EUROPEAN SPALLATION SOURCE

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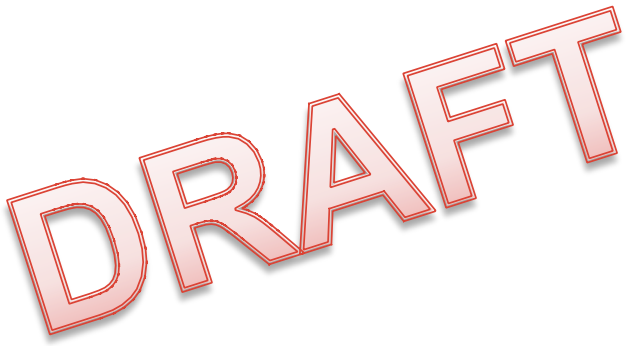
Author	Mathias Brandin
Reviewer	Wolfgang Hees
Approver	Mats Lindroos

Interface
ID 22 – Decommissioning
(Accelerator)



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1. DECOMMISSIONING THE ACCELERATOR

The accelerator parts and surrounding structures, e.g. the radiation protection shielding, will be activated from beam losses during operation of the accelerator. Activation levels will increase along the accelerator. They will be lowest in the low-energy front end and highest in the high-energy end of the machine. According to the preliminary study done on radiation protection [1], after 40 years of operation, the complete volume of concrete (6365 m^3) will be radioactive above the exemption limit for almost 100 years. The first two metres of soil outside the concrete will also have to be considered radioactive waste for at least 15 years. A copper piece, for instance the windings of a magnet, situated close to the beam will be highly activated with long-lived isotopes. The situation for other materials, like stainless steel and niobium, which are expected to be abundantly present, should be investigated in detail. Alternative construction materials might be evaluated for further consideration. Activated aluminium might be easier to purge from radioactive isotopes than steel, while it might not possess the desired mechanical properties. A decision has to be made on the acceptable trade-offs. A decommissioning plan shall be written. Table 1 presents a rough estimate of the expected amounts of activated materials that must be taken care of.

Table 1: estimated amounts of material to be decommissioned

Material	**Amount**
Concrete (shielding)	~ 6365 m^3
Soil (shielding)	~ 25800 m^3
Accelerator components (metals*)	~ 500 m^3 (compressible)

* Could be for instance niobium, titanium, steel, aluminium or copper

2. REFERENCES

[1] Ene, *Radioprotection studies for the ESS superconducting linear accelerator Preliminary estimates,* 2010