

# General RP guidelines for CENF

CENF secondary beam study group

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# Legislation

## Rules are defined in CERNs radiation protection legislation (Safety code F and underlying rules)

**1.7.1** In agreement with the Safety Policy at CERN, document SAPOCO 42, compliance with this Code is the responsibility of the Department undertaking the planning, construction, operation or dismantling of a particular accelerator, experiment or facility. The Safety Commission provides expertise and support in its specific functions.

## 2.3 Optimisation

**2.3.4** Optimisation can be considered as respected if the practice never gives rise to an annual dose above 100  $\mu\text{Sv}$  for persons exposed because of their own professional activity or 10  $\mu\text{Sv}$  for circumstances not linked with their own professional activity and for members of the general public.

# General guidelines - I

- ALARA (optimization) starts already at the design phase
- Use 'correct/good' materials ... ActiWiz, material catalogue EDMS # 1184236. Material impurities can dominate the activation.
- Perform "core sampling" and a chemical analysis of the soil before construction. Material impurities can dominate the activation, especially after long cooling times.
- Avoid construction of a facility in 'wet' areas or minimize the infiltration of water as much as possible ("geomembrane") ... a hydrological study shall be performed
- Shielding must not only satisfy limits but must also be optimized (ALARA)
- Install only absolute necessary equipment in 'hot' areas
- Use only radiation hard and reliable equipment in 'hot' areas
- Redundancy function for 'delicate' items; for example for the water cooling circuits for horn and reflector

# General guidelines - II

- Use dry air – install an air dehumidifier which reduces the problem of corrosion. Use dry air in cooling room & above He-vessel
- Minimize air volumes in ‘hot’ areas or even better use an He environment or best a vacuum environment.
- Clear separation of ‘air’ in target area, adjacent areas and the outside; ‘air’ tightness is - besides pressure difference - a key element.
- ‘Air’ pressure has to be lowest in the area with the highest radiological risk, higher in adjacent areas and highest outside the facility.
- Use a closed ventilation circuit with HEPA filters for ‘air’ inside target chase area ... a small air release (leak mode) during operation seems possible in case of CENF in order to create an under pressure wrt. adjacent areas. This would be almost impossible if we use air insight the target area !!

# General guidelines - III

- Closed cooling circuits for 'hot' elements (like target, horn etc.) .. heat exchanger, double-wall pipes for primary circuits.
- Avoid sumps and air conditioning units in areas with high concentration of tritium.
- Foresee an evaporator (to eliminate tritiated water) as part of the installation
- Failure of target, horn occurs more often than expected. However, what fails are items like water lines, ceramic isolators, pumps and not the main, expensive device ... have spare parts ready.
- Remote handling/maintenance/repair is a must for equipment in the target chase ... residual dose rate is too high for manual interventions
- Prepare for decommissioning and dismantling already now
- ...