Power converter
for the
TT2 mercury target project

by

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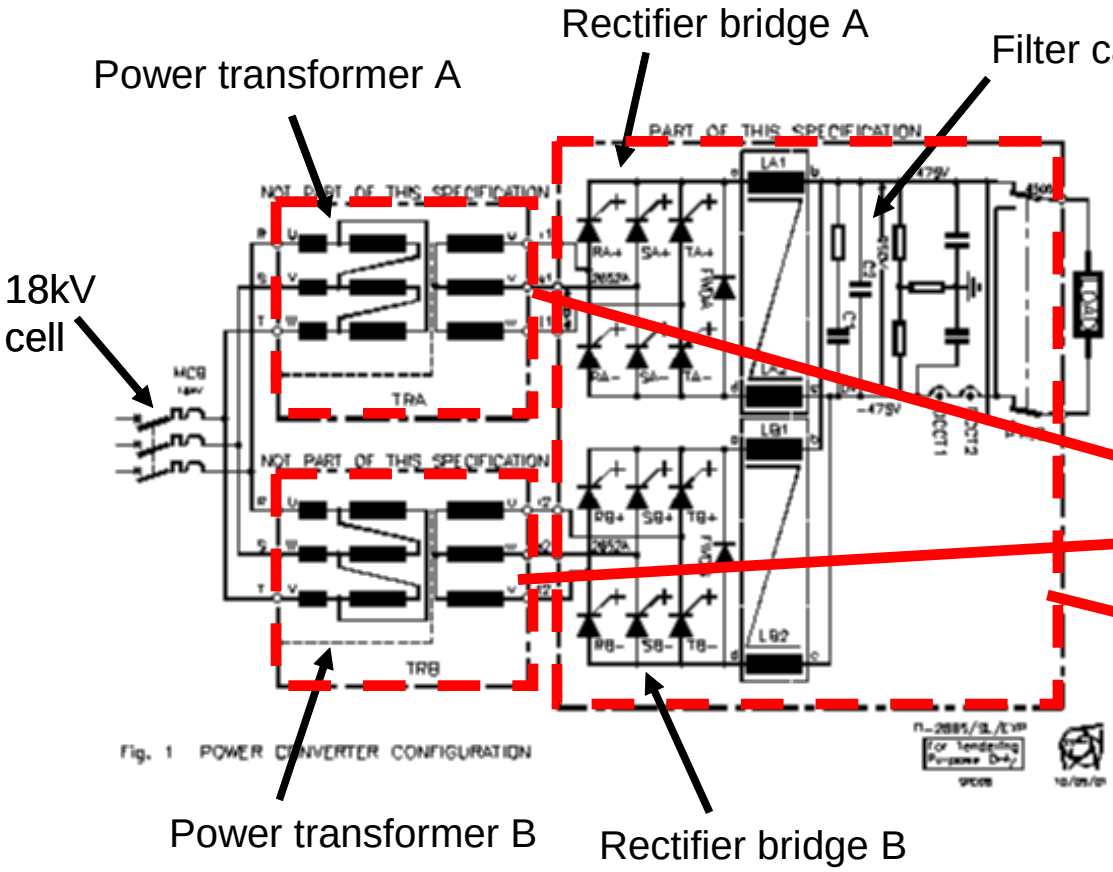
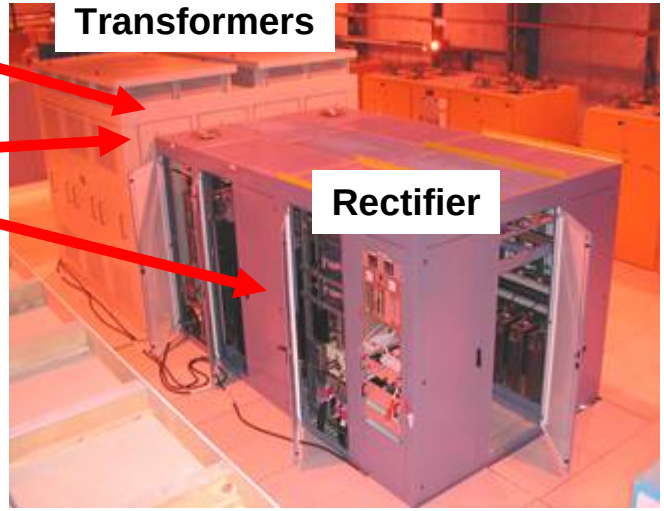
Historic overview

First technical proposal (on 31 March 2004):

- ALICE/LHCb type power converter rated 6500Adc, 950Vdc, 6.7 MW



Converter topology



Historic overview

First technical proposal (on 31 March 2004):

- ALICE/LHCb type power converter rated 6500Adc, 950Vdc, 6.7 MW

Converter location

target

Possibility # 1 - in the ISR gallery

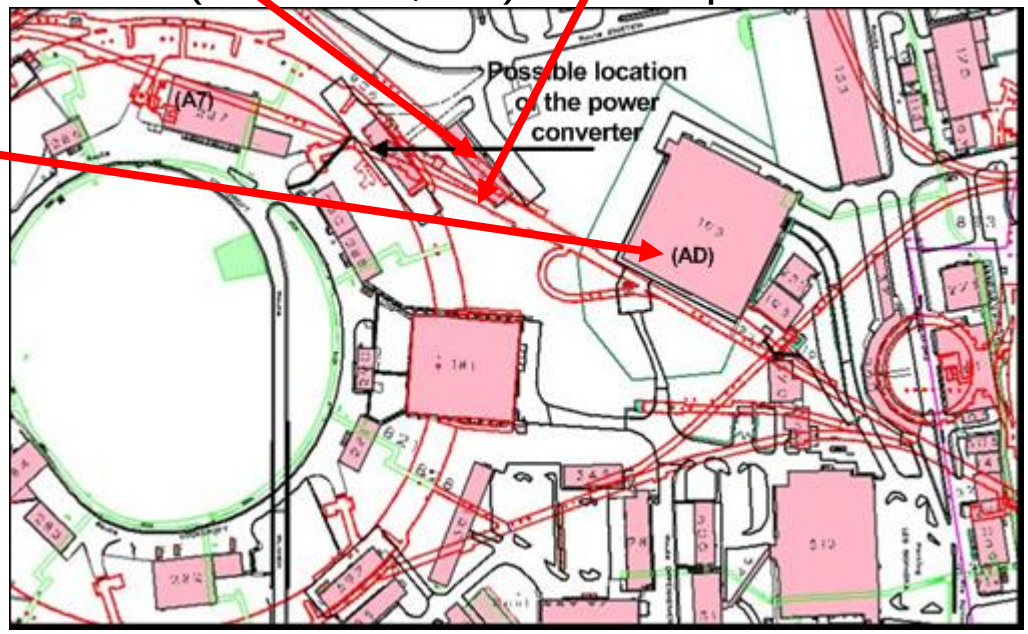
- Short DC cables, between the power converter and the magnet (~30m);

- Long AC cables, between the 18kV cell (in bld 193, AD) and the power converter

Possibility # 2 - in bld 193, AD

- Longer DC cables, between the power converter and the magnet;

- Short AC cables, between the 18kV cell (available in bld 193, AD) and the power converter



Historic overview

First technical proposal (on 31 March 2004):

- ALICE/LHCb type power converter rated 6500Adc, 950Vdc, 6.7 MW

Advantages:

- Brand new system;
- Forced air cooling (no need for water circuit)
- Cast resin power transformers. Can be placed indoor

Inconveniences:

- Already short in time for buying a new power converter;
- Already short in time for buying the power transformers;
- One ALICE/LHCb spare power transformer can be lend, but that implies higher current harmonics in the 18 kV distribution network;
- Ultimate current 7250A output;
- Price: ~300 kCHF for the rectifier part only.

Historic overview

Second technical proposal (~November 2004):

- Decommissioned West Area (WA) power converter rated 8000Adc, 1000Vdc, 8 MW

Advantages:

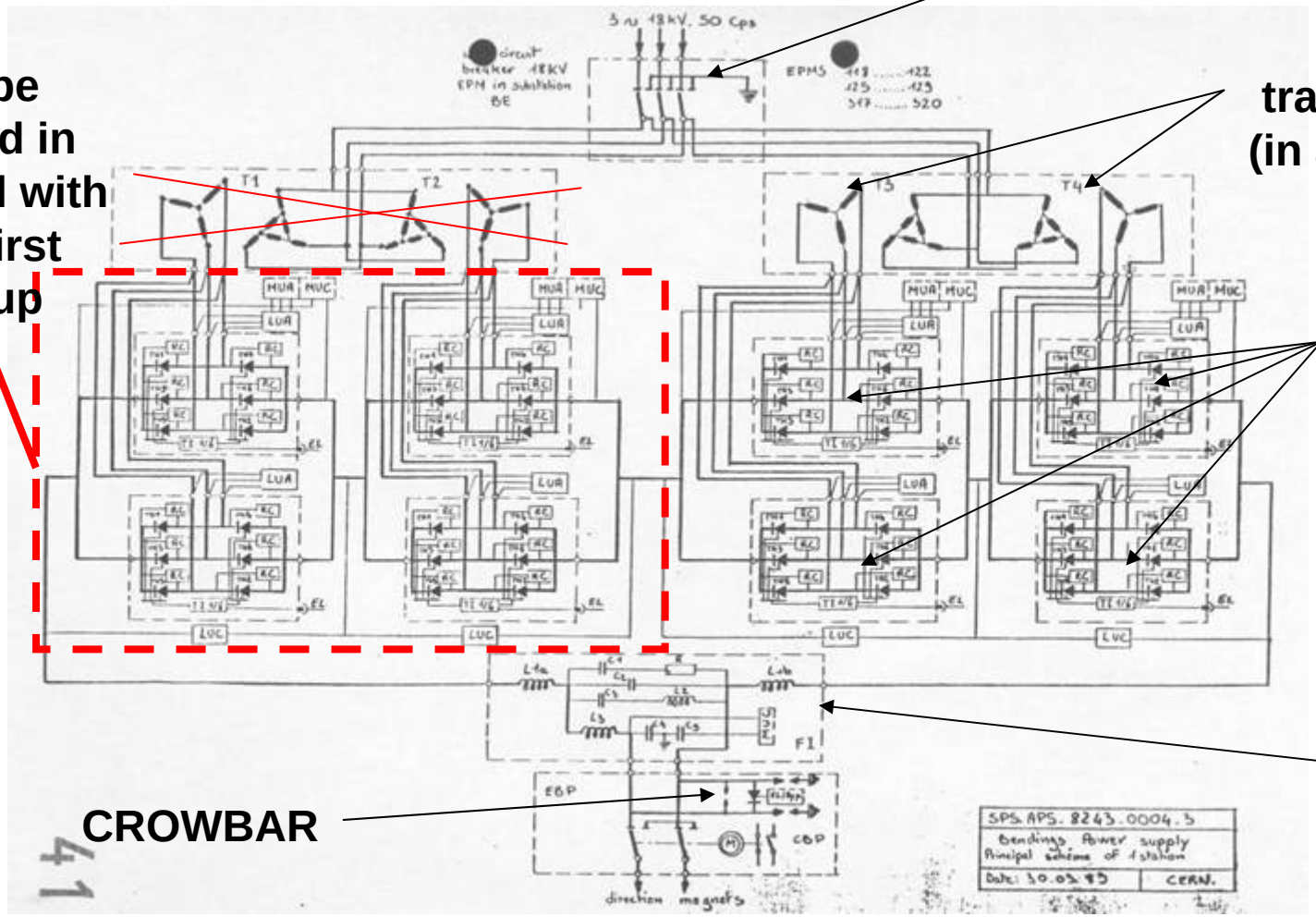
- Availability at the moment;
- Higher current and voltage ratings;
- Available power transformers, allowing low current harmonic distortion on the 18kV network
- Price (detailed later)

Inconveniences:

- Water cooled. Needs water connection to the power converter;
- Oil transformers. Need to be placed outdoor, in a special pit, for security reasons;
- Refurbish of power part and control/interlocks cabling

West Area power converter 8000Adc, 1000Vdc

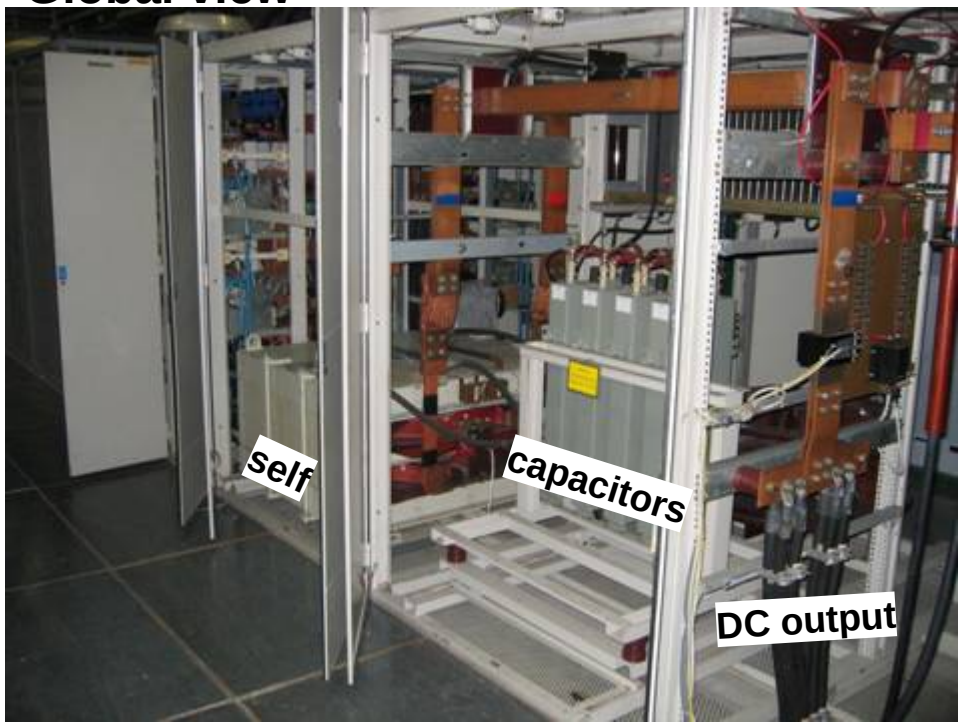
Converter topology



West Area power converter 8000Adc, 1000Vdc

Converter photos, 1

Global view



Rectifier bridges

Passive filter self

Passive filter capacitors

West Area power converter 8000Adc, 1000Vdc

Converter photos, 2

DCCT

CROWBAR & controls

Power transformers

AB/PO proposition
8000Adc, 1000Vdc

Strategy:

- ***Refurbishment of the West Area Power Converter, making it compatible with the project requirements***

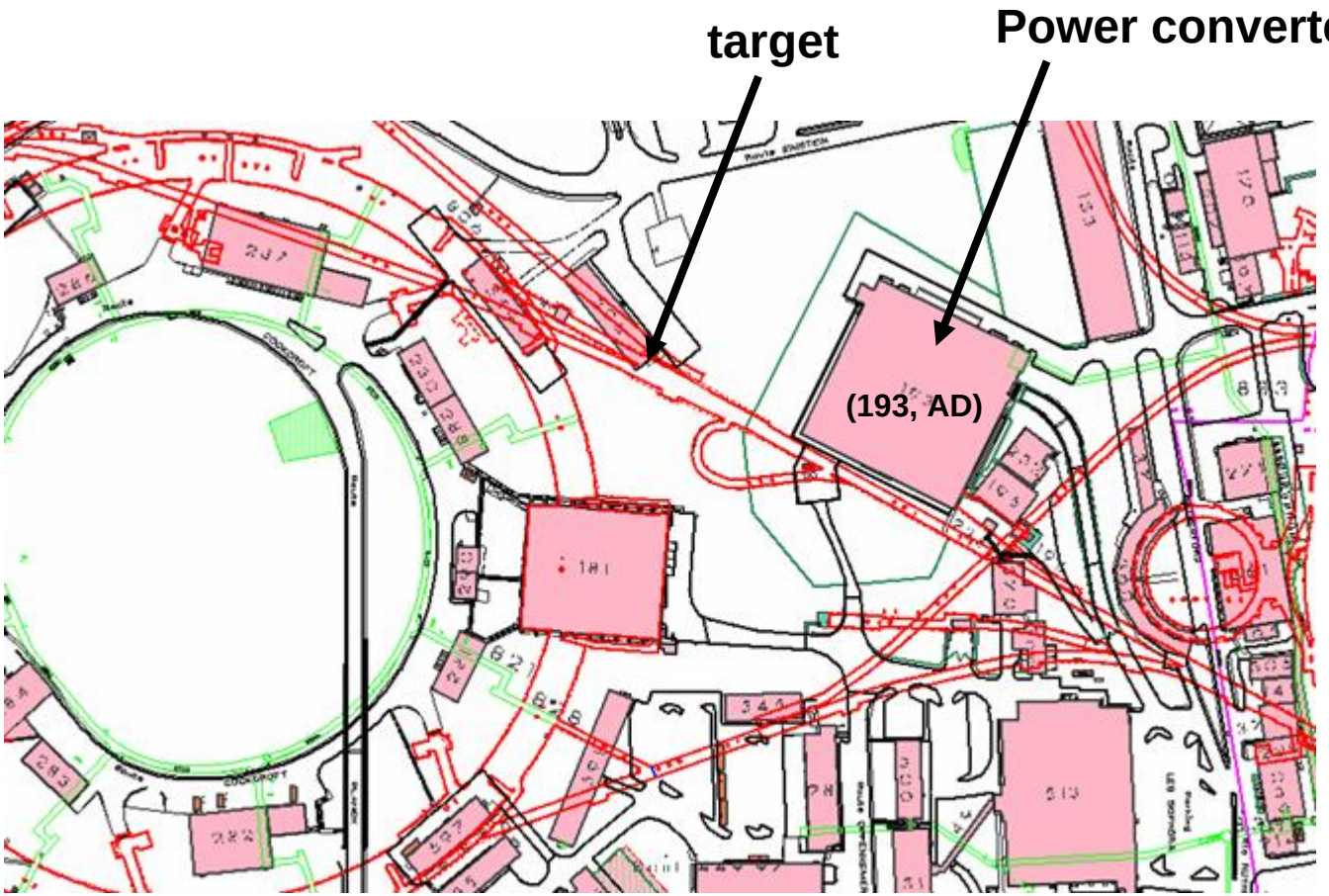
Conserving the main components of the power part

Installing a new digital control electronic system, type PS

AB/PO proposition
8000Adc, 1000Vdc

Power Converters location:

- ***At building 193 (AD) like ALICE/LHCb converter 2nd choice***



AB/PO proposition
8000Adc, 1000Vdc

Available infrastructures at building 193 (AD):

- ***Water circuit in the vicinity of the power converter's location;***
- ***Pit for placement of the power transformer (outside the building);***
- ***18 kV cell***

AB/PO proposition

8000Adc, 1000Vdc

Estimated tasks, at charge of AB/PO, for refurbishment and costs:

• *Disassembling of power converter at its actual location (BA6) and transport to its final location (Bld 193,AD);*	*10 kCHF*
• *Preparation of the zone for reception;*	*5 kCHF*
• *Reassembling, cabling work;*	*15 kCHF*
• *New DCCT;*	*10 kCHF*
• *New control electronics;*	*10 kCHF*
• *Connection to the water circuit;*	*10 kCHF*
• *Test and commissioning*	*40 kCHF*
• *Decommissioning*	*10 kCHF*
Total	***110 kCHF***

AB/PO proposition
8000Adc, 1000Vdc

Tasks not at charge of AB/PO (at charge of TS/EL)

- ***AC cabling between the 18kV cell and power transformer;***
- ***AC cabling between power transformer and thyristor rectifier bridges;***
- ***DC cabling between the power converter and the magnet***