LHC RF Meeting 31st March 2006

Participants: Luca Arnaudon, Olivier Brunner, Edmond Ciapala, Trevor Linnecar, Pierre Maesen, Eric Montesinos, Joachim Tückmantel, Daniel Valuch.

Correction to write-up of meeting 24th March:

RF patch cables (Daniel) Around 450 various length patch cables, equipped with connectors are needed. These will be ordered directly from the manufacturer for **delivery delay** (*not cost*) reasons.

1. Couplers (Eric)

SA2 conditioning: Conditioning of couplers MC128/129 in SA2 is on schedule and now at full power of 325 kW with 500us pulsing. Conditioning with continuous power will start next week.

Coupler MC130 (ex 101): Has been assembled in B252. There is leaking around the helicoflex joints on the second ceramic. The joints are from a new batch. These are slightly different from the previous batch, being a few tenths of mm more in thickness, perhaps due to the spring. The coupler will be reassembled with joints from the previous batch.

2. ACS Modules and SM18 (Pierre)

Cryo connections: We have received the layout of the cryo feed line in RUX45 and drawings of the various flexible lines for connecting to the module. (M. Fathalla AT-ACR/CD). The 8 lines are made up of pre-assembled sets of flexible and fixed pieces, each tailor made for its particular routing. Once assembled the parts cannot be interchanged. <u>The plan views for the four modules</u> show that the line to Module1.B1 Cavity A (LHe in) interferes with the coupler of cavity A. This has since been changed by extending the connecting piece on the main cryo line to allow the flexible line to pass round the waveguide side of the coupler. There are also some concerns about accessibility and ease of inserting and removing the module connections. This will be re-discussed with M. Fathalla early next week. (Action Ed, Pierre)

Isolation of modules: We have considered putting an additional vacuum connection on each module to allow pumping of the module cryo circuits with the cryo inlet and outlet valves closed. This would allow us to re-connect to the main cryo line, after intervention, without the need to purge the whole cryo sector. However it may not be possible to operate in this way with the RF lines open since the cryo valves might ice up (Joachim). This will be followed up with AT-CR. (Action – Ed, Pierre)

Module 5: The stoppers have been fitted and are being baked. We should be able to start cooldown next week.

4 Module transport: LEP modules were transported under vacuum, rather than under dry nitrogen, in order to maintain rigidity. While this may not be a problem with the LHC single cell cavities we will probably also transport them to P4 under vacuum.

The roof blocks on RUX45 will probably be installed with an 8.3 m gap for inserting the modules. With a module of 7.471 m and two sector valves of 0.085 m (total = 7.641 m) this is just OK.

Tuner bellows: The second prototype has now been welded to the supports. We have ordered eight of these bellows to be fitted to the eight new sets of supports. We will time tests and procurement delays such that we can fit new bellows to all four modules in SM18, before installation.

4 Alignment: The proposed solution for fitting the alignment target onto the cryostat will be discussed with the survey specialists. We are taking the module cryostat as reference and assume that everything inside is correctly aligned to it. The tolerance for alignment is 1 mm (Trevor).

3. ACS Power (Olivier)

Future supplies of spare power components: Long term supply of spare klystrons has been discussed with Thales. They will also provide offers for refit of certain klystron parts, e.g. gun, collector etc. Loads and circulators will be discussed with AFT in the near future. We have a sufficient number of modulator tetrodes for the near future. For the long term other solutions will be looked at e.g. solid state.

4. ADT (Eric)

Kicker bakeout: Bake-out of the first batch of 10 will start within the next two weeks. For the moment this is not critical for us in maintaining the installation deadline.

5. APW (Thomas)

Feedthroughs: We are still waiting for the final report from S. Sgobba (TS/MME) on the leaking of the feedthroughs after bakeout. It has now been verified that the present feedthroughs can be safely baked to 225°

6. Controls & electronics: (Luca)

4 ACS system - Lab tests: Integration of the complete system into FESA 2 has started with the introduction of all the PLC variables into the IEPLC and FESA databases. Problems were encountered with compatibility of data in IEPLC, i.e. restrictions on name lengths and use of lower/upper case characters. These have been resolved with the AB-CO specialists. While it is possible to upload data from an excel file (preferred solution!) in IEPLC this is not yet the case in FESA. In spite of the difficulties in doing the configuration the finally configured systems appear stable. The next step is to build up applications in LabView then eventually in JAVA.

Interlocks tests: The tests on a full chain in the Lab have been completed successfully, including diagnostics.

- **Arc detectors:** The total quantity of 160 has been built and tested.
- **IT infrastructure:** Ethernet at Pont 4 will be installed by July.

7. Low Level RF

Design and Production of modules: The planning has been discussed again with E. Van der Bij (ST-DEM). Some production delays appear to be rather long, but we have discussed shorter times for some critical modules.

Low Level VME crates: Now that we are organizing series production, the requirements for special VME crates has been reviewed. An <u>updated list</u> now shows 74 crates need, compared with an original 58 in EVM. Some additional crates are for other projects and can be paid on other codes. For LHC we have six additional crates, needed for lab testing, plus four for APW and two for CCC. Note that crates considered as spares will not have CPUs fitted.

8. UX45 installation progress (Olivier)

Cabling: Now that cable tray routing between the walls has been finalized cabling will start as soon as possible.

Ventilation Units: New ventilation units for rack cooling have arrived in UX45. Work is continuing on the Faraday cage cooling units.

RUX45 roof blocks: Late delivery will have a domino effect on the rest of the installation.

9. LSS Review

This was held on 29th March. <u>See Olivier's presentation</u> on RF. Our CE difficulties were presented and the importance of completion all infrastructure in time for us to meet our own deadlines was emphasized. Our equipment is on schedule for installation in July. The BPAWT transverse pickups (needed only for higher intensities) may not be installed for first beam.

Bake-out of LSS4 will be done - this was never seriously in question.

Inclusion of vacuum gauges in the database was raised. This is an issue for the vacuum group. For the DiC we have simply specified cabling for these as relative to the ACS modules, rather than defining the gauges as individual objects.

10. Vacuum layout (Ed/Olivier)

The electron stopper and second beam tubes have been added to the layout list for RF equipment in IP4. See <u>updated IP4 Equipment Positions list</u>. The corrected APW positions, with the APW symmetric around the IP, have been put in the vacuum layout database. See <u>latest version of the vacuum layout list</u> for IP4 => options LSS4 / Study in design.

Next Meeting: Friday 21st April at 08:45 in the JBA room.

E. Ciapala, 3rd April 2006.