LHC Machine Status Report

Roberto Saban

LHCC June 4th 2014
LS 1 from February 16th 2013 to end December 2014

2013

February: M A M J J A S O N D
March: J J A S O N D
April: J J A S O N D
May: J J A S O N D
June: J J A S O N D
July: J J A S O N D
August: J J A S O N D
September: J J A S O N D
October: J J A S O N D
November: J J A S O N D
December: J J A S O N D

2014

January: F M A M J J A S O N D
February: F M A
March: F M A
April: F M A
May: F M A
June: F M A
July: F M A
August: F M A
September: F M A
October: F M A
November: F M A
December: F M A

June 4th 2014

2015

F M A M J J A S O N D

LHC

SPS

PS

PS Booster

beam to beam

available for works

Physics

Beam commissioning

Shutdown

Powering tests

June 4th 2014

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What’s new since March?

V 3.1

DFBA repairs at P6 and P8
CSCM in sectors 67 and 81
A 2-week margin after flushing
for solving non-conformities
The sector test from P2 to P3

From stable shutdown activities which included maintenance, consolidation, upgrade, repair, cabling and had been ongoing for almost one year

To transient states
from shutdown to powering tests,
from powering tests to beam commissioning
Linac2

LS1 and check-out completed
Beam setting up is ongoing since Easter (beam to Linac dump)
Beam into switchyard on Monday May 26th (beam trough transfer line up to measurement lines)
Presently 150 mA on Linac dump, normal intensity for setting up phase, is expected to go up to ~170 mA later
First beam injected into PSB on Monday June 2nd
The Status of the LHC Injectors

The PS Booster

LS1 completed
Slight overrun of LS1 due to the septum leak
Septum leak: completely fixed by now (varnished, vacuum now OK)
Cold check out from week 20-22
Mainly debugging controls, access system, diagnostics etc.
First beam injected into PSB on Monday June 2\textsuperscript{nd}
Now setting up RF etc. (we have a new LL RF system)
The Status of the LHC Injectors

The PS

LS1 completed
The commissioning of the new PS ventilation system is ongoing,
Still in cold check-out phase
Usual debugging ongoing (e.g. magnet tests); so far no delays or showstoppers announced
First injection of beam from the PS Booster planned for June 20th
The Status of the LHC Injectors

The SPS

LS1 not yet completed
Equipment reinstallation activities, following the irradiated cable replacement campaign, still ongoing
Monday a leak was discovered in a vacuum chamber of a magnet; the magnet was moved to the access point under the CCC and will raised to the surface this morning
The maintenance of all the equipment being completed
The Status of the LHC Injectors
Status of Cables and Fibres

~1000 km of copper and optical cables being installed during LS1
Status of the LHC

1. 1695 Openings and final reclosures of the interconnections
2. Complete reconstruction of 3000 of these splices
3. Consolidation of the 10170 13kA splices, installing 27000 shunts
4. Installation of 5000 consolidated electrical insulation systems
5. 300000 electrical resistance measurements
6. 10170 orbital welding of stainless steel lines
7. 18000 electrical Quality Assurance tests
8. 10170 leak tightness tests
9. 3 quadrupole magnets to be replaced
10. 15 dipole magnets to be replaced
11. Installation of 612 pressure relief devices to bring the total to 1344
12. Consolidation of the 13 kA circuits in the 16 main electrical feedboxes

SMACC
Helium leak elimination & status

April 11th

Helium Leak rate in subsector (Cold, RT)

Cannot be pumped

Additional turbo pumping

Continuous turbo pumping

Cryosorption pumping

(DFBA CL flexibles in 2009) ✓

5 QRL leaks ✓
1 cryomagnet leak (S34) ✓
1 QRL leak (S45) ✓

1 QRL leak ✓
17 cryomagnet leaks ✓

A23R8.M – on-going
Triplet 5L – use-as-is
DFBAK – to do

A8R6.M
QRL ssH 7-8
Several others pre-LS1

Created in thermal transients

Courtesy Paul Cruikshank
Status of the LHC

R2E

Point 1
All the equipment has been reinstalled and reconnected
Commissioning in progress

Point 4
The cabling for the relocation of the electronics for cryogenics is in progress

Point 5
Major cabling campaign complete
Safe-room installation almost complete
RR shielding installed
Commissioning will start in July

Point 7
Major cabling campaign complete
Equipment re-installed and being commissioned
### Status of the LHC Sector by Sector

<table>
<thead>
<tr>
<th>Sector</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sector 12</td>
<td>Leak test completed. One leak ($10^{-5}$ mbar l/s) localized on a compensator of header C of the QRL and will be repaired after the ELQA</td>
</tr>
<tr>
<td>Sector 23</td>
<td>Pressure test ongoing</td>
</tr>
<tr>
<td>Sector 34</td>
<td>Insulation vacuum leak test ongoing</td>
</tr>
<tr>
<td>Sector 45</td>
<td>Insulation vacuum being closed and insulation vacuum leak test ongoing</td>
</tr>
<tr>
<td>Sector 56</td>
<td>DFBAK leak repaired</td>
</tr>
<tr>
<td>Sector 67</td>
<td>Cool down in progress in parallel with the smoothing of the magnet alignment</td>
</tr>
<tr>
<td>Sector 78</td>
<td>Leak test ongoing</td>
</tr>
<tr>
<td>Sector 81</td>
<td>Pressure test done. Leak test on going. Cool down starts on June 23rd</td>
</tr>
</tbody>
</table>
Status of the LHC  TheCooldown of Sector 67

http://hcc.web.cern.ch/hcc/field.php
The Schedule v3.1

http://cern.ch/ls1dashboard

June 4th 2014

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