anticipated.**
  - J. Hansen mentioned that the flanges for these magnets based on the previous design have been unfortunately already ordered.
  - **K. Hanke expressed concerns about a change in the design of magnets at such a late stage in the project.**
    - W. Weterings replied that a **document has been prepared**, <https://edms.cern.ch/document/1355024/1.1>, detailing the mentioned changes to be circulated for discussion and approval.
  - L. Soby asked about the impact of this new design on the impedance. W. Weterings replied that the experts confirms that the situation improves with the new proposed design.
- R. Froeschl commented that the choice of graphite for the new PSB absorber, as described in document <https://edms.cern.ch/document/1578463/0.1>, is fine from an RP point of view, but it has to be checked with the TE-VSC Group if the material choice is adequate.