Report: 28

Activity: LHC Insulation Vacuum

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Meeting 03/08/2020

CERN | LS2

Performed activities during last 2 weeks

- Leak test activities
  - Global Leak tests after the pressure test in S8-1
    - 3 leaks 1.0E-07 - 1.0E-05 mbar l/s
      - A1R8.M: Known (from the installation) leak on the CM circuit – no degradation (1.0E-07 reported in 2008)
      - A15R8.M: New (LS2) leak in line E ; Phase I @ 10bars: 4.0E-07
      - D81.Q: Leak in line D ; compensator on C line exchanged during LS1 and on the D line during LS2 – Phase I @10 bars: 7.5E-07

	CRYOMAGNET																						
SECTOR	LSS RIGHT					ARC													LSS LEFT				
						A7R	A11R	A15R	A19R	A23R	A27R	A31R	A31L	A27L	A23L	A19L	A15L	A11L	A7L					
8-1	A1R8	A4R8	A5R8		A6R8	1.20E-08	7.80E-09	4.40E-07	8.40E-09	7.00E-09	7.30E-09	3.00E-09	6.00E-09	2.50E-09	1.10E-08	7.20E-09	1.00E-08	2.70E-09	4.00E-09	A6L1		A5L1	A4L1	A1L1
	1.10E-06	1.30E-09	3.90E-09		6.90E-10															2.00E-09		1.50E-09	1.40E-09	3.00E-09

SECTOR	QRL								
8-1	A	B	C	D	E	F	G	H	I
	1.10E-09	6.00E-10	7.70E-10	2.70E-07	7.20E-10	1.80E-08	1.00E-09	5.30E-10	1.70E-09

Performed activities during last 2 weeks

- A19R5.M: new clamshell for M-bellows developed.
  - Clamshell tests made on M, N sleeves and M bellows (35 tests) in 5 ICs: QBBI.A20R5, QBBI.B20R5, QBQI.20R5, QQBI.20R5 and QBBI.A21R5 – no outcome
  - Accumulation pockets installed on all al the positions + M2N.
  - Waiting for TE-CRG availability for the accumulation test (W34)
- Closure and preparations for global leak tests
  - Pump-down start of 4x volumes in S7-8

Performed activities during last 2 weeks

- Closure and preparations for global leak tests
  - Resolution of Q6L8 O-ring NCs in s. 7-8 (In collaboration with ICM and TE-MSC)

PHASE 2 MAIN ACTIVITIES

	DISCO (diode flange) local LT	SIT local leak tests	SAM activities	QRL activities	Pumping group consolidation
S1-2					(4)
S2-3					(5)
S3-4			(2)		
S4-5					
S5-6			(1)		
S6-7					
S7-8			(1)		
S8-1					

(1) Triplet tie-rod + pumping group consolidation
(2) Replacement of standalone damaged O-rings (W34)
(4) LSS finished, ARC1-2 ongoing
(5) LSS R2 pending (to be made after pressure test, W35-W37)

FINISHED ONGOING NOT STARTED

Status of pumping group consolidation

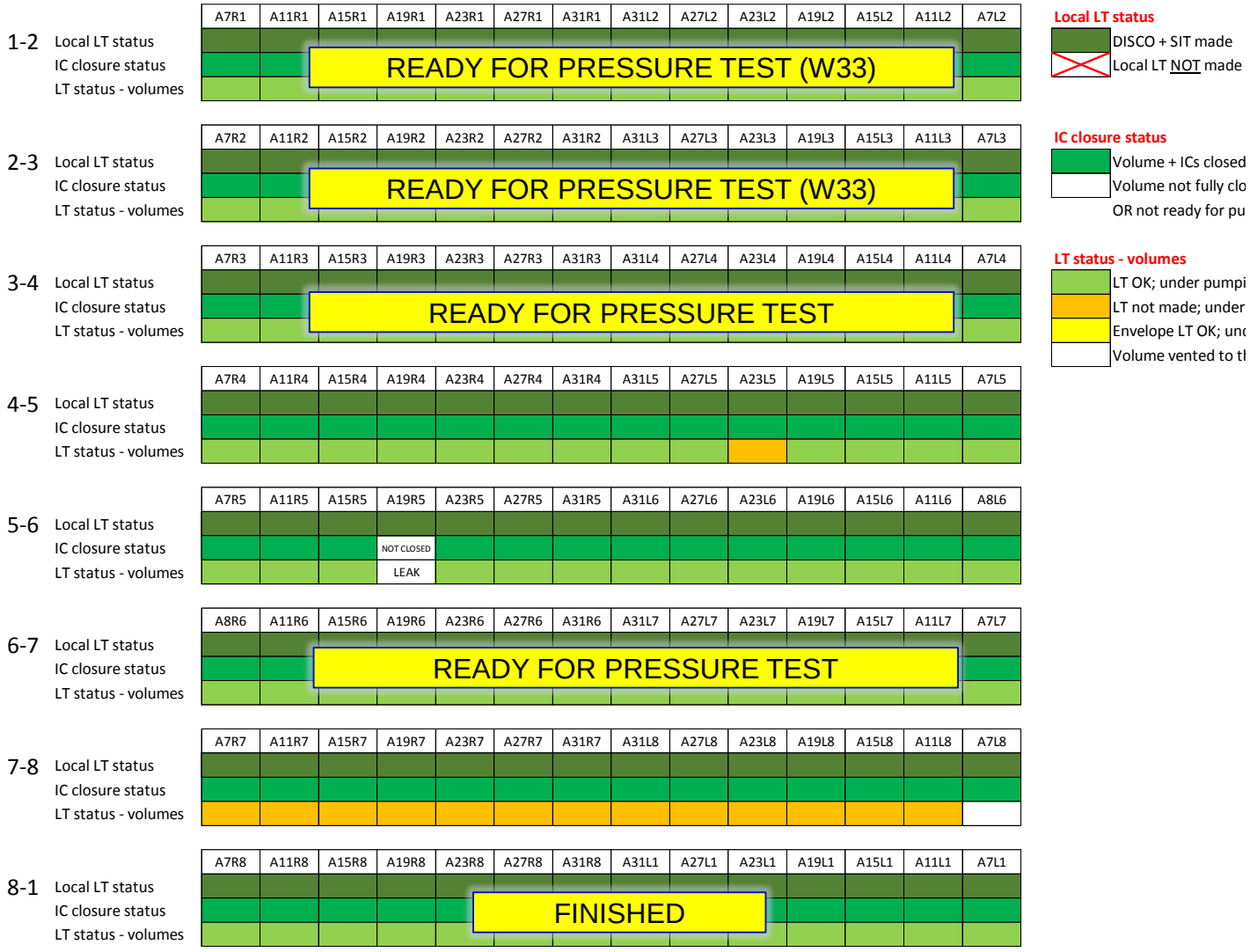
ARC 1-2								
16R1.Q	24R1.Q	32R1.Q		32L2.Q	24L2.Q	16L2.Q	14L2.Q	13L2.Q
Q15R1.M	Q23R1.M	Q31R1.M		Q31L2.M	Q23L2.M	Q15L2.M		

	LSS RIGHT					ARCS	LSS LEFT				
S1-2	4R1.Q						4L2.Q				
	Q2R1.M	Q3R1.M	A4R1.M	A5R1.M	A6R1.M		A6L2.M	A5L2.M	A4L2.M	Q3L2.M	Q2L2.M
S2-3	4R2.Q						4L3.Q				
	Q2R2.M	Q3R2.M	A4R2.M	A5R2.M	A6R2.M		A6L3.M				
S3-4	4R3.Q						4L4.Q				
	DFBLC				A6R3.M		A6L4.M	B5L4.M	A5L4.M	SC2 L4	SC1 L4
S4-5	4R4.Q						4L5.Q				
	SC1 R4	SC2 R4	A5R4.M	B5R4.M	A6R4.M		A6L5.M	A5L5.M	A4L5.M	Q3L5.M	Q2L5.M
S5-6	4R5.Q						4L6.Q				
	Q2R5.M	Q3R5.M	A4R5.M	A5R5.M	A6R5.M			A5L6.M	A4L6.M		
S6-7	4R6.Q						4L7.Q				
			A4R6.M	A5R6.M			A6L7.M				
S7-8	4R7.Q						4L8.Q				
					A6R7.M		A6L8.M	A5L8.M	A4L8.M	Q3L8.M	Q2L8.M
S8-1	4R8.Q						4L1.Q				
	Q2R8.M	Q3R8.M	A4R8.M	A5R8.M	A6R8.M		A6L1.M	A5L1.M	A4L1.M	Q3L1.M	Q2L1.M

TO BE FINISHED AFTER LEAK TESTS

	Consolidation completed and pumping group operational
	Mechanical assembly completed but pumping group not operational (waiting for ICM intervention)
	Mechanical assembly completed but waiting for new intervention after consolidation of tie-rods
	Consolidation not started but pumping group operational
	Consolidation not started AND pumping group NOT operational
NOTE	Pumping groups of QRL only require mechanical intervention

DISMAC – leak test status



Planned activities for next 2 weeks

- Leak test activities
  - A19R5.M: local leak tests by accumulation
  - Global LT after the pressure test in S1-2 and S2-3
- Closure and preparations for global leak tests
  - Replacement of standalone damaged O-ring in Q6L4 (W34)
  - Envelope leak test of ~8 vacuum subsectors S7-8
- Turbo pumping group consolidation and others
  - End of pumping group consolidation in S1-2 (2 positions at B12.Q)

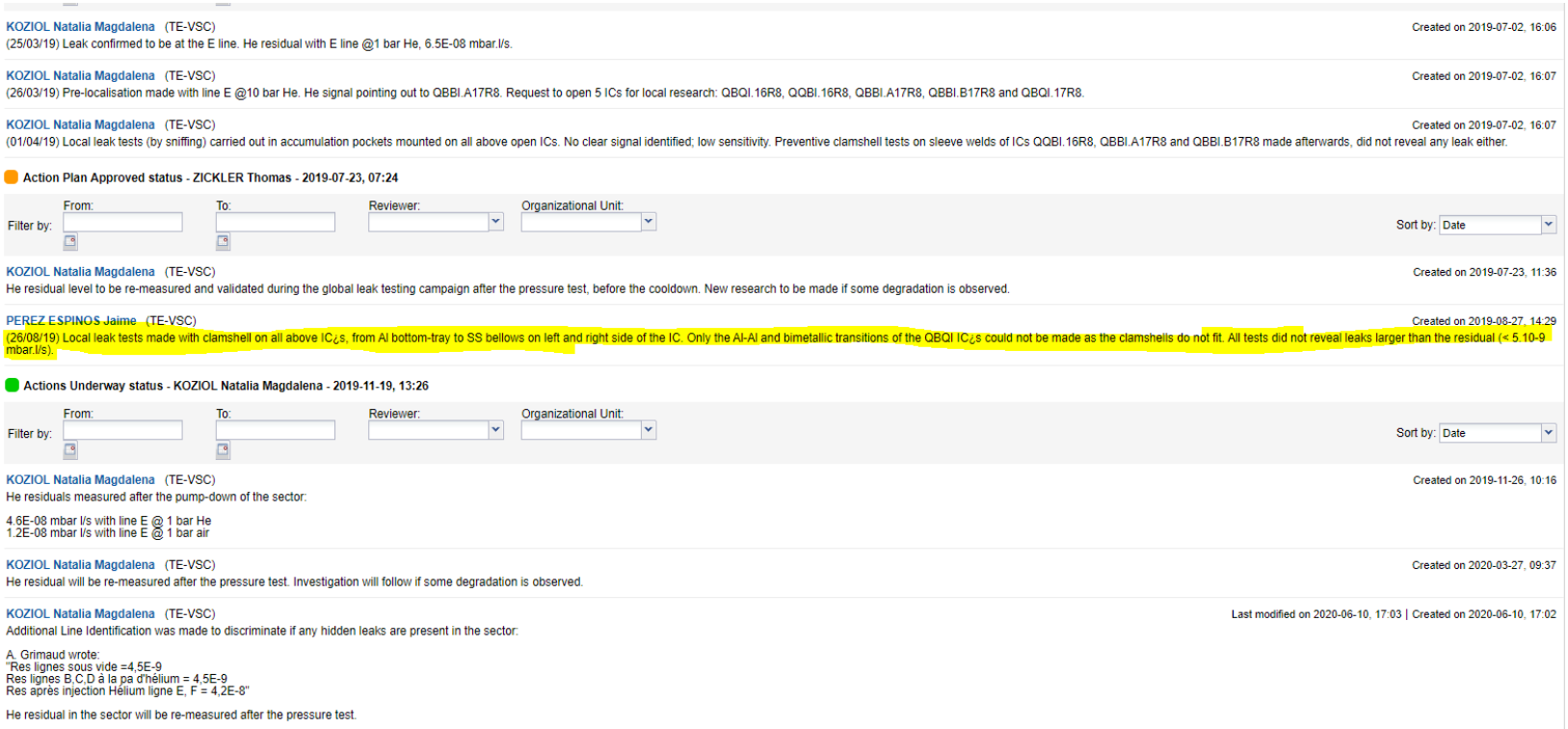
Status of resources

- AL4030: 3 teams + 2 team coordinators (50%, shared with other activities) + % of 1 store keeper (also allocated for mechanical assembly on surface)
  - Reduced from today
  - 1 team coordinator on most of July and August
- CERN: Natalia, Wim, Guillermo (% varies according to his activities in cPS) and Jaime

Thank you !


CERN
LS2
Technology Department
TE
Vacuum
Surfaces
Coatings

Backup Slides



KOZIOL Natalia Magdalena (TE-VSC) Created on 2019-07-02, 16:06
(25/03/19) Leak confirmed to be at the E line. He residual with E line @1 bar He, 6.5E-08 mbar.l/s.

KOZIOL Natalia Magdalena (TE-VSC) Created on 2019-07-02, 16:07
(26/03/19) Pre-localisation made with line E @10 bar He. He signal pointing out to QBBI.A17R8. Request to open 5 ICs for local research: QBQI.16R8, QQBI.16R8, QBBI.A17R8, QBBI.B17R8 and QBQI.17R8.

KOZIOL Natalia Magdalena (TE-VSC) Created on 2019-07-02, 16:07
(01/04/19) Local leak tests (by sniffing) carried out in accumulation pockets mounted on all above open ICs. No clear signal identified; low sensitivity. Preventive clamshell tests on sleeve welds of ICs QQBI.16R8, QBBI.A17R8 and QBBI.B17R8 made afterwards, did not reveal any leak either.

Action Plan Approved status - ZICKLER Thomas - 2019-07-23, 07:24

Filter by: From: To: Reviewer: Organizational Unit: Sort by: Date

KOZIOL Natalia Magdalena (TE-VSC) Created on 2019-07-23, 11:36
He residual level to be re-measured and validated during the global leak testing campaign after the pressure test, before the cooldown. New research to be made if some degradation is observed.

PEREZ ESPINOS Jaime (TE-VSC) Created on 2019-08-27, 14:29
(26/08/19) Local leak tests made with clamshell on all above IC¿s, from Al bottom-tray to SS bellows on left and right side of the IC. Only the Al-Al and bimetallic transitions of the QBQI IC¿s could not be made as the clamshells do not fit. All tests did not reveal leaks larger than the residual (< 5.10-9 mbar.l/s).

Actions Underway status - KOZIOL Natalia Magdalena - 2019-11-19, 13:26

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KOZIOL Natalia Magdalena (TE-VSC) Created on 2019-11-26, 10:16
He residuals measured after the pump-down of the sector:

4.6E-08 mbar l/s with line E @ 1 bar He
1.2E-08 mbar l/s with line E @ 1 bar air

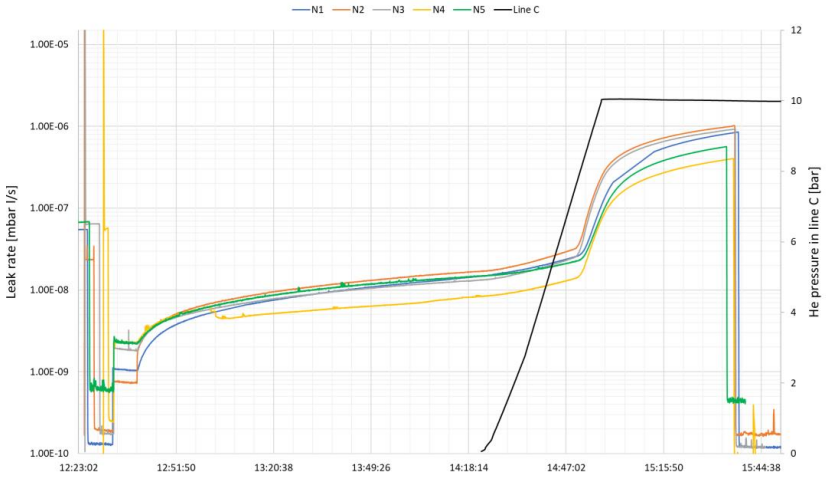
KOZIOL Natalia Magdalena (TE-VSC) Created on 2020-03-27, 09:37
He residual will be re-measured after the pressure test. Investigation will follow if some degradation is observed.

KOZIOL Natalia Magdalena (TE-VSC) Last modified on 2020-06-10, 17:03 | Created on 2020-06-10, 17:02
Additional Line Identification was made to discriminate if any hidden leaks are present in the sector:

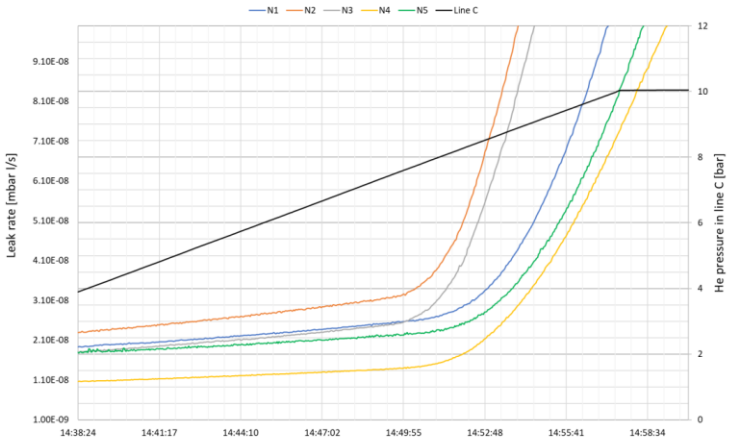
A. Grimaud wrote:
"Res lignes sous vide =4,5E-9
Res lignes B,C,D à la pa d'hélium = 4,5E-9
Res après injection Hélium ligne E, F = 4,2E-8"

He residual in the sector will be re-measured after the pressure test.

Backup Slides



3) Close-up of the next part of the pressurization:



9) Close-up of the moment of the critical raise in the signal (moving average with the period of 100 (~4min))