LHC RF Meeting 12th May 2006

Participants: Luca Arnaudon, Philippe Baudrenghien, Thomas Bohl, Olivier Brunner, Andy Butterworth, Edmond Ciapala, Wolfgang Höfle, Pierre Maesen, Joachim Tückmantel, Daniel Valuch, Frode Weierud.

Excused: Eric Montesinos. (E-mailed input on ACS couplers, APW and ADT added in this write-up)

1. Couplers (Eric)

SA2 conditioning: Conditioning of couplers MC123/128 in SA2 is now complete with full power full power at all phases and different couplers positions. This was therefore successfully completed before the water cooling system work in SA2.

4 Polarization coupler vacuum seals: We now have a report from S. Sgobba (TS/MME) confirming that there are some machining quality problems in the factory. The supplier has been informed. We are still waiting a new set of seals, with better quality and some improvements to the profile. (promised for 10-11 May, but not yet delivered)

2. ACS Modules and SM18 (Pierre/Eric)

4 Module 5: Cavities A and D are nearly finished power and field conditioning (8MV/m reached in both). Long duration tests at full power are still to be done. Cavity B, which suffered an alarming vacuum burst early in the conditioning process, recovered well but has still to be completed. Cavity C (coupler not baked after fitting) was started on yesterday morning, with 'normal' vacuum activity. We plan to more or less finish conditioning on all cavities before doing a warm up during the Ascension weekend, then do cool down and final power and field tests during the following two weeks.

Cryo connections: Flexibles for connections in RUX45 between the modules and the QRL eXtensions F and H have been delivered. Since some are of very short length (<2 m) possible difficulties with insertion and removal of the rigid end tubes into and out of the module were a concern. Tests were done, together with AT-ACR, with all flexible types on a module in SM18, the QRL end fixed at the same positions as in the tunnel. These proved successful, no special difficulties were found.

4 Tuner bellows: Eight new bellows have just been delivered. These will be fitted to the eight newly made sets of supports. Dismantling of tuners on modules 1 and 3 and been done. Modifications are being done at the same time on all the mechanical parts to make fittings for potentiometers and limit switches identical on all tuners.

3. ACS Power (Olivier)

Spares for circulators and loads: The supplier has been visited to discuss future contracts for spare parts.

Circulator TCU: Work has started on a new Temperature Controller Unit (TCU) for control of the circulator magnetizing current.

4. ADT (Wolfgang/Eric)

4 Kicker bakeout: Bake-out of all kickers has now been completed. One HOM feedthrough had to be changed. Only one (spare) kicker remains to be assembled. The kickers have been transported back to B867 for storage under nitrogen till they can be installed. This is an important milestone. Only the mounting pieces for the alignment targets remain to be fitted.

(Note: careful attention is paid to the overall temperature during bakeout, not specifically around the region of the feedthroughs as incorrectly stated in Meeting 21^{st} April).

4 Testing in B867: This is on stand-by due to PS and SPS machine start-up work.

Resistors: The manufacturer has done more tests on the new design, and another improved version has been made (change in the ceramic part)

Amplifiers: Assembly is progressing in Dubna. We will visit in June.

Water cooling: The parts for the water distribution will be delivered soon.

5. APW (Eric/Thomas)

PU No.2: Has been assembled and will be tested soon. VA group is ready to take it as soon as the tests will be finished, but the bake out process will not start before the 22^{nd} May.

Series production: The PUs will be assembled one after the other in the coming weeks, tested by Thomas and baked out just after.

6. Controls & electronics: (Luca)

Equipment: All ACS equipment is ready. For ADT there are only two PLC controllers remaining to be delivered out of the total of 16. ACS interlock crates have all been delivered; eight ADT crates will be delivered soon.

Rack & patch panel local cables: Over 600 prefabricated control cables are needed for interequipment cabling and patch panel connections. For ACS these are all delivered, for ADT they should be delivered next week. Cables from the various accessories on ACS modules to the patch panels will be delivered by the end of June.

7. Low Level RF

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Equipment: There will be a special equipment and software status presentation at the next meeting.

3/8 inch cable connectors: In addition to the problem of large number of connectors in the batch recently delivered having missing inner connector pin, there is a further serious concern.

Fixing of the connector body to the cable is only done at one point, near the very end of the cable, rather than with a screw-in piece at the tail as normally done. A special tool is also required to fit them correctly. Incorrect mounting can result in the cable coming out of the connector when disconnecting. (This has already happened). We understand that these connectors are not recommended for use if frequent connecting/disconnecting is needed. This may be acceptable (?) for cables going to fixed patch panels, but not for cables to rack-mounted equipment. For short RF cables (see below) additional connectors need to be ordered in any case. (roughly 1000, cost CHF 20-30 each). We intend to order these in standard type and from a different supplier. The question arises as to whether we should now order sufficient numbers to use these standard connector supplier for price quote and delivery delay. (Action: Daniel)

Short RF cables in ACS racks: A number of pre-fabricated 3/8 inch flexwell cables are needed for connection of RF and HOM signals from patch panels to equipment. Daniel and Jean-Claude will define these; then Jean-Claude will make the DiC and follow up the fabrication and installation. (Actions: Daniel, Jean-Claude)

RF cables in ADT racks: Same, with Wolfgang and Jean-Claude.

(Action: Wolfgang, Jean-Claude)

SR4 RF cables – Philippe, again with Jean-Claude.

(Action Philippe, Jean-Claude)

8. UX45 installation progress (Olivier)

General situation: Work has re-started but there are delays in TS/CV work and big delays in cabling work.

Cabling: Planning has been revised by ST-EL. (A meeting on the details will be held later today). Cabling will not be finished until the end of September, instead of the end of July. We will not be able to put equipment in racks beforehand, since free access in the racks is required for cabling activities.

Furthermore the cables will need to be tested before being connected to equipment, estimated at 2-3 weeks overall (!)

CV work: Klystron water circuit by-passes and mechanical supports are to be put in place next. The details are already fully defined. The same applies to ADT connections in RUX45. Eight metre long water pipes from UX 45 to RUX 45 will have to be removed and refitted due to QRL work.

4 Roof blocks: These are now on-site. They will be put in place next week. There are simply two blocks, one on each side, each block weighing 36 tons. Special steel plates (themselves 3 tons) are needed on the floor to cover the trenches during their passage through UX45. A gap of 8-9 metres will be left to allow installation of RUX45 and LSS4 equipment. Once these blocks are in place the ventilation units can be installed and the QRLX supports put in place.

QRLX extensions: Both extensions, H (left Sector 3-4) and F (right Sector 4-5) have been taken to point 4 and are in RUX45. Work on installing these and connecting to the QRL will start when the roof blocks are in place (- needed for the supports) and will take two weeks.

- **Earthing:** Still no news. (*Post meeting there will be follow up next week!*)
- **Floor drilling:** SU group will first mark the equipment positions on the floor.

9. SR4 (Philippe)

Jean-Claude has obtained an inexpensive offer from a local firm for closing off the control area. There are two options. The first, with two walls, takes the SR4 door into the control room area, while the second, with three walls, leaves a passage outside with the SR4 door at the end. The first has a main door only, the second needs an additional (emergency) door. Both would allow fitting a roof later, with the addition of two supports in the centre of the control area. Additional lighting could be put on the racks. (As done in the ADT area in B867). Safety issues (blocking the SR4 door in the first option will be followed up with TS) so we can make take rapid decision. (Action: Jean-Claude)

10. AoB

Bunch length measurements: We been asked by the LHC Experiment Accelerator Data Exchange Working Group <u>LEADE</u> about providing bunch length measurements (average over all bunches) for the experiments. Accuracy to a few percent and update every second has been mentioned. Our planned bunch length measurement system will use the APWL (2 GHz b/w) and fast transient digitizers with memory. We should provide an estimate on the accuracy and update time that can be obtained with this system. Thomas has agreed to do this.

We will need to develop drivers and applications for all bunch measurement applications, mountain range displays, etc. for use by RF, OP and the experimenters. Participation by OP staff in this work would be very welcome. We will contact OP group. (Actions: Thomas, Ed.)

TCC news: See <u>minutes</u>, once published. No new ECRs will be accepted. (unless essential !). Magnet installation has reached and may even exceed 25 per week. Magnet interconnects are the bottleneck.

There will be no sector test in 2006.

LSS review follow up: There will be regular follow up of the LSS planning (every month). Olivier will be our representative.

Next Meeting: Exceptional time – Thursday 18th May at 16:00 in the JBA room.

Special topic: LLRF hardware and software status – Philippe, John, Andy.