

LHC Technical Co-ordination Committee

Summary of meeting 2005-02 held on 25 February 2005

Present: [see annex 1](#)

Main topics of this meeting:

- Matters arising
- General information
 - Hardware baseline and ECRs
 - Status of QRL installation
 - Status of installation
- Master planning of the LHC and SCRs
- Equipment readiness reports

1. Comments on the summary of [TCC 2005-01](#)

There were no comments.

2. Matters arising

J.Inigo-Golfin commented on the unexpectedly low heat dissipation experienced during the TI8 beam tests in late 2004. The data collected and processed during the test have been verified and are correct, confirming a few tens of kW were released to the tunnel air, much lower than expected. Further checks have been made on an MBA magnet, and the results are consistent with the data from the beam tests. The conclusion is that the estimates were significantly wrong, and an in-depth analysis is now needed in order to understand the implications for the LHC machine. **P.Proudlock** stressed that this is particularly important for points 7 and 3, since if it is possible to slow down the ventilation rates this could have a considerable impact on air activation. **P.Ciriani** added that one should always be wary of the consequences of overestimating effects such as these.

P.Proudlock emphasized the importance of respecting the intended use of the space recently liberated in the West Area, and reminded the committee of the people responsible for the different zones;

- B180 A.Perin
- B180 X7A B.Nicquevert
- B180 X7B P.Seraphin
- B180 X5A B.Nicquevert
- B190 X5B B.Nicquevert

He added that the use of the old Gargamelle building, which has the advantages of a 50T crane and proximity to SMI2, is also under negotiation. **E.Tsesmelis** asked if the territorial safety responsibilities are clear in these buildings. **P.Ciriani** replied that they are not at all clear and should be reviewed with the Safety Commission.

3. General information

L.Evans informed the committee of a problem found in mid February during the QRL repair work of sector 7-8. This concerns the thermal shield interconnects, and while easy to fix this could have had important consequences had it not been detected. As it is, 8 fixed points in the recently installed components in sector 8-1 will need corrective intervention, with implications for the magnet installation foreseen to start there soon. **S.Weisz** asked who would effect the repairs of these fixed points, and suggested that it may be easier to coordinate if the work was performed by CERN staff.

3.1 R.Saban presented the status of the [Engineering Change Requests](#).

LHC-DFBX-ES-0280 DFBX to Helium Gas Recovery
(J.Zbasnik) **Released Version 2005-02-09**

3.2 R.Saban presented the [Engineering Specifications presently in circulation](#).

LHC-LQ-EC-0001 Change of Spool Piece Bus Bars Cabling Layout for the Short Straight Sections Cold Tests (D.Bozzini) **Accepted 2005-02-09**

LHC-XRP-EC-0003 Installation of Roman Pots at IP1 for ATLAS Luminosity Measurement (I.Efthymiopoulos, P.Grafstrom) **Accepted 2005-01-16**

LHC-LJ-EC-0005 Update of Magnet Polarities for LHC Layout Version 6.5
(M.Zerlauth, S.Ramberger) **Accepted 2005-02-09**

LHC-LJ-EC-0007 Infrastructure Layout in IR7
(P.Collier) **In circulation for approval**

LHC-PM-MS-0014 Installation Schedule of Machine Elements in the Continuous Cryostat of Sector 8-1 (K.Foraz, S.Weisz) **In circulation for approval**

LHC-CIP-EC-0001 Cable Request for connection between Powering Interlock Controllers, AUG and UPS (R.Schmidt) **In circulation for approval**

3.3 G.Riddone [summarized the status of the QRL situation](#).

The rate of repair of Service Modules and Fixed Points continues to exceed the planning, and the repair of elements that were installed in sector 7-8 is about to start. Repair of pipe elements, on the other hand, is slightly below the planning.

Installation in sector 8-1 was adversely affected during weeks 2 and 3 of February, due to problems with the porosity of certain welds. Investigations were made to check for causes, such as different ambient conditions and purity of gas used in the process, but nothing unusual was found. The present solution is to perform the work under a protective tent, and in these conditions the situation is much better. Mostly because of these problems, the overall progress in sub-sector G is a little behind schedule, but the global milestones for the sector are still expected to be met. A 4th team from the contractor is foreseen from mid March, which should help in this.

More details were given on the problems discovered with the thermal shield interconnects. The origin of the problem is that the design being followed does not correspond to that approved by CERN, with three main differences;

- Insufficient overlapping between shields (135mm instead of 180mm)
- Thinner intermediate pieces which join the different parts of the shields
- Lower number of fixations between the different parts of the shields

Tests have been made to investigate the consequences of these deviations, clear problems have been found and a number of corrective actions defined;

- The collars have to be reinforced (increase thickness)
- The connection between the different shields has to be reinforced (additional fixations)
- The overlapping between the shields must conform to the original value of 180mm (increase length of the external shield)

In sector 4-5, geometry verification and tunnel marking is under way, and installation of support plates is progressing. Positioning of QRL elements is scheduled for mid March, with the first modules expected to be installed beginning of April.

With the increased capacity coming from new or enlarged plants, production rates are now getting close to the planning at most manufacturers.

3.4 C.Hauviller presented the [status of the QRL reinstallation in sector 7-8](#).

The organization of this work is well established, and the emphasis is now moving from the preparation to the operational phase. Wherever possible a just-in-time strategy has been applied, due to space limitations. Progress is coordinated through regular weekly meetings and can be followed on the web site at <http://proj-s78.web.cern.ch/proj-S78/default.htm>

3.5 S.Weisz presented the [status of LHC installation](#).

Progress with General Services and Local Cabling is summarised in Tables 1 and 2 respectively. **P.Proudlock** commented that point 7 still needs a final definition of cabling requirements, and that care should be taken to distinguish between cables needed for the early years of operation and those needed for later phases of the collimation system. He stressed that one should avoid installing superfluous cables in a hostile radiation environment.

Table 1: General services – remaining activities in the main ring

| Zone | Status |
|--------------------|--|
| UA/RA23 | Signal cabling & connection with R22 – 55% done |
| LSS3R | Signal cabling in progress – ends April 1 st |
| LSS5L | Piping work finished Signal cabling in progress – 15% done |
| Point 5 By-pass | C.E. work on the floor postponed to week 12 Signal cabling in progress – 15% done Piping work starts in July |
| LSS5R | EL general service phase 1 done, F2-F3 in progress – 90% done Signal cabling starts March 7 th Piping work starts in June |
| UA/RA63 | Signal cabling in progress – 25% done |
| UA/RA67 | Signal cabling starts March 14 th |
| ½ Arc 6-7 (side 7) | Signal cabling done |
| Point 7 | Integration/new C.E. work to do/EL & CV to re-install |
| 5/8 of ring | Painting of guiding line for transport vehicle should be done by May |

Table 2: Local cabling

| Zone | Status |
|---------|-------------------------------------|
| Arc 2-3 | In progress: signal 55% - power 10% |
| Arc 3-4 | In progress: signal 80% - power 50% |
| Arc 4-5 | Done |
| Arc 5-6 | In progress: signal 05% - power 05% |
| Arc 7-8 | In progress: signal 90% - power 55% |
| Arc 8-1 | Done |

A series of photographs from around the ring was used to illustrate a number of things: In many places installation is going to be very tight, with clearances down to a few mm in some cases. While training is ongoing in sector 1-2 for magnet placing and interconnects, it is taking longer than foreseen and the first teams will not be fully operational before the end of March. The first water cooled high current cable is just going in, to be compared with the expected date of end 2004. Work on alignment of jacks in sector 8-1 was interrupted to allow the QRL contractor to work on the outer welds in this region, following which damage to some adjustment screws was found.

This last point serves to emphasize that cohabitation between several teams is a cause for concern and needs careful attention. This is going to be the case almost immediately, with the first magnets due to go into the tunnel from March 7th. It was suggested in view of the latest QRL repairs needed in sector 8-1, that it may be prudent to consider delaying the start of magnet installation for a week or two. **P.Ciriani** commented that installation teams are going to have to get used to these kinds of situations, and proposed that we should go ahead as foreseen. The committee agreed with this proposal.

4. Master planning of LHC installation and SCRs

S.Weisz presented an [updated master planning of LHC installation](#). Compared to that [presented at the January TCC](#), the planning for 8-1 and 7-8 has been further compressed, mostly by starting magnet interconnect work in 8-1 earlier and by suppressing some of the QRL tests in 7-8. This allows the power tests to start in both of these sectors in mid 2006 which in turn should allow a sector test with beam around the end of September.

The accelerated 7-8 8-1 schedule introduces more flexibility for the other sectors, where it is now possible to develop the planning with no more than 3 teams working on the magnet interconnects, and with a maximum of 2 sectors undergoing hardware commissioning at any time (around points 8, 4, 6 and 2 in turn). Based on this, the General Coordination Schedule for LHC construction and Installation will be finalised, and should be available mid March.

The increased risk in compressing the schedule should not be underestimated. In particular there will be an enormous amount of co-activity in sectors 1-2 and 2-3 towards the end of the installation, and the various groups should be aware of this.

R.Saban commented that, because the DFBs will be tested for the first time in the tunnel, the hardware commissioning of the first sectors will probably take longer than expected; therefore he suspected that it would be very difficult to meet the beam test deadline of Q3 2006.

D.Tommasini emphasised the risk element by pointing out that disconnecting a magnet in order to displace it, with subsequent reconnection after any intervention, could well turn out to be a very tricky procedure.

K.H.Mess commented that it is now necessary to check the details implicit in this new schedule, for which a clear list of dates is needed for the various activities. **P.Proudlock** replied that this is the purpose of the numerous Schedule Change Requests that will be issued in the coming days and weeks. The first of these SCRs was issued on February 15th and has to date attracted 26 responses, including 2 rejections (lack of training and difficulty in performing the interconnects in two passes).

5. Equipment readiness reports

P.Proudlock announced that after discussion with department heads concerned, it has been agreed to schedule in future TCCs a series of [installation readiness reports](#). The idea is for each group to present a brief installation status report and to show how this relates to the major project milestones. A provisional timetable has been established, with the installation schedule in mind, in which the first systems to be treated are;

- Cold powering (by AT/ACR and AT/CRI groups and covering DFBs, DSL, connecting cryostats, cryoplants)
- Warm powering (by AB/PO, AT/CV and AT/EI groups and covering power convertors, cooling and ventilation, power cabling, DQR/S)
- Long Straight Sections (by AT/MEL group and covering special insertion magnets, DFBX)

Each group involved is asked to concentrate on the earliest installation, but then briefly cover the rest of their activities around the machine. In each case the first group in the list should assume the lead role, and orchestrate the presentation.

The full timetable, although provisional, is included below.

| System | Groups involved | TCC |
|-----------------------------|-------------------------------|------------|
| Cold powering | AT/ACR, AT/CRI | 01.04 |
| Warm powering | AB/PO, AT/CV, AT/EL | 29.04 |
| LSS | AT/MEL | 27.05 |
| Controls | AB/CO | 24.06 |
| Access and safety systems | TS/CSE | 29.07 |
| RF systems | AB/RF | 26.08 |
| Injection systems | AB/BT, AB/ATB, AT/MEL | 30.09 |
| Beam instrumentation | AB/BDI, AB/BT | 28.10 |
| Extraction and dump systems | AB/BT, AB/ATB, AT/MEL, AT/VAC | 25.11 |
| Collimation | AB/ATB | dd.mm |
| Vacuum | AT/VAC | dd.mm |

6. AOB

P.Proudlock announced that there will be a Hardware Commissioning internal review held at CERN on May 12th and 13th, chaired by S.Myers.

Next Meeting

The next regular meeting of the LHC TCC is scheduled to take place on

Friday 1st April 2005 at 10.00 h – 12.00 h

Provisional Agenda

- Matters arising
- General information
 - Hardware baseline and ECR's
 - Status of LHC installation
- Presentation of master schedule
- Installation readiness report – Cold Powering

Reported by Roger Bailey

Distribution:

Via e-mail to members, those present and mentioned.

All minutes and attachments are available at: <http://lhc.web.cern.ch/lhc/tcc/tcc.htm>