# LHC RF Meeting 23<sup>rd</sup> April 2004

**Present:** Luca Arnaudon, Olivier Brunner, Andy Butterworth, Edmond Ciapala, Wolfgang Hofle, Trevor Linnecar, Roberto Losito, Pierre Maesen, Eric Montesinos, Volker Rödel, Joachim Tückmantel.

## 1) ADT (Wolfgang)

- **Kicker Fabrication:** This is now transferred to a new factory and test sample welds are being done. Local Quality Control tests indicate that a surface layer (oleic acid?) is the reason for welding problems, showing up as black spots on the weld. High sulphur content in steel pipes, (ordered in 2001 from stores) is also cited as a reason for poor vacuum. The aim remains to finish production this year
- **Amplifiers:** Critical parts have now been dispatched from CERN, although there is concern over long customs clearances on arrival in Russia. Some of the final assembly will now be done after delivery at CERN, to avoid the need to send certain parts and thus avoid further delays.
- Anode Supplies: The contractor (Imtec) was visited this week. The official contract has been sent but has not yet reached them. There may be some delays due to the special production of HV capacitors, but the final delivery dates are still expected to be maintained.
- Feedthroughs: These have been accepted, the vacuum performance being OK. Problems of corona discharge and arcing may need reshaping of the ceramic and metal end pieces to common dimensions, or the addition of shields. Results of chemical analysis of the ceramic material are still to come.

### 2) ACS Coupler Production (Eric)

• Four main ceramics have been received. The two couplers presently being assembled (109 and 110) are on schedule, subject to receipt of brazed polarization ceramics for test early next week. They should be completed and baked by the end of week 20 (in three weeks time)

#### 3) SA2 – LHC Klystron & Installation (Eric, Olivier Luca)

• **Installation:** The LHC klystron has been installed and connected and the waveguide system dismantled and re-mounted. It was decided to leave the original LEP circulator in place. The area has been reorganized and the EEV and SLAC klystrons removed. The control system hardware has been prepared and basic software tested. Some cables have to be re-routed and others added. Hardware tests can start towards the end of next week, hopefully allowing power tests in the following week (week 19). This is the result of an excellent effort from everyone concerned.

• Water Quality: Other klystrons (Argonne) have shown similar problems on the collector as our EEV klystron. Build up of deposit in the channels around the collector causes vaporization of cooling water, resulting in further deposits. Temporary repairs are usually unsuccessful. To avoid recurrence of the problem with the new klystron, it is important to check the SA2 cooling installation as soon as possible. (with B. Occelli TS-CV). It was suggested that wrong filter types (porosity) might be the problem. The results of tests on water samples should also be followed up.

#### (Action: Olivier)

• **RF Power limits:** The LHC klystron is rated for 330 kW cw, somewhat less that the 550 kW plus to which couplers have previously been conditioned in SA2. Coupler conditioning in other installations has been ruled out. Addition of a second klystron in SA2 could be considered, but this would significantly delay coupler progress. In LHC we will in any case be limited to one klystron per cavity; hence the de-conditioning which will occur above the maximum single klystron limit will not be recoverable. Conditioning with beam is not an option in LHC. Pushing the klystrons to higher limits has therefore to be explored. With 62 kV (maximum allowed), 10 A and 60 % efficiency, over 360 kW could theoretically be obtained, under certain conditions. Pulsed operation, using the mod anode, may allow higher power without increasing collector dissipation.

# 4) ACS Module 1 (Pierre)

• Module 1 was re-measured and is still correct. However a blockage of the tuner of D limits the range for this cavity. This is being investigated<sup>1</sup>

# 5) SM18 (Roberto)

• **Space:** Extra magnet test benches will be installed in SM18. A new layout for the area in front of the RF area has been proposed. Our requirements to be able to move modules from the bunker to assembly area and storage area are understood and accepted. The space remaining in front of the bunker appears to be the very minimum for moving a module in and out. This will be measured and checked when the present module is moved out of the bunker. TIS-RP will not accept prolonged presence of personnel in the area in front of the bunker.

• **Bunker Modifications:** The modifications to increase the height of the entrance will be done in week 20. The waveguides will be modified just after.

# 6) ACS Cryo (Roberto)

• **He Circuits**: A <u>meeting with L. Serio on 21st Apri</u>l was held to follow up points raised in the <u>RF/Cryo meeting of 12<sup>th</sup> March</u> The main points discussed were proposals to prevent damage from icing around the quench valve outputs. The Warm Recovery Line (WRL) was also discussed. Its main advantage would be to allow operation even with unstable conditions in the D-line. It was agreed that the material be chosen and integration completed but that a final decision on installation be postponed. Note.

• He release into UX45: We have had no objection from TIS to the proposal release helium from the module into the UX45 cavern, in the event of opening of the 2.5 bar protection valve (or rupture disc).

• Integration in UX45: Routing of the quench valve outlet lines back to the QUI and the above outlet to the cavern still have to be studied and presented to the Integration WG.

# (Action: Volker, Roberto et al.)

# 7) Infrastructure (Volker)

• Fibres: J-C Perrier is now following up the installation of fibres, with L. DeJonge.

# 8) Market Surveys (Volker)

• Flexwell cables: The required documents for the Market Survey are now in EDMS. They will be presented in the Specification Committee of 29<sup>th</sup> April. A decision has to be made on which cables are to be specified as phase compensated. (Action: Philippe & Wolfgang)

• Faraday Cages: Documents are being prepared for the above Specification Committee.

# 9) Equipment naming (Ed)

• We are waiting on feedback from CO, OP and naming responsibles on the RF equipment naming proposal, and on the choice of 'operations' names.

# **10)** Commissioning (Olivier)

• Our request for 24-30 weeks commissioning of the RF systems needs detailed analysis to ensure that all activities are based on the most efficient use of resources, in order to best justify the time requested. (Action: Olivier with everyone concerned)

# 11) AoB

• **EMC**: A meeting will take place with AB-PO group (G. Fernquist and F. Bordry) to look at measures taken by them to avoid EMI problems in their installations in B377 (near B30) Room R-004 on Friday 23<sup>rd</sup> April at 11:00.

Next Meeting: Friday 30th April 2004 at 08:45 in the JB Adams Room 864-2-B14

E. Ciapala, 26<sup>th</sup> April 2004.

<sup>&</sup>lt;sup>1</sup> The problem was later identified as due to a minor wiring error, now rectified.