LHC RF Meeting 19th April 2007

Participants: Maria Elena Angoletta, Luca Arnaudon, Thomas Bohl, Olivier Brunner, Andy Butterworth, Edmond Ciapala, Trevor Linnecar, Pierre Maesen, Eric Montesinos, John Molendijk, Wolfgang Höfle, Joachim Tückmantel, Daniel Valuch, Frode Weierud.

1. P4 Commissioning

UX45/RUX Activities – ongoing and pending items:

Water: Water is running reliably at 8 bar pressure. A blockage in the circuit of one HV bunker has still to be located and cleared. The inlet/outlet crossover on RB46 side for ADT has been corrected.

• **ACS tests:** Focus and heater supplies have been switched on for eight klystrons. Test with HV will start next week. A spark gap will be put in place for the first tests on each supply. The new fast overvoltage protection circuit prototype will be tested. There will be one for each bunker.

The electrical wiring in SR4 for the ACS converters has already been upgraded to provide full power, but the current measuring transformers will not be installed till 25th May. (One week interruption)

• Access system: Shielding blocks for the chicanes in the RBs will be put in place in week 21, once the remaining 8 warm magnets have been transported. The RUX45 roof blocks are also planned for the same time. However transport of the repaired inner triplet may affect the planning. A new overall planning should appear soon (mid-May?)

• **Earthing:** The UX45 installation has been completed and connected to the main system. We will check the latest versions of the UX45 earthing layout drawings LHCEIE_4011 4012 and 4014. (By TS-EL - Juan Gomez)

• **Cryo:** We are waiting for the pressure tests. (2 bar in the He tanks). We will fit one 2 bar valve on each module.

• Vacuum: We need to check on the status of the electron stoppers. (Not yet in place)

• **HOM cables and trays:** Cable trays on the platform will be fitted in the next week or two. The necessary material is stored in A5. Extra connectors may need to be ordered.

4 SR4:

• **SR4 cooling and ventilation units:** (info from J-C Perrier) TS-CV will do a partial upgrade, to cope with the reduced requirements compared to LEP. We will see the cost estimate soon.

2. ACS Modules, Couplers and SM18

He tank pressures & safety valves: Due to the likely operating difficulties at 1.6 bar opening pressure we would prefer to run with a setting of 1.8 bar. We may need to seek a special exemption (derogation) for this. A formal request is in preparation, nevertheless there will be further discussions with SC. A final decision is needed soon. We should shortly receive the data on pressures to expect for abnormal incidents, with the valve and rupture disc sizing now to be taken.

Module 4 (Europa): The module has been re-installed in the bunker and will be connected up next week, to start tests on He levels and measurements.

3. H112 test stand:

Startup: Installation of all equipment is complete and water cooling is running. The power converter is also ready for switch-on.

4. Klystrons:

Thales: Tests on the collector cooling have been be done by Thales. The visible 'hot spot' on the collector follows the same position opposite the inlet as the cooling manifold is rotated. We have suggested a new design, with the water inlet directly facing the collector cone and returning via a second cover to the outlet.

5. ADT:

Anode Converters: We have authorisation to switch on the anode power converters (TS-EL)

6. APW:

Feedthroughs: Prototype replacements have been ordered from different suppliers and they will be tested.

Instrumentation: VME crates and NIM crates have been installed in the racks on the cryo side of UX45. The software requirements are being looked at.

7. LLRF:

WME Crates - 3.3 V Supply (John): The oscillation of the voltage loop has been understood by the manufacturer. It is related to the high capacitive load, from the large amount of decoupling capacitance needed on the modules. The supplies are designed for fast response with low load capacitance. This can easily be changed by changing a capacitor in the regulation loop. The manufacturer will carry out the modification, but we will have to collect and return the supplies. The modified version will carry a new part number. It is this version that will be supplied to CERN stores in the future.

4 Polar Loop and Modulator: Modulator tests are ongoing and simulation of the complete modulation / demodulation chain is being done in the lab. The problems of additional modulations on the modulator output are still being investigated. An additional band-pass filter may be needed in the chain.

Series Production of modules: Around 100 VME modules have been assembled and will be delivered soon. This includes clock distribution and tuner front end modules. It does not include the feedback modules which will be launched soon.

4 Damper electronics: The final design of the analog front electronics is being agreed. The bunch position electronics prototype is now fully working. The processing module is nearly finished, in its PS damper form. It now remains to make an LHC version with the 1 Gbit/s serial interface connection to get data from the bunch position modules, and do all the firmware. There will be a presentation on the design layouts and the status of the ADT low level in the near future.

8. Controls

FESA 2.8 to 2.9: The upgrade gave a number of problems, it took one day to resolve them, with intensive support needed from AB-CO.

Logging server: A dedicated LINUX server is needed for logging of RF system data to the database. It will be installed in the CCC. This is being followed up with A. Bland. (At present we are using a development machine in the lab.)

CPUs for VME crates: We have 13 more CPUs finally coming from AB-CO (Thanks to purchase of last options on the over-stretched AB-CO contract with supplier CES). We will then have 74 in total. A new market survey and contract will be needed before more CPUs can be ordered. We will still need more CPUs in the short term e.g. for fibre optics crates but for less-critical applications like this we can use lower grade CPUs from AB-CO and lab systems.

Damper software - Parameter Control (Andy/Wolfgang): Gain will need to be changed depending on intensity and may also need to be changed batch-to-batch during injection. Phase and 1-T delay will need to be changed with tune. The LHC function generator does not operate in multi-cycling mode. If functions are required at injection and these are different pulse to pulse a work around will need to be found. (e.g. alternate swapping of two functions, with one reloading while the other is running). Initially, at low intensity, we will work with fixed settings set directly by software.

9. AoB

Budget codes: Apparently all LHC budget codes have been blocked. This needs to be resolved soon as we still have to procure significant amounts of material, as planned in EVM inside our Cost to Completion

Next Meeting: <u>Thursday 26th April</u> at 08:45 in the JBA room.

E. Ciapala, 25th April 2007.