Chamonix'09 - Session 8:
What will we do for beam preparation in 2009

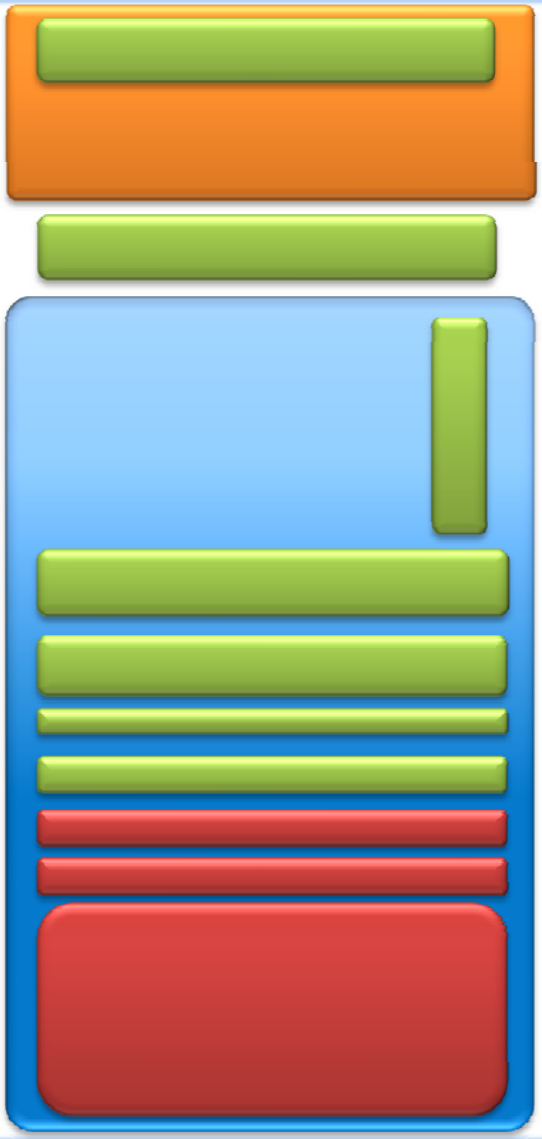
Magnet Circuits

Antonio Vergara for the Hardware Commissioning Team and the whole Powering Tests gang (EiCs, Oper., QPS, PO, PIC, MPP, CV, EL, ElQA, CO...)

special thanks to Markus, Nuria and Reiner for some very good ideas

2005-2008 S.C. Commissioning

2005-2008 S.C. Commissioning



Short-circuit tests

EIQA @ warm

EIQA monitoring

DFB commissioning

EIQA @ cold

Current lead connection

QPS individual system tests @ cold

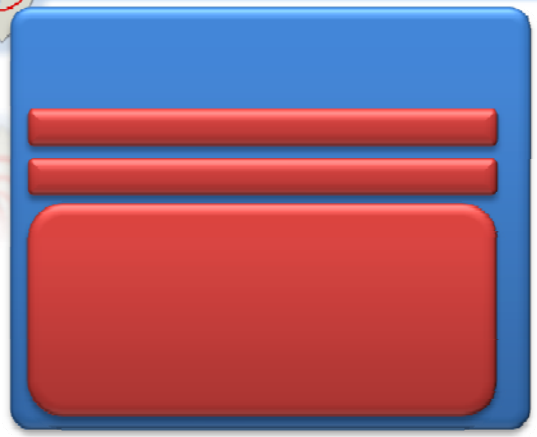
PIC1 – PIC tests without current but converter ON

PCC - Configuration of the power converter

P2N – Powering to nominal

PGC – Powering group of circuits

Powering Tests of a S.C. Circuit



PIC1 – PIC tests with

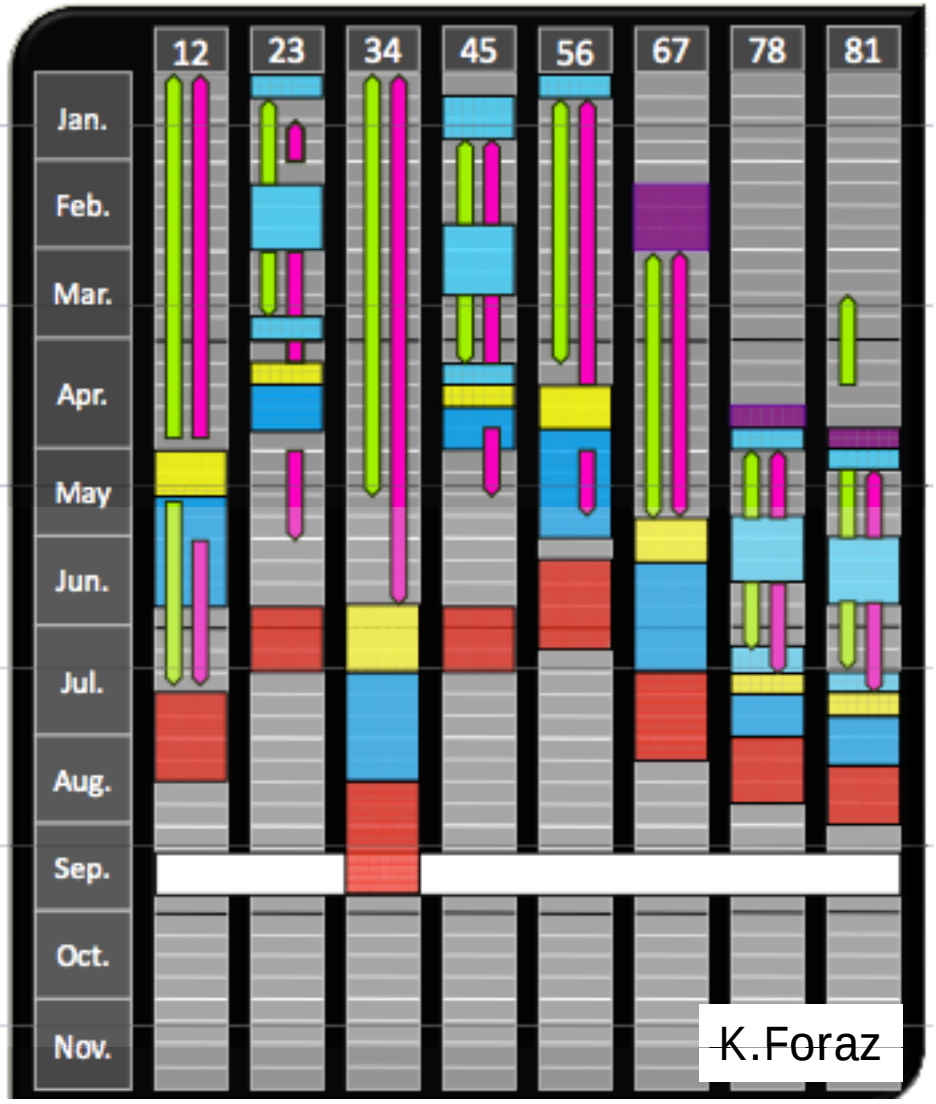
PCC - Configuration

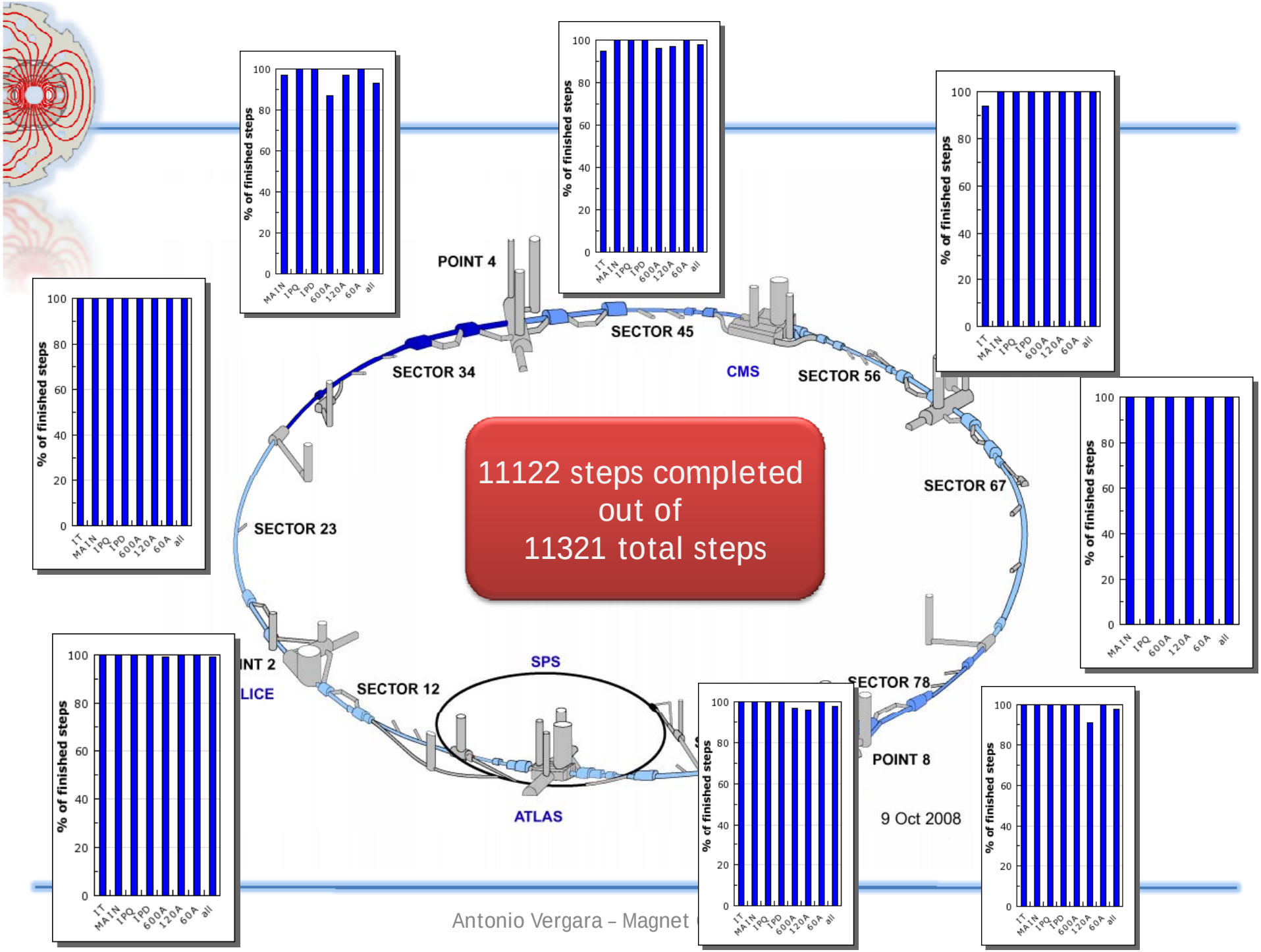
P2N – Powering to n

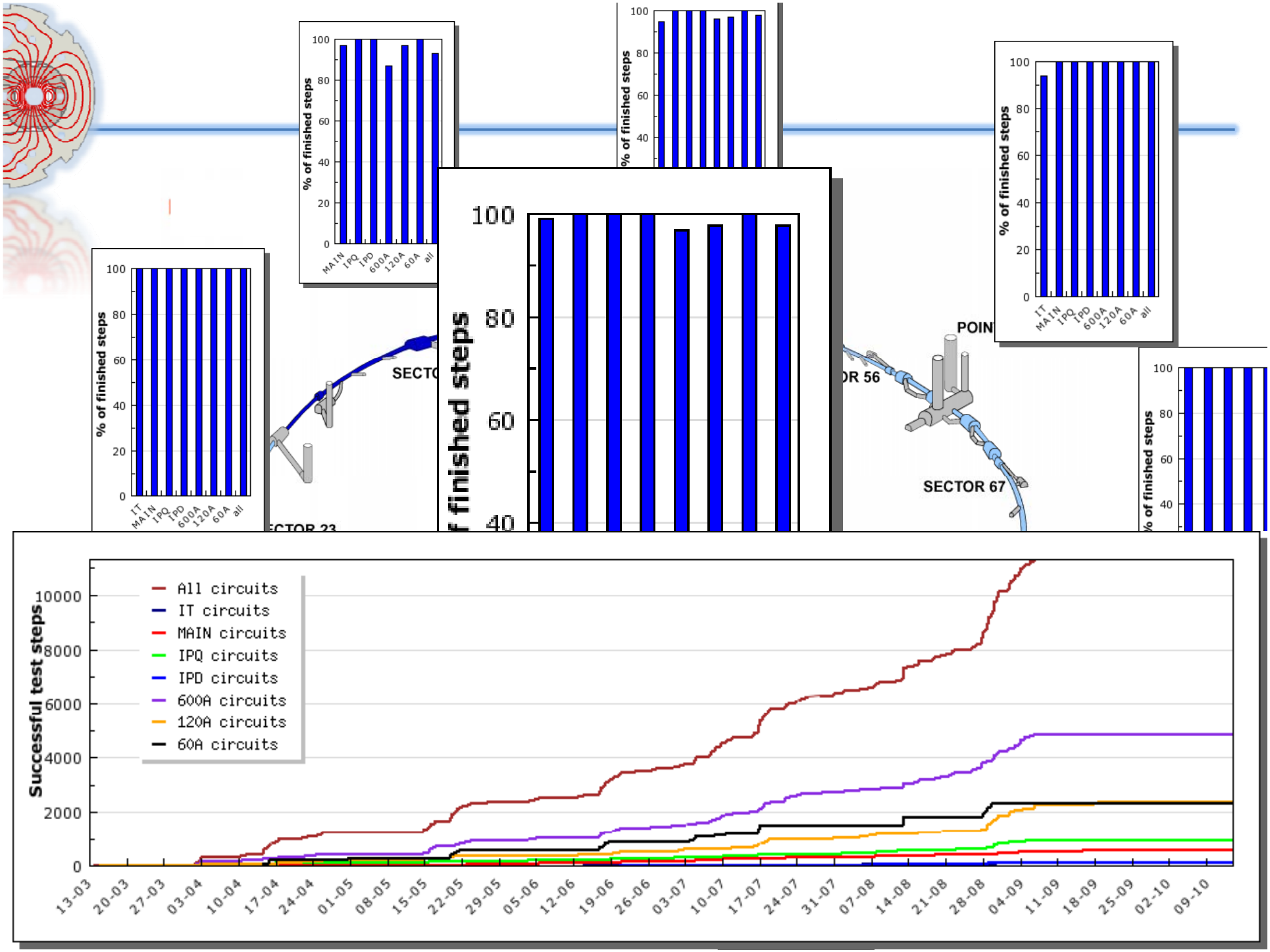
PGC – Powering grou

Steps in pov

CIRCUIT	EIQA	PCC	PIC 2					
RB	EIQA	PCC.2	PIC2 CRYO-OK	PIC2 QPS-OK	PIC2 PC PERMIT	PIC2 POWERING FAILURE	PIC2 CIRCUIT QUENCH VIA QPS	PIC2 FAS ABORT R VIA PIC
RQD/F	EIQA	PCC.3	PIC2 CRYO-OK	PIC2 QPS-OK	PIC2 PC PERMIT	PIC2 POWERING FAILURE	PIC2 CIRCUIT QUENCH VIA QPS	PIC2 FAS ABORT R VIA PIC
IPQ	EIQA	PCC.4	PIC2 CRYO-OK	PIC2 QPS-OK	PIC2 PC PERMIT	PIC2 POWERING FAILURE	PIC2 CIRCUIT QUENCH VIA QPS	PIC2 FAS ABORT R VIA PIC
IPD	EIQA	PCC.3	PIC2 CRYO-OK	PIC2 QPS-OK	PIC2 PC PERMIT	PIC2 POWERING FAILURE	PIC2 CIRCUIT QUENCH VIA QPS	PIC2 FAS ABORT R VIA PIC
600A E-E	EIQA	PCC.5	PIC2 CRYO-OK	PIC2 QPS-OK	PIC2 PC PERMIT	PIC2 POWERING FAILURE	PIC2 CIRCUIT QUENCH VIA QPS	PIC2 FAS ABORT R VIA PIC
600A no EE C-B	EIQA	PCC.5	PIC2 CRYO-OK	PIC2 QPS-OK	PIC2 PC PERMIT	PIC2 POWERING FAILURE	PIC2 CIRCUIT QUENCH VIA QPS	PIC2 FAS ABORT R VIA PIC
RCO (120A)	EIQA	PCC.5	PIC2 CRYO-OK	PIC2 QPS-OK	PIC2 PC PERMIT	PIC2 POWERING FAILURE	PIC2 CIRCUIT QUENCH VIA QPS	PIC2 FAS ABORT R VIA PIC
RCB (120A)	EIQA	PCC.1	PIC2 CRYO-OK	-	PIC2 PC PERMIT	PIC2 POWERING FAILURE	-	-
RCB (60A)	EIQA	PCC.1	-	-	-	-	-	-




POINT 4
SECTOR 45
SECTOR 34
CMS
SECTOR 56
SECTOR 67
SECTOR 23
SECTOR 12
SECTOR 78
POINT 8
SPS
ATLAS
11122 steps completed
out of
11321 total steps
9 Oct 2008
% of finished steps
IT
MAIN
IPQ
IPD
600A
120A
60A
all


% of finished steps
IT
MAIN
IPQ
IPD
600A
120A
60A
all
SECTOR 67
Successful test steps
All circuits
IT circuits
MAIN circuits
IPQ circuits
IPD circuits
600A circuits
120A circuits
60A circuits
13-03
20-03
27-03
03-04
10-04
17-04
24-04
01-05
08-05
15-05
22-05
29-05
05-06
12-06
19-06
26-06
03-07
10-07
17-07
24-07
31-07
07-08
14-08
21-08
28-08
04-09
11-09
18-09
25-09
02-10
09-10


CERN

Lessons Learnt - Strategy

- There is no large difference between time for commissioning at 7, 5.5 or 3 TeV except for the training quenches
- In fact life is much simpler if a common current is left as the target commissioning current for all the correctors of the same type
- Commissioning up to a more conservative energy (3 TeV, 4 TeV?) will not make us save powering time, however, we have large experience in all the sectors below 5 TeV. This may reduce the risks and relax the planning and consolidation needs
- It's very important to know the parameters required for beam optics (e.g. current ramp rate and acceleration) before starting the tests in order to ease the handing over of the circuits to machine check-out
- Commissioning the matching sections and inner triplets can be done in the shadow of the arc circuits. Full priority during the powering test preparation must be given to the arcs

Lessons Learnt - Efficiency

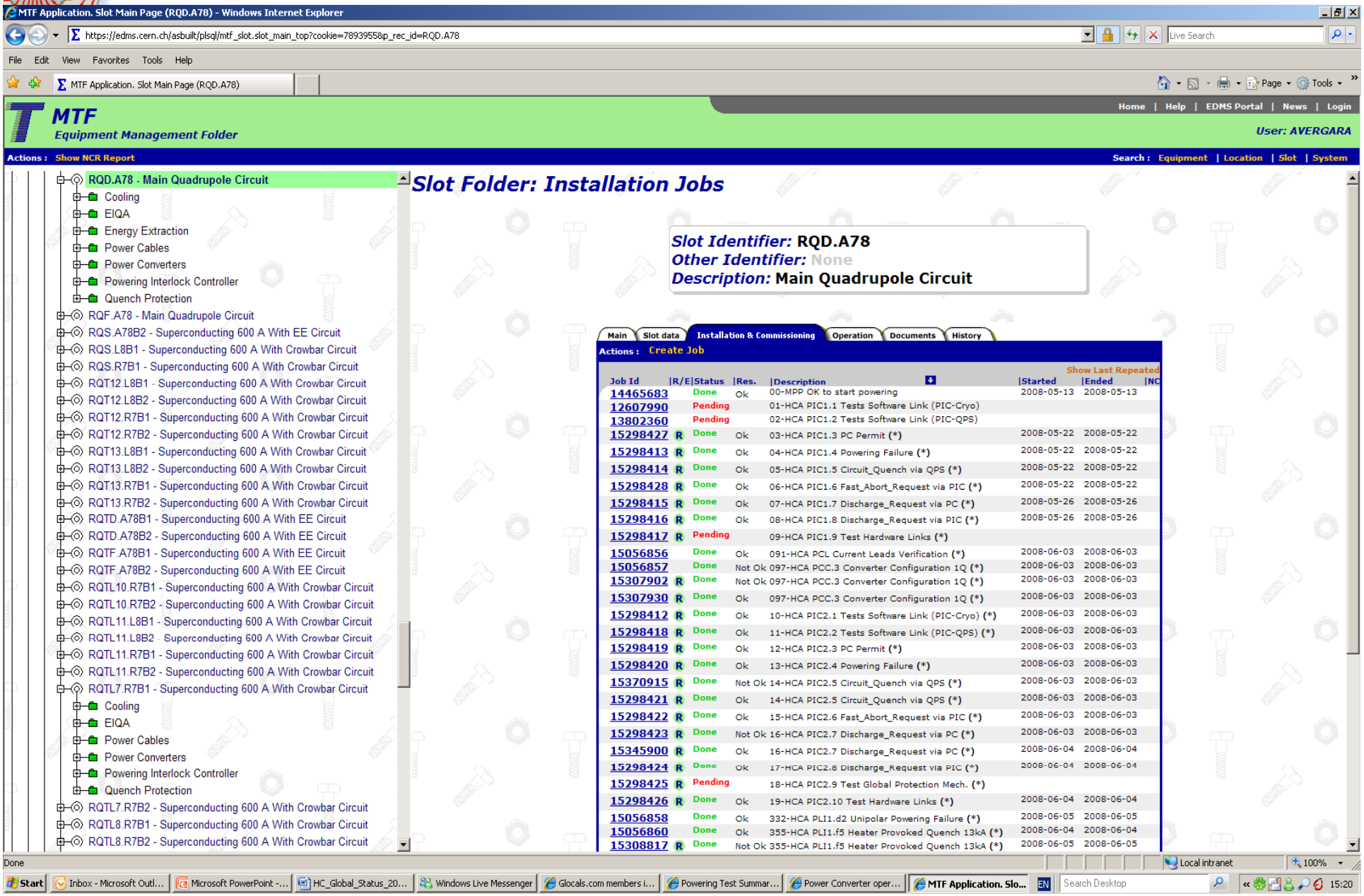
- When several sectors are in powering test mode, we are able to use around 60% of the total time with cryogenic conditions. The 40% of time (time without tests going on) is mainly due to interventions needed in the tunnel and patrols: we can improve this.
  - An option: concentrate all tunnel interventions in normal working hours and use night/weekend shifts for powering when necessary. Powering test coordinators can be trained to help equipment teams with manning difficulties. This will reduce the amount of hours spent by experts in the CCC.
- Automation of tests and analysis was essential to reach the target test rate
- Parallelism constrains and feasibility is now very well understood: as many powering fronts as possible (sometimes up to 6) should be active during normal shift operation as long as safety (access control) is not compromised: tool for helping the EIC on this issue is under study
- ADI approved by the point owners is a very powerful management tool

Where were we on September 19?

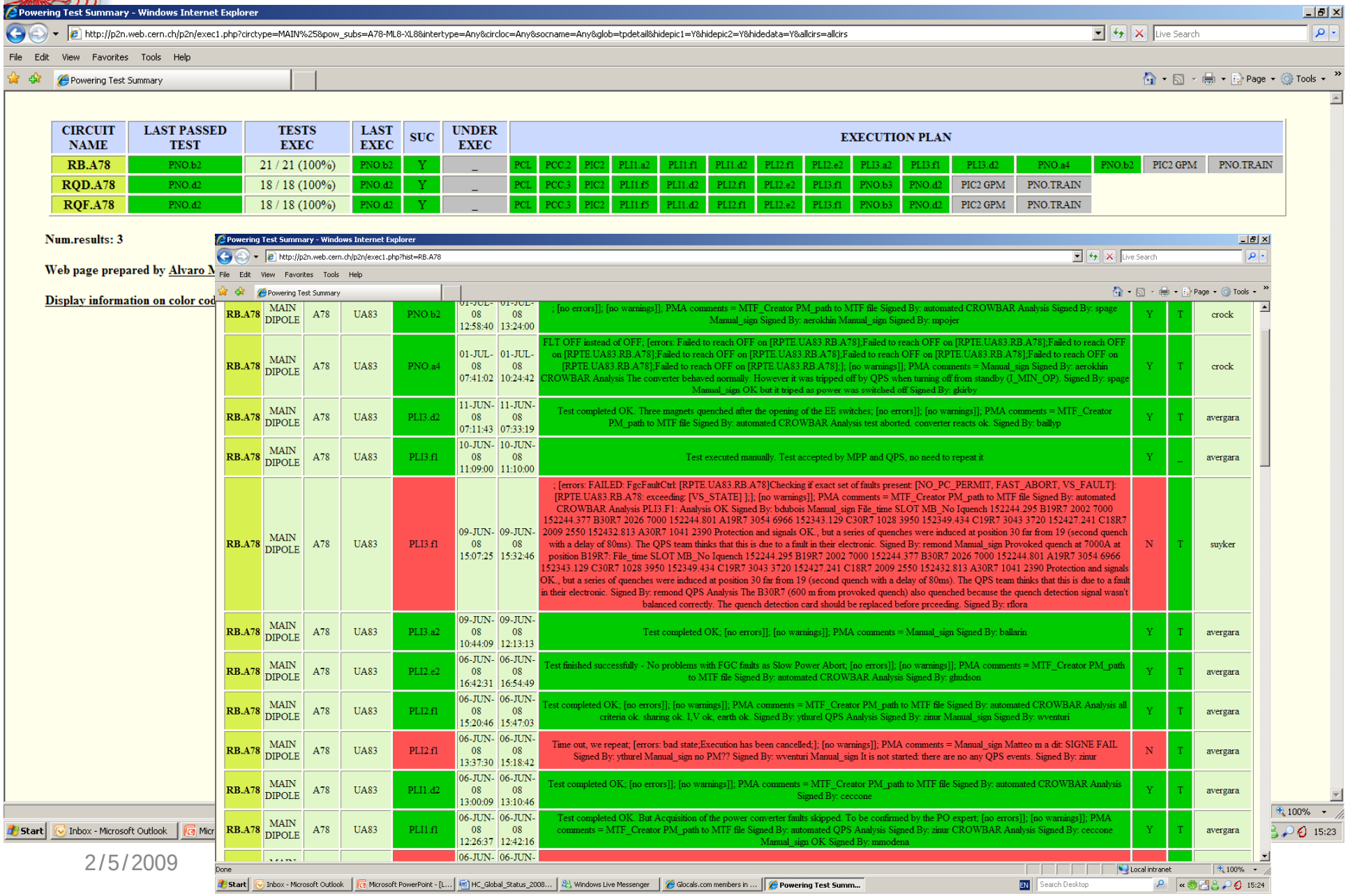
Circuit Type	5 TeV	7 TeV
Main Dipoles	All OK (5.5 TeV) RB.A78 limited to 8465A (5 TeV)	Training campaing to be completed in ALL sectors
Main Quadrupoles	All OK	RQF.A56 and RQD.A56 OK Training to be completed for the rest
IPQ, IPD	All OK	RD2.R8 limited to 5kA RD3.L4 limited to 4.5kA
Inner Triplets (RQX,RQTX1 and RQTX2)	RQX, RQTX2 OK for all triplets	RQTX1 (trim converter) to be commissioned in 5 inner triplets
600A	RSS.A45B1: EE switch issue RQT13.L5B1: splice issue (?), limited to 200A RCO.A78B2: splice issue, blocked RCO.A81B1, RCO.A81B2: to be commissioned 13 circuits in S45 to be completed RQS: Converter DC contactor to be implemented on 8 circuits limited to 200A	RQTF.A45B2: limited to 500A 21 circuits in Sector 7-8 commissioned up to 5 TeV only
80-120A	All OK except: RCBYH4.R8B1, RCBYHS5.R8B1, RCBYV5.L4B2 and RCBYS4.L5B1 limited to 35A	Idem
60A	All OK	

See Karl-Hubert's presentation for details

Where were we on September 19 - Documentation



Where were we on September 19 - Documentation



Powering Test Summary - Windows Internet Explorer

http://p2n.web.cern.ch/p2n/exec1.php?circtype=MAIN%25&pow_subs=A78-ML8-XL8&intertype=Any&circloc=Any&socname=Any&glob=tpdetail&hidepic1=Y&hidepic2=Y&hidedata=Y&allcirs=allcirs

CIRCUIT NAME	LAST PASSED TEST	TESTS EXEC	LAST EXEC	SUC	UNDER EXEC	EXECUTION PLAN													
RB.A78	PNO.b2	21 / 21 (100%)	PNO.b2	Y	_	PCL	PCC.2	PIC2	PLI1.a2	PLI1.f1	PLI1.d2	PLI2.f1	PLI2.e2	PLI3.a2	PLI3.f1	PLI3.d2	PNO.a4	PNO.b2	PIC2 GPM	PNO.TRAIN
RQD.A78	PNO.d2	18 / 18 (100%)	PNO.d2	Y	_	PCL	PCC.3	PIC2	PLI1.f5	PLI1.d2	PLI2.f1	PLI2.e2	PLI3.f1	PNO.b3	PNO.d2	PIC2 GPM	PNO.TRAIN			
RQF.A78	PNO.d2	18 / 18 (100%)	PNO.d2	Y	_	PCL	PCC.3	PIC2	PLI1.f5	PLI1.d2	PLI2.f1	PLI2.e2	PLI3.f1	PNO.b3	PNO.d2	PIC2 GPM	PNO.TRAIN			

Num.results: 3

Web page prepared by Alvaro M

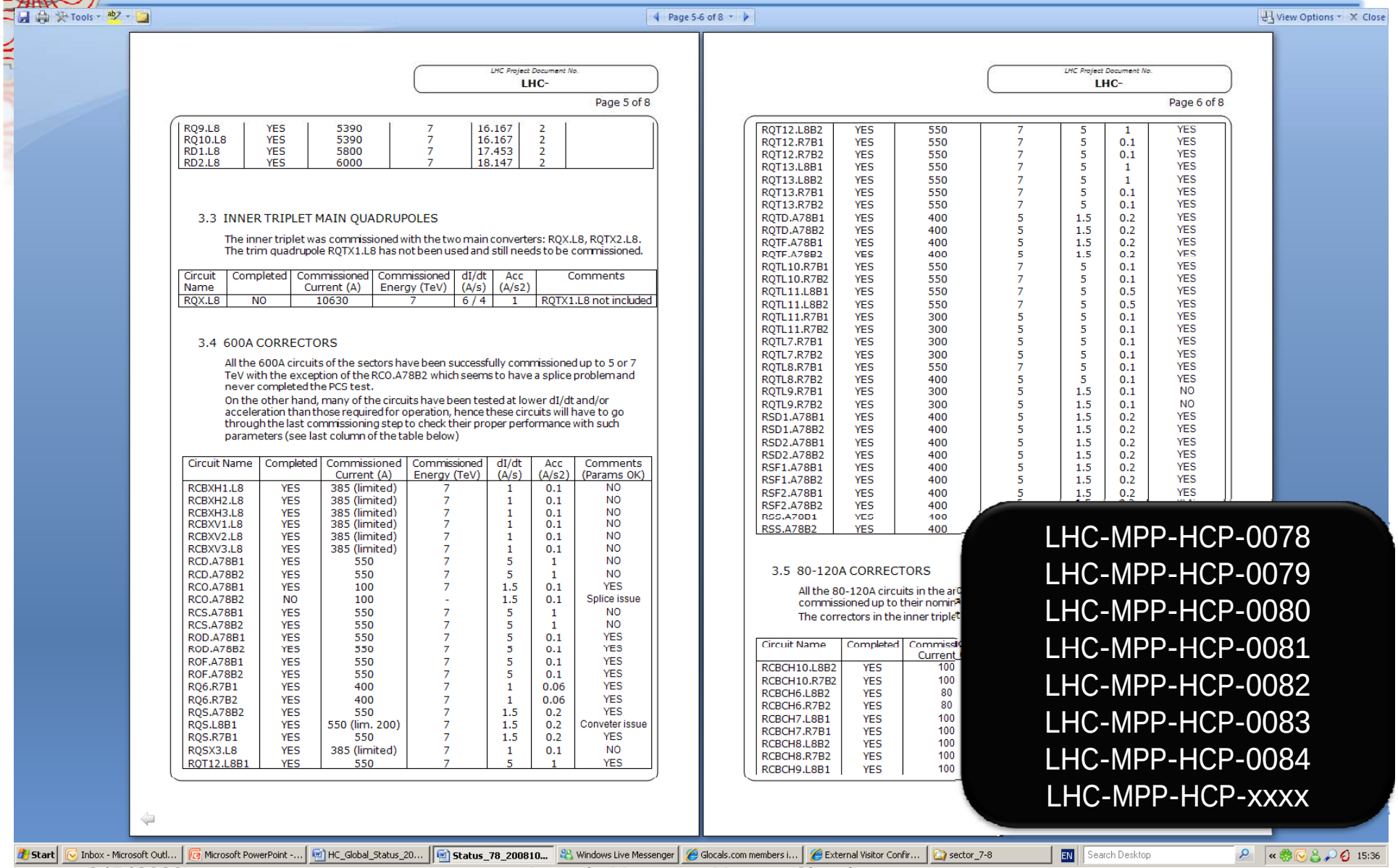
Display information on color cod

Powering Test Summary - Windows Internet Explorer

http://p2n.web.cern.ch/p2n/exec1.php?hist=RB.A78

RB.A78	MAIN DIPOLE	A78	UA83	PNO.b2	01-JUL-08 12:58:40	01-JUL-08 13:24:00	; [no errors]]; [no warnings]]; PMA comments = MTF_Creator PM_path to MTF file Signed By: automated CROWBAR Analysis Signed By: spage Manual_sign Signed By: aerokhin Manual_sign Signed By: mpojer	Y	T	crock
RB.A78	MAIN DIPOLE	A78	UA83	PNO.a4	01-JUL-08 07:41:02	01-JUL-08 10:24:42	FLT OFF instead of OFF; [errors: Failed to reach OFF on [RPTE.UA83.RB.A78];Failed to reach OFF on [RPTE.UA83.RB.A78];Failed to reach OFF on [RPTE.UA83.RB.A78];Failed to reach OFF on [RPTE.UA83.RB.A78];Failed to reach OFF on [RPTE.UA83.RB.A78];Failed to reach OFF on [RPTE.UA83.RB.A78];Failed to reach OFF on [RPTE.UA83.RB.A78];]; [no warnings]]; PMA comments = Manual_sign Signed By: aerokhin CROWBAR Analysis The converter behaved normally. However it was tripped off by QPS when turning off from standby (I_MIN_OP). Signed By: spage Manual_sign OK but it triped as power was switched off Signed By: gkirby	Y	T	crock
RB.A78	MAIN DIPOLE	A78	UA83	PLI3.d2	11-JUN-08 07:11:43	11-JUN-08 07:33:19	Test completed OK. Three magnets quenched after the opening of the EE switches; [no errors]]; [no warnings]]; PMA comments = MTF_Creator PM_path to MTF file Signed By: automated CROWBAR Analysis test aborted. converter reacts ok. Signed By: baillyp	Y	T	avergara
RB.A78	MAIN DIPOLE	A78	UA83	PLI3.f1	10-JUN-08 11:09:00	10-JUN-08 11:10:00	Test executed manually. Test accepted by MPP and QPS, no need to repeat it	Y	_	avergara
RB.A78	MAIN DIPOLE	A78	UA83	PLI3.f1	09-JUN-08 15:07:25	09-JUN-08 15:32:46	; [errors: FAILED: FgcFaultCtrl: [RPTE.UA83.RB.A78]Checking if exact set of faults present: [NO_PC_PERMIT, FAST_ABORT, VS_FAULT]: [RPTE.UA83.RB.A78: exceeding: [VS_STATE]];]; [no warnings]]; PMA comments = MTF_Creator PM_path to MTF file Signed By: automated CROWBAR Analysis PLI3.F1: Analysis OK Signed By: bdubois Manual_sign File_time SLOT MB_No Iquench 152244.295 B19R7 2002 7000 152244.377 B30R7 2026 7000 152244.801 A19R7 3054 6966 152343.129 C30R7 1028 3950 152349.434 C19R7 3043 3720 152427.241 C18R7 2009 2550 152432.813 A30R7 1041 2390 Protection and signals OK., but a series of quenches were induced at position 30 far from 19 (second quench with a delay of 80ms). The QPS team thinks that this is due to a fault in their electronic. Signed By: remond Manual_sign Provoked quench at 7000A at position B19R7: File_time SLOT MB_No Iquench 152244.295 B19R7 2002 7000 152244.377 B30R7 2026 7000 152244.801 A19R7 3054 6966 152343.129 C30R7 1028 3950 152349.434 C19R7 3043 3720 152427.241 C18R7 2009 2550 152432.813 A30R7 1041 2390 Protection and signals OK., but a series of quenches were induced at position 30 far from 19 (second quench with a delay of 80ms). The QPS team thinks that this is due to a fault in their electronic. Signed By: remond QPS Analysis The B30R7 (600 m from provoked quench) also quenched because the quench detection signal wasn't balanced correctly. The quench detection card should be replaced before prceeding. Signed By: rflora	N	T	suyker
RB.A78	MAIN DIPOLE	A78	UA83	PLI3.a2	09-JUN-08 10:44:09	09-JUN-08 12:13:13	Test completed OK; [no errors]]; [no warnings]]; PMA comments = Manual_sign Signed By: ballarin	Y	T	avergara
RB.A78	MAIN DIPOLE	A78	UA83	PLI2.e2	06-JUN-08 16:42:31	06-JUN-08 16:54:49	Test finished successfully - No problems with FGC faults as Slow Power Abort; [no errors]]; [no warnings]]; PMA comments = MTF_Creator PM_path to MTF file Signed By: automated CROWBAR Analysis Signed By: ghudson	Y	T	avergara
RB.A78	MAIN DIPOLE	A78	UA83	PLI2.f1	06-JUN-08 15:20:46	06-JUN-08 15:47:03	Test completed OK; [no errors]]; [no warnings]]; PMA comments = MTF_Creator PM_path to MTF file Signed By: automated CROWBAR Analysis all criteria ok. sharing ok. I,V ok, earth ok. Signed By: ythurel QPS Analysis Signed By: zinur Manual_sign Signed By: wventuri	Y	T	avergara
RB.A78	MAIN DIPOLE	A78	UA83	PLI2.f1	06-JUN-08 13:37:30	06-JUN-08 15:18:42	Time out, we repeat; [errors: bad state;Execution has been cancelled;]; [no warnings]]; PMA comments = Manual_sign Matteo m a dit: SIGNE FAIL Signed By: ythurel Manual_sign no PM?? Signed By: wventuri Manual_sign It is not started: there are no any QPS events. Signed By: zinur	N	T	avergara
RB.A78	MAIN DIPOLE	A78	UA83	PLI1.d2	06-JUN-08 13:00:09	06-JUN-08 13:10:46	Test completed OK; [no errors]]; [no warnings]]; PMA comments = MTF_Creator PM_path to MTF file Signed By: automated CROWBAR Analysis Signed By: ceccone	Y	T	avergara
RB.A78	MAIN DIPOLE	A78	UA83	PLI1.f1	06-JUN-08 12:26:37	06-JUN-08 12:42:16	Test completed OK. But Acquisition of the power converter faults skipped. To be confirmed by the PO expert; [no errors]]; [no warnings]]; PMA comments = MTF_Creator PM_path to MTF file Signed By: automated QPS Analysis Signed By: zinur CROWBAR Analysis Signed By: ceccone Manual_sign OK Signed By: mmodena	Y	T	avergara
					06-JUN-	06-JUN-				

Where were we on September 19 - Documentation



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RQ9.L8	YES	5390	7	16.167	2	
RQ10.L8	YES	5390	7	16.167	2	
RD1.L8	YES	5800	7	17.453	2	
RD2.L8	YES	6000	7	18.147	2	

3.3 INNER TRIPLET MAIN QUADRUPOLES

The inner triplet was commissioned with the two main converters: RQX.L8, RQTX2.L8. The trim quadrupole RQTX1.L8 has not been used and still needs to be commissioned.

Circuit Name	Completed	Commissioned Current (A)	Commissioned Energy (TeV)	dI/dt (A/s)	Acc (A/s2)	Comments
RQX.L8	NO	10630	7	6 / 4	1	RQTX1.L8 not included

3.4 600A CORRECTORS

All the 600A circuits of the sectors have been successfully commissioned up to 5 or 7 TeV with the exception of the RCO.A78B2 which seems to have a splice problem and never completed the PCS test.

On the other hand, many of the circuits have been tested at lower dI/dt and/or acceleration than those required for operation, hence these circuits will have to go through the last commissioning step to check their proper performance with such parameters (see last column of the table below)

Circuit Name	Completed	Commissioned Current (A)	Commissioned Energy (TeV)	dI/dt (A/s)	Acc (A/s2)	Comments (Params OK)
RCBXH1.L8	YES	385 (limited)	7	1	0.1	NO
RCBXH2.L8	YES	385 (limited)	7	1	0.1	NO
RCBXH3.L8	YES	385 (limited)	7	1	0.1	NO
RCBXV1.L8	YES	385 (limited)	7	1	0.1	NO
RCBXV2.L8	YES	385 (limited)	7	1	0.1	NO
RCBXV3.L8	YES	385 (limited)	7	1	0.1	NO
RCD.A78B1	YES	550	7	5	1	NO
RCD.A78B2	YES	550	7	5	1	NO
RCO.A78B1	YES	100	7	1.5	0.1	YES
RCO.A78B2	NO	100	-	1.5	0.1	Splice issue
RCS.A78B1	YES	550	7	5	1	NO
RCS.A78B2	YES	550	7	5	1	NO
ROD.A78B1	YES	550	7	5	0.1	YES
ROD.A78B2	YES	550	7	5	0.1	YES
ROF.A78B1	YES	550	7	5	0.1	YES
ROF.A78B2	YES	550	7	5	0.1	YES
RQ6.R7B1	YES	400	7	1	0.06	YES
RQ6.R7B2	YES	400	7	1	0.06	YES
RQS.A78B2	YES	550	7	1.5	0.2	YES
RQS.L8B1	YES	550 (lim. 200)	7	1.5	0.2	Conveter issue
RQS.R7B1	YES	550	7	1.5	0.2	YES
RQSX3.L8	YES	385 (limited)	7	1	0.1	NO
RQT12.L8B1	YES	550	7	5	1	YES

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RQT12.L8B2	YES	550	7	5	1	YES
RQT12.R7B1	YES	550	7	5	0.1	YES
RQT12.R7B2	YES	550	7	5	0.1	YES
RQT13.L8B1	YES	550	7	5	1	YES
RQT13.L8B2	YES	550	7	5	1	YES
RQT13.R7B1	YES	550	7	5	0.1	YES
RQT13.R7B2	YES	550	7	5	0.1	YES
RQTD.A78B1	YES	400	5	1.5	0.2	YES
RQTD.A78B2	YES	400	5	1.5	0.2	YES
RQTF.A78B1	YES	400	5	1.5	0.2	YES
RQTF.A78B2	YES	400	5	1.5	0.2	YES
RQTL10.R7B1	YES	550	7	5	0.1	YES
RQTL10.R7B2	YES	550	7	5	0.1	YES
RQTL11.L8B1	YES	550	7	5	0.5	YES
RQTL11.L8B2	YES	550	7	5	0.5	YES
RQTL11.R7B1	YES	300	5	5	0.1	YES
RQTL11.R7B2	YES	300	5	5	0.1	YES
RQTL7.R7B1	YES	300	5	5	0.1	YES
RQTL7.R7B2	YES	300	5	5	0.1	YES
RQTL8.R7B1	YES	550	7	5	0.1	YES
RQTL8.R7B2	YES	400	5	5	0.1	YES
RQTL9.R7B1	YES	300	5	1.5	0.1	NO
RQTL9.R7B2	YES	300	5	1.5	0.1	NO
RSD1.A78B1	YES	400	5	1.5	0.2	YES
RSD1.A78B2	YES	400	5	1.5	0.2	YES
RSD2.A78B1	YES	400	5	1.5	0.2	YES
RSD2.A78B2	YES	400	5	1.5	0.2	YES
RSF1.A78B1	YES	400	5	1.5	0.2	YES
RSF1.A78B2	YES	400	5	1.5	0.2	YES
RSF2.A78B1	YES	400	5	1.5	0.2	YES
RSF2.A78B2	YES	400	5	1.5	0.2	YES
RSS.A78B1	YES	400	5	1.5	0.2	YES
RSS.A78B2	YES	400	5	1.5	0.2	YES

3.5 80-120A CORRECTORS

All the 80-120A circuits in the ar
commissioned up to their nomin
The correctors in the inner triple

Circuit Name	Completed	Commissi Current
RCBCH10.L8B2	YES	100
RCBCH10.R7B2	YES	100
RCBCH6.L8B2	YES	80
RCBCH6.R7B2	YES	80
RCBCH7.L8B1	YES	100
RCBCH7.R7B1	YES	100
RCBCH8.L8B2	YES	100
RCBCH8.R7B2	YES	100
RCBCH9.L8B1	YES	100

LHC-MPP-HCP-0078
LHC-MPP-HCP-0079
LHC-MPP-HCP-0080
LHC-MPP-HCP-0081
LHC-MPP-HCP-0082
LHC-MPP-HCP-0083
LHC-MPP-HCP-0084
LHC-MPP-HCP-xxxx

2009 Commissioning

- Main differences with last year campaign:
  - Starting point is not the same
    - 2007: All sectors were warm, no circuit had been powered. Eight machines to commission from scratch.
    - 2009: Boundary conditions change between sectors

2009 S.C. Commissioning

- Scenarios:

Circuits warmed-up and modified (e.g. circuits opened in S34)	ElQA: Full Interlock Tests: Full Powering: Full
Circuits warmed-up but not modified (e.g. DS quadrupoles in S56)	ElQA: TP4 & DOC Interlock Tests: Reduced Powering: Reduced
Circuits kept cold (e.g. circuits in sectors 7-8 and 8-1)	ElQA: TP4 (?) & DOC (?) Interlock Tests: Reduced Powering: Reduced

2009 Commissioning

- Main differences:
  - Starting point is not the same
    - 2007: All sectors were warm, no circuit had been powered. 8 machines to commission from scratch.
    - 2009: Boundary conditions change between sectors
  - Most of the hardware has been already debugged
  - More restrictive access conditions

Safety: access during powering

- All circuits in the access sector < 1 kA

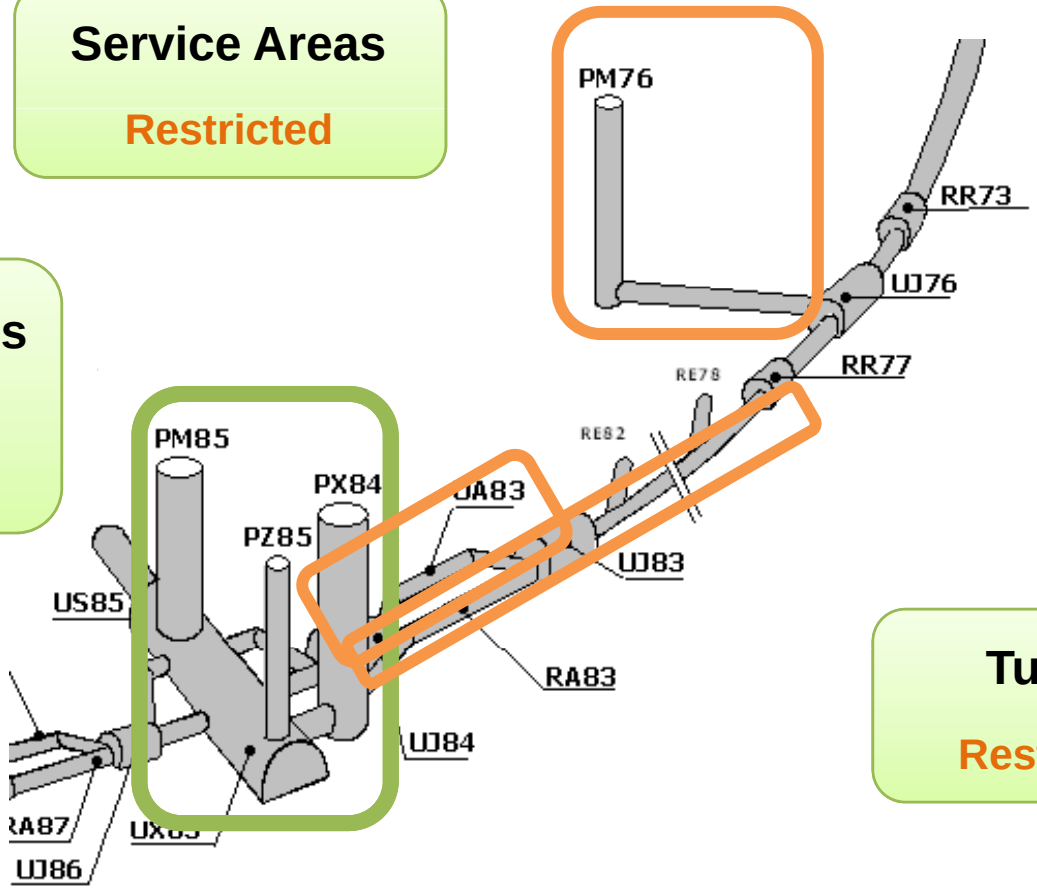
Before 19/09

Service Areas

Restricted

Experimental caverns

General / Restricted (delegated)



Tunnel

Restricted

Safety: access during powering

- One or more circuits in the access sector above 1 kA

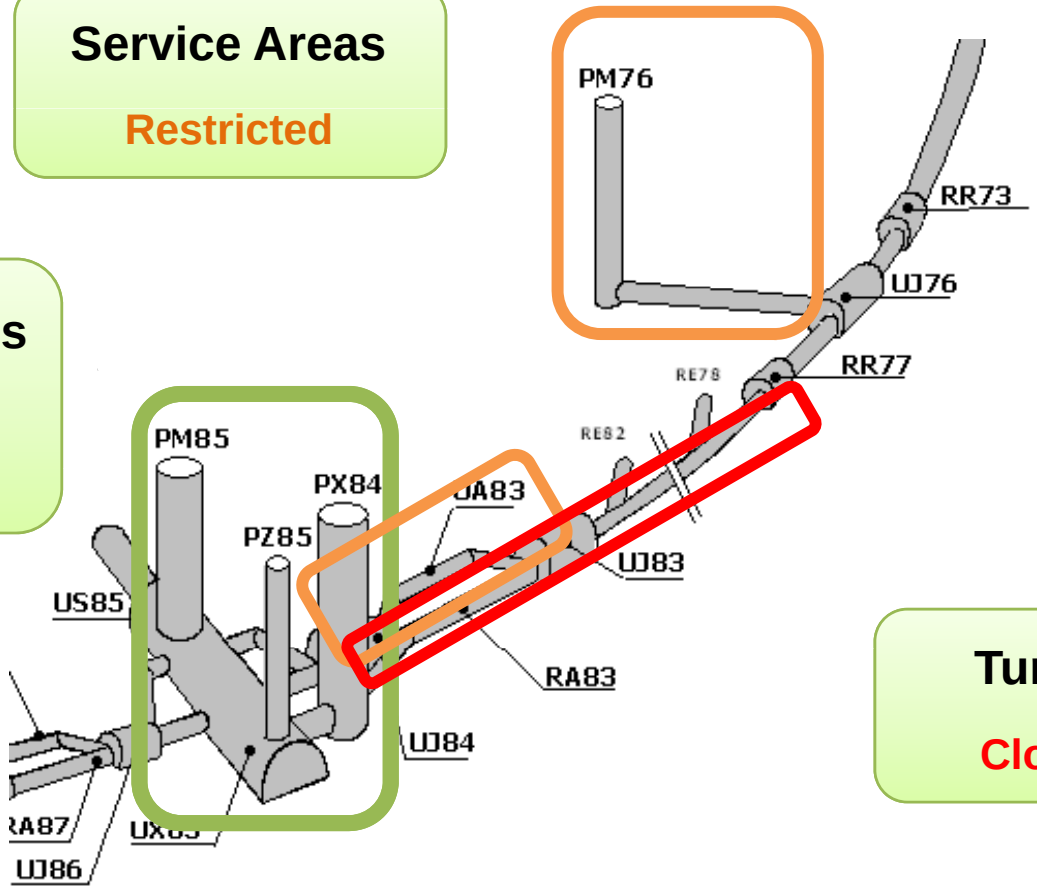
Service Areas

Restricted

Experimental caverns

General / Restricted (delegated)

Before 19/09



Tunnel

Closed

Safety: access during powering

- One or more circuits powered

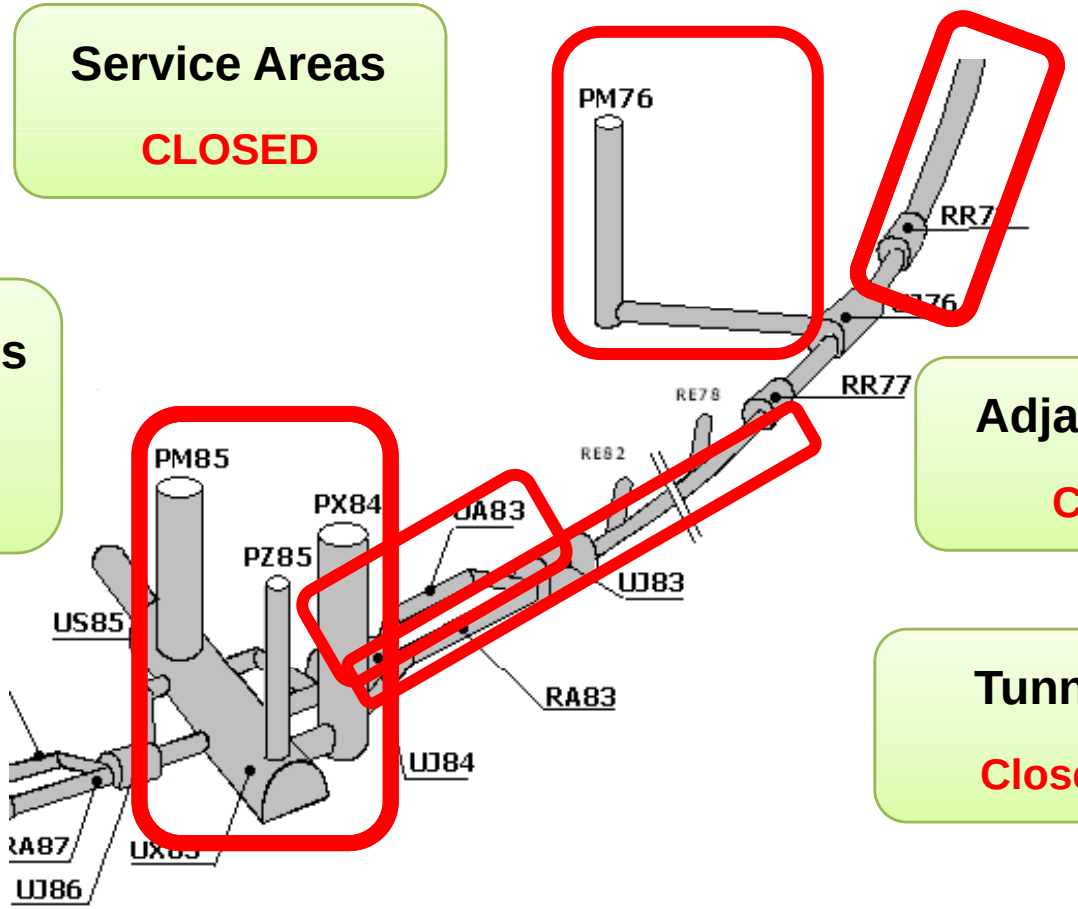
After 19/09

Service Areas

CLOSED

Experimental caverns

CLOSED



Adjacent Sectors

CLOSED

Tunnel

Closed

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After 19/09

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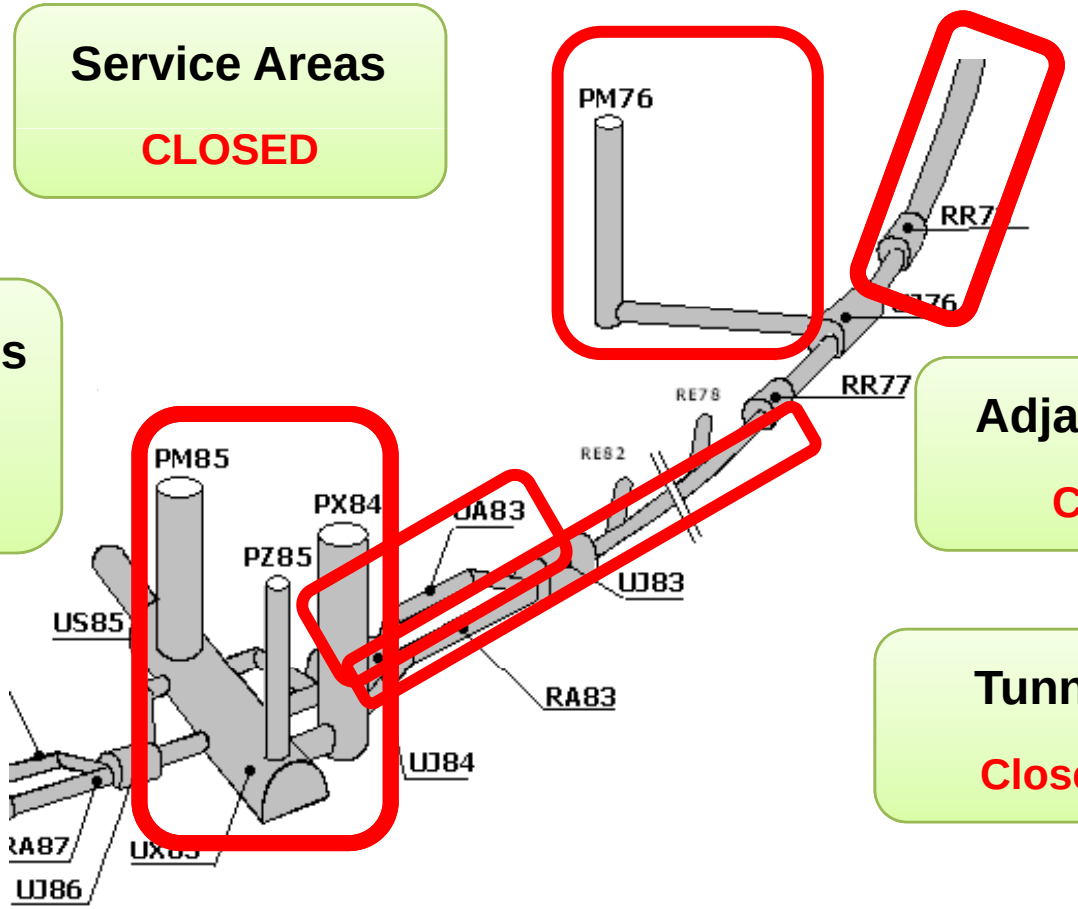
CLOSED

Experimental caverns

CLOSED



Adjacent Sectors

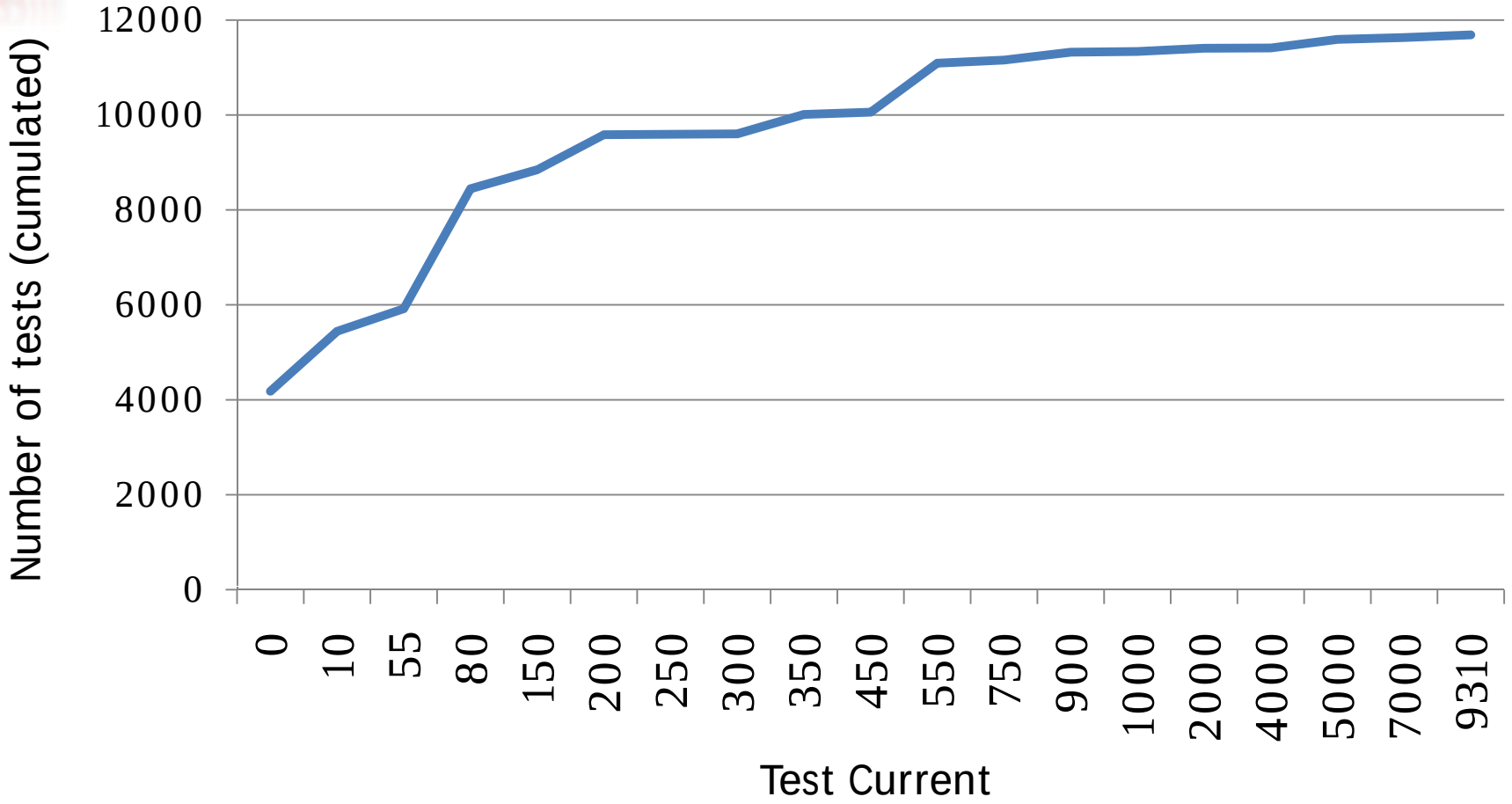
CLOSED

Tunnel

Closed

Access during powering: an idea

- Most of the powering tests are done at low current (value to be defined)



Safety: access during powering

Powering Tests 2009

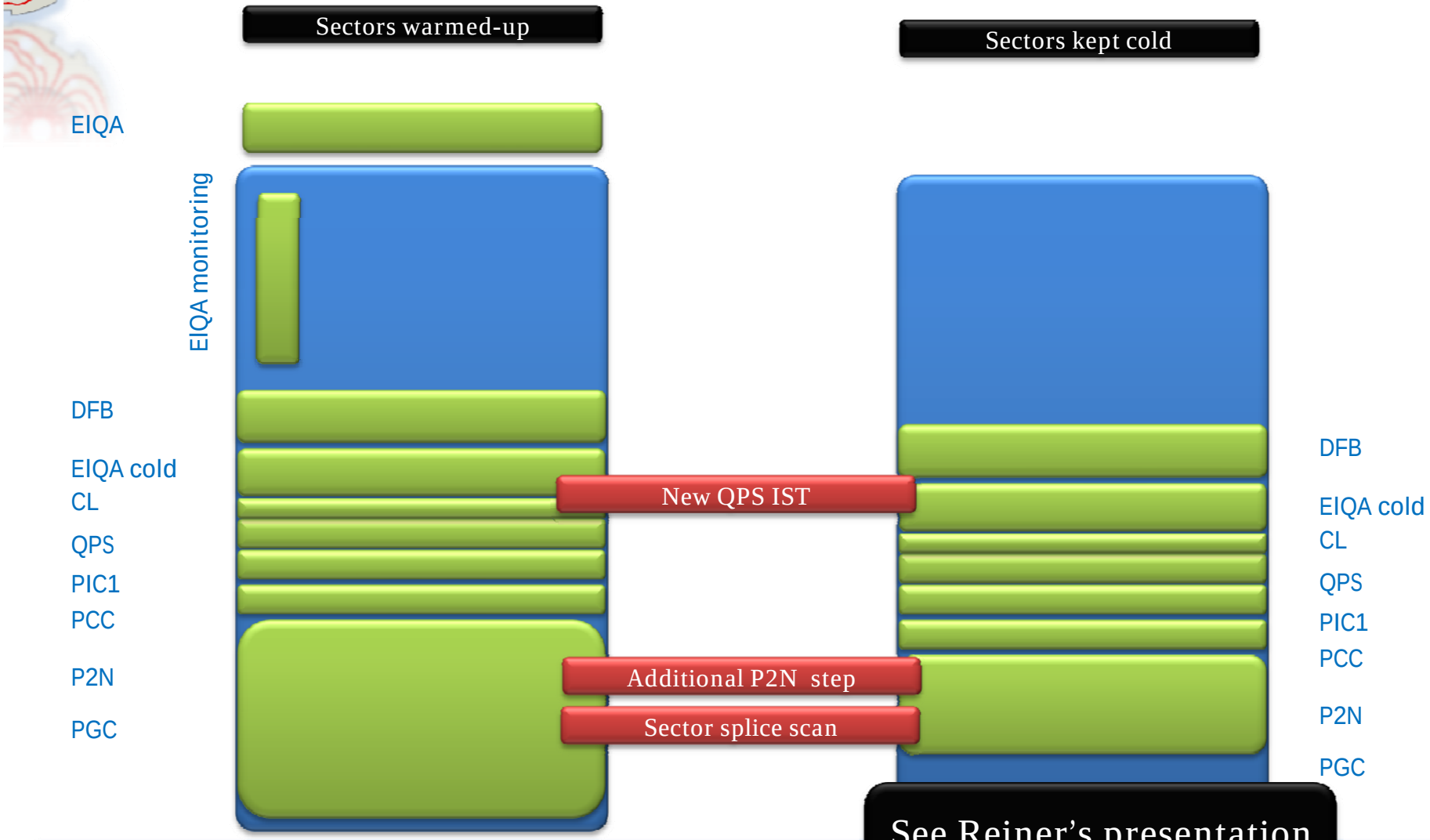
- The access conditions to the underground areas while S.C. circuits are being powered at different current levels are currently under study

-The final decision will have a major impact on the total time and manpower needed for powering (e.g. amount of patrols, equipment maintainability, analysis in the field, etc…)

2009 Commissioning

- Main differences:
  - Starting point is not the same
    - 2007: All sectors were warm, no circuit had been powered. 8 machines to commission from scratch.
    - 2009: Boundary conditions change between sectors
  - Most of the hardware has been already debugged
  - More restrictive access conditions
  - New hardware has been implemented (e.g. QPS upgrade)

Upgraded QPS



See Reiner's presentation for details

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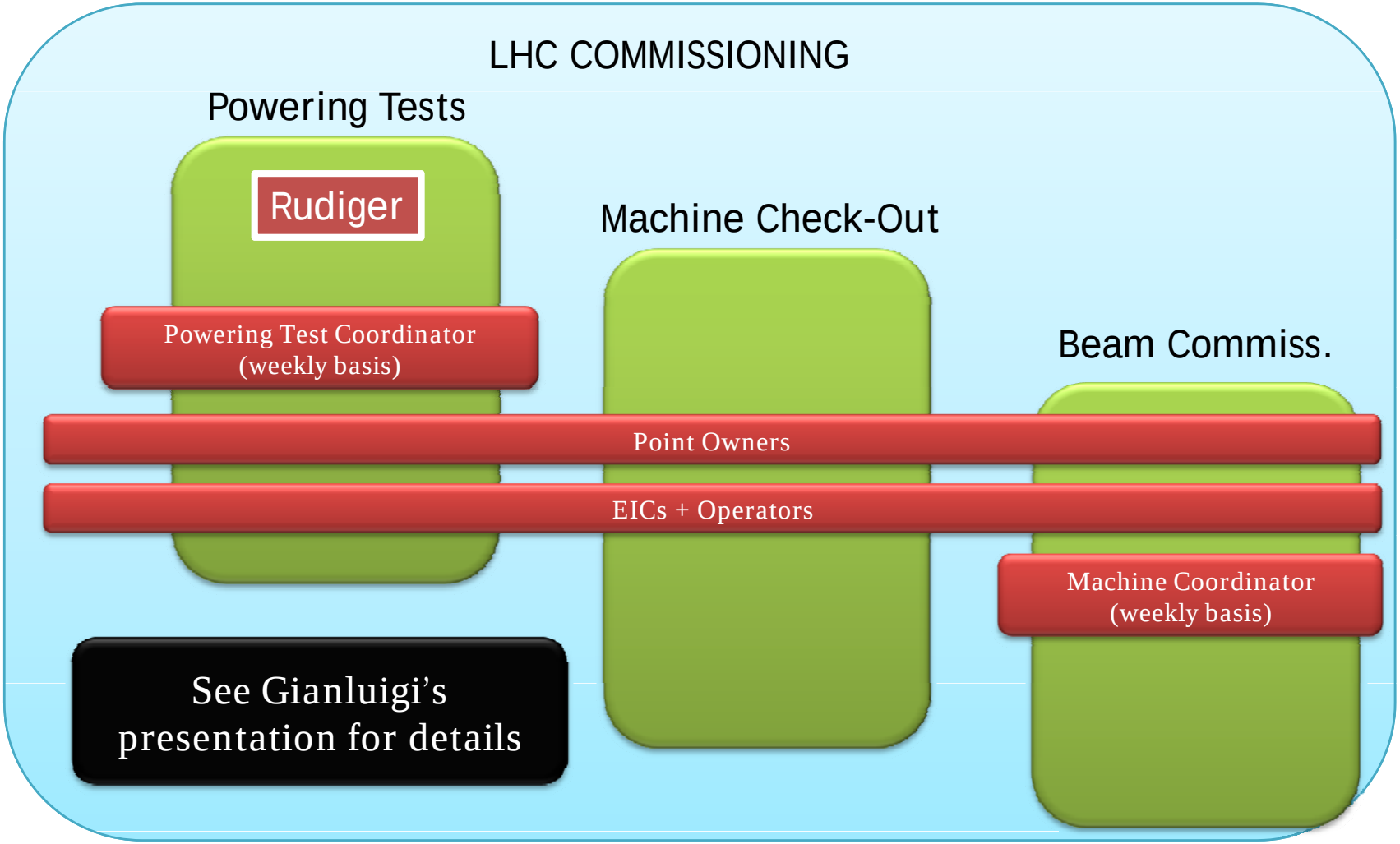
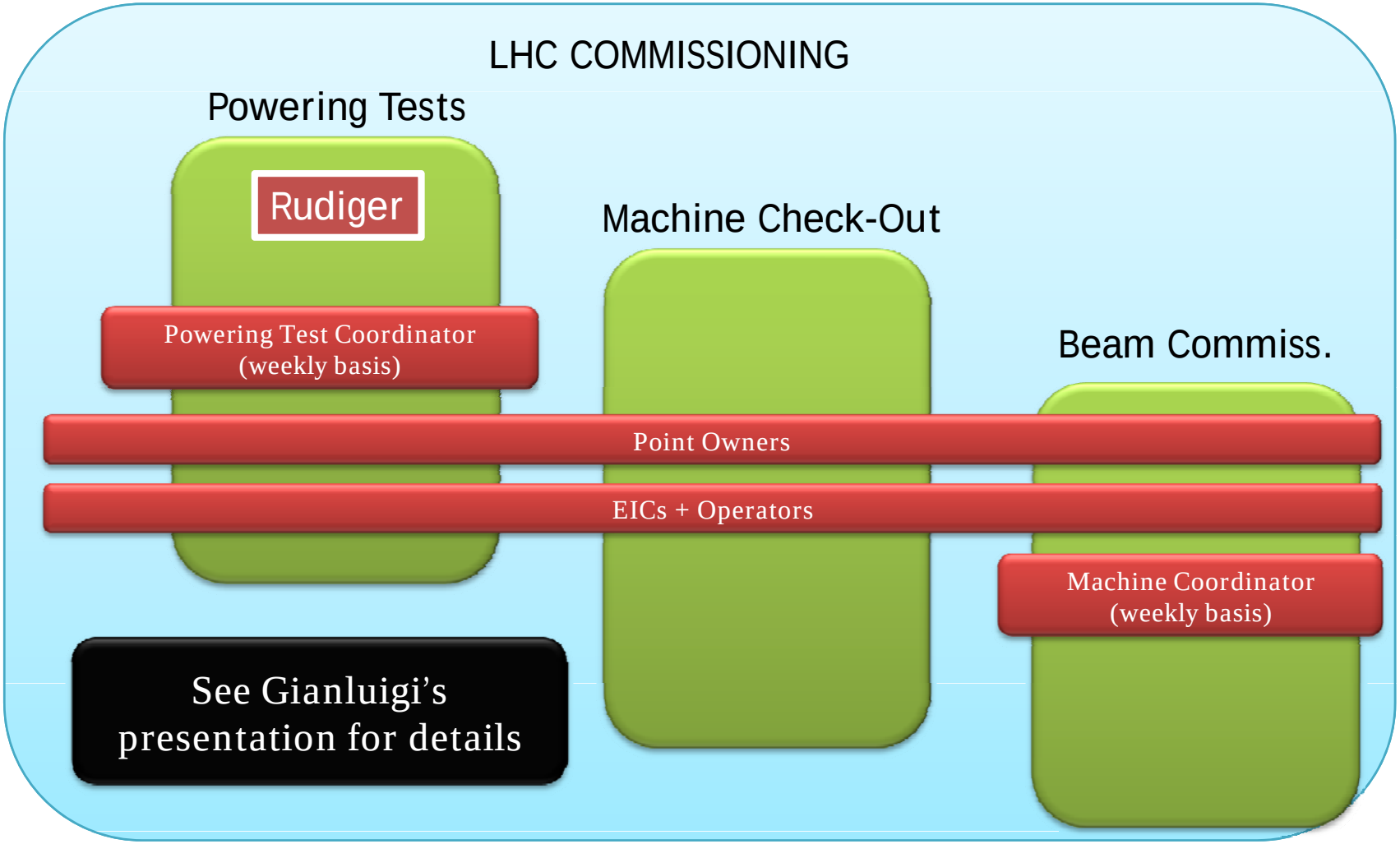
  - The HCC unit doesn't exist anymore. However, the team (Boris, Matteo, Mirko, & Antonio) is now within the OP group. This will allow us to keep the acquired know-how and at the same time integrate better the powering tests with the machine check-out and beam commissioning

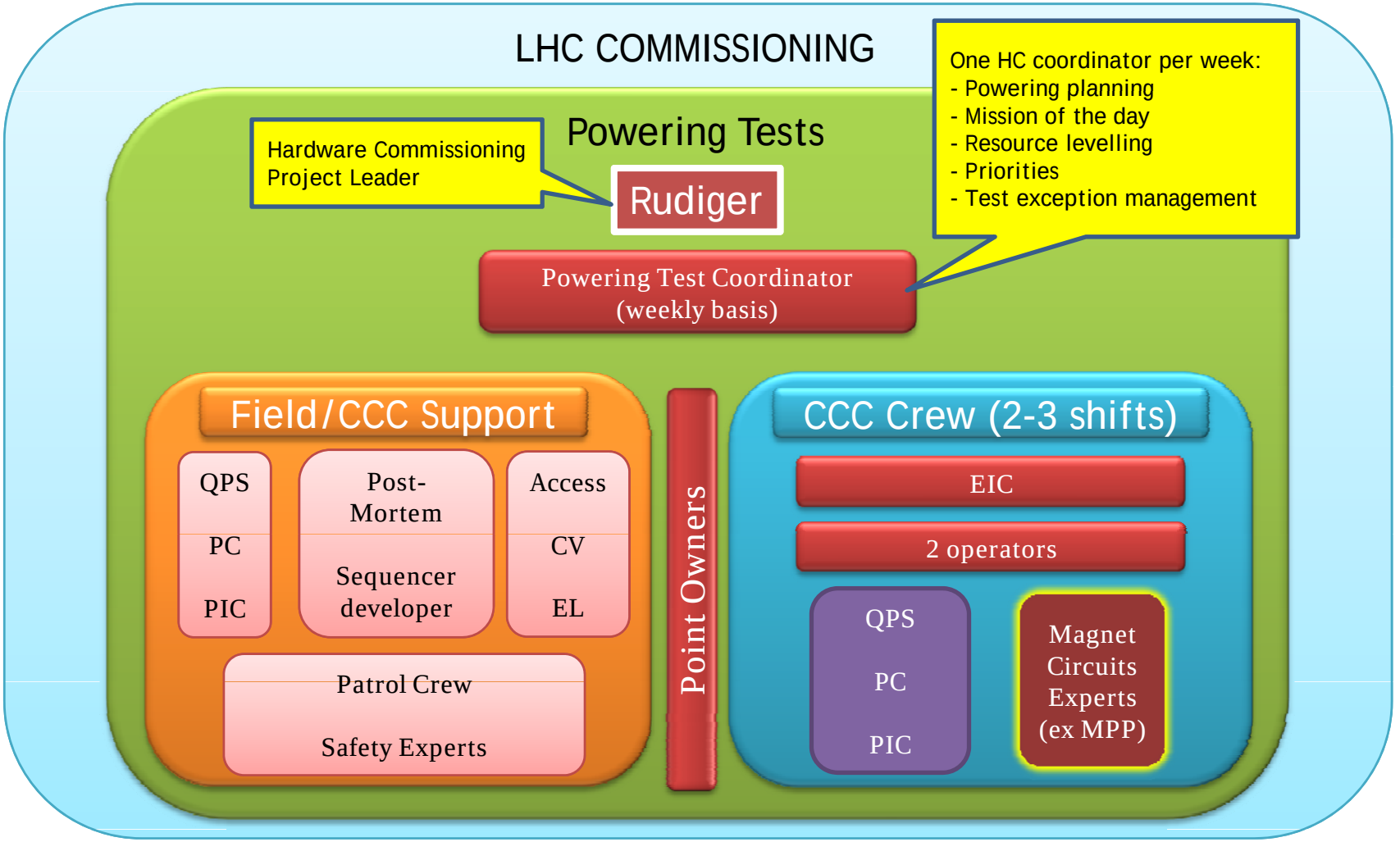
LHC Commissioning Integration



LHC Commissioning Integration



LHC Commissioning Integration



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  - We have done it already! We don't work with estimations and predictions (time, interferences, parallelisms,…) anymore but with knowledge from our 2-year experience.

2009 Commissioning

- Main similarities:
  - Most circuits and equipment have not changed and are already debugged:
    - Most of the systems are already out of the teething failure area
    - Drawback: ageing may become an issue (let hopes it doesn't)
  - Most of the test steps are exactly the same

Powering Test Procedures

- In order to keep the good performance, reliability and know-how reached during the 2008 powering tests, the powering procedures should be modified only if strictly necessary, however, some changes will be required due to:
  - New tests required to commission the new hardware (e.g. QPS)
  - Additional tests to avoid incidents (e.g. splice mapping, calorimetry)
  - Some tests might be simplified in order to reduce interventions in the field (e.g. energy extraction switches, power converters)
  - Higher automation of some tests (e.g. PIC, QPS)
- Two kind of documents:
  - Existing (updated) powering procedure documents: one document per circuit type
  - For each sector
    - Steps that have to be applied and/or skipped for each circuit
    - Sector specificities (special circuits)

2009 Commissioning

- Main similarities:
  - Most circuits and equipment have not changed and have been already debugged.
    - Most of the systems are already out of the teething failure area
    - Drawback: ageing may become an issue
  - Most of the test steps are exactly the same
  - Software tools are already designed and work fine, however, some of them need to be adapted for 2009 and following re-commissioning campaigns (i.e. follow-up webtool, MTF, event DB). The earlier we start the earlier we´ll be ready again
  - Warm magnet circuits: all were commissioned and OK. So far only the ALICE compensator L2 and the RQT4 & RQT5 in R3 (new cabling) needs to be re-commissioned. Any further change should be announced to the Point Owner.

Conclusions

- We have done it (several times) already. Not only we know what to do but also how to do it safely, reliably and on time.
- However, in order to reach last summer performance we need to answer some questions:
  1. Which will be the access conditions during powering?
  2. Which procedures need to be changed? What do we have to re-do?
  3. Can we implement 24-hour commissioning shifts? Can we run at night and weekends? The commissioning coordinators could be trained to help equipment teams with manning issues.
  4. Which are the commissioning targets: all circuits to 5.5 TeV? 3? 4?
  5. Can we define a plan-B in case we run out of time for having physics this year? Circuit priorities.
- A hardware commissioning day will be organised in March

thank you