

WARM MAGNETS COMMISSIONING POINT 8

HARDWARE COMMISSIONING COORDINATION

◆ ◆ ◆
NEXT RAT meeting
Wednesday 23.05
08:30 in 936/R-035
◆ ◆ ◆

May 10th, 2007

Present: Maria Paz Casas Lino, Michel Condemine, Pierre Dahlen, Carlos Fernández, Nicolas Gilbert, Jacky Mazet, Ivan Moya, David Smekens, Hugues Thiesen, Jan Uythoven.

Point 8 – Contact HCC person: María Paz Casas Lino / Iván Moya

1. Status of non conformities and actions to be taken:

- Polarity test non conformities in the following circuits: (RMSI.R8B2; RQID.87900; RQID.88100; RQIF.87800; RQIF.88000)
 - Solved (Condamine)
- Large inductive loops in MSI and some quadripoles and in MBIAH.
 - Solved (Condamine)
- 8h run non conformity RBXWSH.L8: An intervention of TS/CV is required to balance the cooling circuit. Nominal flow rate 20 l/min. (EDMS: 829411)
 - Maria Paz Casas will contact TS/CV
- Power converter: MQIF87800 (3e-4 ripple).
 - It is agreed between AB/PO (Hugues) and AB/BT (Jan) that this non conformity will be fixed during the tests.

2. Modifications to be done before starting the tests:

- Adjustment of T18 functions. It is required by AB/PO to have the functions adjusted already at the beginning of the tests.

- Jan will contact Roger Genand to have the shape of the functions specified in detail and to the person in charge of implementing these modifications.

3. Programme to finish the warm magnets commissioning steps:

- WELQA,WIC, SETUP of PC already completed in the previous tests
- Polarity test to be done in all the warm magnets T12 LHC
- 24h run to be done at I Injection

4. Interferences found at the compensator magnets

- Description of the interferences and conditions during the previous tests (summarized in the presentation below).
- Programme to evaluate and solve the interferences (see presentation below)

1. Evaluation of the interferences:

- I. Turn on **ALL** the PC of the warm magnets of T18 (1st evaluation)
- II. Turn off **the PC on the 18kV line**. (2nd evaluation)
- III. Conclusions

2. Solution implementation

3. Solution validation

5. Time requirement and planning

- See presentation below. Note that after the meeting the planning has been modified due to installation constraints. Activities start on Wednesday 23rd May instead of Monday 21st May

6. Access restrictions

- Warm magnets: Two panels will be placed close to the two access points from the UA27 to the RA27 preventing the access to the warm magnets in between but not to the rest of the RA87 and to the inner triplet. For the accessible warm magnets, signalization and flashing lights will be put in place.
- Power converters: Fencing, signalization and flashing light.

Maria Paz Casas Lino for the Hardware Commissioning Coordination

WARM MAGNETS

COMMISSIONING POINT 8

II

Agenda:

1. Non conformities to be solved and improvements to be done before starting the test.
2. Procedure to follow to finish the commissioning and to assess the reason and solution for the interferences found.
3. Planning and resources.
4. Security issues.

10/05/2007
TS/HDO

GROUPS INVOLVED

- ❑ **AB/PO** (Hugues Thiesen / Roger Genand/ Stephen Riegner)
- ❑ **AT/MEL** (Mikko Karppinen / David Smekens / Jacky Mazet)
- ❑ **AB/CO** (Pierre Dahlen)
- ❑ **TS/EL** (Jean Claude Guillaume / Michel Condamine / Baptiste Lebeau)
- ❑ **AB/BT** (Jan Uythoven)
- ❑ **AB/ABP** (Nicolas Gilbert)
- ❑ **AB/OP** (Verena Kain, Jorg Wenninger, James Ridewood)
- ❑ **TS/HDO** (Maria Paz Casas Lino, Ivan Moya)

PREVIOUS TEST:

NON CONFORMITIES - IMPROVEMENTS

MTF non conformities

POLARITY TEST:

- **RMSI.R8B2**: Might be re-cabled and will need to be checked again
- **RQID.87900**: Wrong labelling on cables
- **RQID.88100**: Might be re-cabled and will need to be checked again
- **RQIF.87800**: Wrong labelling on cables
- **RQIF.88000**: Might be re-cabled and will need to be checked again

- 8H RUN NON CONFORMITY RBXWSH.L8**: Magnet Temperature raised to 58 C due too low flow rate. TS/CV to balance the cooling circuit. Nominal flow rate 20 l/min. (EDMS: 829411)

Jan Uithoven presentation 30 March

- POWER CONVERTER: MQIF87800** (3e-4 ripple)

T18 MAGNETS FUNCTIONS:

- Functions to be adjusted / smoothened, according to spec. Roger Genand. Timing of logging to coincide with exact extraction moment
- Redo heat run during cold check out, with shorter cycle (around 8 s instead of 28 s)
- MCI8115 /6/7 are pulsed, should run dc for required stability

- LARGE INDUCTIVE LOOPS IN MSI AND SOME QUADRIPOLE CABLING**

- TEMPORAL WIC CABLE ?**

PREVIOUS TEST: INTERFERENCES IN COMPENSATOR MAGNETS

□ CONDITIONS DURING THE PREVIOUS TEST:

- COMPENSATORS RUNNING AT 7TeV SETTINGS INSTEAD OF AT INJECTION ENERGY (450 GeV)

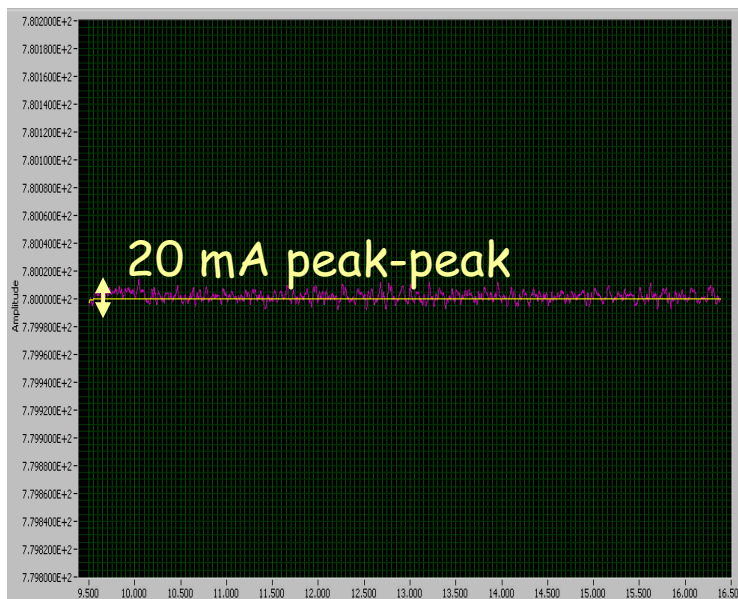
- NOT ALL T18 PC WERE POWERED DURING THE TEST. (upstream of TED 87765) [1.3 MVA vs 5.4 MVA]

- MAIN REACTIVE COMPENSATORS AT POINT 8 NOT OPERATIONAL

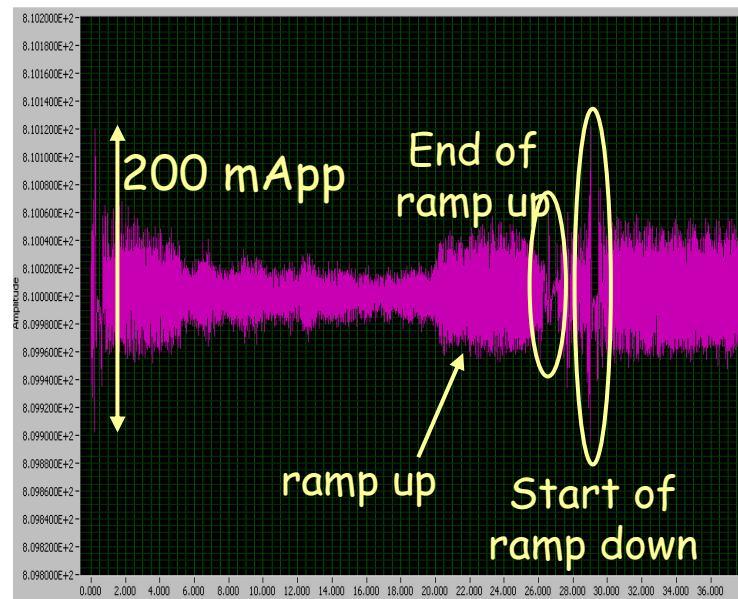
□ INTERFERENCES IN THE COMPENSATORS MORE IMPORTANT AT MBXWS (40 mH) than the MBXWH (160 mH)

LHC Compensators - Performance

- ❑ Interference with the TI 8 power converters
- ❑ Graphs for compensators running at 7 TeV settings
RBXWSH.R8



Without TI8 (end)



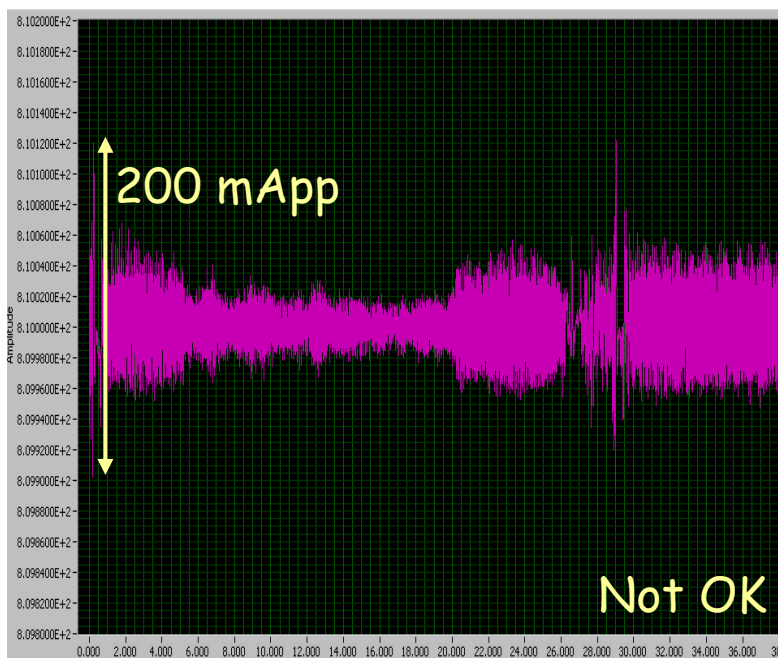
With TI8 (end)

Specification is 20 ppm = 16 mA peak - peak

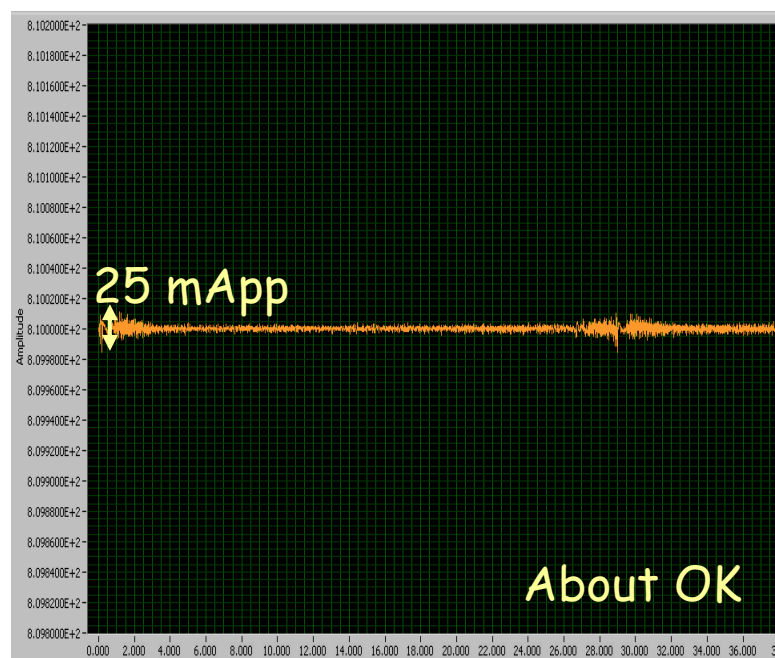
Interference with TI 8 Power Converters

- More important for RBXWSH.R8 than RBXWHX.L8

With TI8 (end)




RBXWSH.R8
(40 mH, 62 mΩ)



RBXWH.L8
(145 mH, 82 mΩ)

PROGRAMME PROPOSAL

1. COMPLETE THE WARM MAGNETS COMMISSIONING AT POINT 8
 - POLARITY CHECK (ALL WARM MAGNETS?)
 - 24H RUN (I INJECTION)
2. UNDERSTAND AND EVALUATE THE INTERFERENCES OF T18 PC IN COMPENSATORS PC
 - TURN ON ALL T18 WARM MAGNETS PC (1st EVALUATION)
 - TURN OFF T18 WARM MAGNET PC 18 KV (2nd EVALUATION)
 - CONCLUSIONS
3. LOOK FOR A SOLUTION
4. VALIDATE SOLUTION?? (If we have time)

TIME REQUIREMENTS

- POWER CONVERTERS IST
- WELQA
- WIC
- WIC PC
- SETUP WARM CIRCUITS

} DONE. 0 DAYS

- WARM CIRCUIT POLARITY TEST
- WARM CIRCUIT HEAT RUN

→ 0.5 DAYS
→ 1 DAYS

- INTERFERENCES 1st EVALUATION
- INTERFERENCES 2nd EVALUATION
- SOLUTION IMPLEMENTATION
- SOLUTION VALIDATION

→ 2 DAYS
→ 2 DAYS
→ ? DAYS
→ ? DAYS

**COMPLETION
STEPS**

**WARM MAGNETS
COMMISSING**

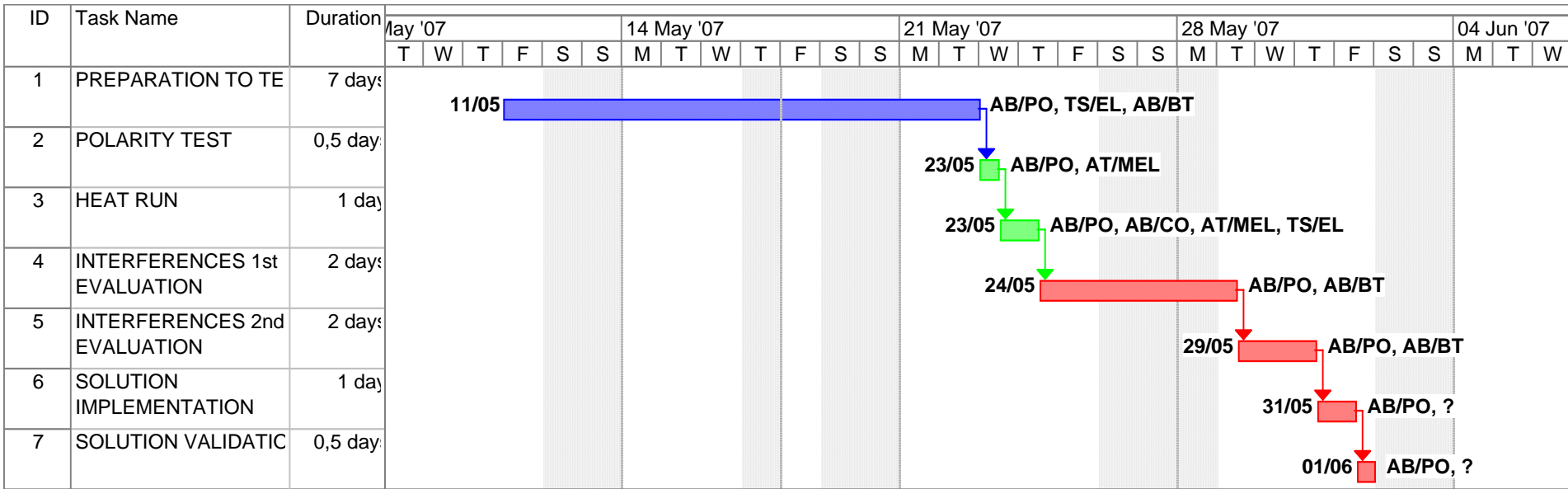
POINT 8

**COMPENSATOR
INTERFERENCES**

**UNDERSTANDING
AND SOLUTION**

POINT 8

PLANNING

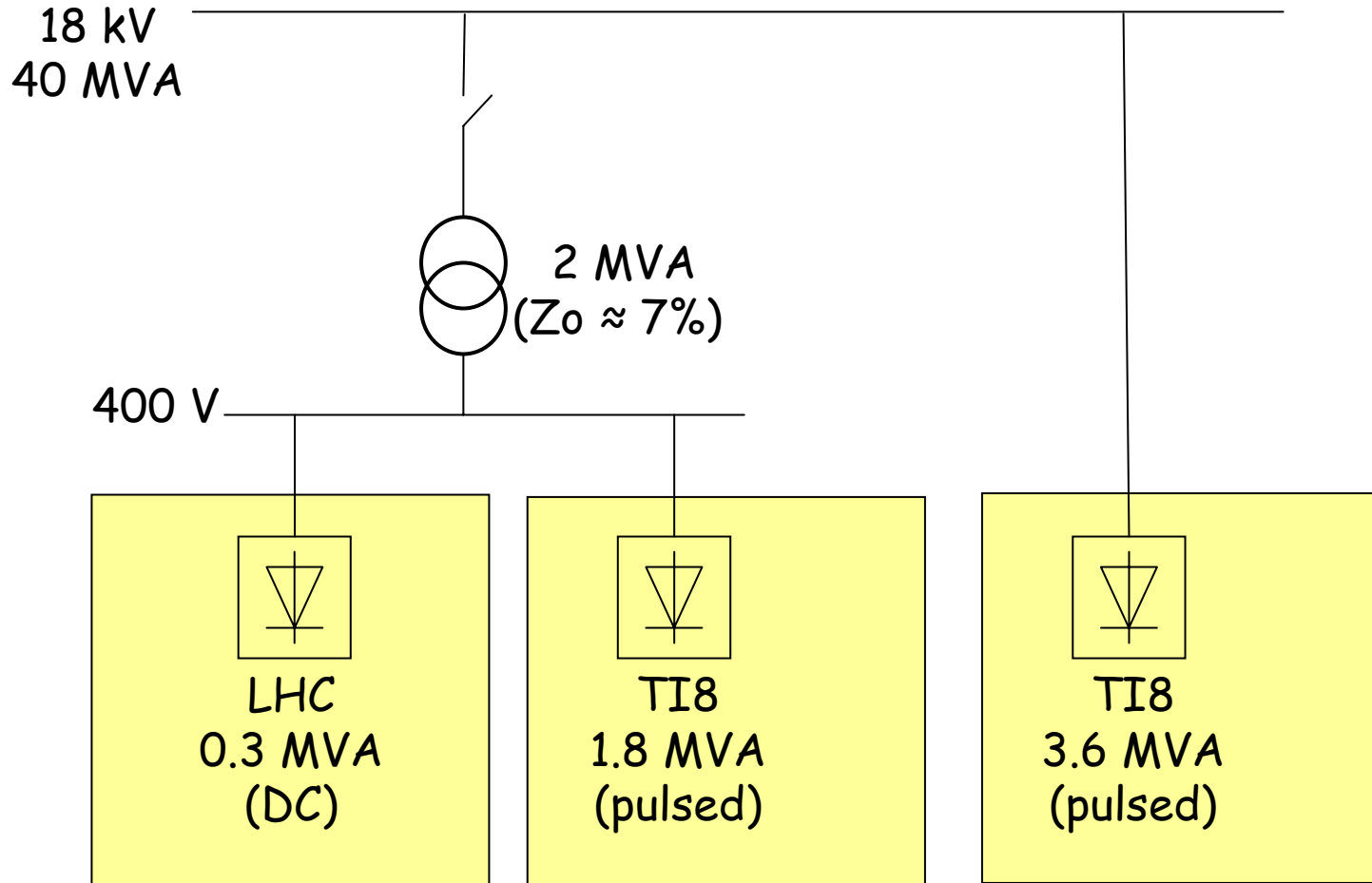


ACCESS RESTRICTIONS

□ During the whole tests:

- Fencing, signalization and flashing lights at the Power Converters level
- Panels forbidding the access to the magnets in the RA87 between the two access from the UA87
- Fencing, signalization and flashing lights for the rest of the warm magnets

Warm magnet circuits at point 8 AC network



Interferences 1st evaluation

Interferences 2nd evaluation