LHC intensity increase – check list

Version 0.2 - 7-Oct-10

Bunch pattern / intensity	200 nominal bunches
Start date	04.10.2010
Fill numbers	1393, 1394, 1397
Next intensity	248 nominal bunches
Comment	**Ok to proceed.**

Fill	Int B1/B2 [1E12]	Emittance [um]	Stable beams (h)	Dump reason
1393	20.0/20.0	~2.5	13.75	OP dump
1394	21.0/21.0	~2.5	1.8	SIS dump on loss of communication with IR7 BLM crate.
1397	21.0/21.0	~2.5	6.4	BLM dump IR4 on wire scan.

Check list

Non-conform points: the intensity increase is put on hold pending a satisfactory understanding / resolution of the issue.

Magnet powering	**Status**	**Who**
No unexplained IPOC failure in Post Mortem for FMCM and PIC	OK	JW
No magnet quench after beam dump in RQ4.R/L6	OK	JW
No unexplained quench of a magnet	OK(1)	JW
No unexplained abort of the 3 previous fills by magnet powering system	OK	JW
No problems with loss of QPS_OK for main circuits following injection process	OK	JW
Comments:		
(1) Quench test at 450 GeV with circulating beam at MQ.14R2. Quench of dipole C14.R2 with a horizontal bump (-) and 1E11 p 'lost' (EE, heaters). For a vertical bump the nQPS triggered the busbar protection (EE, no heaters).		

Beam interlocks	**Status**	**Who**
No unexplained IPOC failure in Post Mortem for BIC	OK(1,2)	JW
No unexplained false beam dump from beam interlock system	OK	JW
No failure of BIS pre-operational check	OK	JW
Comments:		
(1) IPOC warning for fill 1393 and 1397 because the time exceed the 10 us threshold in the BPL breaking. (2) IPOC failure on Thursday morning due to a problem with the timestamps of the timing system. The system disconnected from the GPS, leading to a drift of the timing. Reset by B. Todd.		

BLM	**Status**	**Who**
Internal test (sanity checks) results must be true	OK	JW/BD
Rise time (10 to 90%) of fast losses must be larger then 200 us	OK	JW/BD
No unexplained BLM check failures	OK(1)	JW/BD
Expected losses for the to be injected beam must be 30 % below threshold level	n/a	BD
BLM system modification (ECRs) have to be agreed on, EDMS: notified persons signature is needed	n/a	BD
No nonconformities in the energy transmission to the BLM crates	OK	BD
Comments:		
(1) CPU problem on crate in IR7 correctly detected by SIS and dumped. CPU exchanged.		

Collimation	**Status**	**Who**
Betatron loss map	Done	JW/OP
Off-momentum loss map	To be done next	
No observed violation of cleaning hierarchy	Seems OK	JW/OP
Comments:		

Post-mortem	**Status**	**Who**
Loss leakage to TCTs below 0.5% during beam dump	OK(1)	JW
UFO occurrences	0	JW
No unexplained PM event above 450 GeV	OK	JW
Comments:		
(1) Higher losses on TCT in IR2 during dump from wire-scanner – expected.		

Orbit	**Status**	**Who**
Global orbit in tolerance in stable beams (< 0.2 mm rms)	OK	JW
Orbit IR3/IR7 collimators within $\pm$ 0.2 mm in stable beams	OK	JW
Check that orbit is correctly measured	OK	JW
BPM IP6 (interlock BPM) during first beam with higher intensity and different bunch pattern	OK	BG
Orbit at TCTs in tolerance in stable beams (≤ 1 sigma)	OK(1)	JW
Comments:		
(1) Slight deviation from 1 sigma during length scale calibration but still well within the +- 2 sigma limit as tested earlier.		

Feedbacks & operation	**Status**	**Who**
OFB operational status / no anomalies	OK	JW
QFB operational status / no anomalies	No change(1)	JW/OP
Comments:		
(1) BI will change some components in the BBQ detector/filter to cope with the large voltages. Test ramp before the next step.		

Beam dump	**Status**	**Who**
Asynchronous dumps understood? Protection worked correctly?	OK	BG
Parasitic asynchronous dump data show no loss of protection	OK (1)	BG
No positioning errors on TCSG/TCDQ	OK	BG
No settings or thresholds mistakes/wrong sequences/unexplained faults on TCSG/TCDQ	OK	BG
No unexplained MKD, MKB kicker, TSU or BETS faults	OK	BG
No potentially dangerous XPOC or IPOC failure on MKD or MKB	OK	BG
No unexplained synchronization problem with TSU	OK	BG
Pressure and temperature rise in TDE block within tolerances	OK	BG
Requalification passed OK at 450 GeV and 3.5 TeV with pilot in case of any important component exchange	n/a	
Comments:		
(1) large losses on some B2 TCTs from 3rd fill – due to WS test so ignored		

Note: some items only relevant for increase injected intensity

Injection	**Status**	**Who**
Injection oscillations within tolerance for all injections	OK (1)	BG
No unexplained large beam loss on TCDIs	OK	BG
No issues in injection procedure, settings or tolerances	OK	BG
Orbit in injection region in tolerance wrt reference (tolerance <0.5 mm)		
Resetting of TL trajectories and TCDIs done when needed	OK	BG
No increased rate of MKI flashovers	OK	BG
No increased rate of MKI switch erratics or missings	OK	BG
No unexplained MKI vacuum or temperature activity	OK	BG/MB
No machine-protection related injection system hardware failures	OK	BG
Comments:		
(1) at 2 mm p2p for B2V and B1H; will need to correct this soon if it drifts further		