LHC RF Meeting 1st December 2006

Participants: Luca Arnaudon, Philippe Baudrenghien, Thomas Bohl, Olivier Brunner, Andy Butterworth, Edmond Ciapala, Trevor Linnecar, Pierre Maesen, John Molendijk, Eric Montesinos, Elena Shaposhnikova, Frode Weierud

1. UX45/RUX45 installation (Olivier)

Warm Magnets via RUX45: A total of 50 to 60 warm magnets to be transported to Point 3 may have to be lowered into the tunnel via the RUX45 roof. This is obviously a concern since all our equipment is in place. This will be checked on at the TCC. (Action: Ed.)

Cabling: Responsibilities were agreed between ourselves and TS-EL at a meeting last Friday. We will mount connectors on ACS Antenna and HOM cables and look after certain cables e.g. extending the ACS reflected power cables between the walls.

Reminder of points raised last week:

• A number of details concerning some of the equipment in the racks have still to be defined by us (positions, panel layouts, connector types etc.) and the "DIC" list for the cabling completed. Systems needing final definition are SR4 ACS LLRF, ADT Loops and Controls – to be done very early next year.

• Final testing and measuring of specific cables (ACS antenna, HOM, certain controls cables & connectors, testing, etc.) will be defined and organized by the equipment "owners".

Water cooling systems: We are trying to arrange the pressure tests with TS-CV. WE are doing the required temporary modifications ourselves, by-passes closing valves etc. A static test will be done at 16 bars (with a separate pump), then the circuit will be tested for correct flow through klystrons and circulators at 9 bars with the system pump. We would like to complete this work by the end of the year, since the availability of the systems in January and February is not yet clear.

Compressed air lines: Part of the compressed air system for the sector valves has been omitted during the installation. Installing the missing pipes will be difficult with the equipment now in place and will involve using a different route. Completion (TS-CV) is planned for the end of the year.

Warm recovery line (Pierre): Discussed this week with AT-CR. Installation planning depends on the delivery of valves. The piping is being partially pre-assembled, to make installation as easy as possible. Installation is planned for February with pressure testing at the beginning of March. There should be no problem to fit the heaters in place. The system will be baked and all work finished by the end of March. The vacuum chambers between the middle cavities may have to be put in place before the work is finished; a passerelle will be prepared. This will also be a difficult job now that all equipment is in place and precautions will have to be taken to protect equipment and to avoid dust.

Tunnel Roof: Note that this is planned to be closed by end February.

HV bunkers: Installation in the last bunker is nearing completion.

Klystron controls racks (Luca): All have been tested and all I/O signals verified. (RF test of RF monitoring equipment remains to be done)

Emergency stops: The situation regarding local emergency stop buttons and UPS supply remains to be properly verified with TS-EL. (<u>Note</u> the *Post meeting info from G. Roy was in fact* <u>correctly</u> written last week's write-up *i.e.*" The general policy is to include UPS in local emergency stops, but not in the general emergency stop") To follow up.

Network Situation (Luca): Optical fibres for the network have now been blown. All equipment is in place and IT expects to have the network running already next week.

Electrical Distribution Boxes for ADT (Eric): Modification of the blue distribution boxes one on each side of RUX45, to avoid having two similar rated circuit breakers in series, has still to be decided by TS-EL. For installation, it may be possible to use a mobile lift (nacelle) - if there is space.

2. ACS Couplers and SM18

Couplers 131 and 134: Coupler 131 has a leak after bake-out. The second polarization seal is suspected (New batch?)

Couplers 132 and 133: Conditioning is continuing normally in SA2.

Module 4 (*Europa*) Cavities A, C and D will be fitted with tuning springs then the module will be closed, ready for He tests next year.

Single cavity module LHC21: The 400 MHz klystron was re-connected and successfully tested into a short early last week. Conditioning of the cavity (with the presently installed system) was also successfully started. There is now a short cryo stop then conditioning will continue with the new LLRF electronics (see below).

New Conditioning and LLRF electronics: The new VME crates are in place with the new Dual DDS conditioning module and latest versions of Tuner RF and control modules. Other equipment has been modified for the different position in the racks (e.g. tuning drive, vacuum readout). Calibrations for drive powers and read back of RF powers will be done this week with the waveguide short in place, as well as open loop tests. Software drivers and data readback will also be tested.

It would also be an advantage (John) to have an automatic procedure in the DSP of the tuner control to do a resonance scan for peak amplitude and immediately set the phase rotator for zero error. This could be especially useful in the machine, where cryo stability may not always be as good as presently in SM18. To be tested in SM18.

3. ADT (Eric/Wolfgang)

Amplifiers: The Russian team has arrived but we are still awaiting arrival of the amplifiers. In the meantime the team is doing drawing updates. We may not receive the full delivery of resistors till next February; this will mean temporarily installing sets of resistors for tests, then retrofitting after.

4. APW

Feedthroughs: New designs of feedthrough are being looked at with various manufacturers. In the meantime a small quantity of the present type is being prepared in case of problems.

5. SR4

Control Area Enclosure: Will be put in place by the supplier next week.

6. LLRF (Philippe)

Electronics Modules - Series production: We now have 100 VME modules and 150 NIM modules in series production. These will need to be thoroughly tested and some test procedure documentation may be required, especially for some of the more complex VME modules.

A more detailed overall status review will be given in a future meeting.

7. AoB

FSU work planning: A basic planning for UX45 work in 2007 has been done by Olivier. We will need another electronics technician for testing of the large number of VME and NIM modules, starting early next year. (See LLRF above) This is now being looked at with the company employing our FSU.

Next Meeting: Friday 8th December at 08:45 in the JBA room.