DSG Action - examples of waste treatment at other NDA sites

cyclife GROUPE EDF

Chapelcross Gas Duct Waste Export Project

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AGENDA

- Background and Context
- Status – Story so Far
- Schedule
- Pictorial Step through the project
- Risks
- AOB/Questions
- Supplementary Information

BACKGROUND AND CONTEXT



- Chapelcross has successfully removed the upper gas ducts from all 16 boilers
- As a result the following components need to be removed from site for treatment:
  - X 16 Gas Duct and Bridge Sections
  - X 16 Elbow Sections
  - Convoluted Pipework
  - Filter Pots



STATUS – STORY SO FAR

Tender Submission – 20/11/2017

Tender Assessment Complete – 06/12/2017

Preferred Bidder Announced – 07/12/2017

Early Works Proposal Submitted – 12/12/2017

Early Works Contract Award – 18/12/2017

Full Contract Award Anticipated - 12/01/2018

Anticipated Site Works Commencement – 26/01/2018

Anticipated LLWR Take Title to Waste – TBC

Anticipated Gas Ducts Removed from Site – 13/04/2018


SCHEDULE

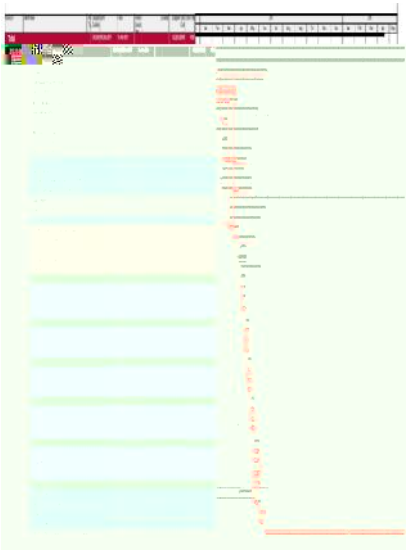
Tender Schedule Submitted

Schedule developed based upon impacted dates outlined in the previous slide

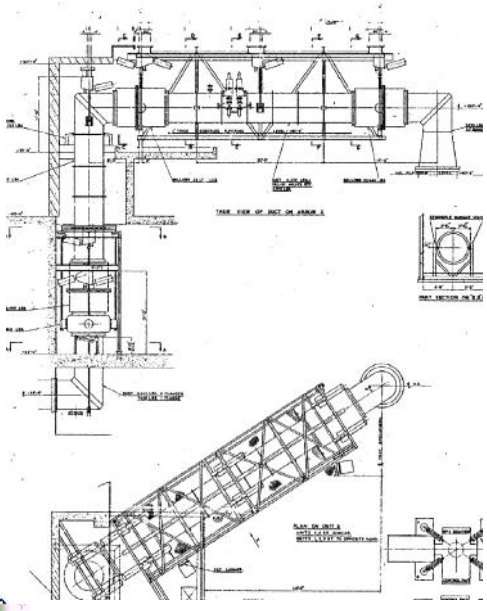
Schedule transferred to P6 as a base Schedule

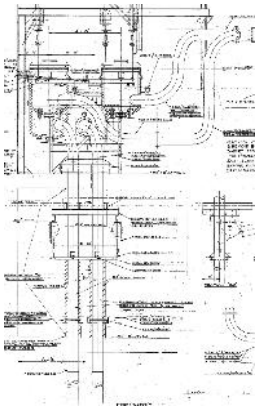
Current Schedule Provides Options for LLWR to Take Title to the Waste given the Later Start Date

Schedule to be reviewed and P50 Modelling to be undertaken



STEP THROUGH THE PROJECT





STEP THROUGH THE PROJECT

- Components located in two areas
- Filter Pots palletised and stored in containers
- Convoluted pipework bagged
- Elbows bagged and sealed with blanking plates
- Ducts bagged and sealed with blanking plates

STEP THROUGH THE PROJECT

Strategy

- Transport Filter Pots and Convoluted Pipework in existing site containers (IP1) to Lillyhall for treatment
- Transport Elbows as SCO1 packages to Sweden for treatment (current TFS)
- Transport Duct Assemblies as SCO1 packages to Sweden for treatment (new TFS)

Requirements

- Confirmation of radiological status
- Confirmation of physical integrity
- Confirmation of transport category
- Confirmation of Cyclife and LLWR Waste Acceptance Criteria

STEP THROUGH THE PROJECT

Filter Pots and Convoluted Pipework

Size reduction of pipework to fit container

Elbows

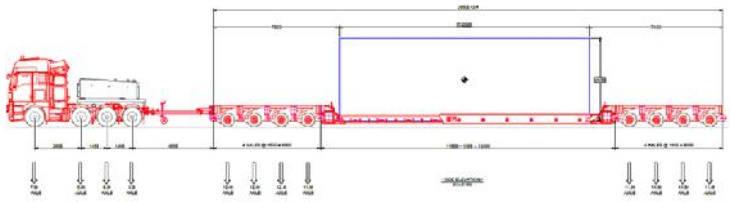
Have been transported previously

STEP THROUGH THE PROJECT

Duct Assemblies

Road Transport to north east port

In transit storage at port

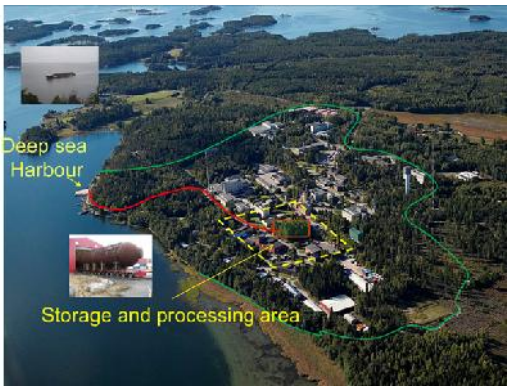


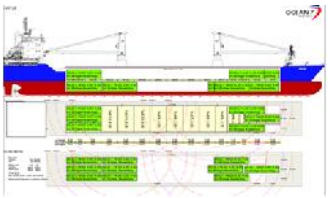
STEP THROUGH THE PROJECT

Duct Assemblies

Sea transport direct to Cyclife Sweden

New TFS for project





RISKS

Tender Risk Analysis Process Undertaken

LFE From Similar Projects Such as Berkeley Boilers Considered.

Tender Risk Register Produced and Submitted

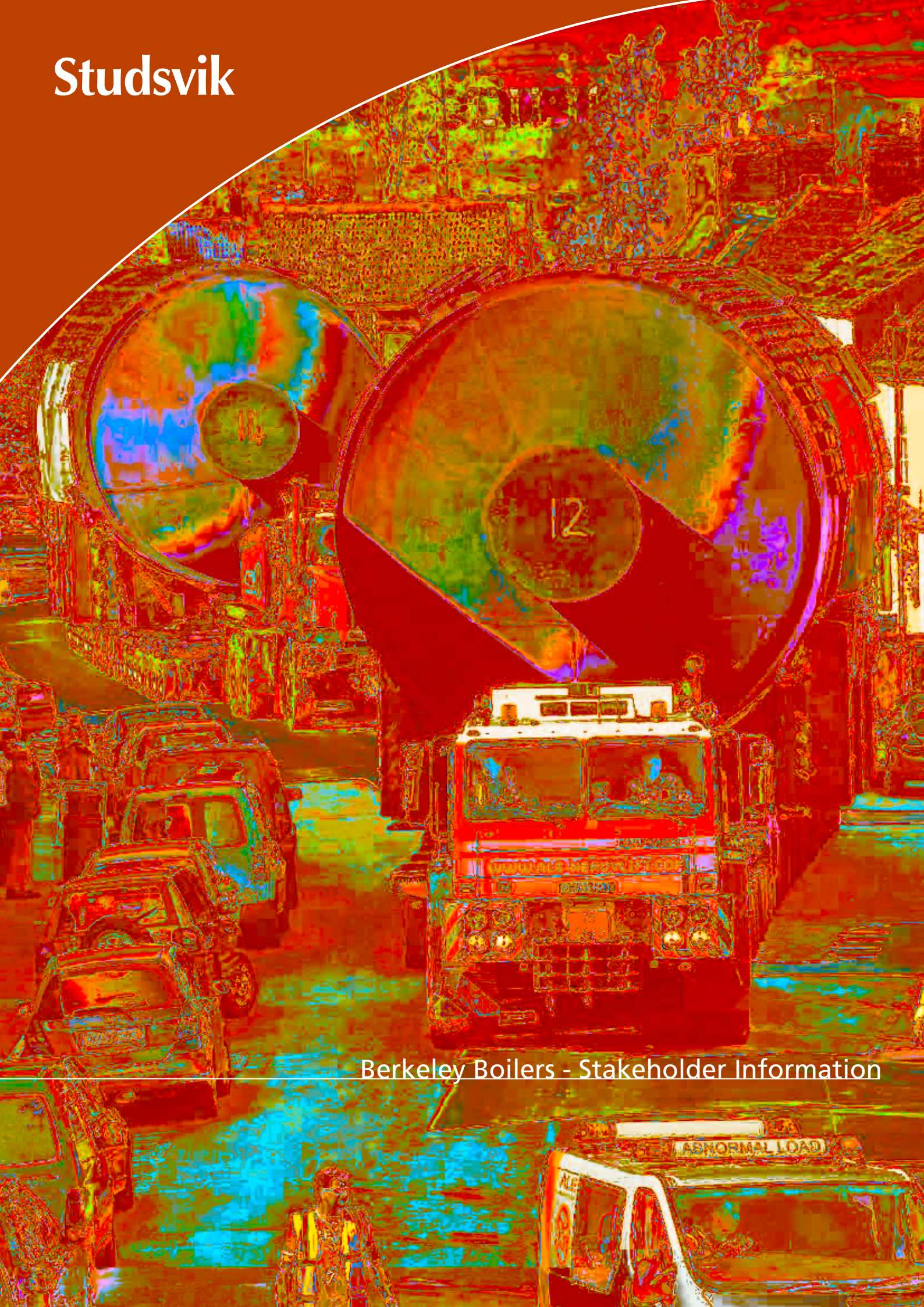
Top 5 Risk As Follows:

- Adverse Weather Conditions
- Unforeseen Radiological Conditions – i.e. External Contamination Impacting Transport Category
- Transport Category Outside of SCO1
- Structural Integrity Items to be Removed
- Third Party Approvals/Intervention

AOB/QUESTIONS

Thanks You For Your Time

Studsvik



Berkeley Boilers - Stakeholder Information

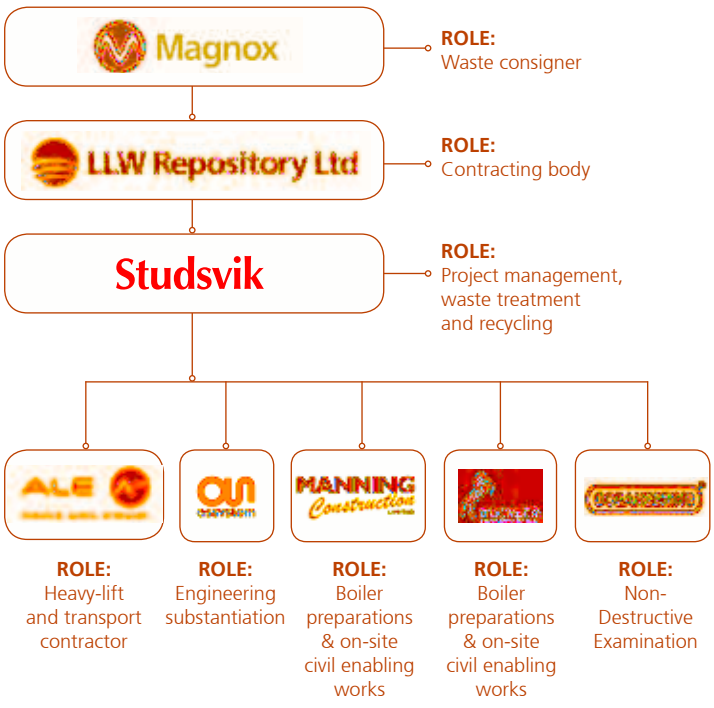
The Berkeley Boilers Project

Studsvik has successfully completed the work to transport and treat five of the boilers (heat exchangers) from the Berkeley power station. All five boilers have now been recycled at Studsvik's specialist large components facility, within our own nuclear licensed site, in Sweden. The secondary residues will be sent back for safe disposal at the Low Level Waste Repository (LLWR) in quarter 1 of 2013.

Following on from this success, Studsvik has been appointed as the main contractor to the LLW Repository (LLWR), on behalf of Magnox, for the transport and treatment of the final 10 boilers that remain laid down around the reactor buildings. This will effectively apply the same methodology as the first project and complete the 'skyline' transformation of the Berkeley site by removing all of the original boilers.

This brochure has been prepared to provide interested stakeholders with feedback from the first contract (Lot 1) and information on the second project (Lot 2).

Lot 2 Project Relationships



Lot 2 Key Dates

Contract awarded November 2012

Lifting operations begin in February 2013

All boilers off site by 15/03/13

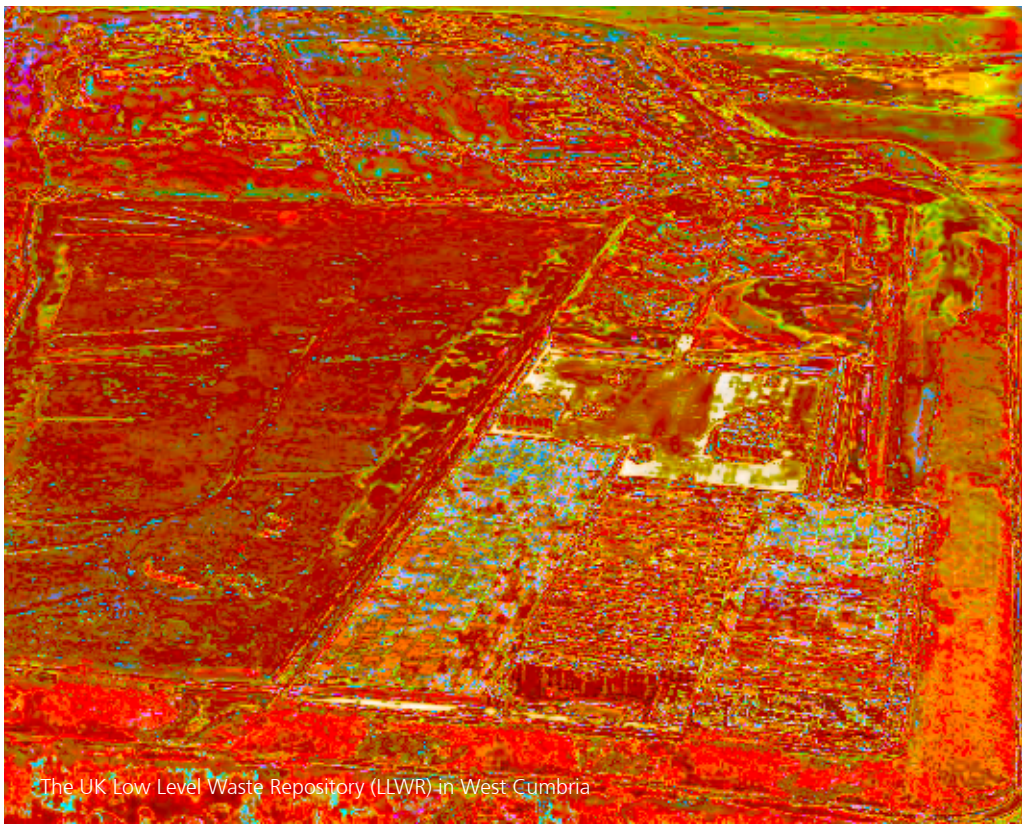
All secondary wastes returned within 2 years in December 2014

all the above dates are weather dependent

Key regulatory bodies involved in the project:
Environment Agency (EA)
Office for Nuclear Regulation (ONR)
Maritime and Coastguard Agency (MCA)
Highways Agency (HA)
Swedish Radiation Safety Authority (SSSM)
Finnish Radiation and Nuclear Safety Authority (STUK)
Gloucestershire County Council (GCC)
Department for Transport (DFT)

Sustainable Decommissioning

Recycling of the first 5 boilers has saved around 1900 cubic metres of space at LLWR, the equivalent of 97 half height ISO containers.

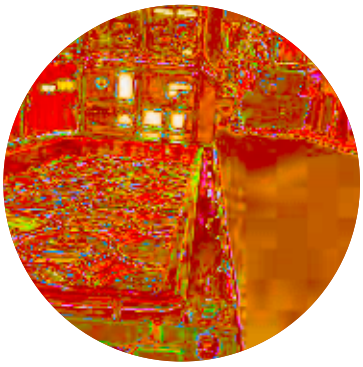


The UK Low Level Waste Repository (LLWR) in West Cumbria

The decommissioning of nuclear sites across the UK will produce significant quantities of low level radioactive solid wastes over many decades. Only the Low Level Waste Repository - the UK's primary facility for disposal of low level radioactive waste, situated in West Cumbria - is able to dispose of low level wastes, of any scale, and this has limited capacity.

The UK's National Low Level Waste Strategy involves avoiding production of such wastes, where possible, and the application of the waste hierarchy (avoid, reduce, reuse, recycle, dispose etc).

One hundred half height ISO containers would have been required if the first 5 boilers had been segmented and sent directly to LLWR for disposal. Due to treatment and recycling by Studsvik, only 3 half height ISO containers will be disposed of in the vault saving 1891.5 cubic metres of space at LLWR. The recycled metal will be used again, providing major environmental benefits.



100 half height ISO containers would have been sent for disposal to LLWR if the five boilers were not recycled

Berkeley Boilers - Lot 1 Case Study

Background

- Each of the two reactors had 8 boilers housed internally to the reactor buildings
- The boilers were de-lagged and disconnected during the decommissioning preparations
- Each boiler measures 21m long, 5 meters in diameter and weighs approximately 310 tonnes
- One boiler was size reduced on-site and disposed of as low level waste in the 1990s
- The remaining boilers were stored horizontally around each reactor (15 in total)
- It was originally planned to leave all 15 boilers in situ until the final site clearance in 2074
- There were only very low levels of internal contamination present

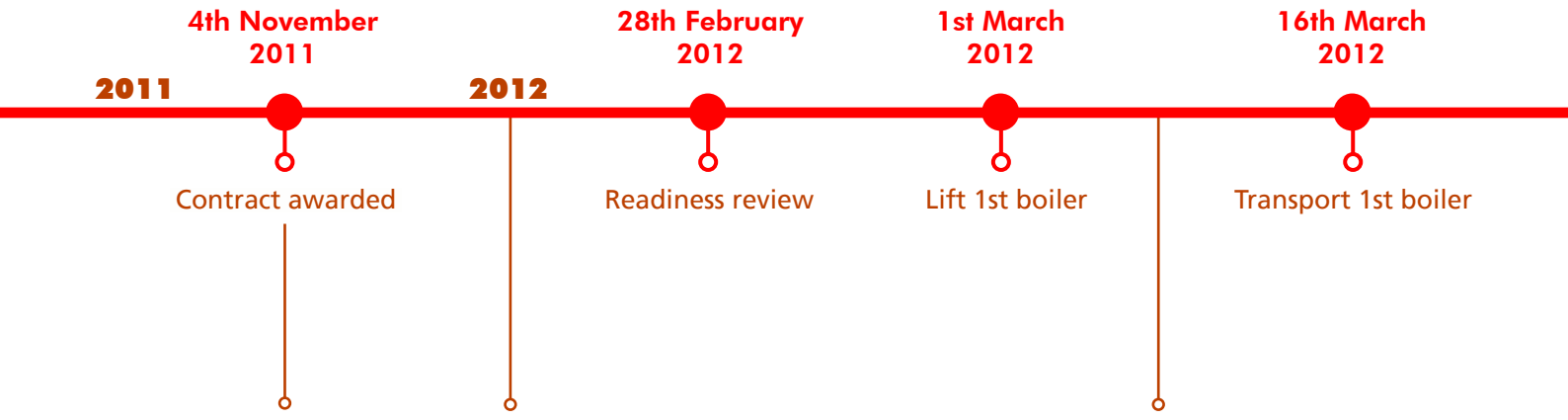
Work carried out

The project to transport and treat the first 5 boilers included a number of stages:

- Enabling works
  - Regulatory approvals
  - Site preparations
  - Design work
- Lifting & site transport
- Off site transport
- Treatment & recycling
- Secondary waste

Benefits from the project

- Accelerated hazard reduction
- Waste not being left for future generations to manage
- Supporting local infrastructure (the use of Sharpness Docks)
- Good for the environment - the re-cycling of metal for re-use
- The key part of the final site clearance completed early
- Noticeable landscape change
- Visible demonstration of the progress of decommissioning at the Berkeley site
- Demonstration of safe dealing of complex tasks by nuclear industry



Studsvik

Preparation

Studsvik, working with Magnox and LLWR, undertook surveys and characterisation of the boilers to reconfirm their radiological status. The small penetrations in the boilers that were used for temperature monitoring instruments were sealed and all surveys and measurements to reconfirm the boliers' structutal integrity were completed. New saddles were used along with existing saddles to secure the boilers during transport. Studsvik also obtained all regulatory permits and approval from the EA, DFT, ONR, GCC and the HA.

Lifting (2)

The boilers were lifited with jacking equipment called 'climbing jacks'. The international heavy lifting specialist Abnormal Load Engineering (ALE) were selected to undertake this aspect of the work.

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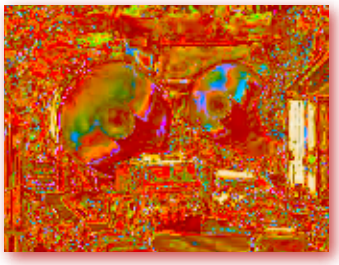
3 

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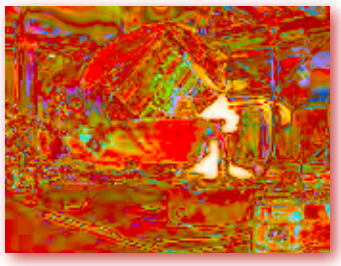
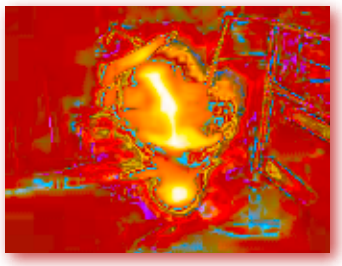
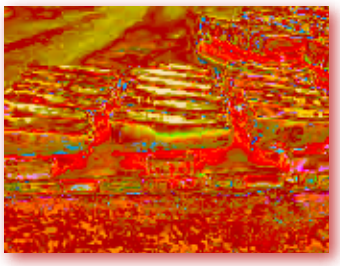
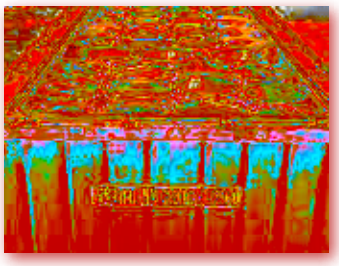
6 

7 

8 

9 

23rd March 2012
Transport 5th boiler

19th April 2012
Treatment began on 1st boiler

31st December 2012
Treatment of final boiler completed

Quarter 1 2013
Return of secondary waste to LLWR

Transport (3 - 5)

The boilers were transferred to Sharpness docks by long, multi-wheeled trailers that were driven by suitable heavy haulage tractor units. From Sharpness, they were transported to Bristol docks by a specialist barge, then transferred to the sea vessel for their onward journey to Sweden.

Treatment (6 - 9)

Once the boilers arrived in Sweden at the Studsvik site harbour, they underwent treatment by size reduction, decontamination and metal melting to recycle the metal. The final stage is to package and return the secondary waste to the LLWR in Cumbria, UK for disposal during 2013.

Safety, quality and regulatory performance

Five boilers were safely transported from Berkeley to the Studsvik site in Sweden without incident. The boilers left the UK on 31st March and arrived on 6th April.

The first stage involved a road journey of approximately two hours between the Berkeley site and the nearest port of Sharpness. Three separate road consignments were involved, the first for one boiler then two journeys each with two boilers. With each journey there was a significant amount of local support and many Heavy Transport enthusiasts from around the world joined the crowds of residents.

The boilers were transferred safely by barge from Sharpness to the larger port of Avonmouth and here all of the boilers were loaded onto a sea going vessel.

Each stage of the transportation was carried out in accordance with all national and international regulatory requirements. This involved multiple agencies from UK (EA, ONR, MCA, HA, GCC), Sweden (SSSM), Finland (STUK).

All of the work associated with the boilers was carried out to the highest standards of Safety and Quality. Some of the techniques used by the project team have been regarded as 'innovative' or 'best practice' and will be used in the future by a number of project participants.

A key success of the project has been the collaborative teamwork between all project participants.

NDA Supply Chain Award

Studsvik, LLWR and ALE won the 'Best Example of Collaboration ' in the Nuclear Decommissioning Authority (NDA) Supply Chain Awards for working together effectively on the Berkeley boilers Lot 1 project.

Described as an "outstanding example of SLC and supply chain collaboration across borders", the judging panel wrote:

"The sheer size of this project meant that it represented a huge step forward in the decommissioning of the Berkeley site and is the largest ever shipment of decommissioned components from a UK nuclear site, and has paved the way for more shipments in the future, saving vital resources in our low level repository."

Ron Gorham, Chair of the judging panel and the NDA's Head of Supply Chain and SME Champion, said: "We were extremely impressed by the collaborative working, range of innovation and sheer dedication of our supply chain, whether they were large consortia or small enterprises - all make a hugely valuable contribution to our mission, and we could not function without them."

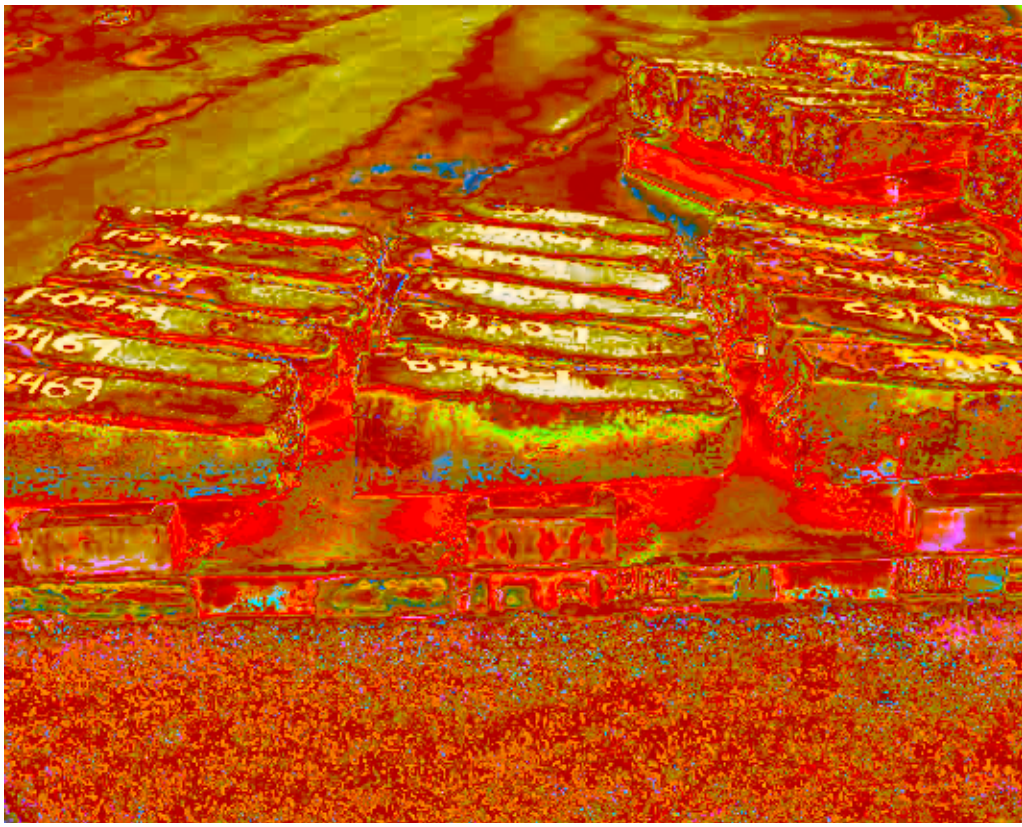
Sam Usher, President of Studsvik added "We are delighted that Studsvik and our partners have been recognised by the NDA for our work on this challenging project. The Berkely Boilers project has clearly demonstrated how effective teamwork can deliver real and tangible progress in the cleanup of our nuclear legacy".

From l to r: Nigel Kitt (ALE), Matt Taylor (Studsvik), Ron Gorham (NDA), Peter Walkden (Magnox)

Lessons Learned

We learnt the following points were key to delivering a successful project of this size:-

- Key focus on safety and quality
- Effective collaboration between project participants
- Regular communication with Stakeholders
- Early regulatory engagement
- Regular risk reviews
- Early enabling activities
- Pro-active characterisation to enable better development of scope of work



Project Radiological Information

This section compares the doses predicted in the Prior Radiological Assessment (information in Lot 1 Stakeholder brochure) with those actually accrued by the workforce on the project. Dose minimisation techniques and regular monitoring of the radiological conditions were undertaken to ensure doses to the workers were As Low as Reasonably Practicable (ALARP), complying with the Ionising Radiation Regulations (1999).

Doses for the Removal of 5 Boilers measured in micro Sieverts (μSv)		
Project Role	**Predicted Dose**	**Actual Dose**
Driver of a transport vehicle	31μSv	6 μSv
Lifting and transport engineer	40 μSv	3 μSv
In comparison, the dose of radiation from a transatlantic flight is 70 μSv		

As the table shows the doses received by the project staff were very low, and the majority are consistent with background radiation and clearly indicate how effective the controls were at minimising dose exposure.