

Winfrith Abrasive Cleaning Machine



Background

In reviewing the Winfrith Site Decommissioning Strategy, UKAEA committed to minimising the amount of low level radioactive waste (LLW) despatched from the site and maximising the amount of material decontaminated to be treated as conventional waste.

LLW is routinely compacted and transported for long term disposal at Drigg. However in assessing the waste produced by Winfrith, it was discovered that much of the waste had only surface contamination and could easily be processed to remove the contamination for disposal as free release material. This would responsibly manage the waste created on site as well as reducing the costs of transporting and disposing LLW at Drigg.



Objective

To maximise the amount of LLW that is decontaminated and disposed through conventional waste streams.

Key challenges

- Establishing a waste characterisation process to identify the radiological characteristics of the waste and radioactive content of each waste item.
- Establishing a protocol for dealing with and managing the wastes.
- Ensuring the waste complies with the acceptance criteria for either despatch to Drigg or as free release.
- Determining waste suitable for size reduction.

Solution

The waste is characterised to fully understand the type and extent of contamination. It is then sorted into those wastes that can be cleaned and waste that must be consigned as LLW.

Material to be cleaned is often size-reduced using plasma-cutting techniques within a controlled area, to make the material the most suitable size for waste treatment.

The material is then passed through the Winfrith Abrasive Cleaning Machine (WACM). Using eight blast-wheels the WACM fires iron shot at the contaminated material, removing the surface paint and contamination, leaving 'clean' metal. The WACM filters the surface contamination and dust removed from the material into a waste drum, which is disposed of as LLW.

The treated material is monitored to confirm that it is free from contamination, it is then stored until it can be proven that all traces of contamination have been removed. Once 'clean' the material can be disposed of as conventional waste and sold as scrap metal.

The WACM has a dedicated ventilation system and a separate filter system continually cleaning the iron shot fired at the material before the shot is reused, minimising waste from the treatment process.

Versions of the WACM are used in industrial paint removal and there is thought to be only one other used in the nuclear industry.



Outcome

- UKAEA specified and procured the WACM and following active commissioning the first active material was processed in early 2002.
- The first 18 months of operation for WACM has saved Winfrith some £300K in sending LLW to Drigg and including the operational costs of the plant.
- Blast media consisting of iron shot and grit is recycled through the machine to minimise secondary waste.
- WACM can be operated on a continuous basis, allowing 'nose to tail throughputs'.
- WACM not only cleans the waste items but also continuously cleans the blast media, ensuring the contamination build up is not a problem.
- 200 tonnes of material were cleaned in the first two years of operation.
- Two substantial batches of waste and a number of smaller batches have been processed on a commercial basis.

Key facts

- Average length of time for material to pass through WACM 15 minutes.
- Amount of shot fired by the blast wheels: 1.75 tonnes per minute.
- Size of aperture items suitable to use in WACM must pass through 1 x 0.5m. (WACM is designed to process larger items but is also suitable for processing large batches of smaller items).

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