LHC RF Meeting

26th January 2007

Participants: Maria Elena Angoletta, Luca Arnaudon, Philippe Baudrenghien, Olivier Brunner, Andy Butterworth, Edmond Ciapala, Pierre Maesen, Eric Montesinos, Elena Shaposhnikova, Daniel Valuch, Frode Weierud.

1. UX45/RUX45/SR4 installation/commissioning (Olivier et al.)

Olivier gave an update on the status of activities in the various areas, based on his presentation last week:

- **Klystron zone:** The TCUs (Temperature Control Units} for the circulators have been connected and are being tested. (These are the original AFT units; the new version will follow sometime later). HV bunker equipment tests with 60 KV are all completed, as is the test of the HV cables with PO. Connection to the correct bunkers was also checked. One set of spare cables is connected to an HV switch (commutator), at the surface, used in LEP to allow isolating the HV of the separated 'half-units' 471_1 and 431_2 installed furthest away on either side of the IP which shared a common converter. The commutator is situated at a relatively inaccessible point on the surface site. We should obtain a fixed junction box to replace this commutator, or else re-route the cable. The procedures for carrying out the water tests have been agreed with TS-CV and we expect the work to start next week. Water leak detectors have been installed and connected.

  Note that magnet transport via the RUX45 has not yet finished; the transport plates have to remain in place for now.

  PLC software upgrading is done. There are still problems with FESA 2.9 but we expect these to be resolved quickly (Andy). FIP cabling to the surface building (for ADT) has been installed. Note that the status of the FIP gateway from the Faraday cages to SR4 for the function generators (installed by AB-CO) should also be checked. **(Action: J-C Perrier)**

- **Faraday Cages:** There is still a fair amount of cabling work to be completed, including a missing patch panel. Some means of generating RF for the initial testing of klystrons is needed. Work has already started on making special crates. However another option would have been to make use of the DDS generators and switched on the conditioning modules, if they could be easily adapted and made available on time. To follow up. **(Action: Olivier/Philippe)**

  We have now decided to install the VME crates without modules. Work is ongoing on re-arranging the rack cabling to make room for these deep crates. We do not expect any major difficulties with this.

- **Platforms - HOM cable loads:** A new arrangement is being studied (Daniel), with the aim of reducing time taken for the assembly work. This is based on rolling on a frame 1 m by 1 m 20 cm wide, instead of the original flat spiral arrangement. Daniel will organise production of a prototype and its testing. Series production (64 loads) should be contracted outside.

- **Inter-wall Zone** New cables (for w/g reflected power to Faraday cages) from the trenches to the platform are in place and can be connected.

- **Tunnel – RUX45:** The work on installation of the Warm Recovery Line (WRL) continuing; the heaters are now in place. Fitting of coupler mechanics on the modules and fitting of the waveguides can be done as soon as the protective covers can be lifted from the cavities. The local ion pump supplies have been switched off for safety reasons while the cryo activities continue. We have had occasional trips of the other set of pump supplies (VA group) however on each occasion we have been able to switch back on without problems.

  ACS antenna cable calibration is ongoing.

- **ADT and APWs:** Patch panels for Q7/Q9 pick up cables are now being put in place in the RBs. Power cables and connections are being checked.

Note Layouts and cabling for diagnostics and ADT equipment in UX45 and SR4 remain to be defined. To be followed up early next week **(Action Ed, Wolfgang, Andy and Daniel)**

- **SR4:** Jean-Claude will obtain an estimate for fitting a roof and also contact TS-CV on requirements for roof vents. For the GPS system being installed by an outside firm, a mast is already in place from the LEP era (GSM?) and this can be used for the antenna.

2. ACS Couplers and SM18

- **Couplers 131 and 134:** These were fitted to the test cavity some time ago. VA group have now looked at the faulty pump (oil leak, but not into vacuum) and will organize the repair.
- **Single cavity module LHC21:** We will keep the cavity in the bunker till mid-February to continue the LLRF tests.

  Note that cryo will not be available from mid-March to the end of April, for the change over of the 12 kW plant to the 6 kW.

3. LLRF

- **Switch and Protection (Philippe):** The system was set up; over-saturation of the klystron was successfully clamped. Tests were also done with RF feedback on. Results will be presented at a future meeting.
- **Patch cables:** A sizeable quantity has to be ordered. Some of these will have N connectors on one end and SMA on the other, to minimize use of adapters. We will contact stores, but will probably place the order ourselves.
- **MatLab simulations:** The work has been written up; Janne will give a presentation at Monday morning's FB section meeting.

4. Machine Protection

- **Beam interlock signals:** On the issue of 'maskable' and 'unmaskable' inputs to the Beam Interlock System (BIC), we agree to rely on the software interlock system in the range 0.5 mA (estimated safe for un-cooled cavities) and 3.5 mA (LHC safe beam limit). The paramater used will be LHe level. We will in any case need a hardware signal from the cryo for helium level for the above 3.5 mA level. This now needs to be followed up with the cryo team. **(Action: Ed, Luca)**
- **Beam Quality:** The issue was brought up at the recent Post Mortem Workshop. Concerning RF, some parameters were mentioned but no concrete specification has been made. We should now follow this up, and decide what we can put in place, first reviewing the work already done.

  (Action: Elena)

5. AoB

- **UPS and Emergency Stop**: We are using UPS for equipment in the racks and in the Faraday cages, to provide a more stable supply and for diagnostic equipment. Normally UPS provides power for safety systems, including emergency lighting. These should clearly not be switched off if we have to cut the electronics in an emergency. Also, any emergency power stop must be accompanied by a level 1 alarm to the fire service. Ideally we should be able to decouple our electronics from the safety systems, perhaps by having some additional circuit breaker downstream. Olivier will discuss the problem with TS-EL. **(Action: Olivier)**

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Next Meeting: Friday **2nd February** at 08:45 in the JBA room.

E. Ciapala, 30th January 2007.