

Organisation of the Linac4 Reliability Run

Topics discussed during the “Mini-Workshop” on November 30th, 2016

Schedule :

The Linac4 technical stops (TS) will be synchronised with the LHC injectors’ technical stops. During the TS weeks, Linac4 will stop operation at the same time as the other injectors, but the duration of the Linac4 stop will be longer than for the other machines, to avoid as much as possible overlapping of interventions with injectors and LHC.

Flexibility:

It is important to keep flexibility and to revise periodically the Reliability Run (RR) plans.

Operation from CCC:

Three stations will be added to the PSB console for monitoring the Linac4 parameters. The operator will permanently check: a) the transformer signal before the dump; b) the transformer signal after the RFQ; c) the logging of ToF after last PIMS - if the beam does not go through the stripping foil (in this case the current in the transformer before dump is an indirect measurement of energy). Once per day, the operator will measure the emittance.

Applications required for operation from CCC

Some are already available (trajectory, source autopilot, etc.), others have to be implemented (synoptics, ToF, BSM, emittance, RF overview). OP will do the implementation during the EYETS with the support of the groups in charge of the equipment.

Running-in time:

A first part of Run-in with reasonably flexible schedule and short runs will precede the proper Reliability Run. During the first part, the linac is tested over a period of days with the purpose of finding weak points that can be improved. The AFT should be running during this time with the purpose of recording faults and accessing availability, nevertheless quick repairs to go around problems should be avoided.

Reliability test time:

Once the run-in period is over, the proper Reliability Run (over weeks) will be a mock-up of real operation with different users, changing chopping patterns, changing beam parameters for injection etc. A preparation of the different beams should be envisaged (e.g. LHC beam, beam with energy painting, etc.) over a couple of weeks. The temporary dump installed for the HST could be used (activation to be calculated) as destination for one of the users. Interventions should aim at a quick repair as during operation.

Availability model:

Very useful, should be improved by correcting the impact of vacuum (valves have no impact on operation; the systems can run with one ion pump off).

Accelerator Fault Tracker:

Should treat differently the missing pulses (many are expected, they should not contribute to the fault rate but their origin should be logged and analysed).

Source:

Expected down time is about 2%. It will be caesiated every 4 to 6 weeks; caesiation implies a programmed beam stop of 2 hours and a degradation of beam performance for half day. The autopilot optimises the source and gives a list of actions to the operator.

Training:

Training of personnel is needed in preparation of the RR: training of operators on remote fault tracking and repair, training of additional Linac4 supervisors, training of operators on instrumentation and measurements.

Local reset

To be reserved to the specialists; at least in a first time, it is not required that the operators go to Linac4 for a local intervention or reset.

Beam instrumentation

A review of BI status will be done before the RR.

Specialist interventions

A web tool (similar to the OP piquet web tool) will list the specialists to be called for Linac4 and the modalities of intervention. The principle that no interventions are made during nights is accepted, while different cases will be possible for interventions during weekends, to be revised after the initial RR period. The position of the support groups present at the meeting is as follows:

1. RF will provide a first-line support from the LRF section on a best effort basis, including weekends. Interventions of specialists should be limited to working hours. While an engagement of the LHC high-power piquet could be considered after an initial training phase, this should be excluded for the LLRF piquet.
2. The ion source team will be available for interventions during working hours, for the weekends on a best effort basis and without guarantee.
3. The BI specialists will be available during daytime on a best effort basis as for the other machines. Most of the software faults can be solved directly from home.