

Berkeley Chute Silo - Transfer Flask

Client: Magnox



Transport & Packaging



Aims and objectives

The project was to design, manufacture, factory test, install and commission two pieces of plant for the Chute Silo Project at Berkeley; a Shielded Transfer Flask and an Import/Export Facility. This case study describes the Shielded Transfer Flask project.

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The client

Magnox Ltd is the management and operations contractor responsible for safely managing 12 nuclear sites and one hydroelectric plant in the UK, working for the sites' owner, the Nuclear Decommissioning Authority (NDA).

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Project overview

The Chute Silo ILW project was set up by Magnox to retrieve waste in the form of irradiated control rods and charge chutes, from a storage silo on the Berkeley nuclear site.

The project involved carrying out in-silo, size reduction of the waste, retrieval from the silo and transfer of the waste to a shielded container for export to an on-site storage facility.

A scheme design was produced for the process and equipment to carry out the Chute Silo Project.

This equipment comprised:

- Transfer Flask to transfer the waste retrieved from the silo to an external facility/module.
- Import/Export facility to receive waste packages from the Shielded Transfer Flask and facilitate the waste packages being loaded into Ductile Cast Iron Containers (DCIC).

Health and safety was the primary objective and, during the design, a high emphasis was placed on the duty and fit for purpose since it was estimated that only 35 transfers were required between the chute silo and the import/export facility.

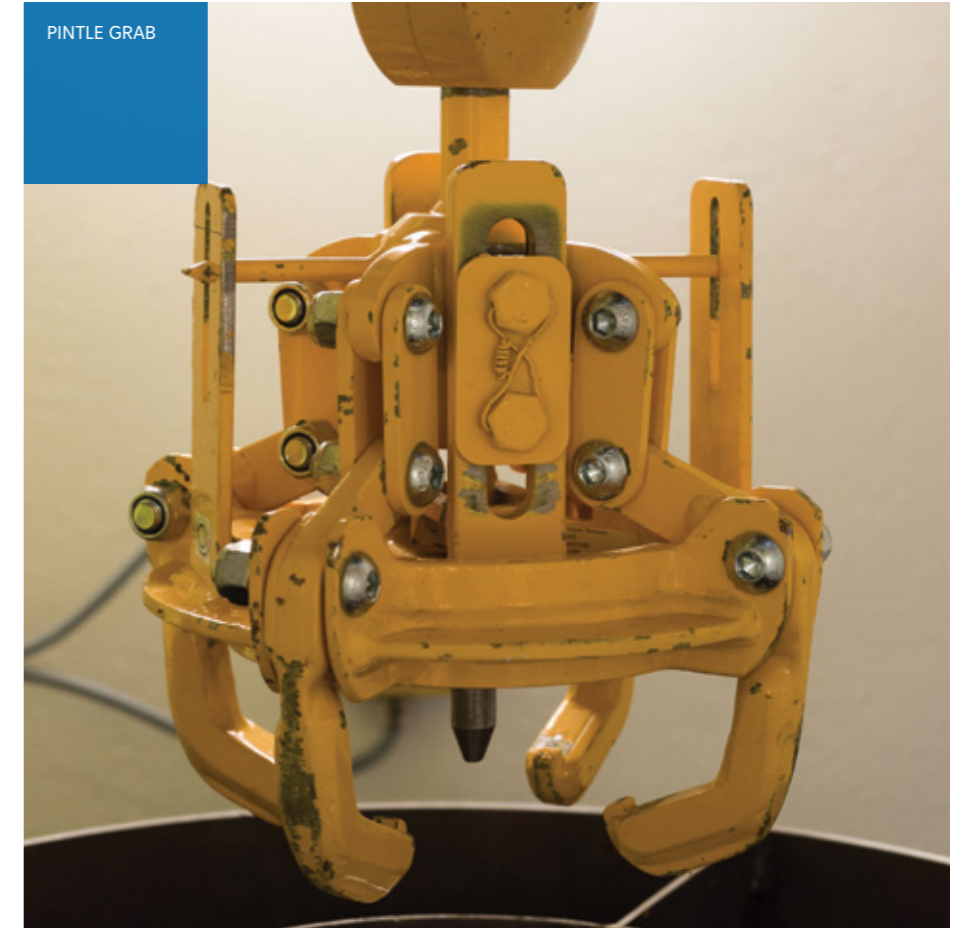


During tendering, Aquila prepared a risk register highlighting a number of areas where we could mitigate risk by addressing the fundamental design and manufacturing philosophy from the outset.

The principal areas for risk mitigation included:

Pintle grab

Aquila presented a design of a pintle grab which was a Commercially Off The Shelf (COTS) solution, working with an industrial materials handling supplier. The successful design eliminated a number of technical, and therefore commercial, risks from the contract. Adopting a COTS grab eliminated the need for cable reeling. Our concern with the cable reel arose due to potential conflict between its principal of operation and that of the pintle grab which could give rise to erroneous load cell measurements.



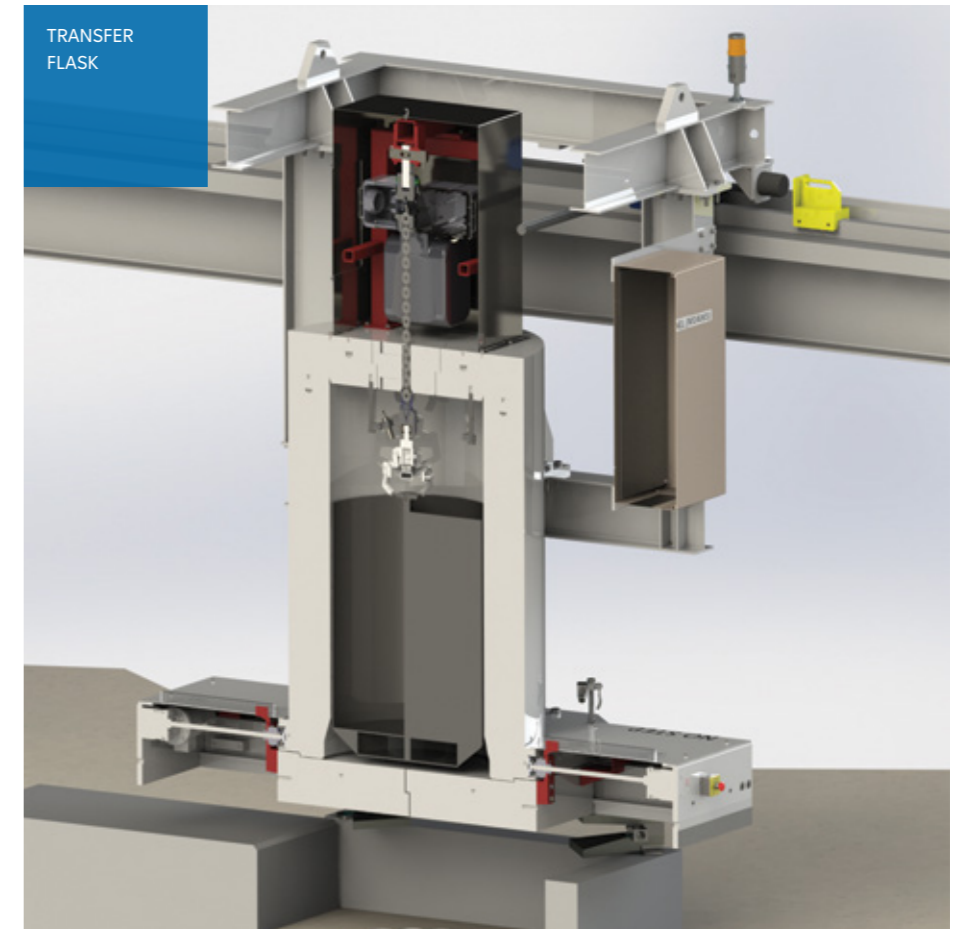
PINTLE GRAB

Assay System

This feature was removed from integration into the Transfer Flask and treated as a separate work package. Although there is still a cost for the assay system, it is a much simpler solution and did not over complicate the design of the Transfer Flask.

Gamma Gate flags

Rather than design sensors within the Transfer Flask gamma gate, located at the base of the system, we incorporated physical flags which could be easily detected by remote cameras which were already required within the solution. These flags will indicate the fully open position of the gamma gate, therefore eliminating the need for electrical design, control sensors, wiring, logic and validation.

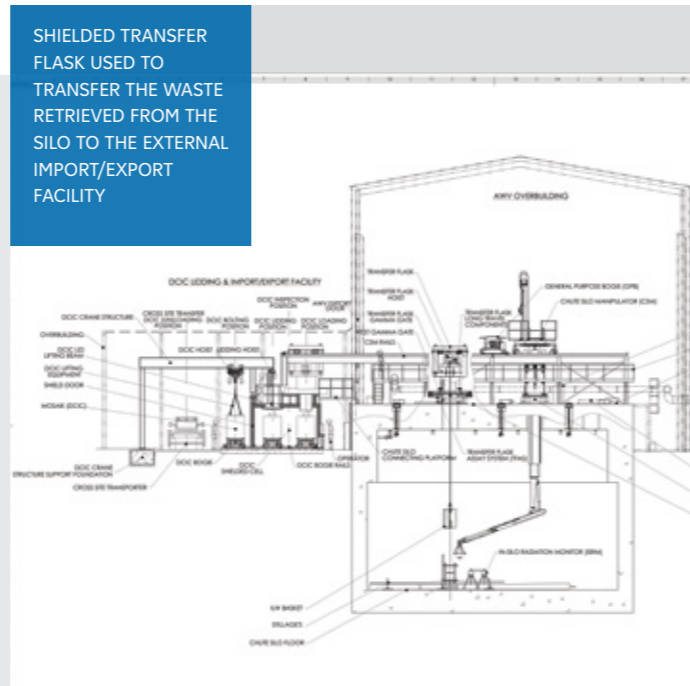


TRANSFER FLASK

Transfer flask

The Transfer Flask is, in effect, a crane crab unit with an integral shielded container and designed to run on existing rails that are used by the facility Chute Silo Manipulator (CSM).

The rails run either side of and parallel to the centreline of the chute silo, allowing travel over a gamma gate which is the designated position for retrieval from the silo. The CSM rails continue a short distance outside the building. It is this section of rail that is used to position the Transfer Flask.



Material Supply

The flask body and top comprises forged sections which were the basis of the safety case. Within the tender assessment period, we identified that the supplier of these forgings could provide a competitive advantage to Aquila in terms of delivery, price, integrated manufacture and quality. This supply was sourced within Europe and offered significant savings both in price and delivery.

Programme, contingency and Project Management

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The Aquila offer was a breath of fresh air, simple, pragmatic and very competitive. Magnox is tasked with undertaking decommissioning at pace and at good value. Working with Aquila from the Tier 3 arena, goes a long way towards helping us achieve this.

CHRIS BURDEN.
PROJECT MANAGER CHUTE & SILO, MAGNOX

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Summary

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The success of this projects rests with both Aquila and Magnox working hand-in-hand. During tendering, all parties were instructed to offer 'fit for purpose'. Aquila offered exactly this and provided 3D models of the complete solution within the bid. The features described above were incorporated into the tendered solution which resulted in an extremely competitive price and programme. Job done.

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