

## RAT in P4 - *Status of Sector 45* - Preparation of Cool-Down

HARDWARE COMMISSIONING COORDINATION - WEEK 21

22<sup>nd</sup> May POINT 4 (2485 2-001 SX4)

Present: E.Barbero, A.Bouillot, P.Cruikshank, P.Denis, C.Fernandez Robles, D.Gerard, S.Grau, P.Maesen, S.Pelletier, S.Russenschuck, B.Perea Solano, M.Solfaroli, A.Suraci.

A detailed plan of the following 4 weeks coming before the cooldown of sector 45 can be found attached.

### **Sector 45 & Sector 34 (B.Perea/M.Solfaroli for HC)**

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#### **Installation (E.Barbero/C.Fernandez)**

- The inversion of cables at the level of the DFBML in LSS4R will be corrected on Thursday 24<sup>th</sup> May.
- The bake-out of D5R4 and E5L4 could be moved from wk24 to wk23. This would be good for BI, who could transport the telescope early week 24 instead of week 23. This would give them a few more days to get their instrument ready (D.Gerard).
- The Access cable will be installed during 2 days starting Tuesday wk22. Then they will do further fixation of the cable along the arc during the full week.

#### **Vacuum -Cryogenics (P.Cruikshank/A.Bouillot)**

- The following leaks have been located:
  - ✓ There are two large leaks in Q7-Q11 4R. One leak has been localized and a second one is being localized today. At 1:30 they will open the interconnections.
  - ✓ A leak in the external envelope in Q15.
  - ✓ Leaks in the DSL 5L envelope are under repair
- The consolidation, understood as leak localisation and repair, could be finished by the end of this week depending on the weld repairs to be performed in sub-sector A7R4. Re-closing of the A7R4 interconnects and re-pumping will take place next week.
- Purging should start then wk 22 and the flushing will only start wk 23 (due to the 400kV line). 28 CV910 valves are being replaced week 23 if they are machined wk22. Whether the flushing should start before they are replaced or not is a decision not taken yet. After the new puppets have been installed the control system should be re-initialized.

#### **Cryo-Instrumentation (A.Suraci)**

- 20 out of 79 crates have been fully commissioned, and they should be working in the arc until the cool-down starts.
- Automatic tests on the cryo-valves will be carried out during the evenings - this is basically to check out coherence.
- Due to the problem of some instrumentation cables not withstanding 1.9 kV (2 cables for the 13 kA current leads), they need to find out new

connectors. This is not done yet since they are waiting for some part of the connector to be delivered.

#### **Access System Tests (S.Grau)**

- Wk22 - Short tests at the surface doors will take place at both access points (PM45 and PZ45) on Friday 1st June from 9am to 12 am. This should be transparent for people working in the field.
- Wk23 - Short tests at the surface doors will take place at both access points (PM45 and PZ45) on Monday and Tuesday 5<sup>th</sup> and 6<sup>th</sup> June. Wednesday 6<sup>th</sup> June and Friday 8<sup>th</sup> June there will be tests on the tunnel and RF area carried out from 17:30. The doors will be fully closed in this case and exit is possible, but this would screw their tests. They will place personnel and announce the tests in advance at the lifts so as to re-route the personnel wanting to exit the tunnel to the PZ.
- Wk24 - Tests should be carried out Monday and Tuesday 11<sup>th</sup> and 12<sup>th</sup> June from 17:30, allowing the personnel exit. On **Saturday 16<sup>th</sup> June** a test involving the full site will be carried out. During this test the access through Point 4 will be fully closed!

#### **Beam Instrumentation (D.Gerard)**

- Due to problems with the DC cabling layout, which requires an extra DC cable and a resistance, the BGI warm magnet commissioning will be postponed after the cool-down. AB/BI and AB/PO - TS/EL are fixing the design problem and taking action.

#### **Radio Frequency (P.Maesen)**

- A.Bouillot informed that the Pressure Tests of the Radio Frequency Cavities will be carried out Thursday from 18h. Esther will verify that no transport is scheduled for that day.
- Power test on the 8 klystrons - 2 Power Converter concerning the 2 RF modules that will be cooled with Sector 45 are being carried out.
- Antonio Suraci informed that the code for the PLC is being implemented and should be finished in two weeks. Basic hardware interlock tests should be carried out this week.

#### **Current Leads (P.Denis)**

- The current lead heater functional tests have started this week in DFBAI and DFBLD (LSS5L). Then wk22 they will move to point 4 to finish there. A number of non-conformities have been found (connectors) in LSS5L and the list is being sent by P.Denis to S.Pelletier.
- S.Pelletier will correct together with P.Denis the non-conformities at the level of DFBAH LSS4L.

#### **60A Orbit Correctors (M.Solfaroli)**

- The 8 x 60 A Power Converters in Arc45 will go through the 8h-Heat Run tests next Wednesday 30<sup>th</sup> May from 17:30.
- ELQA-DOC and Polarity tests are being finished and non-conformities being corrected.
- P.Denis agreed to do the final connections as marked in the planning.

## week 21

		Monday	Tuesday	Wednesday	Thursday	Friday
POINT 4						
RF		RF-Cryo-Instrumentation Interlock Tests				
LSS4R	DFBMK	BPMs				
	DFBML				Cable Inversion FLOHE	
	DFBMG	Cabling BPL, BPL, BQS, BCT (A6R4-A7R4-E5L4-A7L4)				
	DFBAH			Repositioning of the LCM's cables		
		Cabling BPL,BPL, BQS, BCT				
ARC		Cryo-Instrumentation				
			ELQA-DOC 60 A Orbit Correctors (Q10-Q5 5L)	Polarity + Connection 60 A Orbit Correctors (C33-C34)		
		Consolidation				
LSS5L	DFBLD	CL Heaters Functional Tests		ELQA-GII		
	DFBAI			CL Heaters Functional Tests		
	DFBXE	ELQA-GII		ELQA-TP4-A		
		Warm Magnet Tests	Warm Magnet Tests	Warm Magnet Tests	Warm Magnet Tests	Warm Magnet Tests

## week 22

		Monday	Tuesday	Wednesday	Thursday	Friday
POINT 4						Access test (9am - 12pm) PM 45 / PZ45
LSS4R	DFBMK					
	DFBML		ELQA-GII			
	DFBMG		Cabling BPL, BPL, BQS, BCT			
	DFBAH				ELQA-GII	
			CL Heaters Functional Tests			
ARC			Acces& Safety cable instal.			
			ELQA-DOC 60 A Orbit Correctors (C33-C34)		8h-Heat Run 8 x 60 A Orbit Correctors (4R)	
			Cryo-Instrumentation			
			Consolidation/Flushing			
			BLMs of the interconnections that have been re-opened during consolidation			
LSS5L	DFBLD		CL Heaters Functional Tests	ELQA-TP4-A		
	DFBAI		ELQA-TP4-A	CL Heaters Functional Tests		
	DFBXE		Warm Magnet Tests	Warm Magnet Tests	Warm Magnet Tests	Warm Magnet Tests

## week 23

		Monday	Tuesday	Wednesday	Thursday	Friday
POINT 4		Access tests PM 45 / PZ 45	Access tests PM 45 / PZ 45	Access test (from 5:30pm) on tunnel and RF area		Access test (from 5:30pm) on tunnel and RF area
RF		RF PLC Cryo-Instrumentation Tests				
LSS4R	DFBMK	CL Heaters Functional Tests				ELQA-TP4-A
	D4-D3	Bake-out E5L4-D5R4				
	DFBML			CL Heaters Functional Tests		ELQA-TP4-A
	DFBMG					CL Heaters Functional Tests
		FE Cabling 12 x BPL- 2 x BQK - 2 x BQS - 8 x BCT (A6R4-A7R4)				
		ELQA-TP4-A				
ARC		Cryo-Instrumentation				
		Connection 60 A Orbit Correctors		ELQA-DOC 60 A Orbit Correctors (4R)		
		Installation of CRYO valves			Flushing	
LSS5L	DFBLD					
	DFBAI					
	DFBXE					

week 24							
		Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
POINT 4		Access tests (from 5:30 p.m) exit possible	Access tests (from 5:30 p.m) exit possible		ELQA-TP4-B (Access Restricted)		Access tests (access forbidden)
LSS4R	DFBML						
	D3-D4	Transport BSRT	BSRT HC				
		FE Cabling of the BGI detectors					
	DFBMK						
	DFBMG						
DFBAH							
ARC	Cryo-Instrumentation						
	Flushing						
LSS5L	DFBLD						
	DFBAI						
	DFBXE						

## Open Issues

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### Current Leads

- 15.01.07 Current Lead heater functional tests LSS5L and LSS4R (L.Poyet)
- 22.05.07 NCRs CL heater cables DFBAI & DFBLD (S.Pelletier)
- 22.05.07 NCRs CL heater cable DFBAH (S.Pelletier)
- 27.04.07 Connectors of the cables No 1421742, 1421737, 1421731 don't have the right convention for cabling (S.Pelletier)

### QPS

- 31.01.07 LSS5L DFBAI, DFBL, DFBXE continuity/assignment cables and HVT - non-conformities to be repaired by J.Mourao and TS/EL(R.Denz)
- 31.01.07 LSS4R DFBAH, DFBMK/L/G continuity/assignment cables and HVT - non-conformities to be repaired by J.Mourao and TS/EL(R.Denz)

### Cryogenics

- 22.05.07 Radio Frequency Cavities - Pressure Tests (A.Buillot)
- 10.05.07 Isolation of DBX jumpers in view of the cool down (insulation vacuum) (J.P.Tock)
- 30.03.07 RF instrumentation and SCADA system will be carried out week 15 and 16 (A.Suraci)
- 13.04.07 Manipulation of cryo valves in DFBs LSS4R and LSS5L (wk17-wk18) (A.Suraci)
- 30.03.07 Mobile test bench tests in Arc45 (wk15 on) (A.Suraci)
- 16.02.07 Manipulation of cryo valves in sector 45 - compressed-air problem with 3 or 4 valves and coherence tests (A.Suraci)
- 16.02.07 Connection of the temperature sensors and control cables (A.Suraci)

### Beam Instrumentation

- 11.05.07 Installation of the BSRT - wk 23/wk 24 (J-J.Gras)
- 13.04.07 BGI Commissioning (J-J.Gras)

### ELQA

- 16.05.07 NC 842369 in MCB Circuit Q5R4
- 16.05.07 NC 842358 in Q5, Q6 L5 - Wrong polarity of 120 A circuit (M.Zerlauth)
- 16.05.07 NC 842336 - Continuity error in instrumentation cable Q10R4 (TS/EL)
- 16.05.07 NC 842324 - Abnormal resistance on the current lead DFLDS.30R4.2 (AT/MCS)
- 09.05.07 NC 839924 - Short-circuit in cable Q17L5 (1507116) IFS box to 60 A PC rack (pins1&2) (TS/EL)
- 27.04.07 Re-positioning of the cables in LCM of the DFBAH (4R) (B.Lebeau)
- 20.04.07 ELQA-TP4A in LSS4R and LSS5L (D.Bozzini/V.Chareyre)
- 22.02.07 Non-conformity (EDMS 816458) at the level of the cable trays installed

above the DFBXE (D.Bozzini)

#### Energy Extraction

- 16.03.07 Verification of the connection of the 13kA EE-quench detectors arc (K.Dahlerup-Petersen)

#### Power Converters

- 13.03.07 60 A Orbit Correctors (S45)-2<sup>nd</sup> Heat Run (A.Solfaroli)
- 20.03.07 60 A Orbit Correctors (S45)-50kHz/26V RPLA34L5.RCBH33 (H.Thiesen)

#### AOB

- 22.05.07 Warm Magnet commissioning in P5 will start with ELQA activities wk 21
- 23.03.07 DFBXE *T* sensor boxes from D.Bozzini, grounding of the 120 A cables, insulation vacuum of the current leads, the coating of the insulator.
- 16.03.07 120A mechanical connection DFBAH (P.Chambouvet/P.Denis)
- 27.04.07 Two water-cooled cable crossed in DFBML in LSS4R - wk21
- 27.03.07 Installation of the control equipment (second half of June) in sector 34 and 45 (2wk each) (S.Infante)
- 27.04.07 Power balance in point 4 (weeks 20-21-22)

#### **Open Issues (followed by TS/IC)**

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- 27.03.07 Inner Triplet repair in LSS5L

#### AC non-conformity

- 13.11.06 Non-conformity of the crates of cryo instrumentation in Sector34 and Sector 45 (inrush current) (A.Suraci: ready next year)

#### DC cabling

- 10.05.07 Re-positioning of WC cables after the CV works on the DFBAH and DFBML in LSS4R: 1408479 DFBML;1408463 DFBAH;1408465 DFBAH;1408459 DFBAH
- 13.04.07 LSS4L Cabling by Flohe - 1 cable to be changed DFBA - wk21 (B.Lebeau)
- 23.03.07 BGIs connectors wk15 - problem vacuum leak A6R4 (S.Pelletier)
- 23.03.07 Cabling campaign LSS4L & LSS4R for Beam Instrumentation wk13 (S.Pelletier)
- 16.03.07 Access & Safety cable (4 short cables + 1x3km cable) Thursday-wk 22 (S.Pelletier)

#### Cryogenics

- 20.03.07 Leak and pressure tests of the RF Warm Recovery Line (A.Bouillot)

#### Warm Vacuum - NEG Activation

- 23.03.07 RF vacuum pipe installation wk 16-17. NEG-Activation wk 25 (P.Maesen)
- 05.02.07 NEG Activation in A6L5 in LSS5L and in D5L4 in LSS4L



## WorldFip

- 10.05.07 Installation of two connection boxes for the Radiation Monitoring WorldFip in Point 3 (A5R3 and UJ32) (C.Dehavay-J-C.Guillaume)  
23.03.07 Short or missing WorldFip Cables for Cryo, QPS, PO, BI in the arc 34 (x10) and 45 (x10) (S.Pelletier)

## Other issues

- 10.05.07 Installation of MQKA in LSS4L - wk 22 (L.Ducimetiere)  
30.03.07 Jacks and spacers in Q5-D4.R4. QN-LHC-4R-QBQM.5R4 NC on supporting system of the Magnets D2-Q5 (S.Weisz)  
09.02.07 Non-conformity for damaged BPM.22R4 Sector 45 (J-J.Gras)  
12.02.07 Activity on the water pressure valves for the ACNs

## **Closed Issues**

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60 A Orbit Correctors (S45)-grounding problem (J.Pierrelot)	11.05.07
BGIs Installation LSS4L & LSS4R	11.05.07
ELQA-TP3 in LSS4R (D.Bozzini/V.Chareyre)	20.03.07
LSS4R Replacement of the heat exchanger cables (S.Pelletier)	27.04.07
Modification of the DFB side of the cables 1513712 and 1513713 (DTH06 instead of DTH09) (S.Pelletier)	27.04.07
Current lead cable non-conformities : 1515511 1515512 1515513 1515514 1515516 (L.Poyet + J.C.Guillaume)	27.04.07
LSS5L test on the heat exchanger cables (S.Pelletier)	27.04.07
CL Insulation Vacuum DFBLD in LSS5L (P.Denis)	20.03.07
Visualization of the cameras in the field control room in UA43 due to breakage of the door (C.Ducastel)	27.03.07
Water leaks at the level of the BCTs to be repaired (J-J.Gras)	13.04.07
CL Insulation Vacuum in LSS3R (P.Denis)	13.04.07
CL Insulation Vacuum DFBAI LSS5L (P.Denis)	13.04.07
Radio Frequency: heater connections and 8 capillaries for pressures sensors	30.03.07
Check of the 6kA and 13kA cable presentation in LSS4R (P.Denis)	12.02.07
Pre-mounting 600-120A in DFBAI LSS5L (TS/EL)	09.02.07
Pre-mounting 120A in DFBMk/L/G LSS4R (TS/EL)	06.02.07
Polarity Tests of the 120 A in DFBAH, DFBMK, DFBML and DFBMG in LSS4R (TS/EL)	29.01.07
Pre-mounting 600-120A in DFBAH (TS/EL)	26.01.07
120A mechanical connection DFBAH, DFBMK/L/G (P.Chambouvet/P.Denis)	09.03.07

CL Insulation Vacuum DFBAH, DFBML/K/G in LSS4R (P.Chambouvet)	09.03.07
Current Lead heater functional tests LSS4R (P.Chambouvet)	09.03.07
60 A Orbit Correctors S45 - 1 <sup>st</sup> 24h Heat Run - wk12 (M.Solfaroli)	23.03.07
Renco intervention on the 13kA EE System LSS5R (K.Dahlerup-Petersen)	27.03.07
Cable inversion at the fans of the 13kA EE System LSS5R/LSS4L (K.Dahlerup-Petersen)	27.03.07
Re-installation of Cryo-Instrumentation boxes in arc45 (P.Fessia)	05.04.07
CL Insulation Vacuum in LSS4L (P.Denis)	05.04.07
60 A Orbit Correctors (S34)-Individual System Tests-wk17(J.Thomson)	04.05.07
Re-positioning of the DC water-cooled cables by Flohe on the DFBAH and DFBML (LSS4R) (B.Lebeau/F.Moro)	04.05.07

### **Closed Issues (followed by TS/IC)**

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Installation of the roof at the level of the RF Cavities-wk20 (C.Fernandez)	22.05.07
DFBLD mechanical works LSS5L (wk15)	11.05.07
Pressure Tests on DFBAI and DFBLD (LSS5L) (A.Bouillot)	11.05.07
BPM Schottky electronics installation (wk19)	11.05.07
NEG Activation A5L5 LSS5L	11.05.07
NEG Activation A6R4 LSS4R	11.05.07
Global Leak and Pressure Tests Sector 45	13.05.07
Pressure Tests on the DFBAH	08.05.07
wk12-13 fiber installation campaign for the experiments in LSS5L	13.04.07
Installation of instrumentation cables of D3L4 (arc 34) (S.Pelletier)	27.04.07
Pulling profibus cables in UA47 and USC55 (S.Pelletier)	27.04.07
Inversion of the <i>cosses</i> of RB circuit in UA43 (J-C.Guillaume)	13.04.07
Installation of UPS PIC boxes (E.Barbero)	13.04.07
Cooling and ventilation annual maintenance	23.03.07
Cryo instrumentation racks installation in Arc 45 (A.Suraci)	16.03.07
Correction of two water-cooled cables on the DFBAI - Flohe (LSS5L)	16.03.07
Non-conformity of the AC cabling of the crates under the magnets. This concerns ACR, MEL & VAC.	16.03.07
Interconnections around DFBAI, Q5-DSL, Q4-DSL	16.03.07
Local leak and pressure tests on DFBLDs (A.Bouillot)	09.03.07
Water-cooled power cable joints replacement by Renco in UA43 and UA47	09.03.07

Interconnection and WRL connection DFBMK/L/G (LSS4R)	16.02.07
Interconnections around Q6-DSL (LSS5L)	26.01.07
Cabling 600A and 120A in DFBAI, 120A in DFBL in LSS5L(INEO)	09.02.07
13-6kA cabling at the DFBML in LSS4R (Flohe)	06.02.07
Cabling 13-6kA in DFBAI and DFBX in LSS5L(Flohe)	19.01.07
Cabling Q6, Q7, Q8, Q9 and Q10 in LSS5L (INEO)	26.01.07
Cabling of the 600-120A in DFBAH,120A in DFBMK, DFBML and DFBMG, Q6, Q7, Q8, Q9 and Q10 in LSS4R (INEO)	26.01.07
Installation of two power outlet (required by worldfip) in the arc 45	09.03.07
Interconnection and WRL connection DFBAH (LSS4R)	09.03.07
WorldFip Tests in Arc 45 (week 08) (J.Thomsen)	09.03.07
Cabling 13-6kA in DFBAH, DFBMK\G in LSS4R(Flohe)	09.03.07
NEG activation in E5R4 and D5R4 in LSS4R	09.03.07
Interconnections around DFBAI, Q6-DSL	23.03.07
Cooling & Ventilation annual maintenance P4 (F.Moro)	30.03.07
NEG Activation in A7R4 (DFBAH) w13 or wk14	30.03.07
Installation and activities on the DFBL - meeting in the field	30.03.07
Local leak and pressure tests on DFBAH (A.Bouillot)	04.05.07
Qualification of WorldFip Segments in Sector 34 and Sector 45 - wk 15 (C.Dehavay)	04.05.07
Installation of the RF Power Converter Transformers (P.Maesen)	04.05.07
Connection of the QUI (surface to QRL) wk 11 & wk12 (A.Bouillot)	04.05.07

**Milestones: Test Schedule Sector 45 and Sector 34 (foreseen dates provided by TS/IC)**

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Sector 45	Sector 34	TASK
Wk 10-11	Wk 18-19	AB/PO short Circuit tests
Wk 17-18	Wk 28-29	ELQA-TP4A
Wk 19	Wk 25	Interconnections+Vacuum
Wk 19	Wk 34	Interconnection DFBL
Wk 19-20-21	Wk 34-35-36	Pressure Test + Consolidation
Wk 25		Cool Down Sector 45
Wk 34		Powering Tests

E.Barbero/C.Fernandez/M.Solfaroli/B.Perea