



PFR Heel Pool Removal

Client: Gow's Lybster Limited



**Containment
Shielded Facilities
Transport & Packaging**

Aims and objectives

Cyclife Aquila was awarded the contract to design a receipt vessel, to store the pool of sodium remaining in the base of Dounreay's Prototype Fast Reactor Vessel.

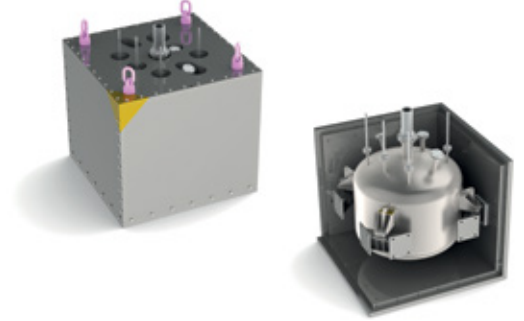
The design also required a transport skid for the receipt vessel, which incorporated appropriate radiation shielding for the radiological activity of the sodium.

Additionally, Cyclife Aquila was contracted to design a small pressure vessel, a small vacuum vessel and a transportation skid, to be utilised in the pumping system removing the sodium. The transportation skid housed the two vessels, all the control cabinets, and the pumping system mast and hoses.

Cyclife EDF Group - Subsidiaries



01 Project overview



Gow's Lybster awarded Cyclife Aquila the contract to design a receipt vessel, integrated into a shielded transportation skid, to receive the sodium that was used as a heat transfer medium within a Reactor Vessel (RV) at Dounreay

In 1994, approximately 90 tonnes of sodium were transferred from the RV and disposed via the Sodium Disposal Plant. Due to the extract system configuration, a pool of liquid sodium remains in the base of the RV known as the Heel Pool - this sodium is currently in a solidified state.

For this sodium to be removed from the Heel Pool, it will need to be converted into a liquid state and then pumped out.

Cyclife Aquila also designed two small 'Gas Panel' vessels and a Transport

Skid, to house the control panels and mast assembly, utilised to remove the sodium from the Heel Pool.

Receipt Vessel

For the Receipt Vessel, Cyclife Aquila designed a stainless steel cylindrical vessel, within a shielded transfer skid, to safely store the sodium.

The 2,400 litre vessel has a 7 barg working pressure at 200°C and was designed in accordance with PD5500 and 2014/68/EU(PED).

The vessel design incorporated a trace heating system capable of maintaining its temperature at 200°C.

The shielded transfer skid is a 150mm thick carbon steel box with lifting features incorporated within its lid. A bund, complete with leak

detection, was included within the skid to capture any sodium loss.

Transport Skid

The transport skid has been designed to support a bespoke pump mast, used to apply Water Vapour Nitrogen and pump out the effluent from the RV that is created during the WVN process. The sodium will be pumped into a receipt vessel for storage until a final treatment and disposal route is available.

The skid is also designed to support control panels to allow the pump and receipt vessel to be remotely controlled and monitored.

Gas panels on the skid, which included a vacuum and pressure vessel, were also designed to meet the PD5500 and PED requirements.

02



Summary

Cyclife Aquila designed a solution that met the client's specifications and also carried out the task at hand. This project took into consideration a number of different aspects, from the location of where the transportation skid would be used, to the long term safe storage of the sodium.



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