

Decommissioning and Demolishing Stacks from legacy fuel cycle facilities at Sellafield Site

Wednesday, 25 May 2016 15:45 (5 minutes)

The Sellafield skyline provides visual markers on the progress being made in decommissioning. The most notable change in the last few years has actually been one of construction of a new 123m high stack which is designed to replace current assets and also provide an expanded radioactive ventilation service for at least 100 years, supporting the decommissioning and demolition legacy buildings.

The planning for the decommissioning and demolition of two of the most iconic structures at Sellafield - the First Generation Reprocessing Stack and Pile Chimney - are well advanced. Although both stacks fundamentally provide(d) the same functionality (discharge process steam and heat together with dilution and dispersion of radioactive aerial effluent due to their height) they present very different challenges. However, the overall risks are similar - damage to adjacent facilities.

First Generation Reprocessing Stack

This 61m operational stack is used to dilute and disperse 80% of the site airborne radioactive material discharges. It is situated on the roof of the now redundant first generation separation plant facility which itself is located within a cluster of operational Magnox reprocessing and waste management facilities at the heart of the Sellafield Site.

Due to its age it does not meet current seismic resistance standards. Removal of the stack therefore addresses the safety risk associated with design basis earthquake events.

Following detailed engineering and safety assessments work has already commenced with the installation of a temporary external passenger and goods lift to the side of the building and a further lift will be attached to the stack. A mock stack has been constructed off-site to trial the self-climbing platform - this provides the opportunity to train operators and fine-tune operational practices.

The method of demolition is tried and tested. Hydraulic jaws will size reduce the concrete and the internal metal flue will be cut using plasma arc. It is expected that the demolition will reduce the size of the stack by around a metre a week. To put the overall scale of the task into perspective the amount of waste has been estimated as 600 tonnes of concrete and rebar plus 25 tonnes of stainless steel fuel liner.

Pile Chimney

The adjacent facility and stack was the site and high level discharge point for the UK's worst radiological event - the 1957 Windscale fire. Notwithstanding the additional radiological considerations related to the pile chimney as opposed to the first generation reprocessing stack, the location of the pile chimney provides a different demolition challenge and associated opportunity. As with the stack, detailed assessments are required to support safe construction and use of the tower crane and associated equipment.

The solution for the pile chimney is to use a luffing tower crane. More commonly seen being used in high-rise city development areas they requiring little room for slewing. At a total height at full extension of 151m the crane will be tied-in to the pile chimney at a number of locations. The lifting capacity of 12 to 14 tonnes it will be used to remove the concrete blocks and supporting the cutting of over 1.2km of wire.

Country or International Organization

UK, Sellafield

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

Yes

Primary author: Mr SLATER, Steve (UK)

Presenter: Mr SLATER, Steve (UK)

Session Classification: Session 4A - 3

Track Classification: Technical and Technological Aspects of Implementing Decommissioning Programmes