SIS commissioning status

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- ❑ Almost all tests that could be done have been performed.

- ❑ Remaining test require beam, higher beam intensity, special tests during injection (multi-bunch) and later close to nominal conditions.

- ❑ Recently a new interlock was added to the injection permits to cover corruption of threshold tables (requested by C. Zamantzas & S. Jackson).

Status of SIS commissioning

4/17/2015

- ❑ All powering tests are finished except the surveillance of the spectrometer bumps (injection permits).
  - o *Commissioned during / just after switching on the ALICE & LHCb spectrometers. Logic in place, pre-checked during the sector test.*
- ❑ The QPS-OK status tests have not been rechecked. Only the changes were implemented (few circuits).

SMP

- ❑ All β* and optics IDs fully tested against machine settings.
- ❑ Check of the restricted SBF in place, to be tested:
  - o *Interlock if:*
    - − Total intensity < 5E11 p (*protection against false interlocks*),
    - − At least one bunch with high intensity (> 3E10 p),
    - − SBF in RESTRICTED mode.
  - o *Requires multiple bunch injection and nominal bunches for test.*

Beam injection

❑ The interlock series covering injection requests and injection buckets must be tested & adjusted (injection permits).

- o *Injection in abort gap and abort gap keeper range: max. bucket to be defined and then checked.*
- o *Protection against over injection beyond the nominal: ensure that requested bucket satisfies distance to last bunch. To be checked.*

❑ Interlock on the requested ring (MTG failures) to be fully checked. It seems the information on the requested ring SIS was using is no longer available – to be investigated.

❑ Particle type interlocks (f RF range, users and energy in SPS).

- o *Last few checked needed (f RF).*

❑ Intermediate intensity interlock (injection of nominal only when intermediate beam circulating).

- o *Requires more beam intensity, first short trains → later.*

❑ ADT protection (intensity range) to be re-tested.

- o *As soon as nominal bunch is available.*

Miscellaneous

- ❑ IQC, XPOC and PM status checks are place. Still to be tested systematically for IQC and XPOC.
  - ○ *Problem with subscription to IQC server on the sis host (works on local virtual machine).*
- ❑ MKI interlock (softstart, temperature, vacuum) in place and tested.
  - ○ *Remaining issue with one gauge that does not publish (replaced by an adjacent one).*
- ❑ Interlock on RF voltage ready but requires final settings.
- ❑ Abort gap protection (cleaning & dump) in place but not tested.
  - ○ *For cleaning the connection to the ADT is missing.*

Orbit

- ❑ Orbit interlocks in place and checked. Requires final references and tolerances (start with 2012).
  - o *Will follow evolution of the orbit.*
- ❑ COD settings interlocks are also in place and checked.
- ❑ COD failure / trip interlock to be rechecked (one / beam).
- ❑ COD integral field (energy change !) to be checked.
- ❑ OFB related checks (failures during ramp or squeeze) in place, but to be checked.

- ❑ Interlock on TDI gap ready, requires final settings.
- ❑ Beam position at TCDQ/TCSP is still based on IR6 BPMs. To be replaced by the DOROS acquisition on the TCSP.
  - o *Ready but misses settings and a few checks (with the settings).*
- ❑ Collimator BPM interlocks for the future:
  - o *Settings structure for the interlocks is prepared (tolerance, beta collimator versus β*, etc). Software to generate settings to be written (1day).*
  - o *Acquisition to be integrated.*

- ❏ New logic for RP 'interlocks': instead of dumping the beam, **warning to shift crew when orbit is not in tolerance**.
    - o *Ideally send 'retract' command – but not easy to do in current FESA design.*
    - o *Ideally SIS should give a **insertion_permit**, if FALSE → out.*
- ❏ Warning given out if any RP leaves the home switch and the position of N out of M BPMs (1/2 oo 3 for ALFA, 2/3 oo 6 for TOTEM - tbc) is out of tolerance.
- ❏ Everything is in place and pre-tested.
- ❏ Systematic test of orbit interlocks, RP switches and announcing of fault conditions to be tested.
    - o *Before the RPs start insertions !*