

TE

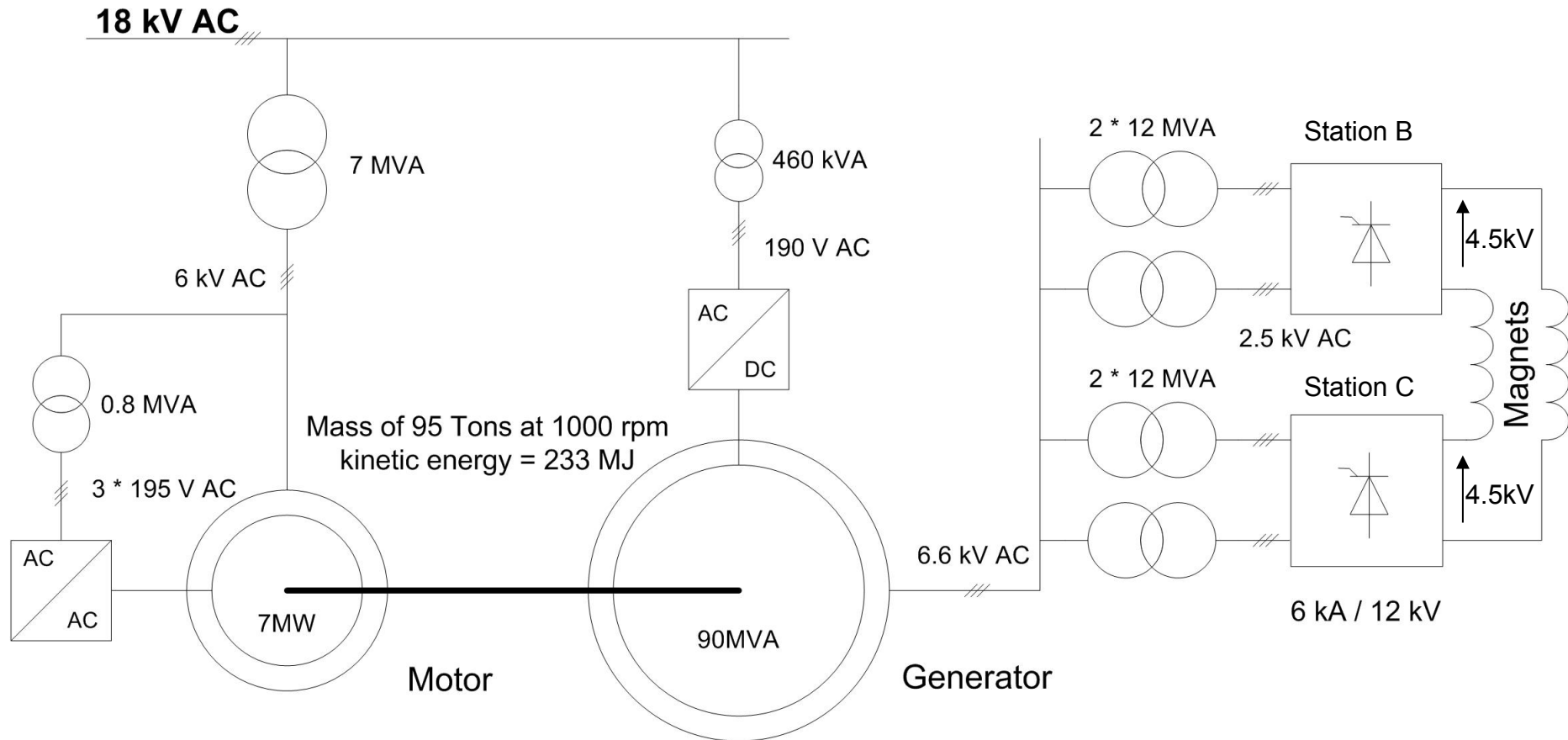
PS-MPS faults

Friday 4 September 2009

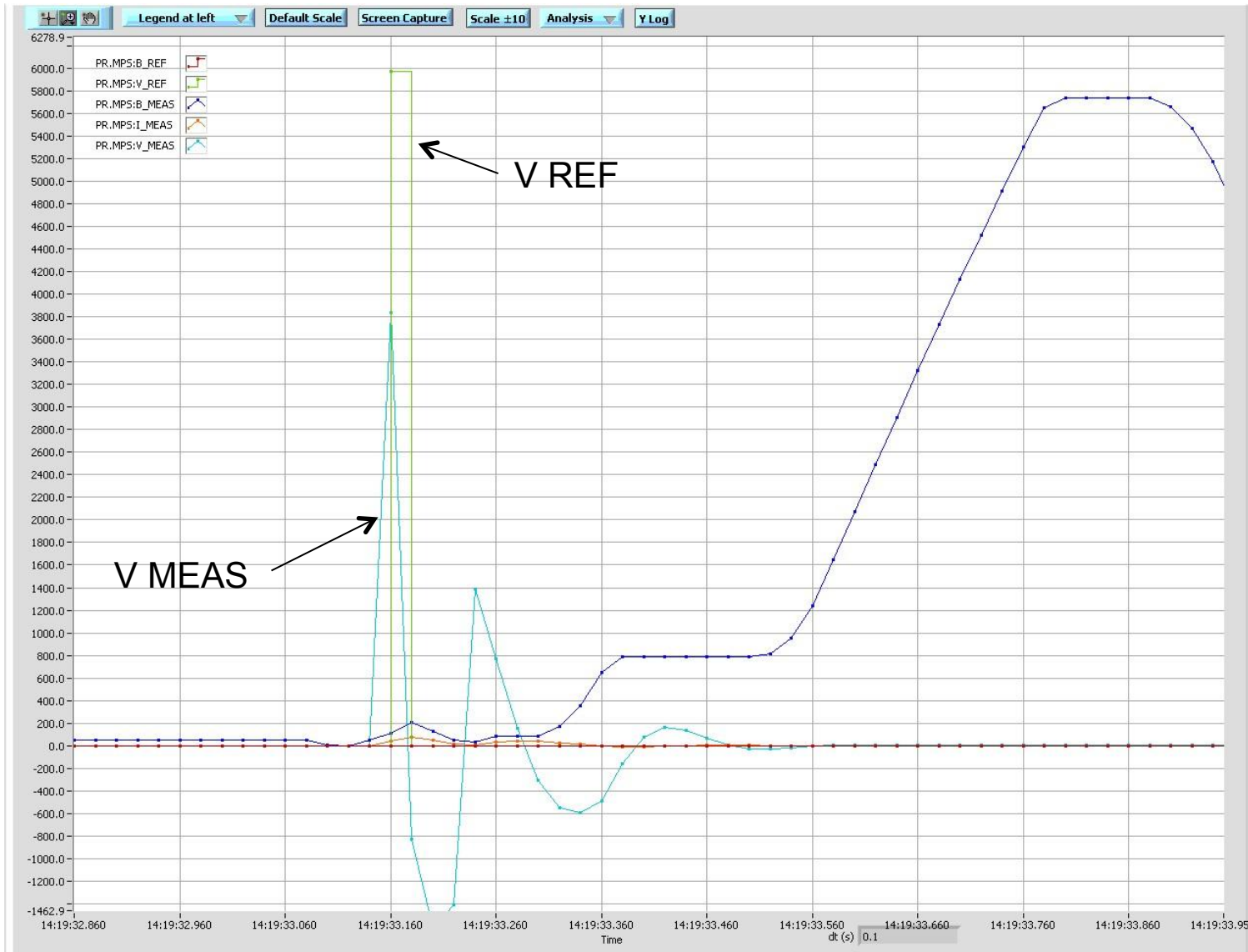
Yves GAILLARD,
on behalf of all involved colleagues from TE/EPC

FOM 08 September 2009

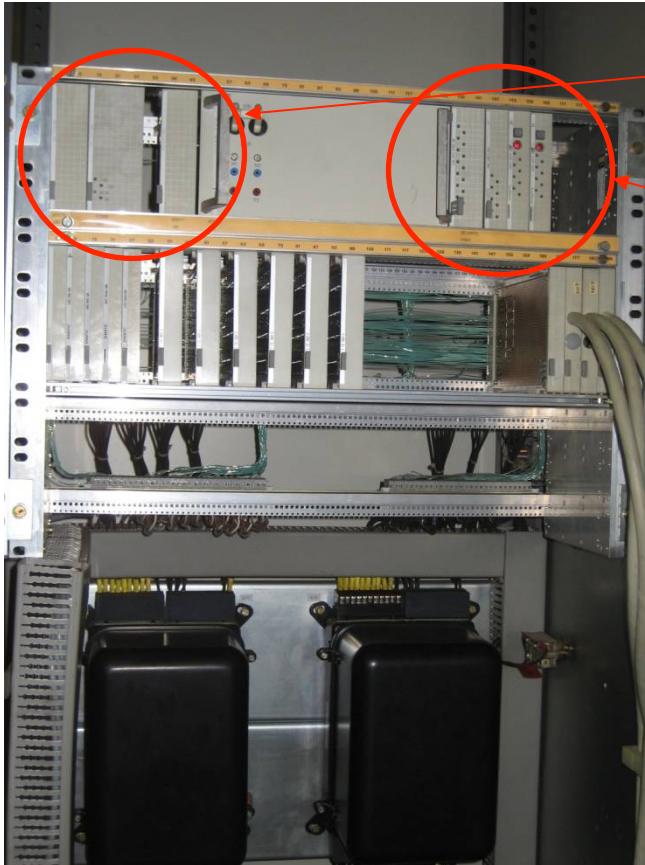
PS-MPS Layout



MPS trip 04-09-09 14h19



+/-15V Auxiliary Power Supply fault

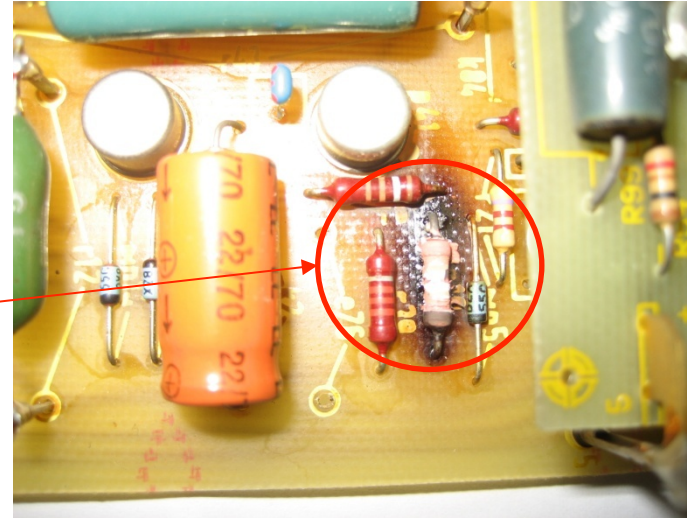
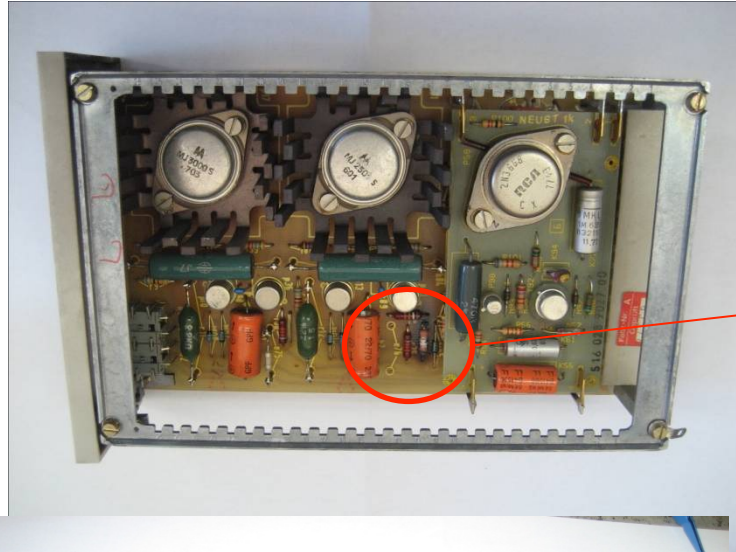


+/-15V Auxiliary Power Supply faulty

Electronics cards supplied by aux. power +/-15V:

Firing pulse amplifiers
Fiber optic transmitter
Fiber optic receiver

+/-15V Auxiliary Power Supply fault



4 Auxiliary Power Supplies in use

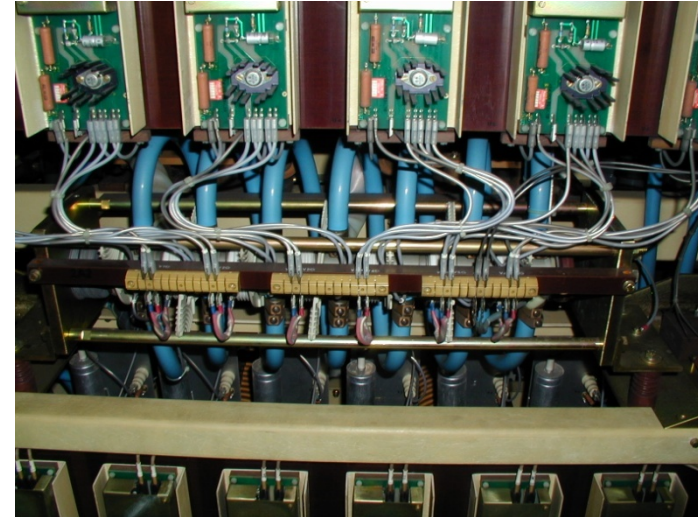
+1 spare

+1 faulty (to be repaired)

Thyristors stack fault

- One stack with 6 thyristors has been changed.
- All thyristors were tested at 3500 V, none was in short-circuit.
- The gate circuits of the six thyristors still need to be checked.

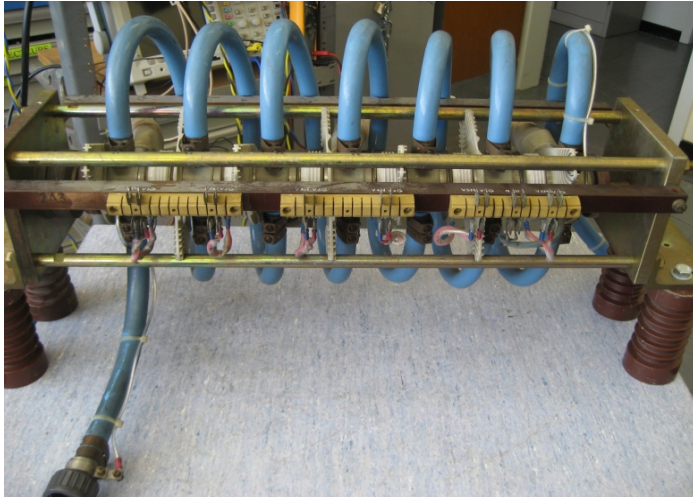
Thyristors stack fault



108 Thyristors in use per station
(2 stations)

Total: 216 thyristors

Thyristors spares



Spares:

1 stack of 6 mounted to be repaired



57 Thyristors

Conclusions

We observed several different distinct problems in the PS:

1. Earth fault in magnet busbar
2. Failure of aux. +/-15V power supply - for firing pulse amplifiers, fiber optic transmitter and receiver
3. Possibly a thyristor failure (depending on investigation of thyristor gate circuits)

It is likely that these events were linked to each other. We don't know (yet) which of the three events was the initial cause of failure. We can only suspect that the problem on the +/-15V power supply has probably generated a fault in the gate system.

Possibility 1:

Did the failure of the aux. supply cause an overvoltage, which then caused the earth fault? Our FGC2 recordings of the initial failure do not show any overvoltage. The initial failure was not linked to an overvoltage.

Additional question: Why did this aux. power supply fail?

Possibility 2:

Did the earth fault in the magnet cause the auxiliary supply to fail? Very unlikely.

Based on the recordings we have, it is difficult to answer these questions. Investigations will continue.