

**The Swedish Radiation Protection Institute's Regulations on  
the Protection of Human Health and the Environment in connection with the  
Final Management of Spent Nuclear Fuel and Nuclear Waste;**

issued on September 28, 1998.

On the basis of 7 and 8 §§ of the Radiation Protection Ordinance (1988:293), the Swedish Radiation Protection Institute has issued regulations as follow.

**1 §** These regulations apply to the final management of spent nuclear fuel and nuclear waste. The regulations do not apply to landfills for low-level nuclear waste in accordance with 19 § of the Ordinance (1984:14) on Nuclear Activities.

**Definitions**

**2 §** In these regulations the following concepts are used with the meanings specified here.

*Best available technique:* the most effective measure available to limit the release of radioactive substances and the harmful effects of the releases on human health and the environment, which does not entail unreasonable costs,

*intrusion:* human intrusion into a repository which can affect its protective capability,

*optimisation:* keeping the radiation doses to humans as low as reasonably achievable, economic and social factors taken into account,

*harmful effects:* cancer (fatal and non-fatal) as well as hereditary effects in humans caused by ionising radiation, in accordance with paragraphs 47-51 in Publication 60, 1990, of the International Commission on Radiological Protection,

*protective capability:* the capability to protect human health and the environment from the harmful effects of ionising radiation,

*final management:* handling, treatment, transportation, interim storage prior to, and in connection with, final disposal as well as the final disposal,

*risk:* the product of the probability of receiving a radiation dose and the harmful effects of the radiation dose.

Terms and concepts used in the Radiation Protection Act (1988:220) and the Act (1984:3) on Nuclear Activities have the same meanings in these regulations.

### **Holistic approach etc.**

**3 §** Human health and the environment shall be protected from detrimental effects of ionising radiation, during the time when the various stages of the final management of spent nuclear fuel or nuclear waste are being implemented as well as in the future. The final management may not cause impacts on human health and the environment outside Sweden's borders that are more severe than those accepted inside Sweden.

**4 §** Optimisation must be performed and the best available technique shall be taken into consideration in the final management of spent nuclear fuel and nuclear waste.

The collective dose, as a result of the expected outflow of radioactive substances during a period of 1,000 years after closure of a repository for spent nuclear fuel or nuclear waste shall be estimated as the sum, over 10,000 years, of the annual collective dose. The estimate shall be reported in accordance with 10-12 §§.

### **Protection of human health**

**5 §** A repository for spent nuclear fuel or nuclear waste shall be designed so that the annual risk of harmful effects after closure does not exceed  $10^{-6}$  for a representative individual in the group exposed to the greatest risk<sup>1</sup>.

The probability of harmful effects as a result of a radiation dose shall be calculated using the probability coefficients provided in Publication 60, 1990, of the International Commission on Radiological Protection.

### **Environmental Protection**

**6 §** The final management of spent nuclear fuel and nuclear waste shall be implemented so that biodiversity and the sustainable use of biological resources are protected against the harmful effects of ionising radiation.

**7 §** Biological effects of ionising radiation in habitats and ecosystems concerned shall be described. The report shall be based on available knowledge on the ecosystems concerned and shall take particular account of the existence of genetically distinctive populations such as isolated populations, endemic species and species threatened with extinction and in general any organisms worth protecting.

### **Intrusion and Access**

**8 §** A repository shall be primarily designed with respect to its protective capability. If measures are adopted to make access easier or to make intrusion difficult, the effects on the protective capability of the repository shall be reported.

**9 §** The consequences of intrusion into a repository shall be reported for the different time periods specified in 11 - 12 §§.

The protective capability of the repository after intrusion shall be described.

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<sup>1</sup> The Swedish Radiation Protection Institute's regulations (SSI FS 1991:5, amended 1997:2) concerning the limitation of releases of radioactive substances from nuclear power plants and the Swedish Radiation Protection Institute's regulations (SSI FS 1994:2, amended 1997:3) concerning health physics for activities involving ionising radiation at nuclear facilities, apply to facilities in operation.

**Time Periods**

**10 §** An assessment of a repository's protective capability shall be reported for two time periods of orders of magnitude specified in 11 -12 §§. The description shall include a case, which is based on the assumption that the biospheric conditions which exist at the time when an application for a licence to construct the repository is submitted will not change. Uncertainties in the assumptions made shall be described and taken into account in the assessment of the protective capability.

*The first thousand years following closure of a repository*

**11 §** For the first thousand years following closure, the assessment of the repository's protective capability shall be based on quantitative analyses of the impact on human health and the environment.

*Period after the first thousand years following closure of a repository*

**12 §** For the period after the first thousand years following repository closure, the assessment of the repository's protective capability shall be based on various possible sequences for the development of the repository's properties, its environment and the biosphere.

**Exceptions**

**13 §** If special grounds exist, the Swedish Radiation Protection Institute may allow exceptions from these regulations.

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These regulations enter into force on February 1, 1999.

On behalf of the Board of the Swedish Radiation Protection Institute

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