Management of spent fuel and radioactive waste: EU legal framework

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This Commission staff working document provides an inventory of radioactive waste and spent fuel present in the Community's territory and the future prospects.

This document is based on the information provided in the second national reports of EU Member States on the implementation of Council Directive 2011/70/Euratom establishing a Community framework for the responsible and safe management of spent fuel and radioactive waste. Its inventory reference date is end of 2016, although more than half of the Member States reported inventory as of end of 2017 or 2018.

The main findings of this document are as follows:

EU radioactive waste inventory

The estimated total inventory of radioactive waste on EU territory at the end of 2016 is 3 466 000 m3. Of this waste, 71.6% is already disposed of (2 483 000 m3) and 28% (983 000 m3) is in storage and will have to be managed in the future. Compared to the 2013 radioactive waste inventory, this is a 4.6% increase of total radioactive waste volumes.

Currently, thirteen Member States have radioactive waste disposal facilities either in operation or closed (nuclear power programme countries: Czech Republic, Finland, France, Germany, Hungary, Romania, Slovakia, Spain, Sweden, UK; non-nuclear programme countries: Latvia, Poland and Portugal) although based on the information from the national programmes and reports it is expected that more repositories will be built in the coming years.

A number of Member States (both with and without nuclear power plants) have dedicated disposal sites for institutional radioactive waste. In some cases, the disposal of waste undertaken in the past at several sites is now being reconsidered and there are plans for the retrieval of the waste disposed of several decades ago.

France and UK have by far the highest share with 44.5% and 36% respectively. The next Member State with the highest share is Germany with 6.5%.

Spent fuel inventory

Based on the Member State strategy, spent fuel is stored pending either disposal or reprocessing. During reprocessing, uranium and plutonium are recovered and separated from fission products, which are radioactive waste.

At the end of 2016 approximately 58 000 tHM of spent fuel was stored in the EU (7% increase from 2013 and 29% increase since 2007) and around 900 tHM of spent fuel (about 1.5 %) was sent for reprocessing outside the EU with the expected returns of resulting radioactive waste from reprocessing. These amounts include both spent fuel coming from power and non-power (e.g. research, isotope production) reactors.

Future estimations

With regards to spent fuel, an increase from present 58 000 tHM to 76 000 tHM in 2030 is estimated. It has to be noted, that the majority of Member States have not reported inventories from planned new build nuclear power plants. It is expected that by 2030 the spent fuel inventory will increase by approximately 10%. As some Member States proceed with spent fuel reprocessing, the actual increase does not represent the actual amount of spent fuel discharged from the reactors.