

## End Week 2 (January 13th 2013) - Status of Accelerators

### Statistics

nTOF: <https://espace.cern.ch/be-dep/OP/PS/default.aspx>

CNGS: [https://accstat.web.cern.ch/accstat/statistics/charts/2012/SPS/CNGS\\_Target\\_Cumul2012.jpeg](https://accstat.web.cern.ch/accstat/statistics/charts/2012/SPS/CNGS_Target_Cumul2012.jpeg)

LHC: <http://lhc-statistics.web.cern.ch/LHC-Statistics/index.php>

### TI (Fabien Hebert)

At 19:15, a failure of the SPS stable filter triggered a CERN-wide electrical glitch and required the intervention of the fire brigade. Major event, " Perturbation électrique sur une partie du CERN suite à déclenchement du filtre de Prevessin".

Location of the event: BE9

Short description of the event:

Le disjoncteur 18kV EMD203/E9 protégeant le filtre stable de Prevessin a déclenché sur l'Imax provoquant une perturbation électrique (alarme buccholz sur le transformateur 66kV/18KV EHT7). Plusieurs équipements ont été affectés sur les points du LHC, le SPS et Meyrin.

### LEIR (Sergio Pasinelli)

The week was calm until the Saturday glitch on the Electrical Network.

After the glitch the LEIR was in an intermediate state not completely OFF but not completely ON. The Linac 3 was also in trouble.

The glitch has happened at around 19:00 and the SPS has called the LEIR supervisor at around 21:00.

The "RESET – ON" on the power supplies in fault was enough for the majority of them.

The major faults were the on the ECooler with the filament OFF ,the circuit breaker on ITE.BHN30 and the damper. I have called specialists for all of them.

PIPO has changed the circuit breaker on ITE.BHN30

A.Findlay gave to me a "recette" to switch ON the damper.

After several attempts to reach an ECooler specialist , we have reached A.Frassier and he gave to us the procedure to Switch ON the filament.

Beam was back Sunday at. 01:20. I spent time to adjust the beams and the LEIR was with the nominal values at around 01:45.

Sunday, The SPS crew has called the Linac 3 supervisor because the intensity was lower.

### Booster (Alan Findlay)

A fairly typical start up week for us, as most of the hardware came back up and stayed up, but some needed a gentle tickle back into life.

The beams came back into the machine without too many problems, but closer observation showed that some of them were reluctant to meet last years specs. LHCINDIV and LHC50ns needed a minor facelift to improve intensity and emittances, and a couple of the MD cycles needed tattering up.

Our main problem was that the LHC4RINGPROBE (that we planned to use to the proton-ion run) came back after the Christmas break having appeared to have been fasting rather than feasting, with a skinny little longitudinal emittance of 0.04EeVs (30ns) in place of the required 0.2eVs(70ns). It appeared that the injection was significantly better for this cycle, and hence we had to shave much more longitudinally to get the desired intensity, but this also reduced the emittance too much. Jose re-worked the voltage functions which got us back into the correct emittances and intensities, but the shot to shot intensity stability was not to the liking of the PS.

Steve and Heiko suggested they try to do the shaving and blow-up in the PS, so the PSB cycle was modified and fixed at 6E10 and the PS crew did the intensity modification. This was how we went into the weekend having informed all parties that we were at fixed intensity of 1-1.2E10 per bunch, and that if more was required, we should call in Heiko (the unfortunate PiLLRF this week) who would help with the intensity adjustments in the PS.

Work to restore the original LHC4RINGPROBE cycle to its former glory will continue next week.

Just in case you weren't aware, there was a wee power cut at CERN on Saturday evening around 19H15, which also took down the LINAC2 and PSB. The operators did an excellent job, although they required the much needed services of the PiHLRF, PIPO & PiLLRF to get the machines back into production, and had operational beams from R3 after 2 hours, and from R4 an hour later, so we were back in the game by 22H30.

We're back in operation, but there are still a number of details we need to sort out.

## PS (Ana Guerrero Ollacarizqueta)

The restart of the PS machine was done fairly quickly with only minor issues.

On Monday the centre ring cooling station and POPs were ready in the afternoon and both ions and protons could be injected as soon as they were ready in LEIR and PSB. The beam could not be extracted until Tuesday morning due to a power supply problem in the extraction bump 16-22.

The rest of the week was mainly dedicated to the set up of the LHCprobe, LHCINDIV and 200ns beams. As requested by the LHC the proton beam has been set-up to provide 1-1.2e10 p per bunch during the week-end.

On Saturday the PS suffered as all other machines from a power cut. Once the machine was back to work the beam had to be stopped around 3h due to a problem with ARCON.

## SPS (Benoit Salvant)

It has been a very busy week for the SPS operation team, with a quick restart after the Christmas stand-by period (leading to delivering beams to NA61 on Thursday afternoon and to LHC as soon as it was ready on Friday) and the cascade of issues caused by the failure of the SPS active filter on Saturday evening.

Currently available beams are the fixed target ion beam for NA61, proton and ion pilots for LHC, proton LHCINDIV for LHC and parallel MDs, as well as the 200 ns proton beam for LHC. The 200 ns ion beam remains to be tested (planned on Monday morning).

It is worth noting that the week before the Christmas break (week 51) was also very busy for the SPS operators, as the new access system was put in place on Monday morning Dec 17th and it suffered many issues while access had to be granted and many colleagues were in Evian. The access system specialists had to work on it continuously all week as there were repeated communication problems between the software and the doors and frequent need to reboot the system after it froze. EPC tests that were planned for Thursday were postponed to Friday as it required to patrol the whole machine, and in the end they could not be finished in week 51.

After the Christmas break, the restart was rather smooth with usual checks without beam, but piquets EPC and First Line as well as BT and BI experts had to be called to restart a few equipment. On Tuesday, the main power supply was not yet available since the intervention approved for the technical stop in week 51 was only completed on Tuesday afternoon. Right after the mains were available, the beam was taken in the SPS and longitudinal and transverse setup was performed on the Fixed Target cycle for NA61 (delivered on Thursday afternoon), LHC pilots (protons extracted on Thursday evening to the TED in TT40 and TT60) and LHC INDIV.

On Wednesday, a survey of TT10 was initiated as cracks and deformations had been observed in the ceiling and roof of the tunnel, in view of an intervention in LS1. The piquet EPC was called for problems on two power converters in TI8. It was also decided to use a short flat bottom cycle with a small ramp (MD2) in front of all beams instead of the CNGS cycle as this cycle can be used for parallel MDs and it reduces power consumption.

On Thursday, a matrix change was performed on the access system for the North Area and a circuit breaker issue on a TI2 power converter was solved by the piquet PO. It is worth noting that the RF transmitter TRX2 tripped many times on Thursday and Friday.

On Friday, the 200 ns proton beam for LHC was tested and a large transverse emittance issue was solved by the operators during the night. An intervention to replace an MKE4 switch cut the beam for all users for 2h. The BT and transport crew had to wait on stand-by for 2.5h that LHC took pilots and were in the ramp to launch the intervention. During the afternoon, the LHC changed plans and suddenly requested ions which had not been tested down the transfer lines yet. Issues with the first bunch error of the BQM were investigated by the RF team, as well as issues with annoying TFID messages sent by the MD2 cycle to the PS logbook. This latter issue was not solved and should be addressed again this week. Finally, the intensity for NA61 was suddenly divided by two and it was found out that a BTV in TT20 went into the beam without explanation.

On Saturday, NA61 physicists asked if it would be possible to have more space between injected batches and said they notice a 50 Hz structure in the spill.

At 19:15, a failure of the SPS stable filter triggered a CERN-wide electrical glitch and required the intervention of the fire brigade. This glitch caused everything to trip (even the lights in the CCC) and the SPS operators needed to call many specialists and piquets: CV to restart cooling circuits, access piquet, RF power as the cavity cooling was down, the septa piquet to restart the ZS, the piquet EPC to restart the mains, the kicker piquet for MKE4 and MKP, and EN-STI for target fans. By 22:45 most equipment was back, but to restart the RF, the power piquet needed access, and could go in at 00:15 after the access system was temporarily fixed by the access specialist. The cavity cooling was restored at 01:00 and 200 MHz cavities were fixed. TRX10 for the 800 MHz would be fixed on Sunday by changing a power supply of a cooling pump. Since the active filter could only be repaired next week, it was decided to try and pulse the mains without the active filter to observe if the SPS could hold the various cycles for the NA61 and LHC, which it did. Beams could be injected at 02:30 on Sunday morning and all were tuned back by 07:00 on Sunday (except LHCION2 which was tried on Sunday afternoon as it was the most demanding cycle in terms of power). An energy tracking fault on the MKD dumped the beams and was solved by the kicker and EPC piquets who replaced a monitor for the main bends current that was sending a wrong value. Ferdinando Tarita informed that Schneider will come on Monday to assess what can be done for the replacement of the active filter with the available equipment at CERN. Intervention to replace the filter will require to cut the beam for decoupling before the intervention on the filter and recoupling after it is done. The intervention itself is expected to take about 2 days.

I would like to thank the SPS operators and equipment group specialists for the very hard work in these difficult conditions.

## **LHC**

Check-out and re-commissioning for proton-lead. Cryogenics back Thursday evening, reasonable progress until Saturday evening – LHC hit hard by electrical perturbation generated by cable failure/circuit breaker on SPS active filter. Back in business late Sunday evening after repair/replacement of 2 UPS in sector 78.

<http://lhc-commissioning.web.cern.ch/lhc-commissioning/>