LHC RF Meeting
11th March 2005

Present: Luca Arnaudon, Thomas Bohl, Olivier Brunner, Andy Butterworth, Edmond Ciapala, Wolfgang Höfle, Eric Montesinos, John Molendijk, Trevor Linnecar, Volker Rödel, Elena Shapochnikova, Joachim Tückmantel, Daniel Valuch, Frode Weierud.

1. ADT and Dubna (Wolfgang/Eric)

Following Eric and Wolfgang's visit to Dubna:

- **Amplifiers:** The overall impression of the quality of the first amplifier, tested in December, is good. Since it is the model for the series production it could not be shipped in January 2005 as had been promised. Production starts with two amplifiers; our first delivery will be either the original model or one of these first two. The latter (preferable) option may lead to delays as some material has still to be sent for the production series. A decision will be taken based on the estimated shipment delays and our planning. The list of material still needed by Dubna was given. Both mechanical drawings and electrical diagrams have been handed over and these will be checked. The choice of certain connectors and their pin assignments still have to be finalized.
- **Supports and amplifier Installation:** The design will be based on the SPS 352 MHz amplifier system. Eric will supply details and Dubna will prepare preliminary drawings. Tunnel floor clearance will be checked. The worst case 60 mm clearance between the floor and the underneath of the amplifier should still allow use of the standard size amplifier case, with 20 mm to spare. This issue will not hold up the production of the amplifiers.
- **Production of the kickers:** Two 304L steel tanks have been manufactured in the factory; they will be checked by Dubna. If OK production of all 20 tanks will proceed this month, then be shipped to Dubna in April for vacuum testing, then to us in May/June.
- **Electrode structures:** The first has been completed, Dubna would prefer to ship in batches to cut down customs work and minimize the high shipment costs.

Other ADT issues:

- **Anode Supplies:** The next Imtech visit will be 24th March. Items to be sorted out are the lifting support system (J-C Perrier) and the key interlock system.

2. RUX45 Layout Diagrams

Drawing LHCLJ4GA0007 needs to be updated and checked against the drawings used by S. Chemli. (by Wednesday 16th. March, copy in **864-1-C14**). An ECR should then be circulated to make it official. **(Actions: Volker + all concerned)**

3. ACS Couplers, SA2 and conditioning (Eric)

- **Couplers MC118 and 119:** Conditioning of these has been completed; they are now in SM18 awaiting mounting on module 2 together with already completed 116 and 117.
- **SA2 Conditioning:** Couplers MC120 and 121 have been mounted on the test cavity and taken to SA2. Conditioning will start this weekend.

4. ACS Modules and SM18 (Ed from Pierre)

- **Module 3 conditioning:** Couplers of Cavities A and B have been conditioned to full power, with low field in the cavity. Cavity C is now in progress. Operation has been difficult with frequent stops due to power cuts. These often resulted in overpressure in the He tanks and increase in beam vacuum pressure due to cutting of the vacuum pumps. Restarting is often difficult.
- **He incidents - Soleil and Module 3:** These will be brought up at the DSOC (Departmental Safety Officer's Commission) in the near future. We have had a pre-discussion with the cryo specialists. The main issues are:

- *Improvements to the Soliel system:* connection of safety valves to outside of bunker and review of the special dewar connections and valves. This will arise if and when another Soleil module is to be done.
- *Opening of valves:* Can anything be done to limit the likelihood of opening of the valves? e.g. change safety positions of output and warm recovery line control valves (from open/closed to closed/open)
- *Use of check (non-return valves) in outlet.* Difficult and costly in SM18?
- *Transmission of Oxygen alarm to the fire service:* It can be noted that this alarm was introduced last year. It consists of audio alarms inside and just outside the bunker. They were set off correctly in both cases. The alarm did not go further as the PLC connection to the level 3 alarm system in SM18 had not yet been made.
- *Implications for the RUX 45 installation*. Non return valves, He exits, valve dimensions - all under study.

- **Cavity Tuning:** The tuning of Cavity B in Module 5 has been measured at room temperature. Note that 0.6 mm of the additional spacing has now been removed in this cavity. There are two plots. The upper plot shows the displacement of the free flange of the cavity from the fixed frame (at four positions around the circumference, also the average) vs. position of the tuner. It shows the taking up of the slack in the tuner wires then average linear displacement at around 0.64 mm/cm tuner movement. The lower plot shows resonant frequency vs. displacement of the flange. It shows that the flange movement with respect to the change in frequency is approximately 0.57 mm/100 kHz, a little more than the 0.5 mm/100 kHz expected. (i.e. 200kHz for 1 mm).
- **Spring compensations (Olivier):** Cost estimates have been received for BeCu disc springs. Delivery delays are long. We should order what we would need for tests.

5. ACS Power (Olivier)

Klystrons: Klystron 16 is now under acceptance tests, klystron 15 will come next week.

HV Ripple: Final tests will be done next week in SM18. Results will be presented at next week's meeting.

6. Low Level RF – Tuner Control (John)

A problem was encountered with connection of (two) address lines on the Tiger Sharc DSP chip. The connections to the PC board are in the form of a 620 ball grid array. The chip could be removed and another successfully mounted. First indications are that the problem has been resolved. Bad soldering is the most likely explanation. This is a concern for the future, especially if we move towards 1220 ball grid devices (Transverse Feedback). The design office is considering the purchase of an X-ray machine. The connections can be verified by the JTAG serial interface, standard on all these large devices. JTAG can also allow self-test of the modules and devices on power-up, the check procedure would have to be defined and written.

7. RUX45/UX45 installation (Olivier)

- **Status & Planning:** Aleph rails will be taken away next week. A solution for support of the 1.1 m wide plates to cover the trenches has been found and the design of the parts is in progress. While CE work and platforms are ongoing, a brief update of planning for certain activities shows some additional delays (cryo, water). Water installation is awaiting confirmation from TS-CV. The shielding wall should be finished by 25th March. We then have to install the UX45 copper grounding sheet and the racks (starting 11th April)
- **Integration:** The integration team will study IR4 again in the coming week or two. Remaining items are re-confirmation of the exact dimensions for the He warm recovery line and its routing. Also He safety release to the UX45 cavern **(Action: Ed, Pierre, Olivier with L. Serio AT-CR)**
- **Q kickers MKQA in IR4**: An ECR is in circulation for installation of ferrite Q-kickers in IR4. These have been moved from IR6 due to radiation and aperture issues.

8. Cabling and infrastructure

- **Flexwell cables (Wolfgang):** The order has now been sent to the firm. They are expected to confirm delivery dates for both cable types (uncompensated/temperature compensated) on receipt of the order.
- **Pulling of flexwell cables (Wolfgang):** An offer has been received from one company. The prices may be competitive with ST-EL estimates.
- **SR4 Control Area (Volker):** The area probably needs walls and a roof. (security, lighting etc.) We should see if the same type construction as the neighbouring controls area could be used, also if ventilation would have to be by a separate unit or if it can be incorporated in the existing SR4 system.

9. Controls (Luca)

- **Arc detectors:** New detectors have been installed for test in the circulator and load in SM18. These have an additional output to allow monitoring of the signals. They will be used later for the couplers.
- **He level conditioning:** A new AT-CR standard He level conditioning module has been successfully tested and integrated in SM18.
- **SR4 Racks layout:** Those responsible for equipment inside the SR4 control room are asked to provide the layout of the equipment in the racks assigned to them. This is needed firstly to allow definition of reset and Ethernet interfaces. It is also needed to permit completion of cabling lists. A template has been circulated to all concerned. The main systems are: controls (Andy). Diagnostics (Thomas), LLRF (Philippe) and ADT Low Level (Wolfgang).
  - Luca should be contacted for any assistance needed.

10. Beam Permit and machine protection (Andy)

- **RF Equipment protection:** A meeting has been organized with the machine protection team (R. Schmidt) to follow up on the handling of 'safe' levels for masking of RF system interlocks (See details last meeting)
- **BDI input to damper (Wolfgang):** This is a concern since the damper can easily produce rapid beam loss at injection with the wrong drive signal. This was presented to the Machine Protection Working Group in 2002. Some form of inhibit on the external input will probably be required.
- **Abort gap cleaning and monitoring (Elena):** The damper will be used for abort gap cleaning. It is vital that some independent diagnostics system be available for this. We should follow up the status of the planned developments (e.g. from BDI), together with the Machine Protection group.

11. AoB

- **LEP Waveguides in ISR:** Some waveguides may be given to a collaboration with India. The list of remaining material has been given. Some re-arranging of stored material will be needed next week.

Next Meeting: Friday 18th March at 08:45 in the JBA Room 864-2-B14.

E. Ciapala, 16th March 2005.