Safety Issues for Hg irradiation

T. Otto (SC/RP), 28 May 2004

- Experiment siting -
  Activation of air and components
- Activity of Hg –
  unsealed radioactive source
- Radioactive waste

Experiment in TT2a tunnel

- TT2a is an old transfer tunnel. As such, it does not dispose of
  - ventilation
  - waste water retention
- Activation of air by 40 pulses of 2E13 p corresponds to approx. 1 yr of operation in EHN1.
- Lack of beam dump leads to unnecessary activation of components and aggravates air activation

Hg activation

- "worst case scenario": Hg spill
  - activity of Hg after 1 month > 22 L_A (50% most active isotopes)
  - TT2a drains go directly in Nant'd'Avril
  - Radioactive pollution of environment
- Handling of unsealed sources
  - Work sector
  - "Sealed" design of experimental apparatus

ISO 2919

- International standard, describing design requirements for sealed radioactive sources
- Graded requirements to respond to environmental conditions
- We require the nearly lowest resistance classes:

Temperature	180 deg for 1 hour
ext./int. Pressure	25 kPa
Impact	50 g from 1 m or equivalent energy
Vibration	no test
Puncture	1 g from 1 m or equivalent energy

“Certification”?

- No certification required, but:
- traceable demonstration, that the (weakest parts of the) apparatus fulfil the mentioned requirements
- Measurements, FE calculations, use of certain materials ...
- SC/GS shall give its consent to the demonstration.
- “Weakest parts” (my guess):
  - beam windows
  - joints in Hg piping

Radioactive waste

- The magnet will be reused in the US or Japan √
- The irradiated Hg shall be transported to the new destination “for re-use” √
- As much as the magnets in TT2a, the N_2 system will be slightly activated – any re-use envisaged ?