LHC RF Meeting
8th October 2003

Present: Luca Arnaudon, , Olivier Brunner, Andy Butterworth, Edmond Ciapala, Roberto Losito, Eric Montesinos, Trevor Linnecar, Volker Rödel, Joachim Tückmantel, Daniel Valuch, Wolfgang Höfle.
Excused/Absent: Philippe Baudrenghien, Thomas Bohl, Elena Chapochnikova.

Agenda:
1) Module 3 status & planning (Eric/Roberto)
2) Status of modules and cavities (Roberto)
3) SM18 - Soleil
4) ADT (Wolfgang)
5) P4 Integration (Volker)
6) Other follow-up from last meeting
7) Round Table / AoB

1) Module 3 status & planning (Roberto)

- Bake-out is ongoing on Module 3 couplers. 170 deg C will be maintained for 24 hours on the lower parts of the couplers, with not more than 100 deg C on the second ceramics. Cool down over the week-end is to be followed by a leak test then transfer to the bunker. Frequency checks will be done, to be compared with those done 5 months ago.

2) Status of modules and cavities (Roberto)

- **Thermal cycling** is stopped for now to allow installation of module 3.
- **ACN Cavities:** The contaminated cavity resisted the sulphanic acid cleaning process and other cleaning treatment will be needed.

3) SM18 Second Bunker (Roberto/Luca)

- **Applications:** These are:
  1) Conditioning of modified Soleil (LEP type) couplers on a test cavity. (Definite)
  2) Power testing of the reassembled Soleil module (Definite)
  3) Thermal cycling of 400 MHz modules (A useful option)
  4) Test of 352 MHz SPL equipment (?)
  5) Other collaborations – Lignaro RFQ (???)
- **Controls:** The 352 MHz Klystron controls for bunker 2 will closely resemble those of the 400 MHz klystron and will make use of the "Line 2" PLC which controls cavity B in the LHC configuration, in the same way that the Line 1 PLC is used for the 400 MHz klystron. Other functionality required for the various applications will be built around a "Generic" PLC. The existing Saclay control (and tuning) systems will be used for the tests on the Soleil module, the Generic PLC making the connection to our Cryo, RF and HV control systems. Costs for the 352 MHz klystron controls material is estimated at around 32 kCHF and 10 kCHF for the additional Generic PLC and material. Equipping the second bunker exactly like the first would cost 78 kCHF. (This is not being considered for now)

4) ADT (Wolfgang)

- **Main Feedthroughs:** The order (CA1294219) has been placed. One month delay was incurred in the elimination of added-on non-compliant bids. Brazing will be done with material (silver nickel) not susceptible to corrosion.
- **Power Converters - Ug1 & Ug2:** The tender opening date for replies to tender for Ug1 and Ug2 supplies is 28th October. One company was eliminated, being unable to show the specified minimum turnover in this type of supply.
- **Power Converters - Anode:** To meet our planning deadlines offers should be received by end of December, to allow necessary preparation for FC in March 2004. The LEIR RF supply is apparently needed earlier than this schedule allows. Whether or not one single IT

can be done for both types has to be agreed. In this context we need to follow up urgently with PO group on the control interface specification and whether we can/should use the same specifications. A preliminary discussion with PO and Pierre Maesen on LEIR RF supplies had suggested that a PLC based approach might be acceptable to PO.

(Action: Ed, + Pierre, Wolfgang, Luca)

- **ADT Kicker Tanks:** Waiting on report from VA group on the non-compliance of the two kicker tanks received from Dubna. This is being followed up by J-F. Malo. A specialist from Dubna should come to follow up on the poor welding quality.
- **Cooling water:** Status as last meeting: Specifications to be done to lead to the actual design: pipe sections, layout, connections. **(Action: Wolfgang)**
- **The installation in B867:** Should be decided with Eric.
- **ADT Power Amplifiers:** A number of parts (e.g. capacitors) have been received for the construction of these 20 amplifiers and will be shipped to Dubna (R. Louwerse). The need to do radiation testing of these components is being investigated. Many other components are needed and three PE/ITs (volume >50 kCHF each) will be prepared this year for material such as resistors, capacitors and transformers. Technical specs on the components also have to be provided. The Russians cannot finish the final design until the order of these components is confirmed. PS damper work is taking taken more time and manpower than expected. This is delaying LHC work.
- **Driver amplifiers:** Status as last meeting - a design review will be held at the manufacturer's premises in week 44.

5) Integration (Volker)

- **ADT Power Amplifiers:** Protrusion of water connections into the transport zone can be avoided by using elbow connections. The HV connections are more difficult however. The amplifier team in Dubna will be asked to modify the design such that the dimensions comply with the available space **and to provide updated drawings**. **(Action: Wolfgang)**
- **Crash barriers for ACS & ADT:** A continuous crash barrier, protecting all equipment, is an essential requirement. Space for a 50 cm high barrier is available all the way along. This is being presented to the Integration Working Group. The suitability of the proposed 50 cm height with respect to the transport vehicle(s) should be checked.

(Action: Volker)

- **Ventilation in tunnel area:** Awaiting TIS input (See last meeting)
- **APW:** As last meeting: Short functional specification, to be produced for the Integration WG. **(Action: Thomas with Volker)**
- **ADT Cooling water:** Also ongoing.
- **Warm Recovery Line:** While integration with all pipes and heaters is in fact not too difficult, we still have to agree on this line and how it would operate. A proposal should therefore be prepared for a meeting in the near future. **(Action: Roberto)**
- **Radiation Stoppers:** The draft ECR LHC-V-EC-0002. has been rejected by us. Maximum voltage levels for conditioning already given to TIS and used in radiation simulations are 20 MV per ring. An He processing mode should also be considered. Discussion is needed with M. Jimenez before the final ECR is prepared.**(Action: Volker, Ed)**
- **Protection of ACS HOM Couplers:** Two methods were proposed: 1) a protective hood fixed to the cavity top platform and 2) a cylindrical cover around the top part of the HOMC. The LEP solution, i.e. a cylinder around the body extending past and covering the connectors, fixed to the mounting flange, was proposed (Olivier). This seems the best option.
- **UX45 Earthing:** The conceptual layout is decided.

6) Other Follow up from last meeting

- **Radiation in UX45** (Andy) Results for the area between the tunnel and shielding wall are available and will be analysed.

7) Round Table

- **Dust Traps:** (Joachim) The design study for four dust-traps has started with B. Goddard and the BT group.
- **Circulator Magnetization Control** (Daniel) AFT can not easily provide an off-the-shelf system with the facilities and diagnostics needed for LHC. The control loop will therefore be implemented in the klystron PLC, where all necessary signals are available.
- **Controls:** (Luca) Production of interlocks and temperature conditioning electronics is now starting. New (better and less expensive) PLCs are now available and a number will be ordered for SM18.
- **Klystrons, Circulators and Loads** (Olivier) Two more klystrons have been delivered and successfully tested, bringing the total to 7. The next delivery of loads, planned for the end of the month may be slightly delayed. Thicker inner plates are to be fitted to the loads to improve their resistance to water pressure rises.
- **HV Cables:** (Olivier) Fitting of connectors to Klystron-Bunker HV cables by an outside firm has been badly carried out. New cables may be needed.
- **Low Level RF:** Design work is starting on the second VME module (Tuning) for the ACS cavity controller The basic layout of the overall tuning system has been decided. The DSP presently in the tuning drive crate will be included in the VME module, such that setting of parameters can be done directly via the control system. Equipment data (limit switch status, tuner and coupler positions will be transmitted serially from the equipment to the VME crate, for best flexibility. This arrangement should allow handling of more complex tuning procedures, such as half-detuning, with minimum hardware modification. This would be an appropriate time to discuss these procedures in some more detail.

  (Action: Joachim, Philippe, others concerned)
- **EVM:** Now that the system is stable, we should check that work units completion status are correctly entered for all work units. (Can be quickly checked using the Gantt chart display). **(Action: All)**
- Some activities are showing appreciable delay, this can certainly be attributed to manpower shortage.

Next Meeting:
(Provisionally) Wednesday 15th October 2003

E. Ciapala, 8th October 2003