Preliminary report on 18.06.09 fault_v2

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Preliminary report on 18.06.09 fault

The scope of this report is to give an overview of what happened on the CERN electrical network on 18.08.09.

Next pictures show clearly a «not satisfactory » situation but no conclusion will be made at this point; Further to the detailed analysis, a risk analysis will compare different scenarii of such major events in order to get the best compromise.

Conclusions will drive us to adjust/optimize the existing network but also will give clear indications on its necessary renovation.

FAULT SCENARIO

At 12h01’37”776 a 3 phases fault occurs in Jura substation, between Voltage transformer and 18kV cable terminals inside a cubicle cable box. These cables were one of the two links from Jura substation to ME59 substation.

Fault was cleared by tripping 66kV feeder CB then Automatic autotransfer reconfigured the network and re energize Jura substation from the EOS side.

Unfortunately, the fault was not cleared and Autotransfert re energized the faulty cubicle again

At 12:02’42. On EOS/SIG substation fault was cleared.

At 12:03’05 Automatic autotransfer reconfigures again and feed the network through Cable MP7 and LHC point 1.

FAULT SCENARIO

MP7 cable was overloaded and MP7 cable CB tripped at 12:37’09 due to a thermal overload protection order.

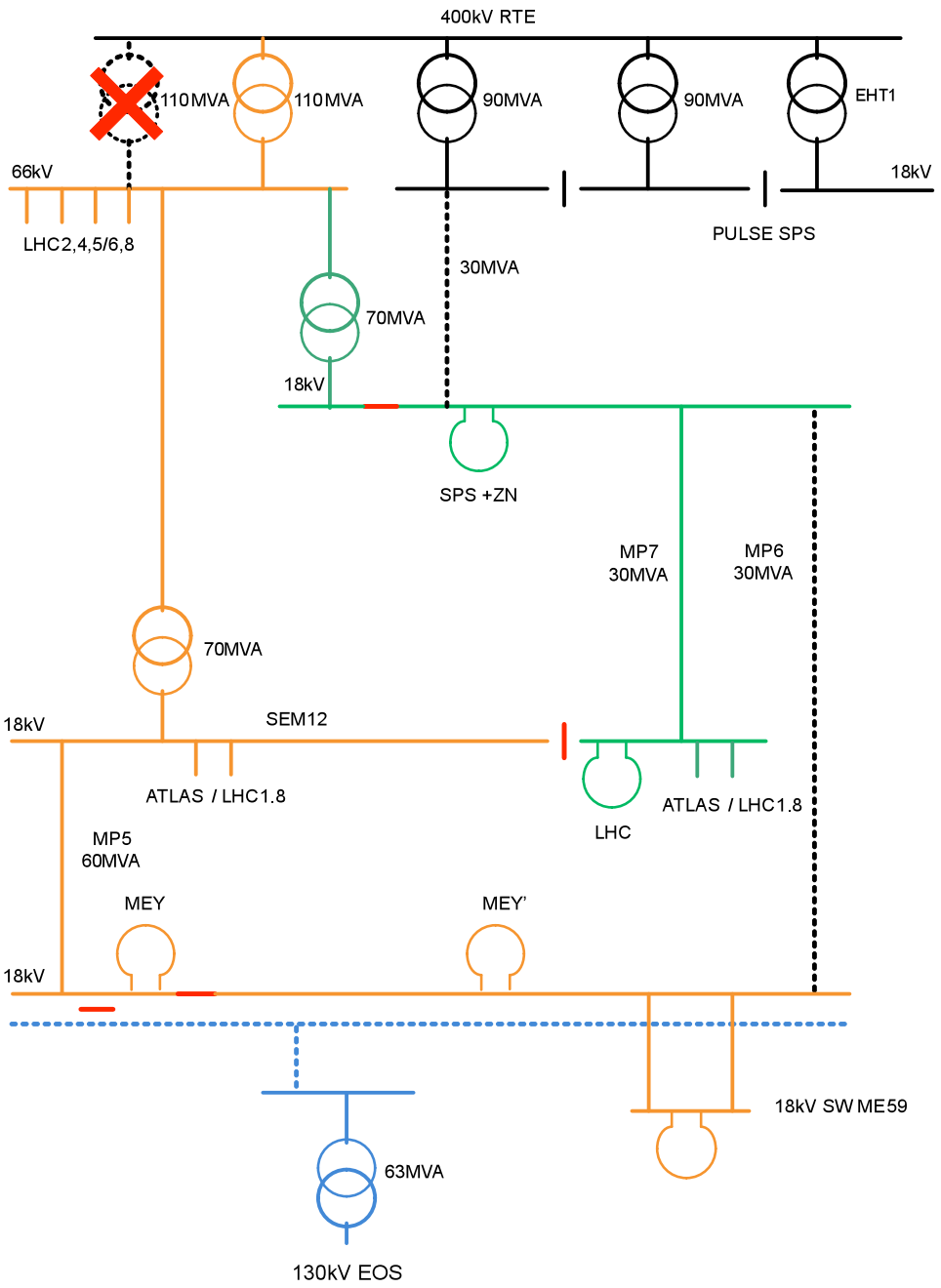
6 minutes later (12:43) Manual reconfiguration was done and the network was back on regular service.

Following pictures show the different steps of this scenario

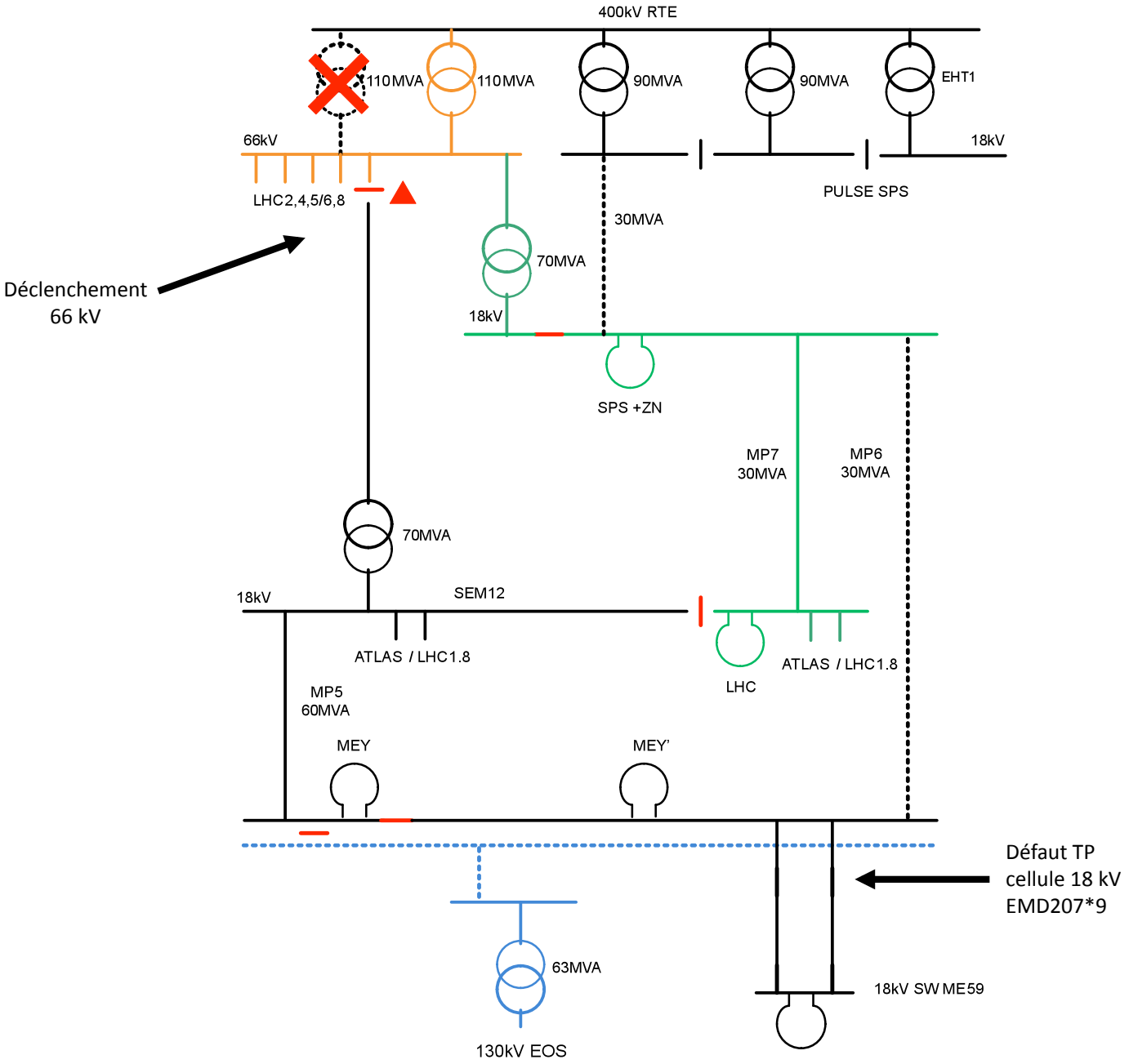
Nota :

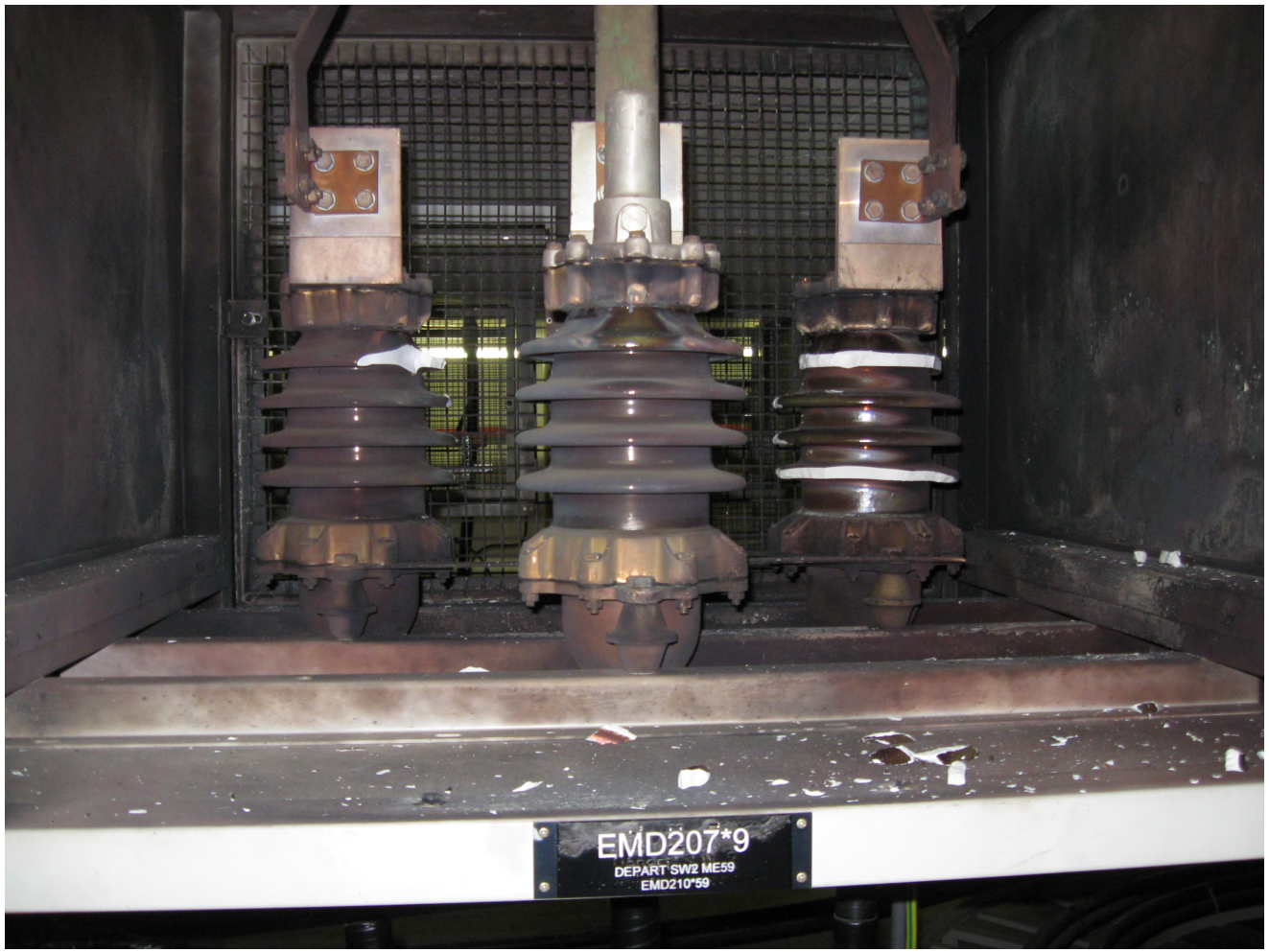
Diesels generators, automatisms and safety UPS worked correctly, personnel safety was maintained all times

Situation initiale 18 juin 09



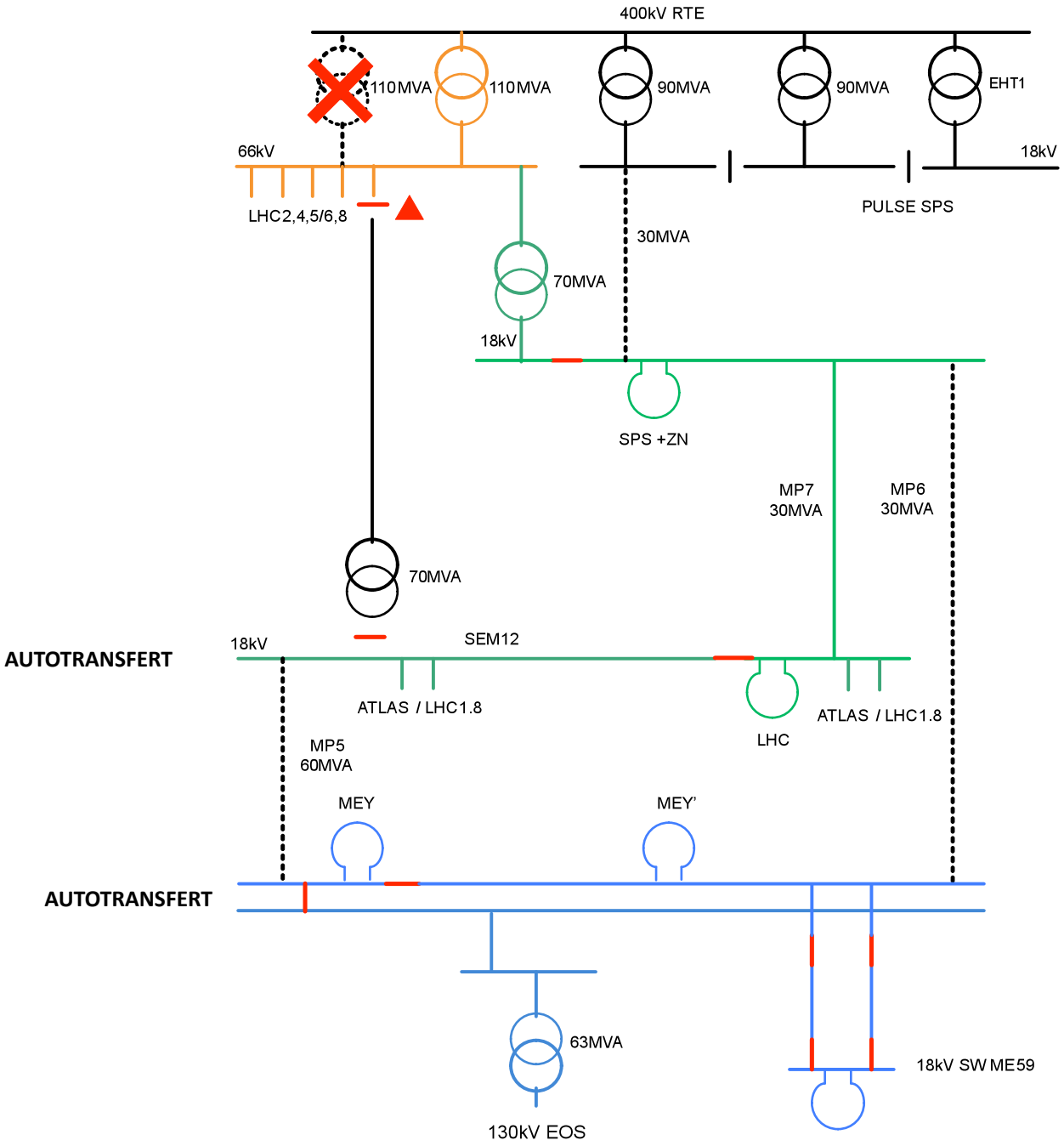
18 juin 09 Situation a 12h01'37"776



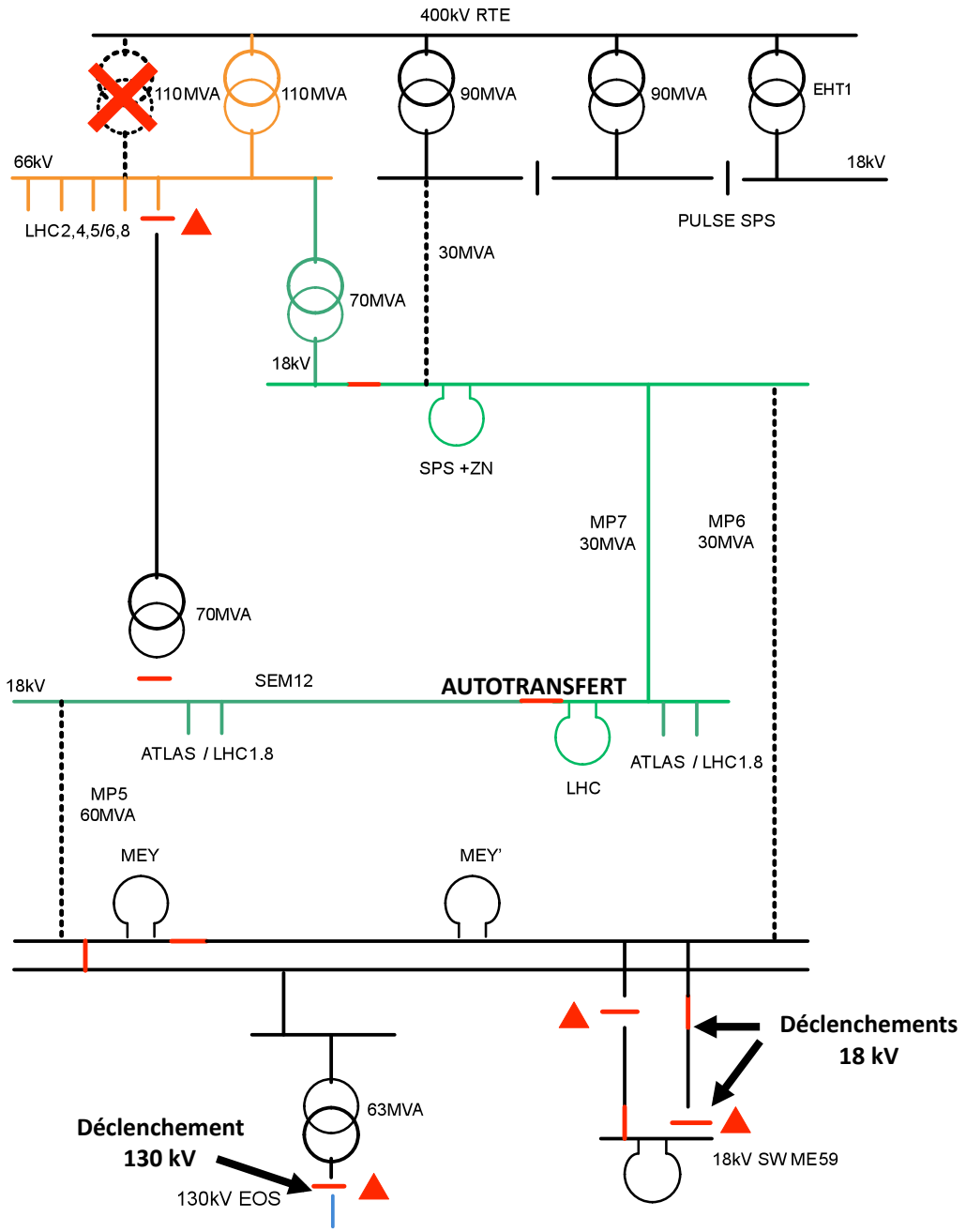

EMD207*9
DEPART SW2 ME59
EMD210*59


MERLIN GERIN
transformateur
de tension
MERLIN
GERIN
TRANSFORMATEUR
de TENSION

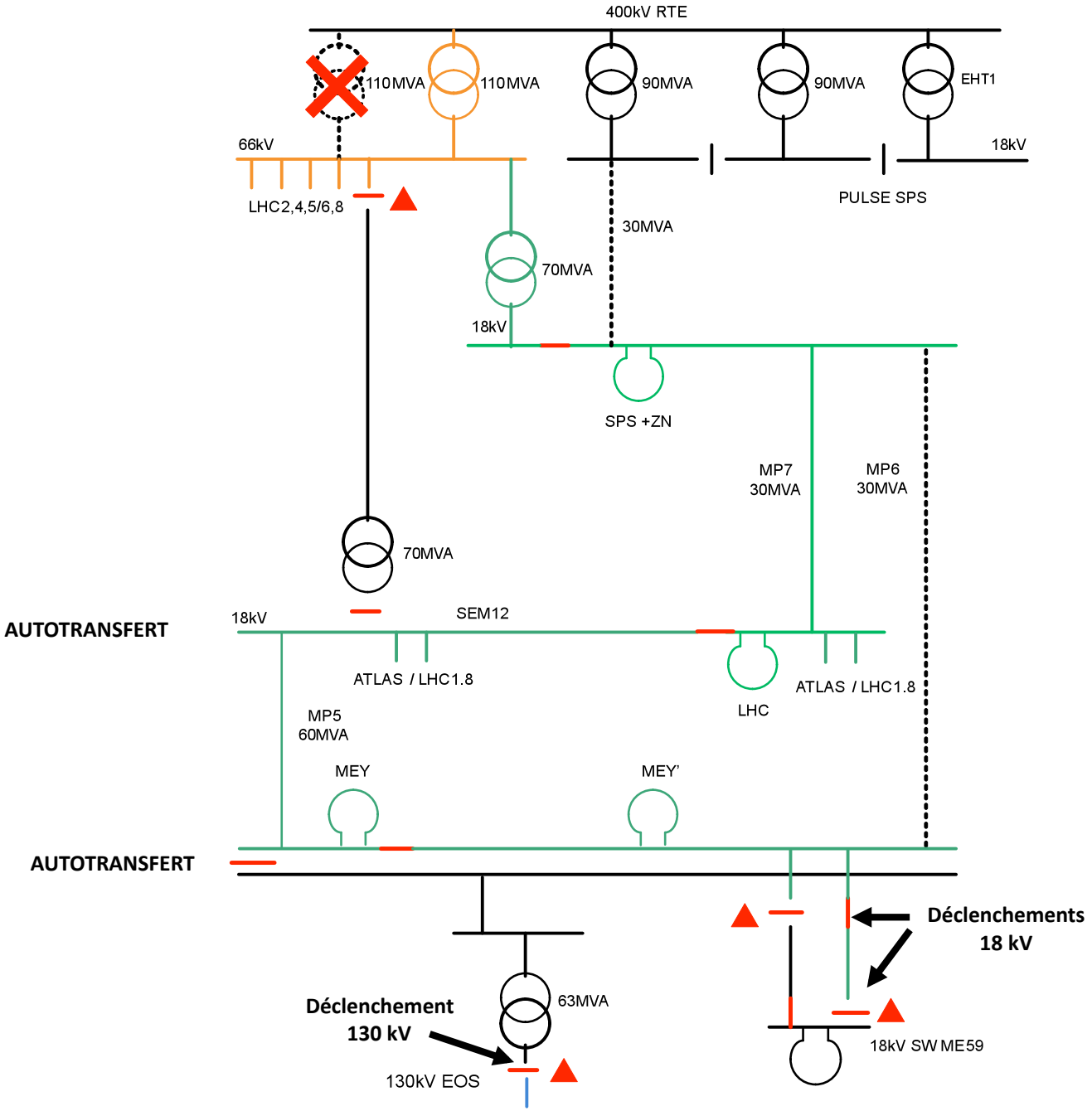
18 juin 09 Situation a 12h01'57"609



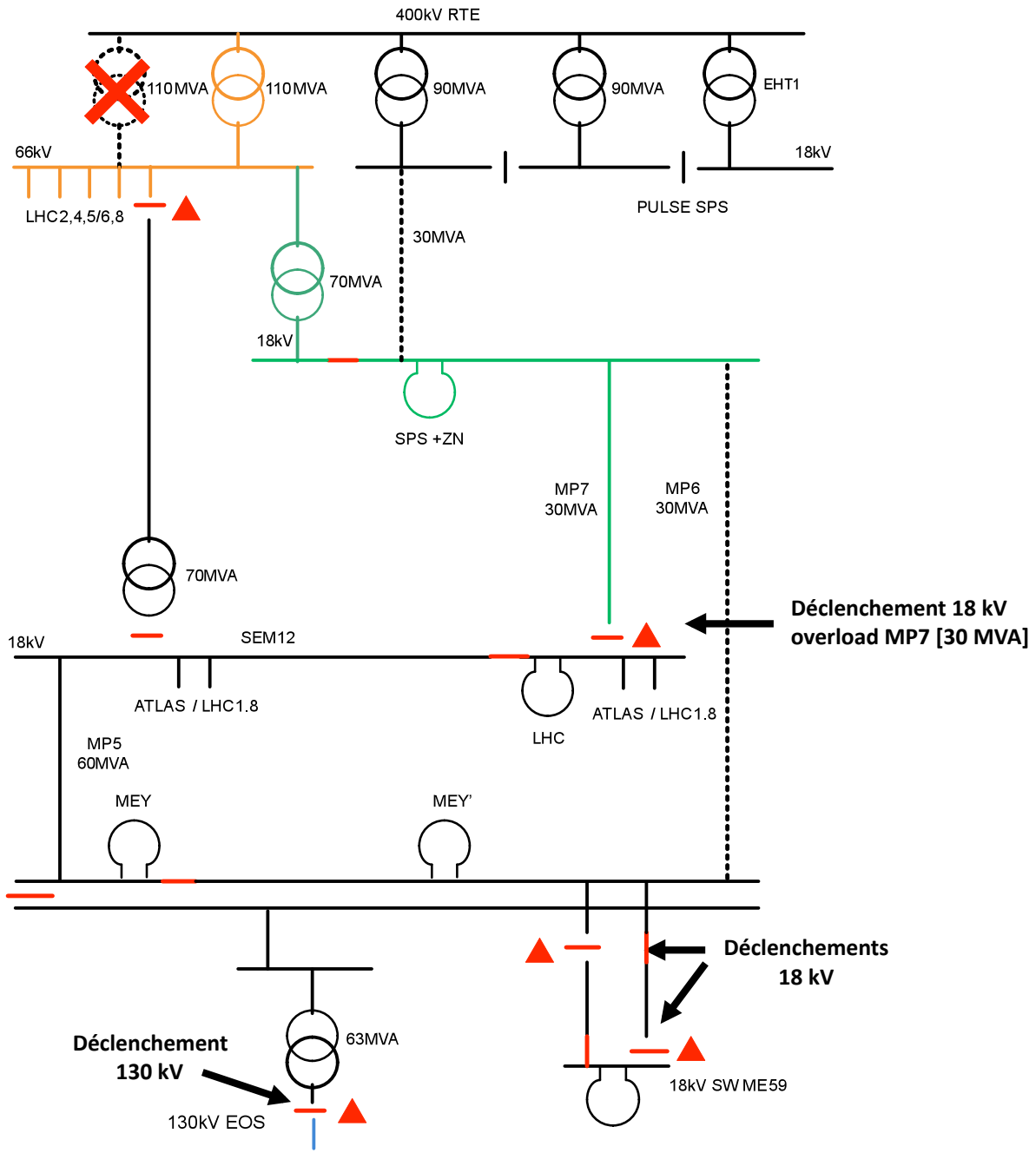
18 juin 09 Situation a 12h02'42"300

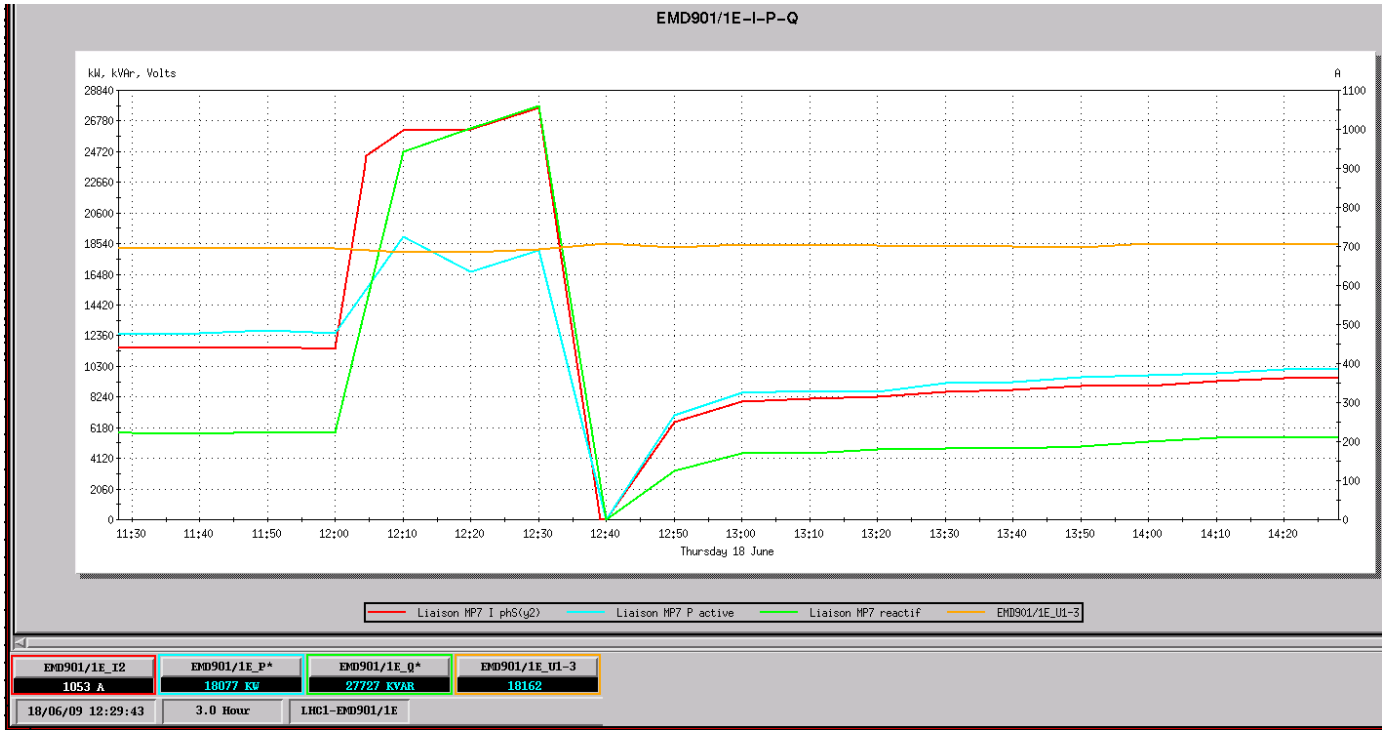


18 juin 09 Situation a 12h03'05"035

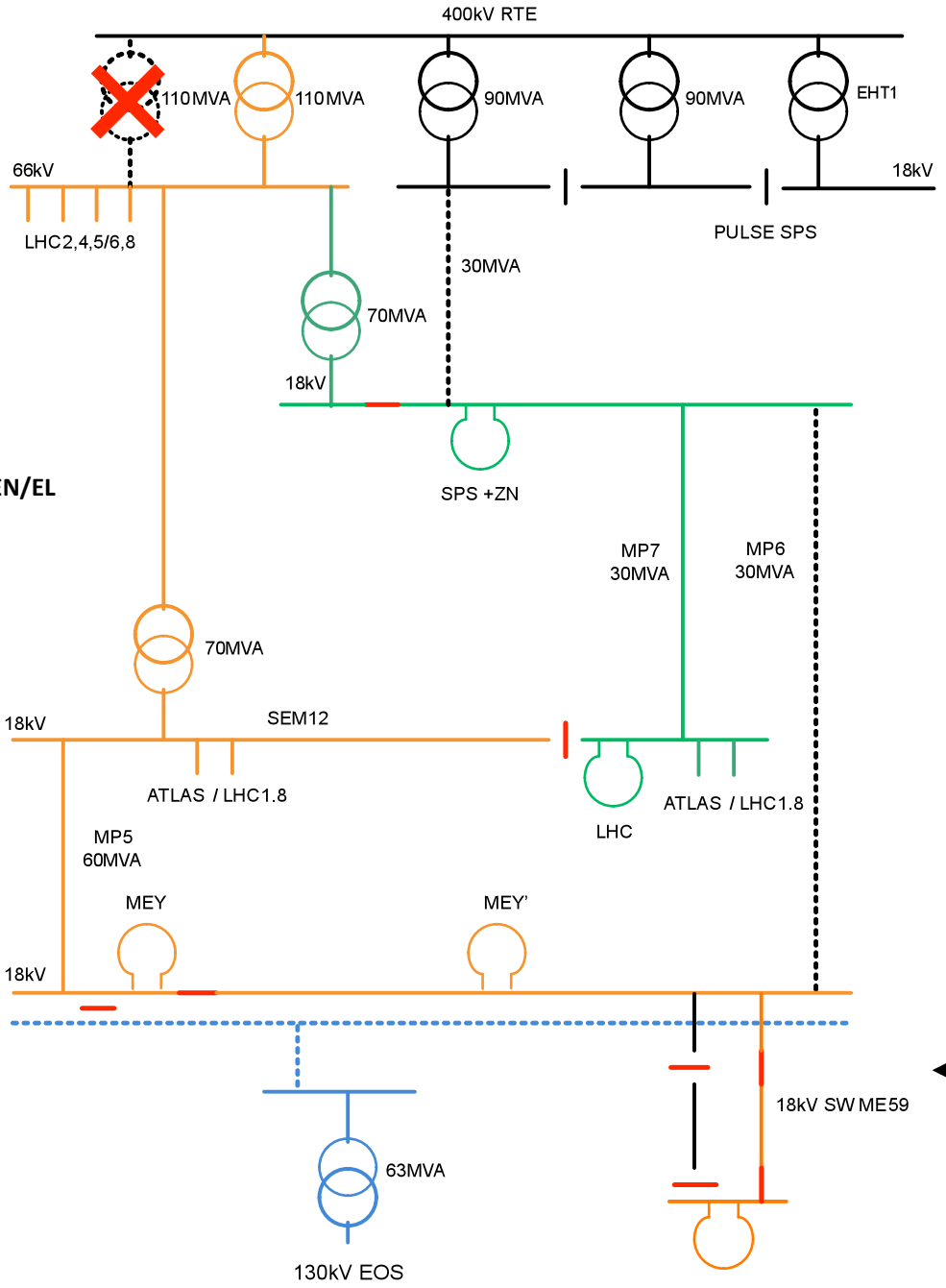


18 juin 09 Situation a 12h37'09"526




EMD901/1E-I-P-Q
kW, kVAr, Volts
A
28840
26780
24720
22660
20600
18540
16480
14420
12360
10300
8240
6180
4120
2060
0
1100
1000
900
800
700
600
500
400
300
200
100
0
11:30
11:40
11:50
12:00
12:10
12:20
12:30
12:40
12:50
13:00
13:10
13:20
13:30
13:40
13:50
14:00
14:10
14:20
Thursday 18 June
Liaison MP7 I phS(y2)
Liaison MP7 P active
Liaison MP7 reactif
EMD901/1E_U1-3
EMD901/1E_I2
1053 A
EMD901/1E_P*
18077 KW
EMD901/1E_Q*
27727 KVAR
EMD901/1E_U1-3
18162
18/06/09 12:29:43
3.0 Hour
LHC1-EMD901/1E

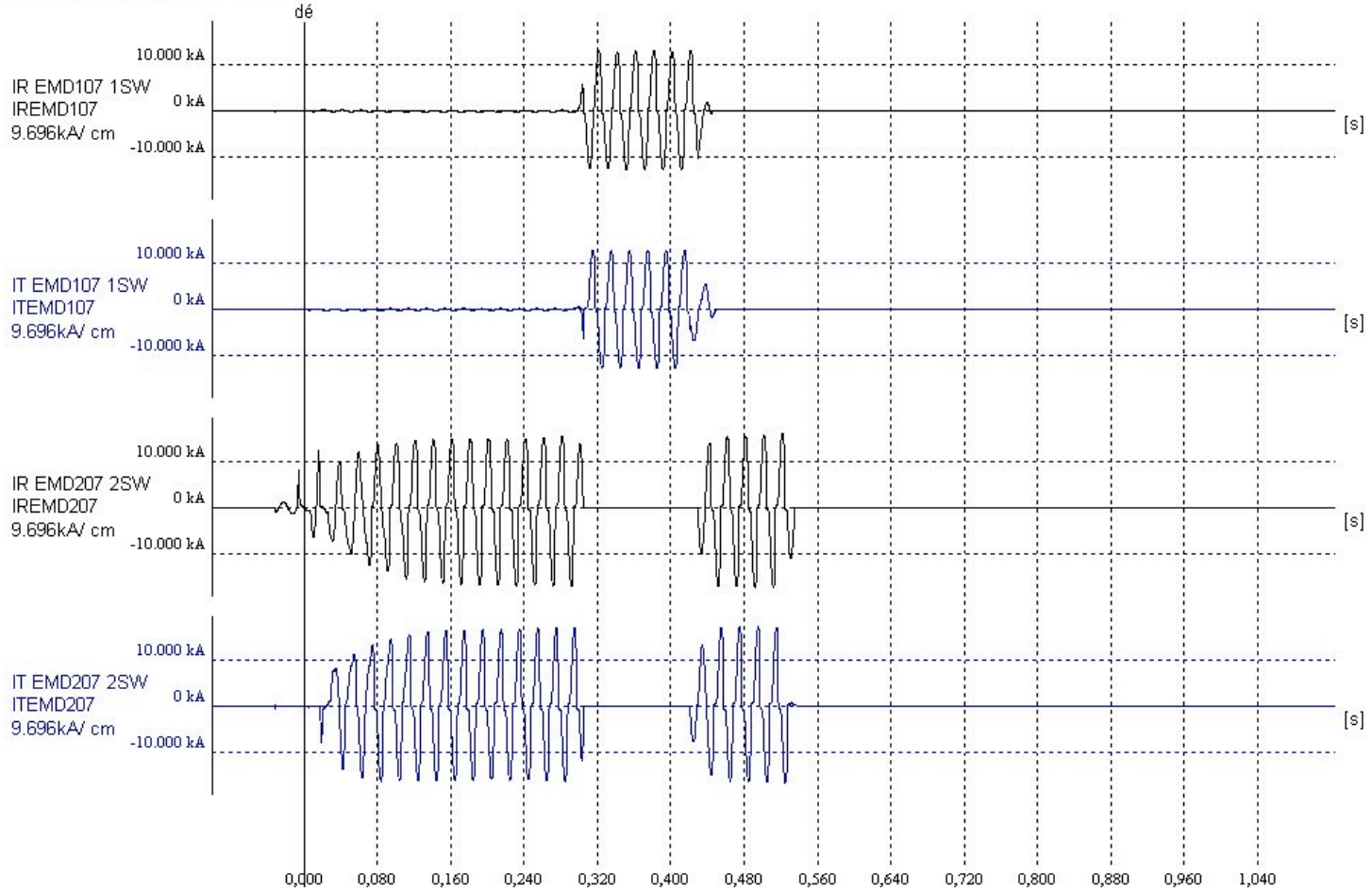
18 juin 09 Situation a 12h43'057"



Reconfigurations manuelles par EN/EL

Liaison SW2 Consignée

heure	description	reseaux Normal SG affectes	reseaux secours / securites affectes
12h01'37"737	detection defaut s/c [EMD207 -209 -701-800-801-EHD21]		
12h01'37"776	Declenchement EHD21/E9	Manque tension MEYRIN - ATLAS (partiel) - LHC18 (partiel) perturbation inferieure a 100ms sur SPS et LHC 35% de chute de tension sur 18 kV et 400V LHC	Manque tension reseaux secours Meyrin
12h01'47"132	fin sequence AUTOTRANSFERT a JURA	MEYRIN realimente par SIG	Reseaux secours Meyrin realimentes
12h01'57"609	fin sequence AUTOTRANSFERT en SEM12	ATLAS (partiel) - LHC18 (partiel) realimente par BE9 (MP7)	
12h02'42"974	detection defaut s/c [EMD207 -cables CERN]		
12h02'43"177	Declenchement EMD207 a JURA		
12h02'43"xxx	Declenchement EMD210*59 Declenchement disj,130 kV transfo SIG ME10	Manque tension MEYRIN	Manque tension reseaux secours Meyrin
12h03'05"035	fin sequence AUTOTRANSFERT a JURA	MEYRIN realimente par SEM12 - BE9 via MP7	
	Reprise reseau secours Meyrin par Diesels JURA et autom.		Reseaux secours Meyrin realimentes
	Synchro reseau secours Meyrin par Diesels JURA et autom.		
12h35'30"'670	alarme thermique EMD412/E9 (MP7) autour de 110% Ib		
12h35'36" 914	alarme thermique EMD901 (MP7) autour de 110% Ib		
12h37'09"526	Declenchement MP7 EMD901/1E	Manque tension MEYRIN - ATLAS - LHC18 - Loop LHC	
	Reprise reseau secours Meyrin et LHC par Diesels et autom.		Reseaux secours Meyrin e LHC realimentes
	fin autonomie un bloc UPS au 513 et qqus declts EOD ?		Reseaux UPS 513 affectes
12H43'40"	Reconfiguration manuelle SEM12	MEYRIN et ALTAS - LHC18 realimente via EHT102/1E 66 kV	
12H43'57"	Reconfiguration manuelle SEM12	Loop LHC realimentee via MP7	
	Synchro retour reseau secours		


Oscillostore Jura, P531 12Bit
Date: 18.06.2009 12:04:35,551
Fréquence d'échantillonnage: 5000Hz
dé
IR EMD107 1SW
IREMD107
9.696kA/ cm
IT EMD107 1SW
ITEMD107
9.696kA/ cm
IR EMD207 2SW
IREMD207
9.696kA/ cm
IT EMD207 2SW
ITEMD207
9.696kA/ cm
10.000 kA
0 kA
-10.000 kA
[s]
0,000
0,080
0,160
0,240
0,320
0,400
0,480
0,560
0,640
0,720
0,800
0,880
0,960
1,040