LHC RF Meeting
24th June 2005

Present: Luca Arnaudon, Philippe Baudrenghien, Thomas Bohl, Olivier Brunner, Edmond Ciapala, Trevor Linnecar, Eric Montesinos, Volker Rödel, Joachim Tückmantel.

1. ACS Couplers (Eric)

- **Couplers MC122 and 123:** Leaks occurred on the copper seals on the upper polarization rings on the first assembly of both couplers. Close inspection revealed afterwards that copper filings had been left on the seals, probably from the factory machining of the knife-edges. The couplers were re-assembled with cleaned seals (water and alcohol rinsing) and are now leak-tight. They will be baked next week. The remaining 60 seals of the current batch will be cleaned before use. Another 50 will probably be ordered.
- **Coupler production:** The next two couplers, MC124 and 125, will be assembled next week. Parts for a further six are being prepared in the central workshops.

2. ACS Modules and SM18

- **Module 2 conditioning:** Cavity C, which had quickly reached 8.2 MV/m with the coupler fully retracted, proved more difficult with the coupler 30 mm in, with persistent activity at 250 kW.
- **Spring compensation:** The prototype set of four springs, made in A5, were measured and fitted onto module 5 cavity B. The spring strength is about 50 % greater than expected. With the springs in place the cavity was detuned 100 kHz lower in frequency. The cavity tuning was moved manually through part of its range. Next week it will be taken to full range and tested with the stepping motor drive. The spring system itself will be measured at lower temperature. Some minor modifications are planned (End support, fixing to prevent rotation on tightening). These may be introduced before testing with the cavity cold; alternatively we could test with the existing system or even test on two cavities, one with each system. This will depend on the time taken to produce new springs, SM18 planning and the LLRF tests.
- **LLRF tests:** Tests on the Tuner RF front end have just started. First results look promising. More details will be reported next week.

3. B867 and ADT (Eric)

- **Material from Dubna:** The final assembly of the first amplifiers, including fitting of divider, resistors, tetrodes, water hoses, etc. has been done by the Russian team in B867. One of the repaired original kicker tanks has developed a vacuum leak and the other good tank will be used instead. A second amplifier has arrived from Dubna.
- **Interlocks:** The overall architecture will be finalized as soon as possible**;** a proposal will be prepared by Luca and Eric once the present work in B876 is out of the way. **(Action: Luca, Eric)**

4. UX45 Installation (Olivier)

- **Faraday cages (Philippe):** Details have been discussed with the manufacturer. It is not easy to reduce the size by 10 cm; construction is based on standard panels of 30 cm. The 10 cm oversize can be split between putting the cages nearer the bunker and by allowing slightly less space for flexwell cable bending at the front. Raising the height of the bottom of the cage door is straightforward. The patch panel layout still needs to be done. We could leave the layout of the connectors to the supplier; however it would be better to arrange connections to fit the cable tray layouts to avoid too much crossing over of cables. It would also be reasonable to define the connectors on the Faraday cage patch panels in exactly the same way as has been done for all other patch panels in the DIC, also ensuring that we have a known logical layout. It may be possible to modify the passerelles above the cages to allow better access to cables and connectors. The air conditioning has been moved by 30 cm. Drawings need to be given to TS-EL and to TS-CV. We need to be absolutely sure that these are correct; they must be verified by both Philippe and Olivier.

(Action: Philippe, Olivier)

The aim is to give approval by July, allowing delivery in September.

- **CE work:** Holes have been drilled in the shielding wall for the flexwell cables.
- **ACS racks:** have been put in place.
- **UX45 Cooling system:** The layout is well defined and documented; there are some details to be completed inside the HV bunkers where space is limited and some equipment has been moved.
- **Cable trays:** The layout is practically finished and in the DIC.
- **UX45 Earthing:** We have not yet managed to contact J. Pedersen on the layout for connection of the earthing lines to the main earthing systems **(Action Ed, Olivier with ST-EL)**

5. SR4 Control area (Volker)

- The cost of the closed area proposed by TS is around 30 kCHF, not including electricity, lighting or cooling. (Rough estimate is 50 kCHF for the latter). Another solution is proposed: simply to close off the whole part of the building with a light wall made of prefabricated panels. This would provide a secure zone and reasonable noise insulation from the power converters. Similar constructions can be found in B181, B168. The cost would be 30 kCHF. No separate ventilation would be needed. The area closed off would take in a bunker belonging to the AP-PO group. (Responsible R. Genand has no objection.). Actual installation would be done later, just before commissioning for example. We will check that there is no safety issue with having one of the building's doors inside our 'private' zone and adopt this solution **(Action: Volker)**

6. UX45 and Access System (Ed)

- **LASS and RF switch off:** (Following discussion with G. Roy) For INB requirements there should be a second switch off channel for all the ACS RF on intrusion into the RF zones, in addition to the 2-3 second delayed interlock to the 18 kV in SR4. Connecting to the RF switches via the fast 'hard-wired' interlock system means 16 additional lines. In addition verification that RF is completely and safely OFF is not straightforward. Switching the MCBs of the power converters is simpler; one line to the thyristor control and MCB each of the four converters, direct from the access system. (This corresponds to the LEP system). Note that RF will always be switched off by the PLC control systems on receipt of the access system interlock.
- **Access System Logic:** The table compiled in May 2005 remains valid, however there is a need to standardize the definitions of activities, beam states and the access safety system (LASS) modes on the left hand part of the table (access specialists). The information contained at the moment is however correct and adequate for the hardware design of the system on our side. A similar table needs to be done for the zones adjacent to the RF. Here some form of interlock verifying that the beam stoppers are actually closed may be necessary; absence of a stopper closed contact would inhibit RF.
- **Radiation for BDI equipment:** There will be a meeting next week with responsibles for BDI's Synchrotron radiation telescope equipment to see if there are radiation issues for this equipment and what protection and shielding may be necessary.

7. APW (Thomas/Eric)

- **Copper layer:** A copper layer may be difficult to apply and is under discussion. Performance and impedance estimates can be made with and without the layer.
- **Ferrites:** These will be ready in 3 weeks and mounted in the prototype.

8. LLRF (Philippe)

- **ACS cavity conditioning:** When using the local FM modulated DDS for independent conditioning of each cavity the tuning system will not function correctly due lack of synchronization with the master RF clocks needed for the digital processing. Conditioning without tuning loop is only just possible in SM18, with its relatively stable cryo system. The design of the conditioning loop will be agreed in the near future.

Next Meeting: Friday 1st July at 08:45 in the JBA Room 864-2-B14.

E. Ciapala, 28th June 2005.