CERN P186 Video Conference

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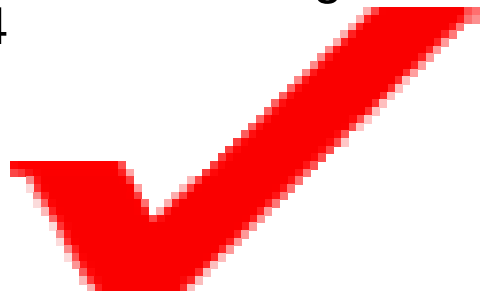
Access to TT2A during PS extraction

- POSSIBLE, see also memo at homepage: subsystem/safety/radiation
- Needed modifications implemented during shutdown 03/04



2 December 2004
IDto2004-30m
EDMS No. 529 235 v.1

MEMORANDUM

A/To: Charles Hill, RSO AB

cc: A. Fabich AB-ATB, H. Haseroth, AB-ABP, P. Cennini, AB-DSO

De/From: Th. Otto, SC-RP

Conc.: Radiological consequences of CNGS beam tuning for TT2A

In 2002, a study of the shielding wall between TT2 and TT2A was performed [1]. A proton beam extracted from the PS and directed towards TT10 may hit this wall. It was found, that under worst-case conditions, a lost beam with a momentum of p=26 GeV/c and a proton intensity of 2.3 10^{13} during a super-cycle of 14.4 s duration could hit the separation wall directly. It would expose personnel in TT2A to an effective dose of E = 250 mSv during a single super-cycle. Consequently, in the following shutdown, 160 cm of additional iron shielding was installed in tunnel TT2 close to dump D3. The additional shielding provides an attenuation factor of exp(160/17.8) = 8000 and the effective dose in a supercycle is now limited to 30 μSv. In addition, an interlock coupled to a radiation monitor will stop the extraction from the PS once a dose rate of 100 μSv/h during 15 min (or 25 μSv in a single pulse) is measured in TT2A. This interlock is generated with a dedicated, high-reliability hardware.

A possible scenario in 2006 is a full beam loss on the reinforced shielding wall between TT2 and TT2A during tuning of a CNGS beam. In this condition, 3 10^{13} protons at p = 14 GeV/c would be extracted every 1.2 s from the PS. In order to judge if and how much additional shielding is necessary, a simple comparison of dose equivalent source terms is performed instead of performing a Monte-Carlo simulation as in [1]. The following table summarises the source terms for the two conditions, calculated after [2]:

Year	**Momentum** (GeV/c)	**Source term [2]** (Sv m^2 proton^{-1})	**Intensity**	**Source term** (Sv m^2)
2002-2004	26	4.2 10^{-11}	2.6 10^{13}/14.4 s	1103/14.4 s
2006	14	1.3 10^{-11}	3.0 10^{13}/1.2 s	390/1.2 s

Personnel in TT2A would be exposed to a dose 3 times smaller per lost pulse than in the previous situation. Under worst-case conditions, the radiation monitor could interlock further extraction after 3 failed pulses at the latest. Additional shielding in TT2 does not seem mandatory under these circumstances.

Thomas Otto

[1] M. Silari, H. Vincke, TIS-RP/TN/2002-018, EDMS No. 341 746
[2] A. H. Sullivan, *A Guide to Radiation and Radioactivity Levels near High-Energy particle Accelerators*, Nuclear Technology Publishing (1992)

Magnet Power supply

- "New" solution for power supply
  - Discovered during dismantling of the West Area (WA)
- Decommissioned, needs refurbishment
- Delivers 704 V, 7200 A (can go to 1000 V, 8000 A)
  - Capabilities are well above the ones of the ALICE type and therefore can easily serve the demands of the experiment
- Refurbishment:
  - 100 kChF (Alice purchase 300 kChF)
  - Installed/operational, including controls, but without cables
- Reuse in Japan not excluded
  - Needs communication with DG
- Oil-filled transformers cannot be placed inside, instead, site next to building 193
  - DC cables 15 kChF more expensive

CERN Committees

Radiation Protection Com.
- People interested
- No exceptional questions

Research Board
- Failure of communication
- A few open questions
  - Is this a US proposal?
  - Who is in charge (spokesperson) for the experiment?
  - who is the CERN contact person;
  - Why is mercury chosen; etc.?
  - What resources are required: cryo, power supply, manpower, etc.?
- Conditional approval
- Clarifying meeting soon, called by the department leader