

Focus 15

The piling-up of nuclear materials and radioactive waste

Large amounts of nuclear materials and radioactive waste arise from the French nuclear programme. Final solutions only exist for some categories presenting the less radioactive inventories and/or the shorter periods. Even for those, some problems exist. The Centre de Stockage de la Manche (CSM), the first disposal site for low-level and intermediate-level short-lived waste, which started in 1969 and closed in 1994, when it was replaced by the Centre de Stockage de l'Aube (CSA), has been placed under surveillance for 300 years, much more than initially planned, because of uncertainties on the safety of its design and the specification and status of some of the waste it contains. Also, some low-level waste that should be disposed of in the CSA remains stored elsewhere because of poor or insufficient conditioning.

Andra's national inventory of radioactive waste and nuclear materials, published in 2006, summarises the status of radioactive waste in France as of the end of 2004. The inventory presents waste volumes based on their final conditioning, either actual or projected, in the case of waste to be produced or waste already produced but still insufficiently conditioned.⁹² In total, close to 890,000 m³ of radioactive waste (in final primary conditioning) had been produced. Almost 40 percent, or 344,600 m³ is linked to reprocessing. This does not account for some Marcoule waste that was dumped into the sea in 1967 and 1969, the equivalent final volume of which is estimated at 12,000 m³ or more.

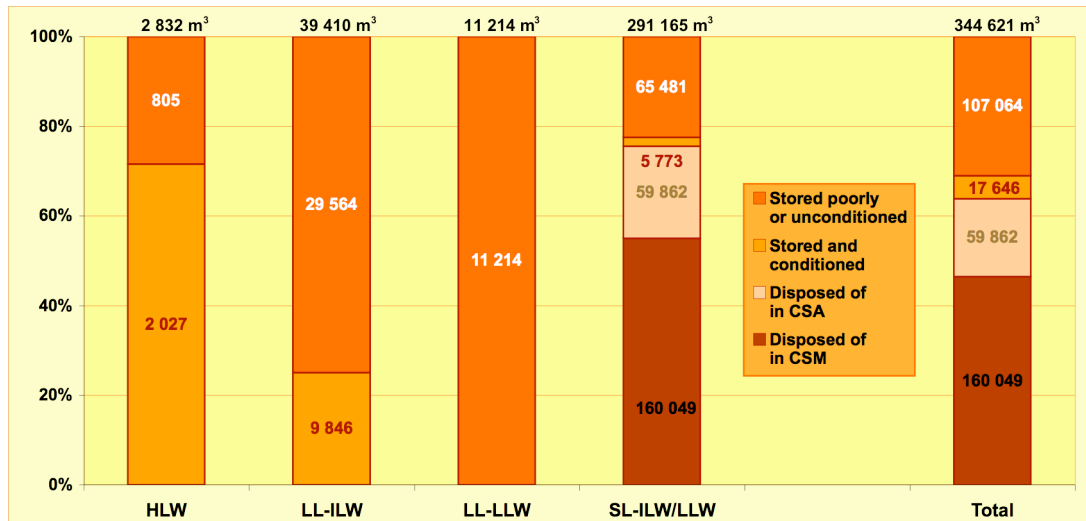
About 64 percent of the waste volume has been disposed of, 5 percent is stored with primary conditioning, and 31 percent with insufficient or no conditioning (see Figure 18). Although solutions exist for the disposal of short-lived low and intermediate level waste, representing 85 percent of the total, almost 25 percent of it is still stored at reprocessing plants with insufficient conditioning. About 12.6 percent of the total inventory is still stored at La Hague and 21.9 percent at Marcoule. Almost 25 percent of the waste volume produced by La Hague is still stored there, 66 percent of it with inadequate conditioning. Almost 50 percent of the waste volume produced by Marcoule is still on site, with only 4 percent of it having received appropriate conditioning.

This inventory of materials already labelled as waste does not include any of the "re-usable materials" currently in stock, the volume of which is also set for continuous growth. These are spent fuels stored at La Hague (low enriched uranium or LEU, re-enriched reprocessed uranium, and MOX), separated plutonium and reprocessed uranium, and scrap MOX. One irradiated and one unirradiated core of the Superphénix fast-breeder, both still stored on the reactor site, are also not included.

Finally, the inventory includes large volumes of low or very low-level long-lived waste inherited from uranium mining in France, that started in 1949 and went up to 2001. With a total of 76,000 tons of uranium produced, this industry accumulated around 50 million tons of residues of treatment disposed of in 17 sites, and about 166 million tons of waste rocks.

⁹² This is subject to some uncertainty, as some of the conditioning techniques involved still remain to be fully developed. Also, the allocation to categories is based on the industry's arguable hypothesis that a large part of the yet-to-be-conditioned waste will qualify as short-lived intermediate-level and low-level waste instead of long-lived intermediate-level waste.

Figure 18 Relative shares of different categories of French reprocessing waste conditioned, unconditioned, stored and disposed of^a



a. Status and quantities as of 31 December 2004. The volumes correspond to the realised, planned or estimated volumes of waste in their final condition.

Source: WISE-Paris based on Andra, 2006