

OUR WORK

WAGR OPTIONEERING AND WASTE PACKING



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PDL CASE STUDIES

PDL WERE SPECIFICALLY TASKED WITH PROVIDING CONCEPTS FOR THE REMOVAL OF THE THERMAL COLUMNS

PDL is a global provider of exemplary engineering design and analysis consultancy services. Our engineering capabilities mitigate risk, shorten development timescales and reduce development costs.

PDL participated in engineering and optioneering studies relating to the Windscale Advanced Gas Cooled Reactor (WAGR) as part of the ongoing decommissioning of facilities within the Sellafield site.

PDL were contracted by British Nuclear Fuels Limited, Environmental services (BNFL ES) to assist with Campaign 10 of this complex decommissioning programme.

PDL were specifically tasked with providing concepts for the removal of the thermal columns, comprising a number of graphite bricks within a fabricated support structure and the cutting and removal of the outer ventilation membrane (OVM) - effectively a sheet metal skin with various stiffening and fixing features.

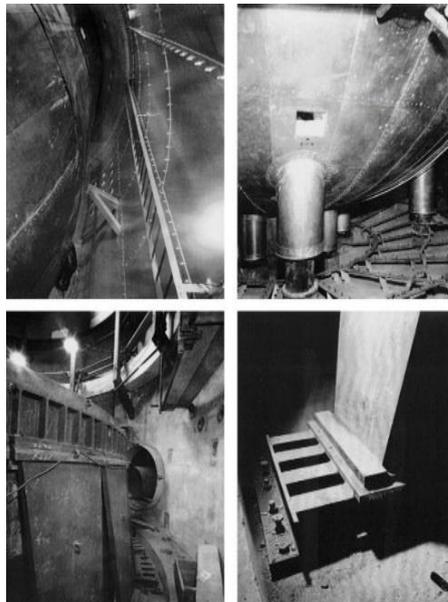


Figure 1: archive images of OVM, courtesy BNFL ES

THE OPTIONEERING PHASE COMMENCED WITH THE CREATION OF AN ACCURATE 3D MODEL USING THE PRO-ENGINEER MODELLING PACKAGE

In addition, PDL engineers were responsible for the modelling of waste forms and the assessment of packing densities within standard waste baskets.

The project posed a number of significant challenges;

1. Due to the radioactive nature of the structures, all activities had to be conducted remotely or autonomously with minimal human intervention
2. The access to the structures was restricted both in terms of equipment volume and mass.

THE 3D MODEL COULD THEN BE USED AS A VIRTUAL TEST BED

3. Existing features such as the Corbel and Strake mounting pads provided further access issues, particularly the 'overhang' created by the Corbel which prevented the direct application of cutting tools and the vertical restraint of items ready for removal.
4. The existing 3Te Cranage and Remote Dismantling Machine (RDM) could not access all of the structures to be removed – again due to the corbel overhang.



Figure 2 - PDL 3D CAD model populated with decommissioning equipment

The optioneering phase commenced with the creation of an accurate 3D model using the Pro-Engineer modelling package. This model included representations of all structures to be removed as part of the campaign, in addition to any infrastructure that would restrict access or hinder operations.

The 3D model could then be used as a virtual test bed for proposed equipment but could equally be used as the backbone for a series of models representing waste forms.

The proposed decommissioning equipment included bespoke manipulators that would overcome access issues whilst providing a stable platform for cutting equipment and waste retrieval accessories.

It was proposed that the corbel, instead of being perceived as a hindrance to the campaign, could be used as an asset through the installation of a 360 degree rail system which would allow equipment to be aligned with any feature of the vault.

THE FINAL DELIVERABLE BY PDL WAS THE SERIES OF CONCEPTUAL DESIGNS FOR THE REMOVAL AND HANDLING OF WASTE

Personnel access equipment was also developed to allow for safe, short duration operations within the vault. The designs incorporated handrails, safety ladders and again, could be positioned as required using the corbel rail to facilitate access to particular structures within the vault.

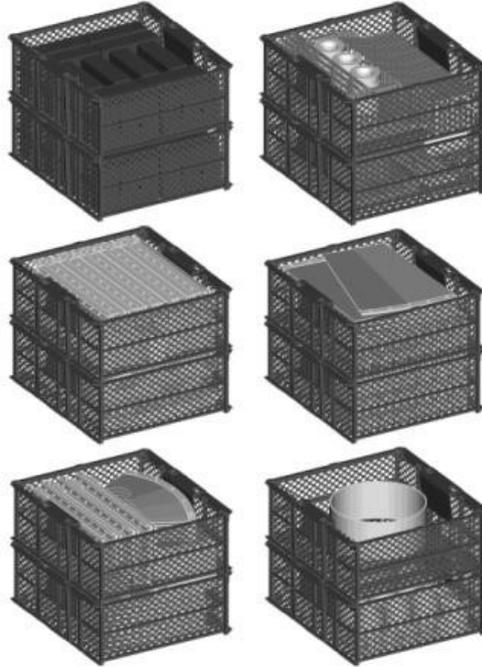


Figure 3 - 3D CAD representations of waste packages

The final deliverable by PDL was the series of conceptual designs for the removal and handling of waste, creation of a series of waste form models, the summation of waste forms by volume, mass and number of packages in an Excel spreadsheet and a final report describing all activities, conclusions and recommendations. This task was accomplished in only six weeks and was well received by BNFL ES.

<http://www.wmsym.org/archives/2012/papers/12474.pdf>

For further information regarding PDL's engineering capabilities please email: solutions@pdl-group.com or telephone our head office.