

Minutes PSB Upgrade WG Meeting 25th June 2015

Participants: J. Coupard, G. Csendes, J. Devine, G.P. Di Giovanni, A. Findlay, R. Froeschl, M. Haase, D. Hay, P. Lelong, B. Mikulec, S. Moccia, R. Mompo, A. Newborough, S. Pittet, J. Tan, W. Weterings, M. Zerlauth.

Agenda (<https://indico.cern.ch/event/403543/>):

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1. Approval of Minutes

- The minutes of the last LIU-PSB WG meeting #151, available [here](#), are **not yet approved**. Some additional input is needed from the RP group.

2. Communications

- Today, the LIU-PT meeting was dedicated to the PS review, therefore there is no new announcement concerning the LIU-PSB.

3. Follow-up of Open Actions

- All WP-holders are reminded to verify that their group requests for EN-MME have been propagated to B. Riffaud. → **Open action concerning the usual reminder closed**
- All WP-holders are reminded to verify that their group requests for EN-EL have been propagated to G.M. Georgiev.
- All WP-holders are reminded to verify that their group requests for CV have been propagated to S. Moccia.
- All WP-holders are reminded to verify that their group requests for work activities during the technical stops have been propagated to D. Hay.

- A. Findlay on "Make sure that the ECR to clean-up the PSB from the unused pick-ups for is submitted" → A. Findlay reported that the preparation of the ECR has been slowed down by an ongoing discussion with A. Blas who would like to re-use one of the pick-ups to clean as a spare for the transverse feedback (TFB) system. The aim is to reach an agreement and start preparing the ECR within the next couple of weeks. A. Findlay proposed to report a summary of the discussion at one of the upcoming LIU-PSB WG meeting.
- D. Hay on "Prepare and submit an ECR to describe the proposed new rack layout in BRF2/BAT." → D. Hay replied that the work is ongoing. The models from the integration group have been received and passed over D. Parchet. The models will be included in the ECR. On Monday a meeting is scheduled to work out all the passages for cabling.

- Y. Muttoni on "Provide the 2D and 3D models for the integration of the metallic structure needed for rack space organization in BRF2" → D. Hay received all the needed input. **Action Closed**
- D. Aguglia on "Approve document with the functional specifications of the rack space for both the LIU-PSB and the Half-Sector Test in Linac4 addressing the open issues from v0.2." → D. Aguglia is working on the new version of the document which should be ready to be circulated sometime in the middle of July 2015.
- M. Haase on "Check the integration with G.M. Georgiev and D. Hay and verify the feasibility of the proposed racks layout of the Finement cavities." → M. Haase sent the information to G.M. Georgiev and D. Hay about how many and which type of cables are needed for the Finemet cavities. As G.M. Georgiev is back at the beginning of next week, they will meet together with D. Hay to work out a possible solution.
- C. Bracco, M. Hourican, W. Weterings on "Synchronize the content of optics file and the positions reported in EDMS document 1170734." → C. Bracco worked out the optics. This issue will be reviewed tomorrow afternoon in a dedicated meeting and the conclusions will be reported to the next LIU-PSB WG meeting.

4. Progress on LIU-PSB Upgrade Work Activities

- D. Hay reported that he did not receive any additional update to the current list of actions. → **Open action concerning the usual reminder closed**
- B. Mikulec asked J. Coupard about the planning to cross-check the requests received with the EVM content:
 - J. Coupard replied that this was a longer term project and it is not one of the current priorities for the scheduling.
- **J. Coupard mentioned that one of the highest priorities is to receive all engineering change requests (ECR) by the end of the year:**
 - The table to fill in was circulated to the relevant WP/WU holders by K. Hanke last week.
 - **If a certain project is not advanced enough to provide an ECR, at least the space reservation request (SRR) should be sent to allow for an overview of the planned activities.**
 - The SRR and ECR documents are needed to centralize and better organize all the activities, avoiding duplication of work.
 - In case of doubts, please do not hesitate to contact J. Coupard and D. Hay.
 - R. Mompo asked if this request also concerns the rack request. → J. Coupard replied that this should be the case if it has an influence on cabling or similar. Any changes of layout of racks have to be mentioned in the ECR which involves this modification. All impacts of an upgrade have to be centralized in the same ECR.
 - M. Haase mentioned that for the ECR of the Finement cavities one must wait for the review in September. J. Coupard agreed that the best course of action is to wait for the conclusions reached at the review and, only afterwards, define the strategy for this particular ECR.

5. Collect Needs for Cooling And Ventilation

- S. Moccia reported that he did not receive any additional update to the current list of requests for cooling and ventilation and that he assumes that this list gives sufficient input. → **Open action concerning the usual reminder closed**

6. Requests to EN/EL for LIU-PSB

- G.M. Georgiev was not present at the meeting, but he sent an updated version of the cabling requests received, see [here](#):
 - All the issues marked in red are actively followed up.
 - G.M. Georgiev reported that at the beginning of next week he will be back and he will look into the requests to verify if the list can be completed by end of June 2015.

7. Warm Interlock System

- M. Zerlauth presented the status of the warm interlock system (WIC) for the PSB injection and extraction line and rings, see [here](#).
- The legacy magnet protection/interlocks is composed of a large variety of electro-mechanical chassis that interconnect the protection of the magnet (thermo-switches, flow meters) to the power converters, which need to be switched off in case a temperature alarm is triggered.
- **The new system aims at homogenizing the layout using the same components for all the accelerator complex:**
 - Standardized interlock system for normal conducting magnets **based on PLCs**:
 - Collects inputs from thermo-switches, flow switches and internal PC faults.
 - Then gives the "Power Permit" to the power converter.
 - **The PLC solution allows for remote controlling and testing.**
 - **The PLC can provide an additional output for the beam interlock control (BIC), if this is required.**
 - Generic hardware/software used for the WIC → This choice allows for efficient and resource-optimized installation, commissioning and operations.
 - **No red buttons or flasher will be installed with the new system:**
 - **There is a clear distinction between equipment safety (magnet against overheating, cables, etc) and personnel protection. → If someone wants to intervene on a magnet, he/she should not rely on the flasher, but ask for a "consignation".**
 - This was instead a bit mixed up for the legacy system.
 - The logic is simple: if a magnet overheats OR there is a flow switch fault OR a failure of the power converters (PC) THEN the relevant PC is switched off or the beam dumped. **The logic is configurable and not anymore hardwired.**
 - The hardware is composed of:
 - Thermo-switches installed on the magnet (e.g. on the coil).
 - The thermo-switches are connected to the "magnet interlock boxes", providing connection to the WIC system. The boxes are generally integrated directly on the magnet. The boxes use a relay for remote connectivity testing (i.e. simulate an open thermo-switch). The testing operation can be done remotely, allowing for periodical checks during shutdowns.
 - The remote interface is a WinCC supervision which is currently in use **for the PSB rings as the WIC was renovated during LS1:**
 - The interface allows for high granularity, by checking which single magnet/element is in fault.
- Concerning the LIU-PSB project, **the WIC still needs to be renovated for the LT-LTB-BI line and the BT-BTP-BTM line:**
 - **The work is part of the consolidation planning.**

- Not all of the work is approved: currently marked as "Draft 3" in the consolidation plan. There is a **high likelihood that the budget will be approved, but currently the budget is not yet allocated.**
- **A. Newborough already provided a detailed list of the magnets to be protected for each line with their protection scheme (thermo-switches, flowmeters):**
 - Currently 69 magnets in the LT-LTB-BI line and 45 magnets in the BT-BTP-BTM line will have to be protected by the WIC.
 - **Ideally the LT-LTB-BI line would be protected by 1 WIC system, including the LBS and LBE where there are only 3 magnets.** It is considered an overkill to have a dedicated PLC installed to provide a destination-specific interlock signal for the LBE line featuring only 3 magnets:
 - In the initial specification 3 WIC systems were requested, one for LT-LTB-BI, one for LBS and one for LBE.
 - **B. Mikulec commented that the WIC for the LBS line could be already removed, while LBE is to be discussed.**
 - **The issue about the BIC destination has to be followed up.**
- **The feedback from EPC is needed to finalize the request to EN-EL.**
- Probably four racks will be needed to accommodate the WIC systems in both the injection and extraction lines.
- **It remains to be seen with EN-EL if and how the cables could be exchanged. Ideally the old cables should not be re-used as they are not reliable anymore and not conform with the new standards of interconnection.**
- An estimation of the work needed can be provided as of today, but **the preparation of a full detailed DIC requires the feedback from the relevant experts.**
- **The TE-MPE-MS group will now start working on the conceptual specification and preparing a more detailed budget estimation: 150-200 kCHF should be the approximate cost for each line.** Generally 2/3 of the budget comes from EN-EL for pulling the cables (one cable per magnet).
- One of the open questions for the TE-MPE-MS group is when to target the installation of the magnet and PC:
 - **B. Mikulec mentioned that the LT-LTB-BI line WIC system needs to be ready for end-2016 to comply with the readiness for a possible Linac4 connection.**
 - **If Linac4 will not be connected at the end of 2016 (EYETS), the WIC system for the PSB injection line could be installed during LS2.**
 - A. Newborough said that if new cables are pulled and not used right away then it will not be possible to remove the old cables, so one should be careful with the planning.
 - M. Zerlauth mentioned that the TE-MPE-MS group would prefer to perform the renovation in a single step, rather than aiming for a step-wise renovation, mainly in order to optimize the resources.
 - B. Mikulec and W. Weterings replied that it is not possible to foresee if the Linac4 will be connected at the end of 2016, but the equipment has to be installation ready for that deadline. Only some time before the EYETS the experts will know if the connection has to be done or not.
 - **M. Zerlauth reported that the TE-MPE-MS group would prefer to renovate the PSB injection and extraction lines during the EYETS to free the LS2 work-schedule for major intervention, for instance in the PS:**

- **A. Newborough replied that the majority of the magnets in the PSB injection line could be already installed during EYETS, but this will not be possible for the magnets in the PSB extraction lines.**
 - **B. Mikulec suggested to focus on the PSB injection line first and get the functional specification ready together with TE-MS-C-MNC and the TE-EPC-LPC groups. M. Zerlauth said the G. Csendes will be responsible to follow this up for the WIC team.**
 - **Once the specification for the LT-LTB-BI are defined, even if not written yet in a document, a summary could be presented in the LIU-PSB WG meeting.**
- **B. Mikulec asked if the remote re-commissioning of the WIC system will be done systematically:**
 - **M. Zerlauth replied that it is the case currently for a new system, but that he would like the operators to take care of periodic tests after longer shutdowns.**
 - **B. Mikulec added that the details of the test performed should be part of a specification document describing the checks to be performed after a longer stop, which is currently being prepared.**
 - **B. Mikulec proposed to have a training session for the PSB operators, as they are not familiar with the new tool.**
- **M. Zerlauth reported that R. Mompo is going to assume the full project leadership for all WIC installations replacing P. Dahlen by the end of the year. G.Cszendes will be the lead engineer for this specific renovation project.**

8. AOB

- The next meeting is tentatively scheduled for the 2nd July 2015.
- **B. Mikulec asked W. Weterings about the RF bypasses installation:**
 - **The common understanding was that the RF bypasses in the injection region will be installed by the TE-ABT-FPS group.**
 - **W. Weterings pointed out that the TE-ABT-FPS group will be responsible for the mechanical installation. Not for the brazing, soldering and wire connections. This is the responsibility of the RF group.**
 - **B. Mikulec reminded that there is still the open issue about the responsibility of the RF bypasses installation in the PSB rings and about the regular testing of the equipment over the years.**
 - **A. Findlay will inform A. Blas about the open issues.**
- **Issues with the water cooled cables which link the MPS and the reference magnet to the PSB magnets:**
 - **The cables should be either consolidated or replaced with air-cooled cables.**
 - **It is not clear who is responsible for the cables.**
 - **A. Newborough said that the magnet group does not take responsibilities for the D.C. cables:**
 - **Currently there are no water-cooled spare cables especially for the longer lengths between the tunnel and power house. It is one reason that the magnet group limits high voltage tests to 4.6 kV. In case of failure, a considerable down-time would be needed to replace such cables.**
 - **If the cables between the surface and tunnel could be changed for solid ones there are clear advantages in minimising the risk of leaks as well as isolating the (radioactive) demineralized water circuit to the tunnel, as desired by the RP group.**

- B. Mikulec proposed the following plan: → **Open Action**
 - F. Boattini and A. Newborough will check together the technical requirements. Hopefully solid cables could replace all the water-cooled cables.
 - F. Boattini and A. Newborough will contact G.M. Georgiev to check the passage of the water-cooled cables. Maybe EN-EL could plan for an endoscopy of the cable routes in case of uncertainties.
 - Come back with a common proposal for the technical implementation and tentative planning.
 - The budget is to be sorted out to figure out if the expenses could be paid through consolidation.

| Assigned to | Due date | Description |
|---|------------|---|
| F.Boattini, G.M.Georgiev, A.Newborough | 2015-07-30 | Define a proposal for the technical implementation of the water or solid cooled cables connecting the MPS and the PSB reference magnet. |

- **W. Weterings asked S. Moccia if it would be possible to switch off the air flow during the exchange of the foils:**
 - S. Moccia said he would need some more details about the working configuration: how long time for the air flow to be stopped, maximum air flow allowed, equipment which will be impacted, etc, etc.
 - W. Weterings expects the time needed to be about 30 minutes and the frequency will depend on the robustness of the foils.
 - **S. Moccia invited to consider reducing the air flow or to isolate an area more than stopping the whole air flow for the PSB.**
 - B. Mikulec suggested W. Weterings to prepare a set of specifications for S. Moccia to work out possible solutions. → **Open Action**

| Assigned to | Due date | Description |
|-------------|------------|---|
| W.Weterings | 2016-01-31 | Define a set of requirements for CV needed for the foil exchange procedure. |

| Assigned to | Due date | Description |
|-------------|------------|--|
| S.Moccia | 2016-01-31 | Verify the feasibility of W. Weterings' requirements for CV for the foil exchange procedure. |

- B. Mikulec asked W. Weterings if the integration of the BTV with the stripping foil unit is ready → W. Weterings replied that it is already integrated and that the preparations for installation in the L4T line end of summer were advancing well.
- J. Tan reported that another meeting with M. Meddahi to review the status of the BI open actions is foreseen for the 7th July 2015.
- J. Devine reported that he looked at the results of the LV measurement campaign and the results look positive; no surprises: A summary should be presented in one of the upcoming LIU-PSB WG meetings.