LHC RF Meeting
1st October 2004

Present: Luca Arnaudon, Olivier Brunner Andy Butterworth, Edmond Ciapala, Wolfgang Höfle, Pierre Maesen, Eric Montesinos, Volker Rödel, Joachim Tückmantel, Daniel Valuch, FrodeWeierud.

1. Installation Planning (Olivier)

From recent meetings on civil engineering and cooling/ventilation, the planning milestones for UX 45 and RUX 45 are:

- **Civil Engineering:**
  - ***Tunnel walls*:** this month.
  - ***Shielding wall:*** November/December. The design allowing partial completion before the QRL is installed and completion afterwards has still to be done.
  - ***Platforms:*** January/February 2005. No equipment can be installed under the platforms before the QRL is completed. At present the planning for QRL installation is to start in the mid-arcs and finish at the IR.
  - ***HV Bunkers:*** March 2005
  - ***Tunnel roof:*** – later
- **Cooling and ventilation:**
  - ***UX 45 cooling pipes:*** February/March 2005. The necessary ex-LEP parts will therefore have to be taken from storage by the end of this year.
  - ***UX45 demineralized water and chilled water:*** will take three months after pipes are in place
  - ***Ventilation systems:*** by end of 2005.
- **RF Equipment deadlines:**
  - ***ACS Modules:*** beginning of 2006.
  - ***Faraday Cages:*** by end of 2005
  - ***ADT kickers:*** Latest by August 2006.

Much of the above depends on the latest speed of light (c) planning which still however awaits the definitive official schedule for the QRL.

2. Cooling System in RUX45 (Volker/Olivier)

A layout has been completed by TS-CV (David Ryan); however some items are not as requested. This is being followed up.

3. Test stand in 867 (Eric)

Eric presented the new layout. The zone will be fully cleaned out by the end of the month. The re-arrangement of partitions and cabins has been done. Water supply is sufficient for ADT. The pump would have to be changed for another situated outside the building if we would have to test ACN at the same time. We will have one anode converter and two amplifiers. The 600 A switchboard may have to be upgraded (J. Pedersen).

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4. ADT Progress (Wolfgang)

- **Anode converters:** The firm will be visited on Tuesday 5th October, to agree on the 6-pulse configuration.
- **Capacitors:** This has been checked with Carlo Rossi (SR section). We will request offers from outside suppliers.
- **Kickers:** The existing tubes, from which the kickers will be made, are to be taken to the factory in the Urals. The diameters will be measured.

Official AT-VA group acceptance from M. Jimenez is now expected to come in the form of an email.

5. ACS Couplers (Eric)

A leak has been detected after the assembly of coupler 113 (before bakeout). This is being investigated; it may be due to the sealing gaskets above and below the second polarization ceramic (new series) which have been found to have a smaller diameter section than they should (by 0.1 mm).

6. ACS Modules and SM18

- **Module 1: (Pierre/Eric**) Conditioning of the coupler of cavity A was relatively quick and power has also been applied to couplers of cavities B and C. Cavity A has gradually been brought to tune, calibrations checked and the max field limit set. A field of over 5 MV/m was obtained for now. Some problems were found with the setting of limit switches on the tuner; the mounting arrangement may have to be improved. Low level tests (overall open loop response and group delay) will now be done with cavity A.
- **Klystron load: (Olivier)** A problem first appeared as an arc detector load interlock. Again the arc detector indication was proved correct - a water leak in the load was found on dismantling the waveguides connecting the load. The load was leaking around the heads of bolts passing from the interior through water channels. The sealing material (silicone?) around the bolts had disintegrated. Some ferrites had detached. The load was changed and will be returned to the manufacturer. The leaking load is a prototype; series loads do not have bolts passing through the cooling channels. It may be advisable to retain LEP water loads in case of long term problems; a solution for mounting these could probably be found.
- **Second bunker operation: (Olivier)** It has now been found possible to keep water circulating through both 352 MHz and 400 MHz klystrons, avoiding the need to adjust water flow settings on changeover from operation of one bunker to the other. This makes day/night switching over a possibility.

7. SR4 (Volker)

Layout diagram LHCACSLA0009 has been updated, showing the control area, the rack layouts and the new positions of the ADT supplies. Rack numbers are also shown; electronics positions in the racks and cabling can now be fully defined.

8. Coaxial cables (Volker)

The tender opening was held this week. The offers will be checked in detail. Cables having temperature compensated equivalent characteristics are included, their cost being 10 to 20 % more than normal cables. If OK we can order in November.

9. Faraday cages for UX45 (Philippe/Volker)

There were 6 replies to the market survey. All comply with MIL standard 285 and have 80 dB isolation at 400 MHz. We need to make the final specification. This depends on knowledge of the UX45 installation planning. The specification committee date should also be decided.

10. ISR clean-out and LEP equipment recuperation

Waveguides for LHC, Linac 4, Soleil and IHEP have now been transferred to other storage areas or at least separated out. Some electronics crates and waveguide phase-shifters remain to be recuperated. Ex-LEP electronics equipment now stored in the tent will be checked to see what should be still be recuperated **(Action: Ed, Philippe, Andy, Olivier)**

11. LEP equipment room in PCR

Racks have to be removed for preparation of the new CCC in 2005. The equipment in these racks is being removed; any useful equipment will be recuperated and the rest disposed of.

The location of the racks which will be needed for LHC is still not decided.

12. Low Level RF (Philippe)

- **Tuner control module:** An auxiliary power line to the FPGA is missing. Tests can still be done with the existing two boards and a new corrected board design will be built in the next week or two.
- **Feedback module:** This will be assembled shortly and should be ready in one month.
- **SM18 work:** Cavity and klystron combined response and group delay will be measured.
- **Fast timing and distribution:** There will be a meeting with AB-CO and BT to review the requirements and the present situation.
- **Fibre transmission equipment:** Specs for RF requirements have been sent to a supplier of RF to fibre conversion modules. We will mount these on VME cards, two modules per card. CO group have their own solution for slow (GMT) timing.
- **Damper synergy:** LHC damper and 1-turn feedback are similar in requirements, however difference in the ratio of fixed delay to beam delay and the wide frequency variation in the PS make PS applications more complex and more challenging to use the same hardware.

Radiation Hard FPGAs: (Andy) A seminar was held recently on Xilinx radiation hard FPGAs. Download 500 page presentation. However, for neutrons in the energy range in which we are concerned, they are not more tolerant than normal devices. (The interest is for high-energy ions in space applications)

Tools for doing triplicate design were also presented; this may be interesting for critical parts of our designs. These will be acquired by CERN (S. Brobecker)

Next Meeting: Friday 8th. October at 08:45 in the JBA Room 864-2-B14

E. Ciapala 5th October 2004, this corrected version 8th October 2004