

Symposium on Recycling of Metals Arising from Operation and Decommissioning of Nuclear Facilities, April 8-10, 2014 at Studsvik

EnergySolutions Abstract

Title : Beneficial Re-Use of Metal from Decommissioning of Power Reactors

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Utilities and contractors decommissioning nuclear power reactors can recycle a high proportion of the scrap metal generated during dismantling either by free release for general re-use directly from the point of generation, or by recycling off-site at facilities specifically licensed for radioactive material. The worldwide commercial vendors operate different commercial models of volumetric decontamination of ferrous metals by thermal treatment. Some aim to achieve free release of output metals for general use, while others accept higher activity metals as feedstock for the manufacture of steel products which contain residual radioactivity, which we term "Beneficial Re-use". It is estimated that 10-30% of metals from light water reactor decommissioning have been exposed to neutron radiation (activated) and/or are contaminated to such an extent that free release is not achievable. This paper outlines a cost-effective alternative to managed storage or disposal for lightly activated or contaminated metal, utilising a "Beneficial Re-Use" programme which has been in routine operation in the United States for over 20 years.

"Beneficial Re-Use" describes the manufacture of products such as radiation shielding from radioactive scrap metal. Unlike recycling practised in Europe, such products remain under control in licensed facilities and the metal does not find its way into general circulation or consumer products. Since 1992, EnergySolutions and its predecessor Duratek has been melting scrap at their Bear Creek, Tennessee facility to produce shield blocks for use in high energy research facilities. Over 62,300t of scrap steel have been re-used, and the demand for shielding products continues long into the future. 3,000t of this feedstock originated outside the US.

This paper proposes the potential for activated steel that will not be acceptable at European recycling facilities to enter the Beneficial Re-use programme. Acceptance criteria will be outlined and typical components considered. Our experience suggests that significant volumes of low-to-medium activated scrap could find beneficial re-use as an alternative to managed storage or disposal. Furthermore, as EnergySolutions operates a manufacturing operation, it takes title to the scrap as it enters its manufacturing process, relieving the original generators of all responsibility for its future control.

The *known* costs of beneficial re-use will be compared to typical *projected* future disposal costs.