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Superphenix dismantling - Status and lessons learned

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Following Superphenix definitive shutdown announcement in 1997, enacted by a decree in late 1998, it was rapidly decided to start the reactor dismantling, for technical reasons (keeping in liquid form large amounts of sodium) and human resources availability.

Out of the 19 sodium fast reactors having been operated worldwide, 13 are dismantled or being dismantled. So there is already a great experience in this domain. Superphenix, taking over some of this methodology processes, got in 2006 the decree authorizing its definitive shutdown and dismantling, which allowed it to start sodium treatment and nuclear dismantling and to have completed by 2015 the entire sodium destruction.

Dismantling of a fast reactor presents specificities related to this presence of sodium and to the necessity to eliminate it, before being able to undertake the usual dismantling procedures. The procedures used to eliminate this sodium in the Superphenix primary vessel, are explained in this paper.

Explanations are given on the last events of these dismantling operations as the use of a dedicated robot to cut internal structures of the primary vessel where residual sodium was accumulated.

This Superphenix experience validates a methodology but shows that there are some remaining points needing further developments for complete elimination (oxidized NaK, oxidized sodium aerosols or cold traps).

Moreover, this experience enables to propose recommendations in terms of future reactor design, aiming at make their dismantling easier.

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