

Clearance of decayed radioactive waste packages

Mr Jeroen Welbergen (*JWCOVRA@Zeelandnet.nl*)

ABSTRACT

One of the options for clearance of decayed combustible radioactive waste is to send it off as conventional waste to an incinerator. Before sending the former radioactive waste to an incinerator it has to be made sure that the levels of activity are below the clearance levels. First, one has to calculate the radioactivity left in the waste package and second one needs a protocol for non-destructive and destructive testing on the waste packages. The acceptance criterion of a conventional waste incinerator is that there must be a combustible fraction and the waste must be separated (as far as possible) from non-combustible components such as metals and concrete rubble. Hence any matrix used for conditioning of the radioactive waste must be removed on forehand. This project will be presented to you by showing how waste packages are dismantled and separated into the parts of the metal drum, concrete rubble and supercompacted waste (mainly containing the combustible fraction). The methods of dismantling the drum with conditioned waste are either cutting or shearing, in such a manner that separation of the waste package matrix is fulfilled. After dismantling of the metal drum the concrete matrix should be removed by crushing it with a special tool. The supercompacted parcels can be removed easily and the remaining matrix must be checked for radioactivity before clearance. The combustible fraction inside the parcels must be uncovered by either cutting, shearing or shredding. We have tested shredding the supercompacted waste packages in a shredder installation and cutting the parcels with explosives and came up with a preference for shredding the waste with a commercial shredder installation. The remaining flakes of waste must be checked for gamma-emitters by non-destructive testing and for alpha- and beta-emitters by destructive testing of the waste. The remaining combustible waste is sent to a conventional incinerator and after incineration the scrap is separated from the ashes and collected for transport to a scrap-yard. All the subsequent steps are taken into consideration into a safety assessment and the scenario "A worker in the bunker storage room of the conventional incinerator during a dust-cloud" is considered to be the worst case scenario. The dose is less than 10 microSievert and is calculated by using as the source term the exemption levels of the radionuclides Po-210 and Pb-210.

The project of dismantling conditioned waste is completed and protocols for Quality Checking of the waste are being developed.