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Material and waste management strategies considerations for decommissioning

Abstract
According to the IEA 2020 Key World Energy Statistic edition, 4,9% of the global energy supply was from nuclear in 2019 whereas it was still above 10% in 2017. Focusing OECD countries, 9,7% of their electricity is delivered by Nuclear Power Plants. This illustrates fossil energies (Oil 31,6%, Coal 26,9%, Natural-Gas 22,8%) as a remaining significant means of global power supply despite their negative impact on climate change, whatever is the progressing share of renewables but, unfortunately, the yearly lack of compensation of NPPS being shutdowned by the new ones being connected to the grid. This emphasizes the necessity for all nuclear producers, to adjust their strategies, to strengthening the undeniable place of nuclear in the low carbon energy production mix. To reach such a global aim, it is necessary to increase nuclear industry credibility, embedding public acceptance. Among some keys (economy, efficiency, high technology, low environmental impact,⋯) this will result in demonstrating continuous improvements of waste management & decommissioning fields which commonly appear as the main public reluctant facet of the nuclear Industry. For operators such as EDF Group, operating totally 75 reactors in 3 countries as well as decommissioning 10 units in France, it is well experienced that a proper and cost efficient management of back-end activities, i.e. WM&D, is key for sustainable nuclear power operation and new build.

Globally, 187 civilian nuclear power reactors had ceased operation in 2019. Besides these NPPs, various other types of nuclear facilities such as experimental reactors, fuel cycle, waste treatment, laboratories are already shutdown, awaiting, or in active decommissioning/dismantling phase.

Hence, this worldwide rise of nuclear dismantling sites, emphasized that the demonstration of a technically and financially mastered decommissioning program is key to increase any nuclear operator's credibility.
Furthermore, considering environmental and sustainable development, facilitates the legal, social and public acceptance, assuming the operator's responsibility in compliance with the future use of the site, whatever it is unrestricted or not. Targeting such an aim in a pragmatic and sustainable way, decommissioning is to be prepared at the earliest, since the design phase.
Consequently, preparing decommissioning of nuclear installations that have not been designed for, induces to setting a number of strategies in consistency with already existing waste routes. Optimizing means, involving efficiently available resources, managing materials, reducing waste, improving techniques and perspectives, became vital for sustainable, safe and cost-efficient decommissioning in order to avoid undue burden on future generations.

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Speaker's title

Mr

Affiliation

FRANCE

Do you wish to be considered for a Young Professional grant?

No

Author: Dr PIERACCINI, Michel (EDF / WNA)

Presenter: Dr PIERACCINI, Michel (EDF / WNA)

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