

Nuclear Decommissioning R&D: a Successful History that Goes on.

Abstract by Michele Laraia, Italy, independent consultant

Research and Development (R&D) in Nuclear Decommissioning date back to the 1980s and 1990s. At that time, decommissioning was a relatively new, sporadic activity; technologies were mostly imported from the non-nuclear field and adapted to nuclear uses (a trend that continues to this day and should not be looked down). R&D were first applied to a laboratory scale, and later on expanded to prototype and pilot installations. The European Commission launched a series of multi-year R&D programmes, ultimately covering the full-scale decommissioning of nuclear power plants and other large installations. Certain installations (especially the BR-3 reactor at Mol, Belgium), were used to test and compare different technologies and assign a ranking based on various factors. In parallel, the US Department of Energy was active in a number of R&D activities, culminating in a number of topical publications until around the year 2000 and the explosive growth of the decommissioning market. In Japan in early 1990s the decommissioning of the Japan Power Demonstration Reactor (JPDR) was used to test almost all dismantling techniques being available at that time: the spin-offs of JPDR work were still flowing into the nuclear community until recently. It has to be also highlighted that the Chernobyl accident boosted a spate of decommissioning R&D aimed at solving practical problems in the aftermath of that severe accident.

Although R&D in this field peaked around the year 2000, R&D efforts have continued to this day. While decommissioning is not "rocket science" and it can be safely stated that this industry has reached maturity, there are areas (e.g. management of secondary waste, access, characterization and dismantling in "difficult" environments) that require further efforts to optimize processes and reduce the still high costs. The IAEA has contributed to these advances in various ways. For example, some 50 topical reports on the decommissioning of certain installations and individual systems, structures and components, and related techniques, have been published in the 1990s and 2000s. These reports include, among others, the achievements of several Coordinated Research Projects in a row where 10-15 organizations active in nuclear decommissioning shared a common theme and periodically reported on their progress at Research Coordination Meetings.

While the writer does not expect significant breakthroughs in decommissioning technology in the foreseeable future, a new impetus to R&D has been given by the Fukushima accident. Due to the complexity of Fukushima circumstances, this is one case where the available technology may not be equal to the challenges that lie ahead and significant technological progress is needed to move on. It is possible that innovative technologies stemming from Fukushima will boost a staggering change in decommissioning. For example, a fleet of robots could carry out decommissioning instead of humans: but we are not there yet.