

## Waste Encapsulation Treatment Plant (WETP)



### Background

The Steam Generating Heavy Water Reactor at Winfrith (SGHWR) was a prototype reactor that supplied electricity to the national grid for 23 years, until it was closed in 1990.

As a result of operating the reactor and cleaning-up the reactor circuits, 316,000 litres of ion exchange resins in the form of sludge were produced. Although when processed, the sludge waste will not initially be consigned to Drigg as low level waste (LLW), its characteristics will fall within the definition of LLW.

The sludge is stored in concrete tanks, known as the External Active Sludge Tanks (EAST), close to the former reactor building. As part of the remediation of the Winfrith site, the sludge required treatment for long term storage, meeting the requirements of passive safety.

UKAEA examined various treatment options and chose to immobilise the waste with cement in 500 litre drums for storage in the Winfrith waste store and future transfer to a low level waste store. This required the building of the Waste Encapsulation Treatment Plant (WETP).



Inside the WETP during construction

### Objectives

- Construct and test the WETP within four years.
- Commission the plant during the following year.
- Operate the WETP to immobilise all of the sludge within two and half years.
- Decommission and return the site to greenfield within one year.



### Key challenges

- Achieving planning consent to construct the WETP on land close to the site boundary.
- Achieving regulatory approvals with the Nuclear Installations Inspectorate (NII).
- Ensuring that effective processes were developed to immobilise the sludge were completed within timescale.
- Receiving a letter of comfort from Nirex.
- Achieving a positive spirit of partnering with the delivering contractor.
- Ensuring time and cost targets are met.

## Solution

As part of the larger Winfrith Operations Maintenance and Decommissioning (WOMAD) programme, UKAEA let the contract for the treatment of the sludge and other major decommissioning tasks working towards site restoration to RWE NUKEM, using the NEC contract to encourage mutual trust and co-operation between client and contractor.

Prior to submission of the planning application, UKAEA undertook a local stakeholder consultation so that the facility and its construction would be sympathetic to the needs of the local community. This approach was also used for the separate, but integral, Environmental Impact Assessment submitted as part of the planning application. The planning approval was achieved within 18 months of inception of the project.

The WETP was constructed using the existing deep reinforced foundations of the already decommissioned cooling towers from SGHWR. This minimised the amount of ground preparation work needed before actual construction could begin, thus minimising the environmental impact of the works.

Interior fit-out of the equipment to treat the sludge began in summer 2003 and will last for 6 - 9 months. This follows complete testing at the sub-contractor's site before shipping to Winfrith for installation and acceptance testing to ensure the plant operates to the desired specification before final operational commissioning in 2005.

Managing the WETP project to successfully treat the sludge has also required the initiation and management of other projects at Winfrith. A contract has been let to refurbish the Winfrith waste store, at the same time as the WETP is built. This will ensure the store is ready to receive the cemented drums of waste as they are produced by the WETP and not adding delay to the programme.



Installing the ventilation system



Fitting-out the interior treatment cells

## Outcome

- The steel supporting structures and the water proofing envelope have been successfully completed.
- The interior cells for the treatment processes have been built.
- Sub-contractor Vosper Thornycroft has built the specified WETP process equipment and is conducting testing on their premises to minimise on-site risk to UKAEA.
- The NII has accepted all safety cases issued to them concerning the project.
- The project is on time and within cost.
- A good relationship between UKAEA and the contractor has ensured work can concentrate on project delivery.
- The WETP and WOMAD projects are widely recognised as best practice examples of client and contractor working together.

## Key facts

Amount of ILW to be treated

316,000 litres

Timescales

Duration of plant construction

1 year

Length of operation of the plant

4 years

Length of time taken to decommission

1 year

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