

## Oral 2.2

### PRINCIPLES FOR TREATMENT OF INTRUSION IN NORM DISPOSAL SITES

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Work is in progress within the Swedish Radiation Safety Authority (newly formed by merger of the former Swedish bodies, the Radiation Protection Institute and the Nuclear Power Inspectorate) to implement exemption and clearance criteria for NORM.

Specific clearance, also called conditional clearance, is clearance of waste in a particular waste stream. For NORM, important streams are represented by reuse and disposal in municipal disposal sites or a surface site with similar (post closure) protective capability. Material containing long-lived radionuclides such as natural uranium with daughters are important components in Swedish NORM streams.

In the clearance regulations for NORM, the issue of specific, or conditional, clearance for disposal of low level long lived waste in municipal disposal sites or surface sites needs to be addressed. The (limited) post closure institutional control offers some protection, limiting the available exposure scenarios and their probabilities. The disposal practice may therefore include specific and total activity levels higher than those for general clearance. The probability of intrusion is also lowered, which may justify a higher target dose for intrusion.

In defining the limiting scenarios, account must be taken of the probability and consequences of loss of institutional control that might open up for various types of intrusion. In an international context, it should be kept in mind that also early intrusion during the site's operational period may be in need of special considerations since in many cases, in particular for developing countries, the effectiveness of institutional control may vary considerably.

A landfill with NORM waste containing radioactive substances above national clearance levels constitutes a repository for low level radioactive waste. For such a case, the existing international guidance is not completely satisfactory. ICRP Publication 81 suggests a target dose in the interval 10 and 100 mSv per year. This value is clearly too high for a landfill. Alternatively, the Commission is assuming that landfills of these kinds do not exist. Any incongruence in ICRP's recommendations is also likely to be transported into the IAEA's safety standards that usually reflect ICRP's positions.

A reference level of annual dose in connection with human intrusion is suggested to be in the order of 1 mSv, allowing for a value a decade higher than the suggested 0.3 mSv to take into account the safety provided by the protective barriers and institutional control. This is a compromise between 0.3 mSv per year, often suggested as a general clearance level for NORM, and ICRP's higher span of doses. The author also wishes to point out that information or knowledge conservation of a repository's data is an important contribution to the ALARA principle. It cannot guarantee eternal societal

control, but it answers ICRP's question defining optimization in the context of institutional control: Have I done all I reasonably can to reduce doses?