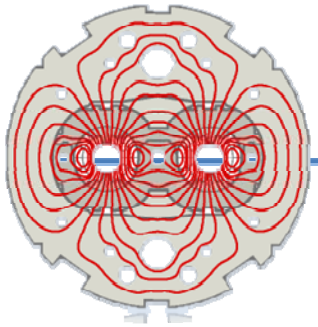


Schedule Impact of Sector 3-4 Repair and Sector 5-6 Connection Cryostats

Francesco Bertinelli – TE/MSC

(10 minutes)

On behalf of - and with several contributions from - surface and IC teams

Consider only 3-4 D-area for this presentation

CC: update since LMC 15 April, TETM 28 April

3-4 D-area: baseline planning (Chamonix)

- Main assumptions:
  - last magnets «ready for installation» W15
  - sequence of magnet installation to be respected
  - keep same sequence of IC series activities
  - no contingency for Non Conformities

➢ Closing of W bellows: earliest plan for W23, no slack
no vacuum subsectors made available earlier

Detail of 8-Weeks IC work

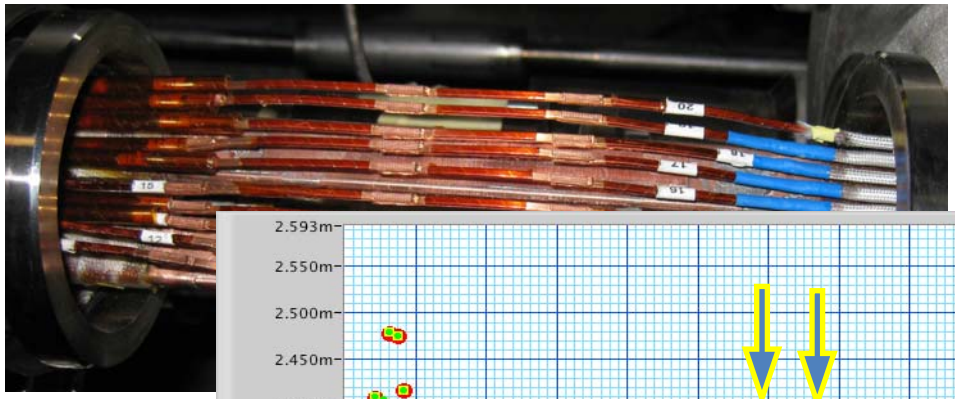
	"IC half-cell"			SSS Q30		MB A31		MB B31		MB C31		
	IC name		QBQI		QQBI		QBBI.A		QBBI.B		QBQI	
1	Magnet ready for installation			W15						W15		
2	Magnet transported			W15						W15		
3	Survey positioning / check			W16						W16		
4	QC: start IC		W16		W16				W16		W16	
5	BB: Busbar Brazing		W17		W16		W16		W16		W17	
6	QC: BB		W17		W16		W16		W16		W17	
7	insulate BB		W17		W16		W16		W16		W17	
8	US: ultrasonic welding spools		W17		W16		W16		W16		W17	
9	insulate spools		W19		W16		W16		W16		W19	
10	ELQA: PAQ		W17									
11	Insert N-Line		W18									
12	Cable N-Line		W18								W18	
13	ELQA: HVQN		W18									next half cell
14	ELQA: AIV1		W19									next half cell
15	US weld N-line		W19								W19	
16	ELQA: MPAQ	all D-area	W19									all D-area
17	ELQA: AIV2		W20									next half cell
18	insulate N-line board		W20								W20	
19	ELQA: MHVQN	all D-area	W20									all D-area
20	TIG weld 139 N-line flange		W21								W21	
21	TIG weld M to N		W21								W21	
22	Cryo thermometers	W21	W21						W21	W21	W21	
23	Final QC-IC certification		W22		W22		W22		W22		W22	
24	Close W bellows		W23		W23		W23		W23		W23	

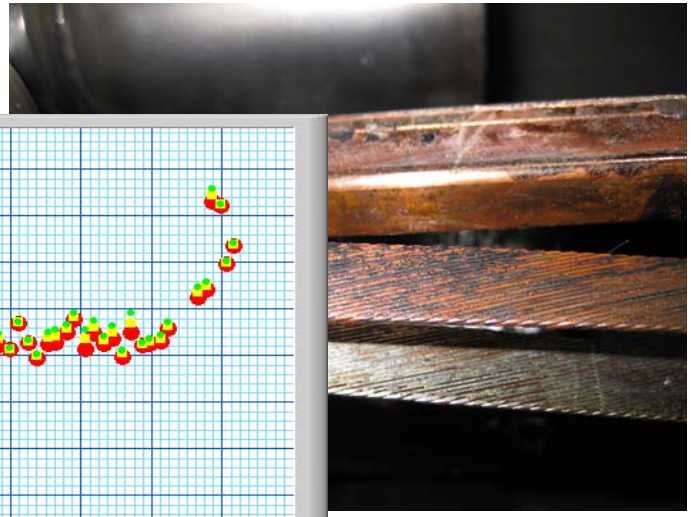
Assumes all previous IC work already done

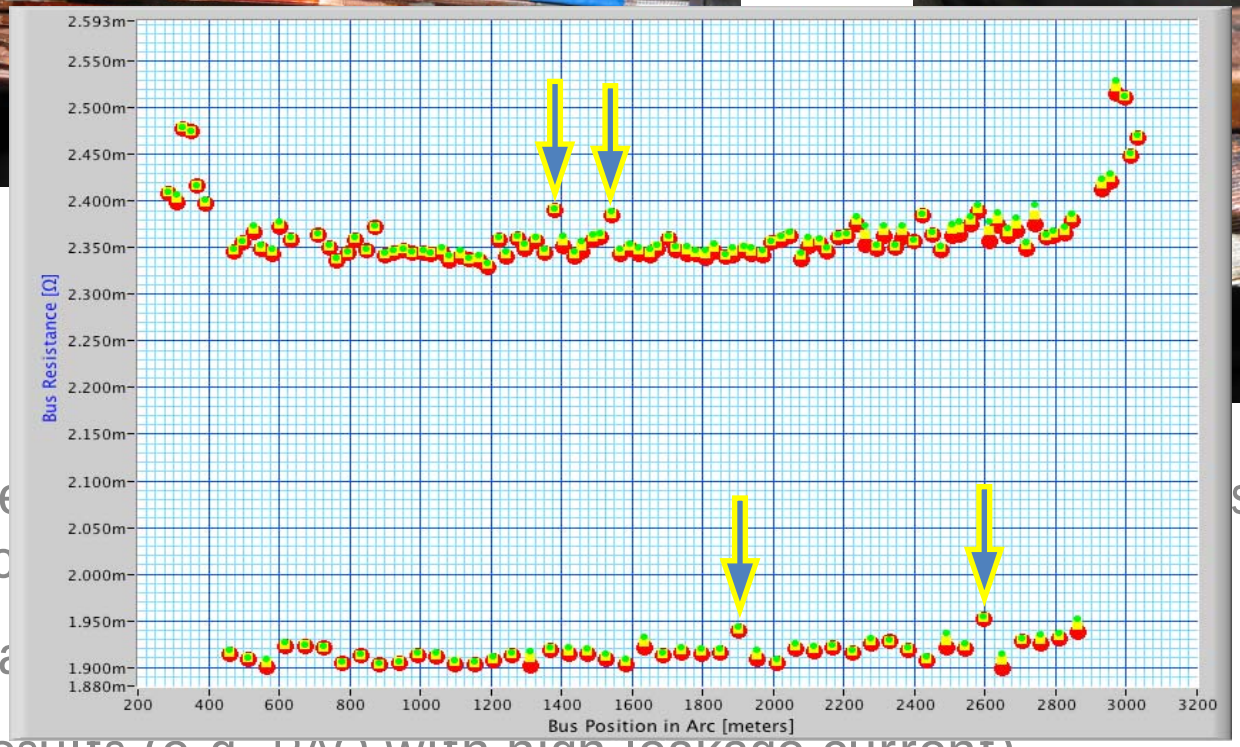
3-4 D-area: update planning

- Revisit assumptions:
  - magnet installation: last 2 dipoles W16, last 2 SSS W18
  - sequence of magnet installation: peaked at end of period, IC work « piled up »
  - keep same sequence of IC series activities: Quality Control activities imply more effort and time; sequences kept so far, may be relaxed in some cases (e.g. PAQs) but risky
  - no contingency for Non Conformities: !!!

3-4: main remaining electrical NC







- Increase soldering or with spec
- Overhea
- ELQA results (e.g. PAQ with high leakage current)
- Cu stabiliser resistance (Andrzej's talk)

3-4 D-area: detailed updated planning

IC	BR	SP	V	E	C'	Y	X	Pq	M	N-I	AIV1	N-US	AIV2	MP	M2N	N weld	Therm	W
IC	BR	SP	V	E	C'	Y	X	Pq	M	N-I	HA			22	w20	w20		
QQBI.26R3														22	w20	w20		w22
QBBI.A27R3														22	w20	w20		w22
QBBI.B27R3														22	w20	w20	w21	w22
QBQI.27R3		5								6	8	11	12	22	w20	w20	w21	w22
QQBI.27R3									5					22	w21	w21		w22
QBBI.A28R3			8	8					5					22	w21	w21		w22
QBBI.B28R3									5					22	w21	w21	w22	w23
QBQI.28R3	6	7								8	11	12	13	22	w21	w21	w22	w23
QQBI.28R3														22	w21	w21		w22
QBBI.A29R3														22	w21	w21		w22
QBBI.B29R3							5		15					22	w21	w21	w22	w23
QBQI.29R3	8	11								12	14	15	18	22	w21	w21	w22	w23
QQBI.29R3							6	5	7					22	w21	w21		w22
QBBI.A30R3							6	5	7					22	w21	w21		w22
QBBI.B30R3							6	5	7					22	w21	w21	w22	w23
QBQI.30R3	7	8	8	8	6		6			12	14	15	18	22	w21	w21	w22	w23
QQBI.30R3	7	8	8	8	6		6		12					22	w21	w21		w22
QBBI.A31R3							6		5					22	w21	w21		w22
QBBI.B31R3						7	8		5					22	w21	w21	w22	w23
QBQI.31R3	7	8								12	14	15	18	22	w21	w21	w22	w23
QQBI.31R3							7							22	w22	w22		w22
QBBI.A32R3							7							22	w22	w22		w22
QBBI.B32R3							7							22	w22	w22	w23	w24
QBQI.32R3	11	12	8	8	6		7			14	18	19	21	22	w22	w22	w23	w24
QQBI.32R3	6	7	8	8	6		7	8	13					22	w22	w22		w23
QBBI.A33R3							7	8	13					22	w22	w22		w23
QBBI.B33R3		6				7	8	8	13					22	w22	w22	w23	w24
QBQI.33R3	25	26								15	18	19	21	22	w22	w22	w23	w24

QUAD	weld LD1	weld Ld2	test LD1-LD2 line
QBQI.21R3	w21		w21
QBQI.23R3	w21	w21	w21
QBQI.25R3	w21		w21
QBQI.27R3	w22	w21	w22
QBQI.29R3	w22		w22
QBQI.31R3	w22	w21	w22
QBQI.33R3	w22		w22

Courtesy A. Musso

3-4 D-area: milestones to monitor

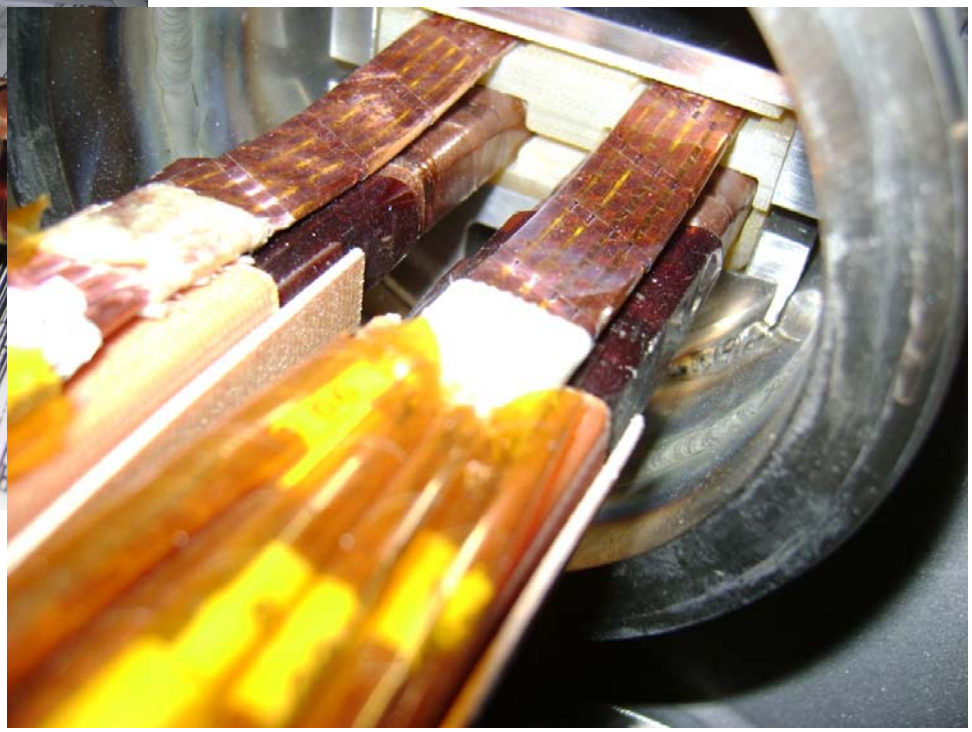
- end W20 (next week): finish all electrical connections and PAQs, except 2 ends
- W21: Bob's measurements
- earliest possible start for « first time activities »: e.g. AIV1 this week, US weld N-line, jumper welding
- close last W bellows: end W25 (i.e. catch up 1 week)
- repairs following Bob's measurements (in all sectors): starting earliest W21 (after 3-4 D-area)

Connection Cryostats

- 6-metre insulation U pieces (finally) delivered;
- Wear tests continuing: OK at 200 cycles with friction
- 2.5-metre pieces successfully inserted
- first trials with 6-metre pieces ongoing
- cutting of fixed point supports in-situ (difficult)
- order for blocking pieces for insulation out (W21)
- Overall short-term strategy discussed: intervene only in
  - 5-6: M3 Down in 11R5
  - 5-6: M1 Up, M3 Down, M1 Down in 11L6(bent)
  - 6-7: M3 Up&Down in 11L7
- Important, to be done (?): local monitoring of leakage current to ground in operation

Courtesy JP Tock

Connection Cryostats: fixed points



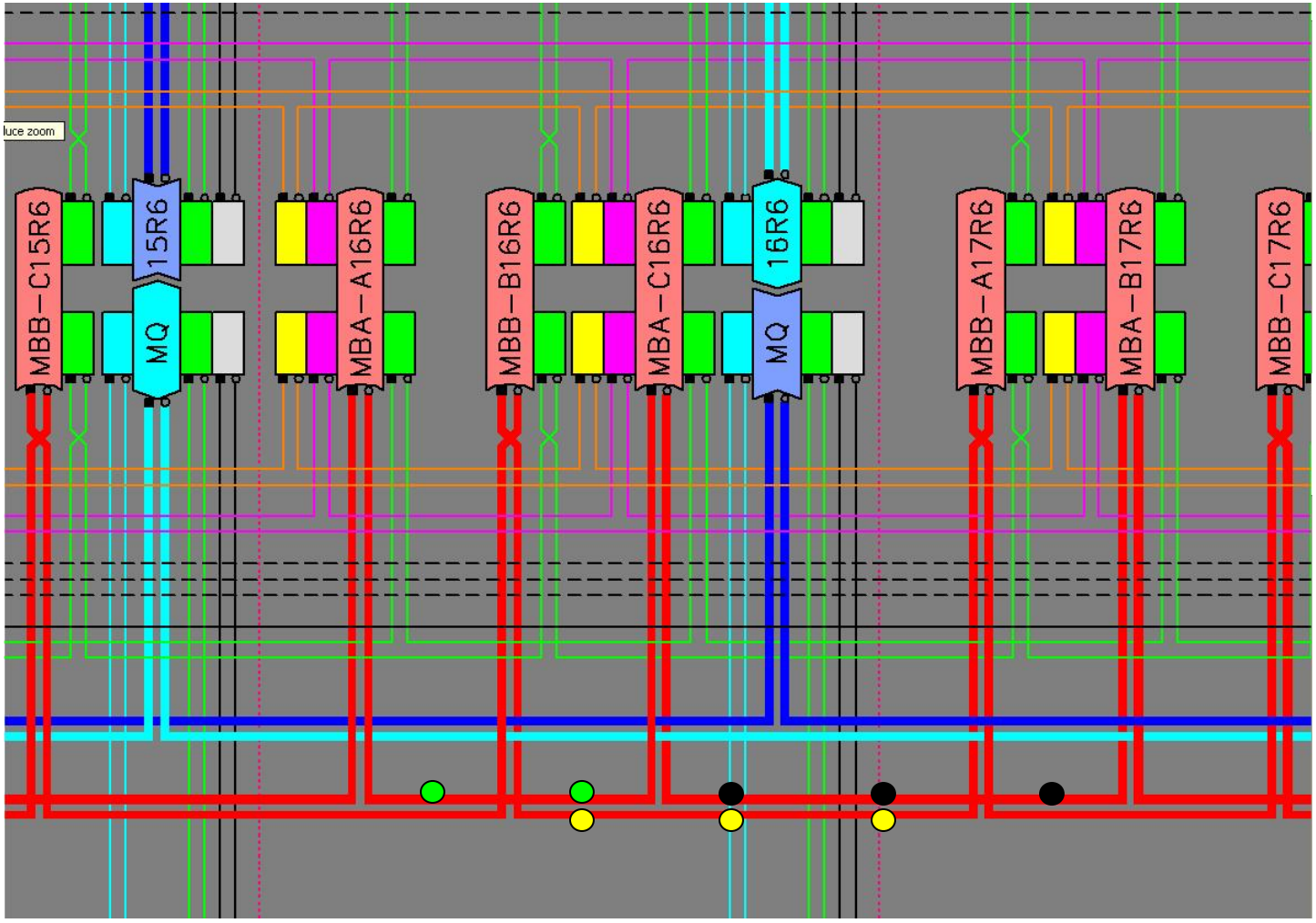
Courtesy JP Tock

CC: impact on schedule

- 5-6
  - ★ M3 Down in 11R5 + M1 Up, M3 Down in 11L6 + M1 Down in 11L6(bent)
    - Cold mass reclosed for W22
    - Repair of insulation in the shuffling module W23
    - Repair of QEDI.5L6 : W22
    - Reclosure of IC : W24
- 6-7
  - ★ M3 Up&Down on 11L7 :
    - Cold mass reclosed for W21
    - ICs reclosed for W22 then 2 weeks of leak test

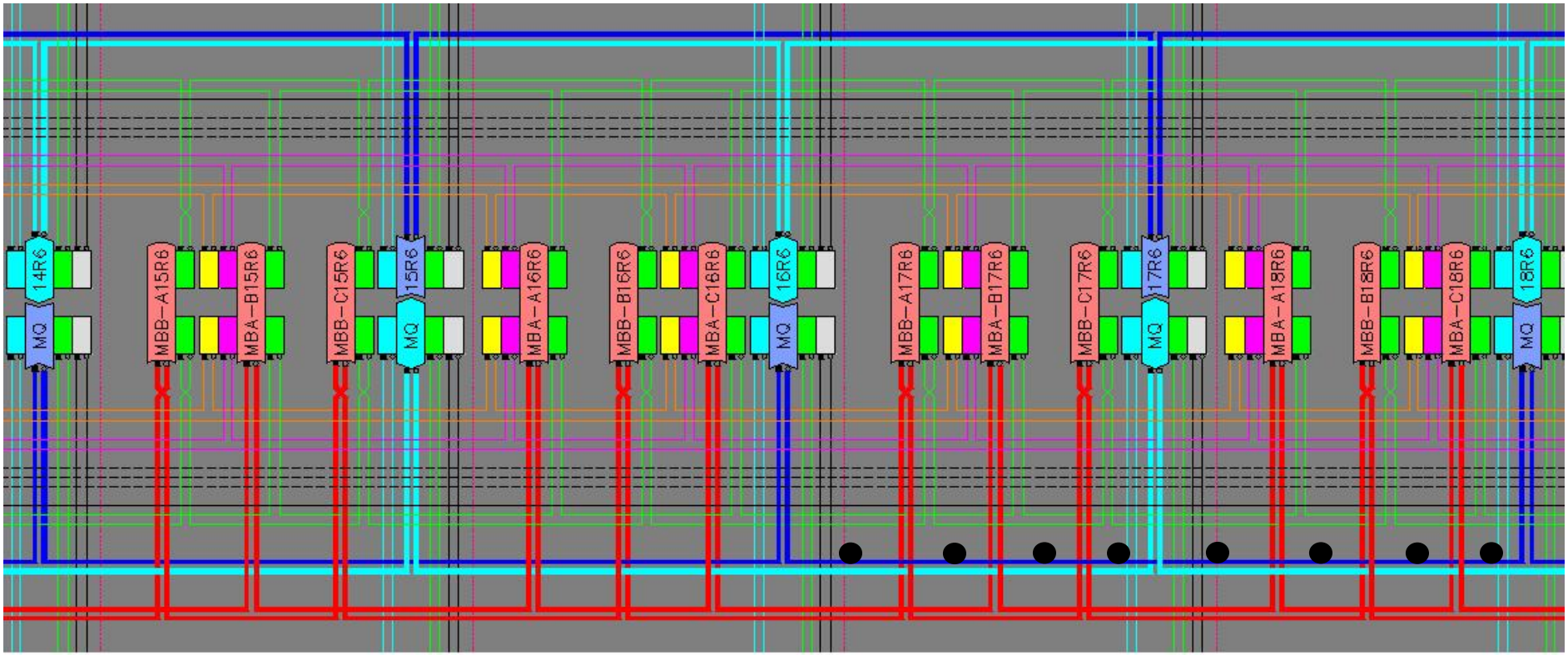
Courtesy JP Tock

Bob's measurements MB



Courtesy R. Flora

Bob's measurements MQ



Courtesy R. Flora

Overview CC

Summary of support position status										
Maximum distance between support (Nominal : 1000 +/- 5 mm)										
[m]	InspDate	M1Up	M2Up	M3Up	M1Ds	M2Ds	M3Ds	Total	Insp	Meas
11R1	28-Feb-08	OK	OK	OK	OK	OK	OK	11R1	Yes	No
11L2	6-Mar-08	OK	OK	OK	OK	OK	OK	11L2	Yes	No
11R2	10-Mar-08	OK	OK	1.39	OK	OK	1.01	11R2	Yes	Part
11L3	12-Mar-08	OK	1.17	1.76	OK	OK	1.5	11L3	Yes	PArt
11R3	27-Mar-08	OK	OK	OK	OK	OK	OK	11R3	Yes	No
11L4	1-Apr-08 2-Apr-09	OK	OK	OK	1.01	1.04	1.04	11L4	Yes	Part
11R4	4-Apr-08	OK	OK	OK	OK	OK	OK	11R4	Yes	No
11L5	9-Apr-08	OK	OK	2.07	OK	OK	OK	11L5	Yes	Part
11R5	3-Feb-09	OK	OK	OK	OK	OK	1.57	11R5	Yes	Part
11L6	13-Feb-09 31-Mar-09	1.52	OK	1.28	*1.87*	1.2	2.16	11L6	Yes	Part
5L6*	20-Feb-09	OK	OK	OK	OK	OK	OK	5L6	Yes	Yes
11R6	18-Feb-08 31-Mar-09	OK	OK	OK	1.03	1.25	1.21	11R6	Yes	Part
11L7	19-Feb-08 6/16-Mar-09	OK	OK	1.5	OK	OK	1.8	11L7	Yes	Part
11R7	7-Feb-08	OK	OK	OK	OK	OK	OK	11R7	Yes	No
11L8	Not done	?	?	?	?	?	?	11L8	No	No
11R8	25-Feb-08	OK	OK	OK	1.14	OK	1.16	11R8	Yes	Part
11L1	26-Feb-08	OK	OK	1.7	OK	OK	OK	11L1	Yes	No

5L6* : 17th CC

Only bent busbar seen is in 11L6 M1 downstream

Endoscopy done AFTER powering cycle for : 4-5 (Up to 10.273 kA for RB & 10.897 kA for RQ)

Endoscopy done AFTER powering cycle for : 5-6 (7-8)

Endoscopy done before powering cycle for : 1-2, 2-3,3-4,6-7, 8-1 (7-8)

	< 1.05 m
	Not OK at 5 TeV [> 1.55 m for MQ; > 1.9 m for MB]
	OK 5 TeV but not at ultimate [1.3 m < X < 1.55 m for MQ; 1.5 m < X < 1.9 m for MB]
	OK ultimate [1.05 m < X < 1.3 m for MQ; 1.05 m < X < 1.5 m for MB]
	?
1.87	Bent busbar