LHC RF Meeting
23rd September 2009

Participants: John Molendijk, Olivier Brunner, Pierre Maesen, Edmond Ciapala, Andy Butterworth, Wolfgang Hofle, Philippe Baudrenghien, Daniel Valuch, Eric Montesinos, Frederic Dubouchet, Michael Jaussi

1. UX45 rupture disc and He release

- During Wednesday night an overpressure from the cryo system caused a rupture disc to release helium into the tunnel. The pressure went up to 2.23 bar (absolute). The discs had been changed on Wednesday on the sector 4-5 modules, as the previous discs were rated at 3.3 bar absolute, which was too high. After starting the cooldown, it was seen that the automated process was not working correctly, so to reduce the He flow, one valve was left open manually at 4%, and one valve was closed completely. Unfortunately during the night a CCC operator decided to speed up the cooldown and put the closed valve in automatic. The resulting high pressure ruptured the disc (at exactly the right pressure), and the pressure dropped to atmospheric. However, this was not immediately noticed, and the valve remained open for over an hour. The total He release was about 800m3.
- CCC operators have the consigne not to start a cooldown in the evening, but to wait for the following morning.
- The safety values were not correctly set, and there had been no check before starting. The cooldown procedure had also been changed by cryo without informing RF.
- On Thursday afternoon, the disc was changed, and heating of the module started on Friday. On Monday it was found that the heaters were not heating, as the remote control was not working correctly. The insulation vacuum was broken to speed up warming. Yesterday the heaters were put into local control, and could heat. However the remote control is still not working.
- The warm recovery line equipment is not covered by the Air Liquide support contract, as it was installed separately.
- Some questions were raised:
    - Do we generate an alarm in this case (Luca?).
    - Why did the fire brigade not see the ODH alarm?
    - Has the painting of the floor to indicate He release hazard zones been done yet?
- In sector 3-4 the new discs were installed last Friday. There may be a small leak, and a leak test may be necessary.

2. UX45 planning

- By the end of this week, both sides will have been purged. Sector 4-5 cooldown will be launched at the beginning of next week, and sector 3-4 in the middle of next week.
- An optimistic scenario would be to launch conditioning in week 41, and LLRF commissioning in week 43.
- The waveguide campaign (removal of short circuits) will be launched at the end of next week. For safety reasons all 16 must be done in one go.

3. Alignment

- One module is misaligned by just less than 1mm. It will be realigned, as the modules are the reference for the rest of the straight section. The survey people will check the whole LSS.
- Eric prefers that the ADT kickers should not be moved if the errors are small (<10mm). The pickups appear to be too high, and this will be checked.

4. ADT

- The ADT Dry Run went well. Wolfgang presented a summary.
- There is a naming mismatch between the power and LL parts: Luca will change 2 of the PLC names to make this consistent.
- More Backplane triggers required in the DSPU, Daniel has proposed a modification on the boards to cable these.
- An additional console PC will be installed in the 864-RA27 lab for ADT.

- Abort gap cleaning: The application was tested with the dummy FESA class. The firmware is 80% done, the smooth frequency sweep is implemented, but not yet frequency stepping.
- There will be another dry run in week 45.
- Analogue acquisition crates (National Instruments boards): Mick is sorting out the software. He hopes to have a working system in a few days, so the trigger distribution can be tested.
- John found SR4 ADT all 4 FGC chains in bad state (NACKs on all functions).

5. UX45 power sweep measurements and calibration

- Motivation: High peak power is needed at injection but not in physics, and it would be desirable to reduce the klystron cathode current and voltage during physics. This would take us further away from the power converter maximum current and reduce the collector power. A gain adjustment is needed in the RF feedback to compensate the klystron gain change, and so it is important to measure the klystron gain and saturation at different voltage and current values. The gain measurements are also needed for setup of the Switch & Limit modules.
- Power sweep tests have been done on some lines in UX45. The klystron saturation level is very sensitive to cathode current, and if the current is reduced too far, the driver trips with excess input power. Between 9A and 6A there is -5dB of gain change.
- The measurement campaign needs to be finished before taking out the short circuits.
- All Switch & Limit boards have been modified (attenuator changed), and need to be re-calibrated, quickly. The calibration will be done in situ, as calibration in lab was not very good (temperature?).

6. ACS power system

- LHC klystron driver: A prototype driver has been ordered from industry. The linearity will be measured. The specification states a negligible compression at 200W output (cf. the nominal in LHC of 120W).
- Acceptance of Klystron 21 has been refused, and it will go back to Thales next week.
- The new Temperature Control Unit, using control embedded in the PLC, has been tested in LHC and works well.

7. LLRF and software

- The LabVIEW interfaces for beam control equipment have been considerably developed and tested, but need testing with real test signals before we can say the diagnostics are operational.
- The LARP collaborators will be here in week 45.

8. SPS ions

- Transfer line tests with ions in TI2 are planned for next Monday. Alice wants synchronized extraction.
- There will be an SPS ion MD in week 41, no extraction.

9. 400MHz fire brigade communications system

- Wolfgang expressed his continuing concern about the proposed 400MHz communication system for the fire brigade. They would like to have the system switched on all the time. Apart from the leaky feeder cable there would be transmitters (relay stations) to cover the areas not covered by the leaky feeder.
- The main risk was thought to be triggering of the RF leakage detectors. However, the other possible consequences have not been fully studied.
- Olivier agreed to contact F. Scionzo.

A. Butterworth, 24th September 2009