

Immediate Dismantling of a Large Fleet of LWR NPPs: Consequences for Spent Fuel and Waste Management

Wednesday, 25 May 2016 15:40 (5 minutes)

The experience feedback shows that the complete dismantling of one Light Water Reactor (LWR) unit is an activity now globally well under control (reactor pressure vessel and its internals removal and cutting included). However some specific industrial difficulties may arise in view of the dismantling of numerous LWR units simultaneously. Indeed more than 300 LWR units are currently operated worldwide, which have been commissioned these last 50 years. So in some countries, many units may be permanently shut-down over a period of few years in the next decades. Such a situation addresses the issue of the overall management of large quantities of spent nuclear fuel (SNF) and decommissioning waste for the concerned units. For example, in France, the legislative and regulatory framework for the nuclear facilities favors their dismantling “as soon as possible” after their permanent shut-down which implies as well to limit the duration of the transition period from operation to decommissioning. Furthermore 58 LWR units have been commissioned between 1977 and 1999 in France –on average more than 2 units per year. In this context, the operator (Electricité de France –EDF) plans to remove quickly the SNF then to perform dismantling actions immediately after the permanent shut-down of the LWR units. One issue is to remove the SNF from all the relevant units, even if this removal is simultaneous in many units (permanently shut-downed or still under operation). Similar issue has to be taken into account regarding the radioactive waste (RW) produced by the dismantling and clean-up actions, notably the RW that cannot be disposed of in a near surface repository. One method followed by the French technical support organization (Institut de Radioprotection et de Sécurité Nucléaire –IRSN) to review these issues is the use of estimates of flows of SNF and RW, based notably on a phasing-scenario and a planning template defined for the decommissioning of the units of one nuclear power plant (NPP) and coupled to an overall schedule for phase out all the units of the fleet. These estimates relative to the next decades can be compared to the current experience feedback of flows of SNF and RW for units under operation, in order to identify risks when facing decommissioning. The risks highlighting are driven by key parameters (as duration of the main dismantling actions) of the estimates which can be adapted to minimize their impact. On this basis, it is possible to identify the key-factors to dismantle each unit of NPPs and phase out the fleet regarding SNF and RW management. It is noteworthy that this work needs to be done in any case upstream the studies and the implementation of dismantling actions. Finally it can be underlined that another issue is the human resources (staff, skills and knowledge) necessary to perform all the decommissioning actions, but this aspect is not addressed here.

Country or International Organization

France

Type “YES” to confirm submission of required
 Forms A and B via the official channels

Yes

Primary author: Mr DEPAUW, Denis (IRSN)

Co-authors: Ms JOUVE, Anne-Cécile (IRSN); Mr PULTIER, Marc (IRSN); Mr FRANCOIS, Patrice (IRSN); Mr MASSIEUX, Stanislas (IRSN)

Presenter: Mr DEPAUW, Denis (IRSN)

Session Classification: Session 4A - 3

Track Classification: Technical and Technological Aspects of Implementing Decommissioning Programmes