

LS1 PS&TT2 H/W test period (31/03/14-21/05/14)

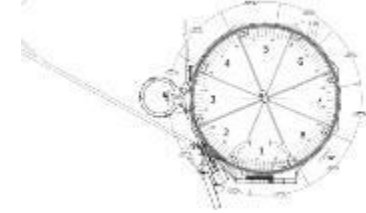
Simon Mataguez EN/MEF-OSS

More info about the PS machine? www.cern.ch/ps



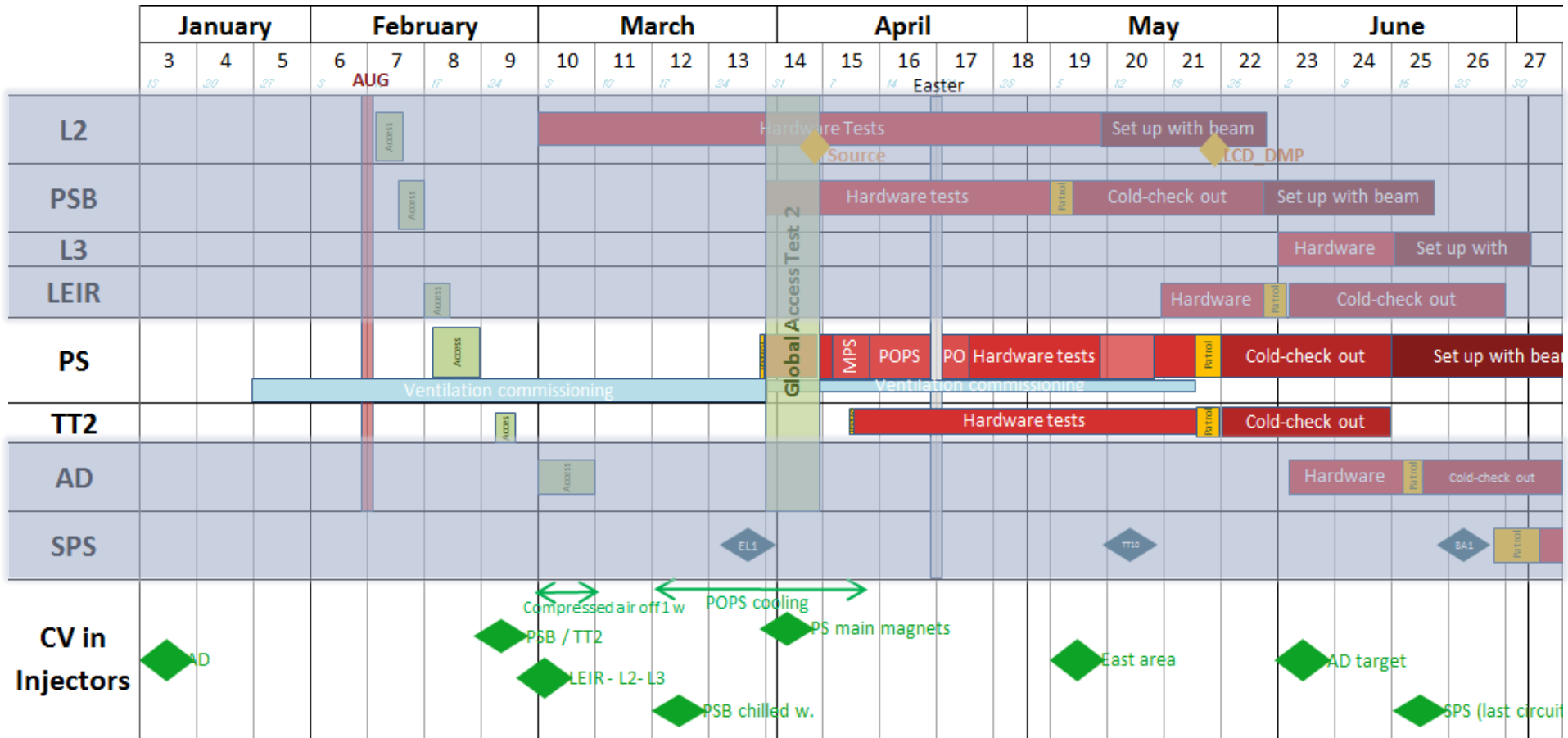
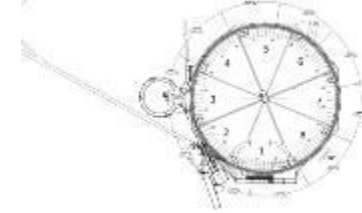
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Outline



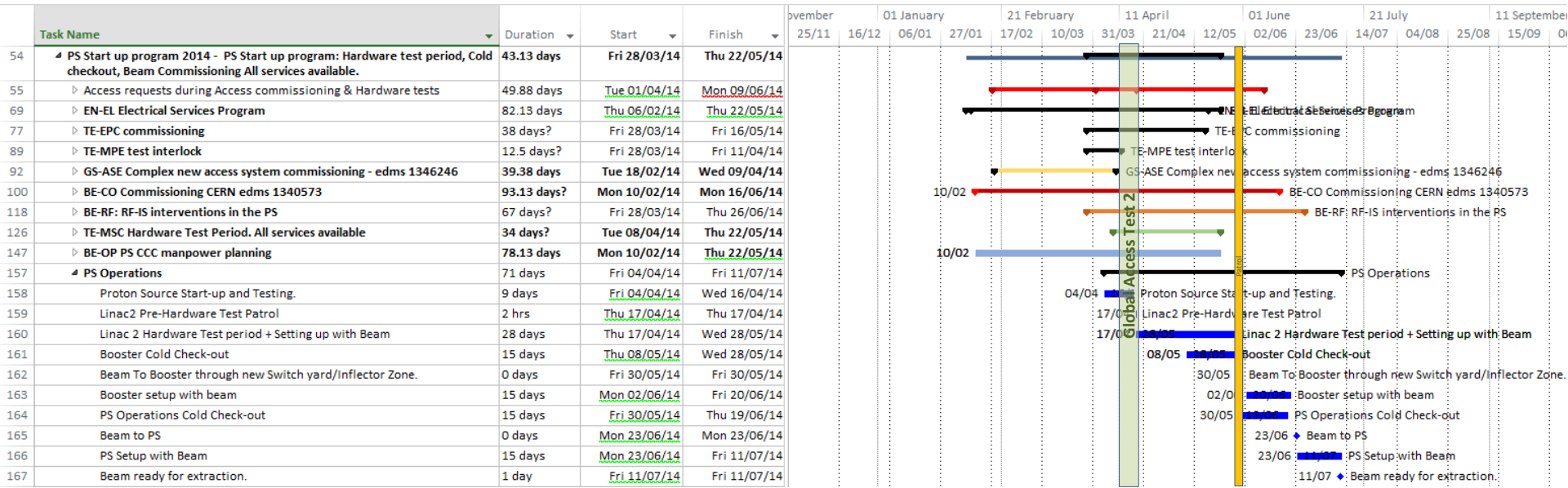
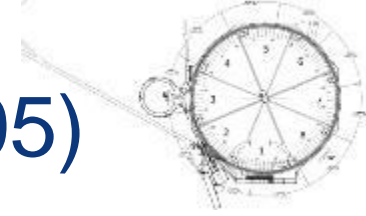
1. Injectors Start-up Schedule
2. PS & TT2 H/W test period (31/03/14-21/05/14)
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Injectors Start-up Schedule



www.cern.ch/LS1planning

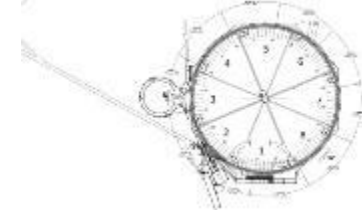
PS & TT2 H/W test period (31/03-21/05)



	W14 31/03 → 06/04	W15 W17 07/04 → 19/04	W18 W19 22/04 → 08/05	W20 08/05 → 18/05	W21 19/05 → 21/05	22/05 → 23/05
from 6.00 to 08.30						No access Hand-over DSO tests
from 8.30 to 17.00	New Access	EPC team	MSC tests		MSC tests	
from 17.00 to 21.00						

- week 14 to 19 all magnets are without covers and PS machine will no longer be electrically “locked-out”
- week 14 & 16 « conditionings HV of SEH23 an SEH31 » X-Ray risks

Organization H/W test period



04/02 FOM Coordination Meeting #01 Update on the start-up Schedule and H/W test period
<https://indico.cern.ch/event/366809/attachments/729188/1000520/02-04-2014.pdf>

20/03 LS1 Coordination Meeting #14 (Last one) for the PS tunnel and TT2
and presentation of **last H/W test period version** EDMS [1363569](#)

From **01/04 to 20/05** **WEEKLY** FOM Coordination meetings, **follow-up/actions reporting**

From **28/04 @ 18.00** PS has been put in "restricted mode access"

All LS1 IMPACT have been stopped and new one for intervention periods LS1 – PS - HWT → 93 IMPACT

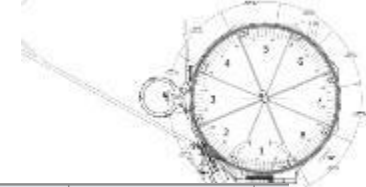
From **13/04 to 22/05** **24 Daily** HWT Coordination meetings (6-2-004) at **8:15** – All slides presented available in EDMS [1373196](#)

- Email sent to CPS Operations with daily program and instructions for operation and access (Only access requests approved in this e-mail are authorised)
- Copy of the Email in PS logbook <http://elogbook.cern.ch/eLogbook/eLogbook.jsp?lgbk=401> (nota: All updates and modifications done in the PS are reported and documented in the PS Shutdown eLogbook)

Access during H/W test period

02/06 released Procedure: Access in LINAC2, PSB, PS and TT2 during the Hardware Commissioning and Tests EDMS [1371388](#)

BE-CO Specification of Dry Runs



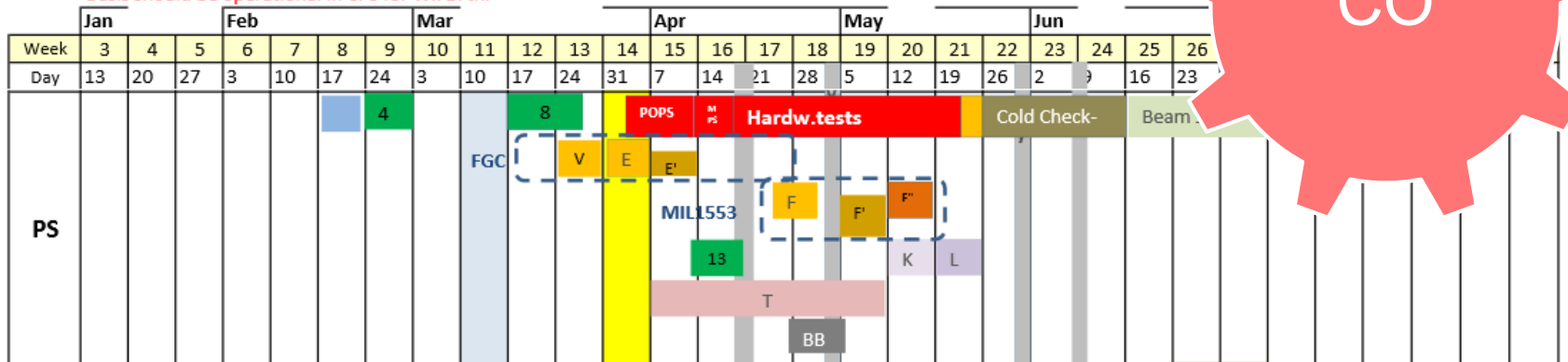
Task Name	Duration	Start	Finish	11 April			01 May			21 M	
				31/03	07/04	14/04	21/04	28/04	05/05	12/05	19/05
BE-CO Commissioning CERN edms 1340573	112 days?	Mon 16/12/13	Fri 23/05/14	[Timeline bar]							
Start of commissioning	1 day	Mon 10/02/14	Mon 10/02/14								
Oasis operational	1 day	Mon 21/04/14	Mon 21/04/14								
cfc-361-rpsbmps, cfc-269-rpsft16, cfc-263-rpseastarea, cfc-263-rpseastarea	21.13 days	Mon 10/02/14	Fri 07/03/14								
All Fes	93.13 days	Mon 16/12/13	Wed 30/04/14								
FGC in Simulation mode (MPS, POPS, Sextupoles)	1 day	Mon 24/03/14	Mon 24/03/14								
FGC: To test FGC device from CCR	6 days?	Mon 31/03/14	Fri 07/04/14								
Spare for E	25 days?	Mon 21/04/14	Fri 23/05/14								
FGC: To test all FGCs (6) from CCR	25 days?	Mon 21/04/14	Fri 23/05/14								
CBMIA: To test 1 CBMIA device per loop per FE from CCR	22 days?	Thu 24/04/14	Fri 23/05/14								
Spare for F	15 days?	Mon 05/05/14	Fri 23/05/14								
To test many MILL553 devices from CCR with Oasis, Timing, etc	1 day?	Fri 23/05/14	Fri 23/05/14								
To test all Power converters and Function Generators from CCR	3 days?	Wed 21/05/14	Fri 23/05/14								
BFA9-21, DFA242-254, SEH23-31, SMH	10 days?	Mon 12/05/14	Fri 23/05/14								
KFA28, KFA45, KFA71-79, KFA4-13-2,TPS15	5 days?	Mon 19/05/14	Fri 23/05/14								
cfv-353-allbc1/2/3/4, cfv-359-allfbc10a/b/c/d, cfv-353-allrfm,cfv-353-cpaos16,cfv-152-cpaos14, cfi-152-cpaos15	23 days?	Tue 08/04/14	Fri 09/05/14								
1-day DRY RUN for CPS BI systems	1 day?	Mon 07/04/14	Mon 07/04/14								

Note: File updated (DD/MM/YY): 27/02/2014

Timing devices (LTIM) connected to equipment will be tested during Specific Dry Runs (Ex: Timings for Power converters)

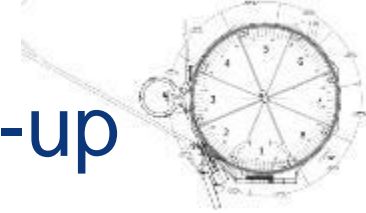
Tests for General Timing devices to be scheduled by BE-OP with BE-CO

Oasis should be operational in CPS for Wk 17th.

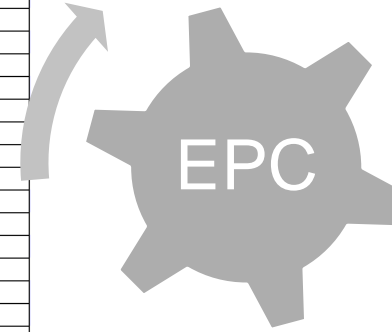


EDMS 1340573 Courtesy Marine Gourber-Pace & Claude Dehavay

Auxiliary Magnets Power Supply Start-up

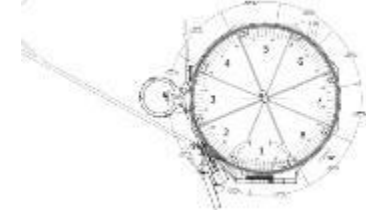


	Logical Name	Model	Designation	Bldg	FEC	Responsible 1	Responsible 2	Technical Ref	Power converter tests 2014
#REF!	PR.WDNI	PFW1	CONVERTER : PFW1 [±1200V,	355	cfc-355-rpspfw	O. Michels	J.P. Burnet	O. Michels	week 15
#REF!	PR.WDNP	PFW1	CONVERTER : PFW1 [±1200V,	355	cfc-355-rpspfw	O. Michels	J.P. Burnet	O. Michels	week 15
#REF!	PR.WDW	PFW1	CONVERTER : PFW1 [±1200V,	355	cfc-355-rpspfw	O. Michels	J.P. Burnet	O. Michels	week 15
#REF!	PR.WFNI	PFW1	CONVERTER : PFW1 [±1200V,	355	cfc-355-rpspfw	O. Michels	J.P. Burnet	O. Michels	week 15
#REF!	PR.WFNP	PFW1	CONVERTER : PFW1 [±1200V,	355	cfc-355-rpspfw	O. Michels	J.P. Burnet	O. Michels	week 15
#REF!	PR.WFO	WIK2	WIK2 [±1000A, ±1400V]	355	cfc-355-rpspfw	O. Michels	J.P. Burnet	O. Michels	week 15
#REF!	PR.WFW	PFW1	CONVERTER : PFW1 [±1200V,	355	cfc-355-rpspfw	O. Michels	J.P. Burnet	O. Michels	week 15
#REF!	PR.WLB8L	PFW2	CONVERTER : PFW2 [±600V,	355	cfc-355-rpspfw	O. Michels	J.P. Burnet	O. Michels	week 15
#REF!	PR.QDN 06	QN-AMP	PC : CBE Redresseur [±10A, ±35V]	355	cfc-355-rpsring	S.Pittet	B. Favre	S.Pittet	week 20
#REF!	PR.RQSK	P_RED 80	PC : P_RED 80 [±30/45V, 80A]	355	cfc-355-rpsring	S.Pittet	B. Favre	S.Pittet	week 20
#REF!	PR.DHZ 15 OC	AuxPS 3	CONVERTER : AuxPS 3 [±450A,	355	cfc-355-rpspfw	S. Reignier	L. De Oliveira	S. Reignier	week 16
#REF!	PR.DHZ 60 OC	AuxPS 1	CONVERTER : AuxPS 1 [±450A,	355	cfc-355-rpspfw	S. Reignier	L. De Oliveira	S. Reignier	week 16
#REF!	PR.ODE	AuxPS 1	CONVERTER : AuxPS 1 [±450A,	355	cfc-355-rpspfw	S. Reignier	L. De Oliveira	S. Reignier	week 16
#REF!	PE.SMH 57	RPHFB	PC:[10kA 8V 1Q] FWD:8kA	356	cfc-365-rpseject	V. Barbet	L. Charnay	D. Nisbet	week 19
#REF!	PE.SMH 61	RPHHA	PC:[4kA 16V 1Q] FWD:6kA	356	cfc-365-rpseject	V. Barbet	L. Charnay	D. Nisbet	week 19
#REF!	RPSFT.358.PR.MPS	POWER	PC:[6kA 10kV 2Q] Use:PS MPS	358	cfc-358-rpsa	Y.Gaillard	X. Genillon	J.P. Burnet	week 16
#REF!	PE.SMH 16	SEPTUM-16	SEPTUM-16 [±30000A, ±4000V]	359	cfc-359-rsepta	J.M. Cravero	D. Aguglia	J.M. Cravero	week 16 +17
#REF!	PI.SMH 26	ALG-3	Septum 26	359	cfc-359-rsepta	J.M. Cravero	D. Aguglia	J.M. Cravero	week 16 +17
#REF!	PI.SMH 42	ALG-1	ALG-1 [±40000A, ±3000V]	361	cfc-269-rpsft16	J.M. Cravero	D. Aguglia	J.M. Cravero	week 16 +17
#REF!	PE.BSW 23	AuxPS 2	AuxPS 2 [±900A, ±450V]	365	cfc-365-rpseject	S. Reignier	L. De Oliveira	S. Reignier	week 16
#REF!	PE.BSW 31	GH-1kA	PS10 [500A, 2000V]	365	cfc-365-rpseject	D. Aguglia	C. Machado	D. Aguglia	week 15
#REF!	PE.BSW16-12	GH-3kA	PS12 [3000A, 2000V]	365	cfc-365-rpseject	D. Aguglia	C. Machado	D. Aguglia	week 15
#REF!	PE.BSW16-14	GH-3kA	PS12 [3000A, 2000V]	365	cfc-365-rpseject	D. Aguglia	C. Machado	D. Aguglia	week 15
#REF!	PE.BSW16-18	GH-1kA	PS10 [500A, 2000V]	365	cfc-365-rpseject	D. Aguglia	C. Machado	D. Aguglia	week 15
#REF!	PE.BSW16-20	GH-1kA	PS10 [500A, 2000V]	365	cfc-365-rpseject	D. Aguglia	C. Machado	D. Aguglia	week 15
#REF!	PE.BSW16-22	GH-3kA	PS12 [3000A, 2000V]	365	cfc-365-rpseject	D. Aguglia	C. Machado	D. Aguglia	week 15
#REF!	PE.QKE 16	GH-3kA	PS12 [3000A, 2000V]	365	cfc-365-rpseject	D. Aguglia	C. Machado	D. Aguglia	week 15
#REF!	PI.BSM 40	PS11	PS11 [6000A, 1500V]	365	cfc-365-rpseject	D. Aguglia	C. Machado	D. Aguglia	week 15
#REF!	PI.BSM 42	PS11	PS11 [6000A, 1500V]	365	cfc-365-rpseject	D. Aguglia	C. Machado	D. Aguglia	week 15
#REF!	PI.BSM 43	PS11	PS11 [6000A, 1500V]	365	cfc-365-rpseject	D. Aguglia	C. Machado	D. Aguglia	week 15
#REF!	PI.BSM 44	PS11	PS11 [6000A, 1500V]	365	cfc-365-rpseject	D. Aguglia	C. Machado	D. Aguglia	week 15
#REF!	PI.BSM SPARE	PS11	PS11 [6000A, 1500V]	365	cfc-365-rpseject	D. Aguglia	C. Machado	D. Aguglia	week 15
#REF!	PE.QKE16CT25	P2KV	PC : P2KV2KA [±2000A, ±2000V]	365	cfc-365-rpseject	C. Machado	Sven Putz	D. Aguglia	week 15
#REF!	PE.QKE16CT73	P2KV	PC : P2KV2KA [±2000A, ±2000V]	365	cfc-365-rpseject	C. Machado	Sven Putz	D. Aguglia	week 15
#REF!	PI.BSW26	MINIDISCAP	MINIDISCAP [±20A, ±700V]	365	cfc-365-rpseject	N. David	Stéphane	J.M. Cravero	week 17
#REF!	PR.QTRJ-DB-A	PL-SW-6000	PL-SW-6000	365	cfc-365-rpseject	N. David	J. Parra-Lopez	N. David	week 17
#REF!	PR.QTRJ-DB-B	PL-SW-6000	PL-SW-6000	365	cfc-365-rpseject	N. David	J. Parra-Lopez	N. David	week 17
#REF!	PR.QTRJ-TR-A	S250-PLS	S250-PLS [250A, 350V]	365	cfc-365-rpseject	N. David	J. Parra-Lopez	N. David	week 17
#REF!	PR.QTRJ-TR-B	S250-PLS	S250-PLS [250A, 350V]	365	cfc-365-rpseject	N. David	J. Parra-Lopez	N. David	week 17
#REF!	PE.BSW 57	AuxPS 2	AuxPS 2 [±900A, ±450V]	365	cfc-365-rpseject	S. Reignier	L. De Oliveira	S. Reignier	week 16
#REF!	PR.OMT 39	AuxPS 2	AuxPS 2 [±900A, ±450V]	365	cfc-365-rpseject	S. Reignier	L. De Oliveira	S. Reignier	week 16
#REF!	PR.OMT 55	AuxPS 2	AuxPS 2 [±900A, ±450V]	365	cfc-365-rpseject	S. Reignier	L. De Oliveira	S. Reignier	week 16
#REF!	PR.OSE	AuxPS 2	AuxPS 2 [±900A, ±450V]	365	cfc-365-rpseject	S. Reignier	L. De Oliveira	S. Reignier	week 16
#REF!	PR.XMT 39	AuxPS 2	AuxPS 2 [±900A, ±450V]	365	cfc-365-rpseject	S. Reignier	J. Baehler	S. Reignier	week 16
#REF!	PR.XMT 55	AuxPS 2	AuxPS 2 [±900A, ±450V]	365	cfc-365-rpseject	S. Reignier	J. Baehler	S. Reignier	week 16
#REF!	PR.XSE	AuxPS 1	AuxPS 1 [±450A, ±450V]	365	cfc-365-rpseject	S. Reignier	L. De Oliveira	S. Reignier	week 16
#REF!	RPOPS.367.PR.MPS	POPS	PC:[6kA 10kV 4Q] Use:POPS	367	cfc-367-rpops	F. Boattini		F. Boattini	week 15

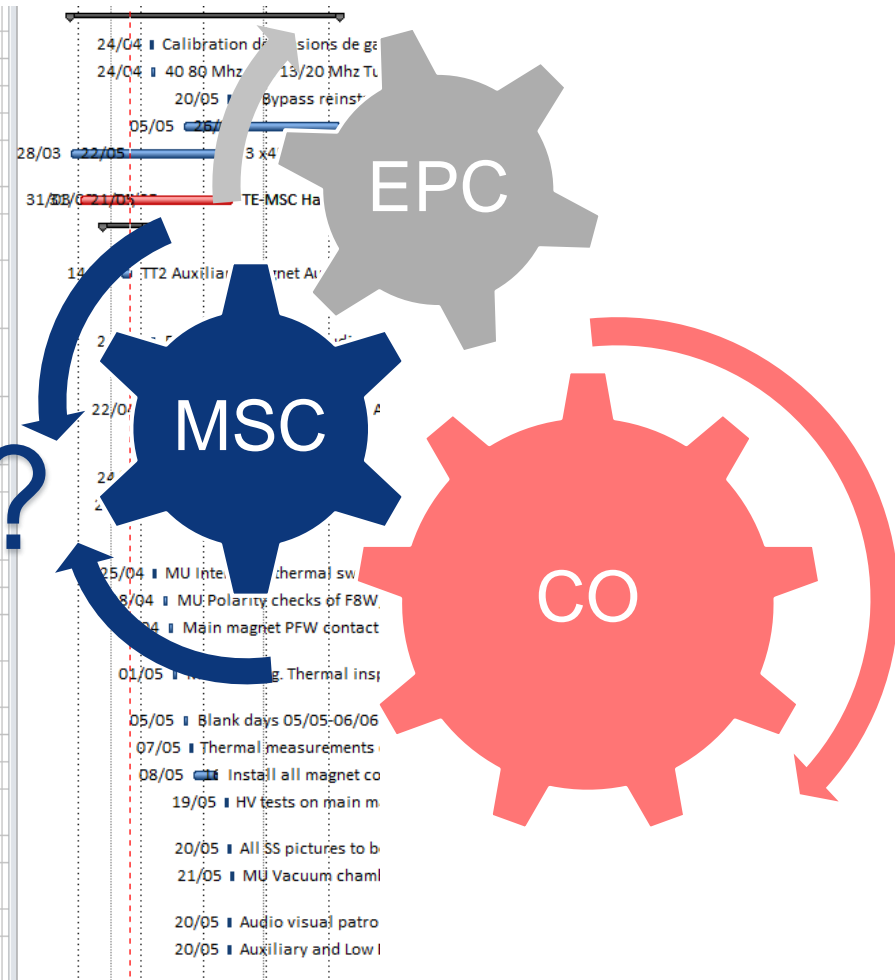


Courtesy Yves Gaillard Not complete list

Magnet tests

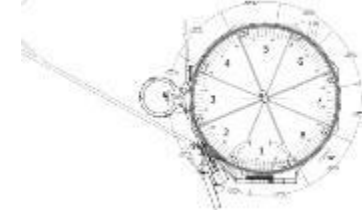




BE-RF: RF-IS interventions in the PS	67 days?	Fri 28/03/14	Thu 26/06/14
Calibration de tensions de gap sur le 10 Mhz	1 day?	Thu 24/04/14	Thu 24/04/14
40 80 Mhz and 13/20 Mhz Tuning	2 days	Thu 24/04/14	Fri 25/04/14
RF Bypass reinstall and measurements	1 day?	Tue 20/05/14	Tue 20/05/14
3 x4Hours access Start up	39 days?	Mon 05/05/14	Thu 26/06/14
3 x4Hours/ week tune of longitudinal damper system in the PS. SS02. (V+C+E.)	43 days?	Fri 28/03/14	Thu 22/05/14
TE-MSC Hardware Test Period. All services available	39.13 days	Mon 31/03/14	Wed 21/05/14
HV tests on main magnets prior to POPS/MPS starting. Without bus bar protection. Need to find agreement with EPC/GS-ASE	10 days?	Tue 08/04/14	Tue 22/04/14
TT2 Auxiliary Magnet Audio Visual Patrol. Power supplies has to be available. Timing available, SuperCycle tests loaded or pulsed in local	4 days	Mon 14/04/14	Thu 17/04/14
PS Auxiliary Magnet Audio Visual Patrol. Power supplies has to be available. Timing available. SuperCycle tests loaded or pulsed in local	2 days	Thu 24/04/14	Fri 25/04/14
ITH & F61 Auxiliary Magnet Audio Visual Patrol. Power supplies has to be available. Timing available. SuperCycle tests loaded or pulsed in local => Special permit needed	4 days	Tue 22/04/14	Fri 25/04/14
LT BHZ 30, 40 polarity test	2 days	Thu 24/04/14	Fri 25/04/14
LTP & LTB Auxiliary Magnet Audio Visual Patrol. Power supplies has to be available. Timing available. SuperCycle tests loaded or pulsed in local	2 days	Wed 23/04/14	Thu 24/04/14
MU Interlocks thermal switches	1 day	Fri 25/04/14	Fri 25/04/14
MU Polarity checks of F8W, Back leg	2 days	Mon 28/04/14	Tue 29/04/14
Main magnet PFW contact resistance measurements after magnet revision	2 days	Wed 30/04/14	Thu 01/05/14
MPS pulsing. Thermal inspection of the refurbished magnets and bus bars. SuperCycle tests loaded - D. Bodart agrees to work 01/05	2 days	Thu 01/05/14	Fri 02/05/14
Blank days 05/05-06/06 - spare	2 days?	Mon 05/05/14	Tue 06/05/14
Thermal measurements of F8W's	1 day	Wed 07/05/14	Wed 07/05/14
Install all magnet covers (MU and Auxiliary magnets) - Key access	7 days	Thu 08/05/14	Fri 16/05/14
HV tests on main magnets upto 4kV after installation of all magnet covers.	4 hrs	Mon 19/05/14	Mon 19/05/14
All SS pictures to be done + movie	0.5 days	Tue 20/05/14	Tue 20/05/14
MU Vacuum chamber ground loop measurements. MPS running. SuperCycle tests loaded	1 day	Wed 21/05/14	Wed 21/05/14
Audio visual patrol	4 hrs	Tue 20/05/14	Tue 20/05/14
Auxiliary and Low Energy magnets polarity tests. (D. Bodart requests 20/05) SuperCycle tests loaded	1 day	Tue 20/05/14	Tue 20/05/14



→ Power supplies will have to be controlled locally for magnets patrols and polarity checks.

Outcome

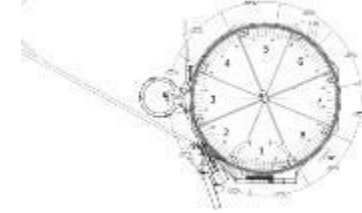


- Coordination meetings, planning, dedicated time slots have to be respected (how to deal with request overestimated?).
-  All systems not ready at the same time and not synchronised for test (PS H/W test period came as total surprise)
- Anticipation needed : test definition, equipment groups, quality plan, rigorous check-out (inverted polarities, faulty instruments...).
-  Objective : Improve stand-alone tests.
- Responsibility and safety procedure for H/W tests have to be sorted out and anticipated (PS Access during H/W tests [EDMS 1369459](#), [EDMS 1371388](#)), power supplies will no longer be electrically “locked-out” / Habilitation électrique procedure has to be clarified.
- To be noted / Feedback from groups : too many meetings (Leir, Linac2, Booster, PS...)



But PS activities for LS1 have been completed and the machine returned to BE/OP less than 24 hours later than planned after 15 months of work !!

References



- [1] PS & TT2 LS1 First long shutdown Post-Mortem Edms [EDMS 1394871](#)
- [2] Presentation at the **IRWG** on Thursday 26th March 2015, PS Feedback [Indico 382770](#)
- [3] PS Planning LS1 2013-2014 [EDMS 1252091](#)
- [4] Presentation at the **IRWG** on Thursday 25th June 2015, IEFC Feedback [Indico 404520](#)



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