



**Injectors Re-commissioning Working Group
Minutes**

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1 LAST MEETING MINUTES

First and second meeting minutes have been approved.

2 AD FEEDBACK

T. Eriksson presented the AD start-up feedback.

T. Eriksson said that it had been one of the longest Shutdowns ever for AD and that many systems had been consolidated (Control system, access system, timing system and so on). One dipole magnet had been completely removed from the ring for repair.

Many modifications had been applied to prepare the venue for ELENA. The ejection line had been modified and the vacuum hardware had been completely renewed.

Regular meetings were held during LS1. The tests were performed by the OP team together with specialists.

There is no formal checklist because AD is a decelerator and the different system priorities are defined by the cooling cycle itself.

T. Eriksson presented the progresses step by step. It showed many hard edges, but the circumstances were exceptional and will probably not be faced again.

Globally most of the difficulties were coming from:

- Lack of testing on the individual systems,
- Un-communicated modifications,
- SW issues related to the recent deployments
- Cabling issues (crossed-cables).

As a conclusion, T. Eriksson pointed out that this was more a re-commissioning than a start-up. The mains remarks are:

- Equipment specialists not always available for AD issues (sometimes only 1 person has the expertise).
- Equipment specialists are sometimes busy with higher priority work.
- Cumulative machine issues seem to have an exponential effect on start-up duration.
- Start-up during holidays...

B. Mikulec asks for the points that could have been avoided. Tommy answers that the magnet cabling errors could have been detected by systematic testing.



V. Kain asks if the timing system was tested during beam time. T. Eriksson answers that the tests have started months before the first beam, but some of the aspects cannot be commissioned without beam.

3 SPS FEEDBACK

S. Cettour Cave presented the SPS feedback from the start-up after LS1.

During LS1, lots of modifications were applied to the SPS ring and to the different transfer lines.

In March – 6 months before start-up with beam, the test of the SPS new timing system began: cleaning up of old settings from the database, generation of new cycles and SW testing and debugging.

During April-May the FGCs were tested. Some diagnostic applications were developed.

In June after the power converter test, the SPS complex was closed.

During July-August daily meetings were held. The objectives were to follow up the activities and to solve the problem of co-activities.

OP people performed many tests. For example: power converter individual test (including polarity checks), OP SW application tests, absolute stepper motor position check... The BI systems were checked individually (camera, screen, sem grid, miniscan...).

As a conclusion, S. Cettour Cave says that some polarity errors were identified as well as many other little details. S. Cettour Cave insists on the fact that OP must be involved in all modifications to keep control of all the systems and that OP proactive actions help to reduce the overall commissioning time.

S. Cettour adds that sub-systems should be tested even before they are completely ready. It helps reducing the testing complexity and it reduces the machine commissioning time.

V. Kain added that the FGC mode “simulation” was very useful to prepare. In general test modes of systems should be put in place to commission interfaces and scenarios before the hardware is fully ready. Also, having surveillance systems such as software interlocks or a fairly complete hardwired beam interlock system, helps a lot for the machine preparation. They have all give the green light before beam can be injected. And the systems have to work.

V. Kain also remarked that the interfaces between machines are frequently forgotten during the preparation. The interlock of the SPS chain 1 to the BHZ in TT2 did not work anymore. A cable was missing. This was only detected during the DSO test.

4 AOB

V. Kain has edited the wiki page of the IRWG web site:

→ <https://espace2013.cern.ch/IRWG/layouts/15/start.aspx#/Proposals/Home.aspx>