

# Programmes and Major Projects Report: Sellafield

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March 2015 (Data as at December 2014)

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## Programmes and Major Projects Report: Sellafield (March 2015)

# Introduction

There are many projects of varying magnitude underway at Sellafield. Given the complexity and interdependency of some of these projects, they are grouped together into distinct programmes. The most significant of these programmes and projects, either by value or importance, are identified as Priority Programmes and Major Projects.

This report provides a high level overview of priority programmes at Sellafield, including summary schedules for some of the major projects contained within these programmes. The summaries include the following information:

- Outline description of each major project.
- A high level representation of the specific projects, schedule and cost forecasts at key reference points (dates) through the project lifecycle and shows how these have changed through time.
- The graph outlines any schedule and cost movements through time, with the specific source information provided for reference on the separate table.  
Note: The “dotted line” elements within the graphs indicate ranges for both schedule and cost at each key reference point.
- Further narrative/commentary is included to explain the basis for any movements between the key reference points and note the key drivers behind these.
- Additional information detailing “Spend to Date” is provided to indicate how much of the total project budget had been expended.

For each programme and project, the report reflects progress measured against a performance baseline derived from the Lifetime Plan (LTP) for each site or contract. The performance baseline is expressed in terms of a target cost range for most programmes, reflecting the inherent uncertainty in delivery of complex programmes over a long timescale. Where a specific “target cost” or schedule is specified this represents a “P50” target, i.e. a 50:50 probability of delivery above or below the stated target schedule and cost.

Many projects in the NDA estate are at a relatively early stage of development, and as such, the project definition and associated cost and schedule estimates are relatively immature. Changes to these are therefore to be expected as projects and programmes are further developed.

The general trend shows cost growth and schedule slippage from original project forecasts. However in the period since Sept 13, estimated costs and scheduled have been largely stable, with the exception of two projects associated with retrieval and treatment of waste from the Magnox Swarf Storage Silos (MSSS). As plans for MSSS have matured and been put out to tender the estimated cost and schedule for the Silos Direct Encapsulation Plant has increased significantly and consequently the schedule for operation of the third retrievals machine, which is linked to SDP availability, has been extended.



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**Note:** The NDA has recently accepted a revised lifetime plan for Sellafield and the targets described on the detailed project sheets reflect the revised PP14 target. A public version of the plan is being prepared for publication before the start of the new financial year.

### **Key terms used within this report**

**PP11** – Performance Plan 2011

**PP14** – Performance Plan 2014

**SL** – Sellafield Ltd

**T2/T3** – Tier 2/3 subcontractors

## Programmes and Major Projects Report: Sellafield (March 2015)

# PROGRAMME: First Generation Reprocessing Plant



The First Generation Reprocessing Plants was constructed in the early 1950s to carry out the first stage of reprocessing fuel from the Windscale Pile Reactors. It was later modified for oxide fuels following the opening of the Magnox Reprocessing Plant, before ceasing operations in the 1970s.

The plant was used to reprocess early reactor fuel before being converted to a head-end treatment plant where fuel was sheared.

The plant contains four highly active cells, each containing redundant radioactive material and two medium active cells. The Highly Active North Outer cell was also used as a shielded ventilation route from 1966 to 1988.

The building also has a 61m stack which is housed on the building roof. The priority decommissioning challenge associated with the First Generation Reprocessing Plants is the safe removal of this stack.

The location of the stack on the roof of the building presents a unique demolition challenge. Physical demolition of the plant cannot be completed until a new ventilation plant – the Separation

Area Ventilation Plant – is constructed and commissioned.

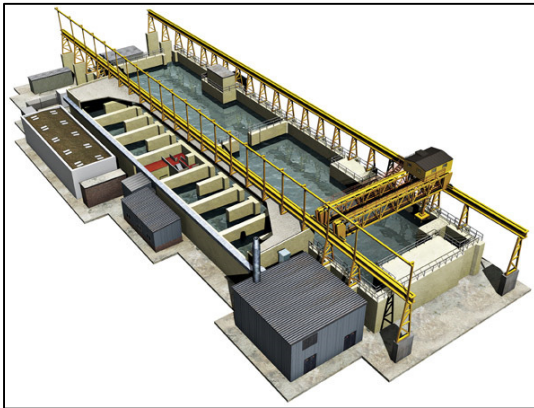
The First Generation Reprocessing Plants programme of work also includes the decommissioning of the Thorp Miniature Pilot Plant.

### Major Projects

- Separation Area Ventilation.....See Appendix 1

## Programmes and Major Projects Report: Sellafield (March 2015)

# PROGRAMME: Pile Fuel Storage Pond (PFSP)



The Pile Fuel Storage Pond is one of four Legacy Ponds and Silos facilities at Sellafield prioritised for clean up by the NDA as part of our hazard and risk reduction programme.

PFSP is a sub-divided open air storage pond which was built in the 1940s and 1950s to store, cool and prepare reactor fuel prior to reprocessing. It contains skips of irradiated metal and oxide fuel which need to be retrieved and transferred for reprocessing or for repackaging prior to disposal. This is challenging because the pond has remained open to the elements for more than 60 years and, alongside fuel, contains radioactive sludge and miscellaneous intermediate and low level wastes which need to be retrieved and treated through separate waste streams.

The objective of the programme is to achieve a “safe environmental state, requiring minimal on-going care and maintenance”. For planning purposes it is assumed that this end point will be when the facility is dewatered.

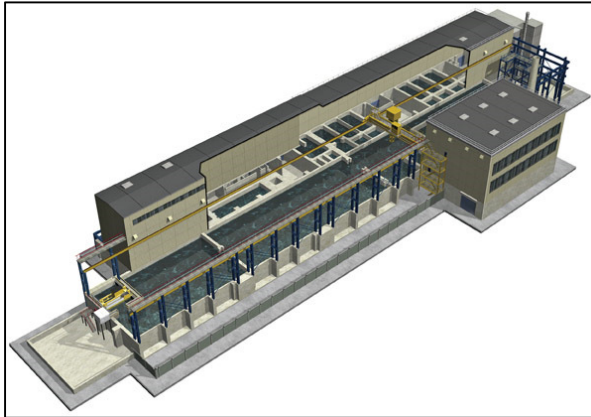
Final Decommissioning of the facility will be undertaken by a subsequent and final tranche of work within the Programme. Although little work has currently been done on this final tranche, the planning of it will be developed as the Programme progresses to ensure integration with the other tranches and alignment to site objectives and priorities at that time.

## Major Projects

- Local Sludge Treatment Plant.....See Appendix 2

## Programmes and Major Projects Report: Sellafield (March 2015)

# PROGRAMME: First Generation Magnox Storage Pond (FGMSP)



The First Generation Magnox Storage Pond is one of four Legacy Ponds and Silos facilities at Sellafield prioritised for clean up by the NDA as part of our hazard and risk reduction programme.

FGMSP was constructed in the 1950s and 1960s to store, cool and prepare Magnox fuel for reprocessing. It contains skips of used nuclear fuel which need to be retrieved and transferred for repackaging prior to disposal.

This facility presents significant challenges because alongside the fuel, the pond also contains radioactive sludge, fuel fragments and other debris which need to be retrieved and treated through separate waste streams.

The Programme key benefit is accelerated reduction in radiological risk to workers, public and environment. Currently the programme is creating a set of diverse waste retrieval capabilities as it prepares for retrieval operations.

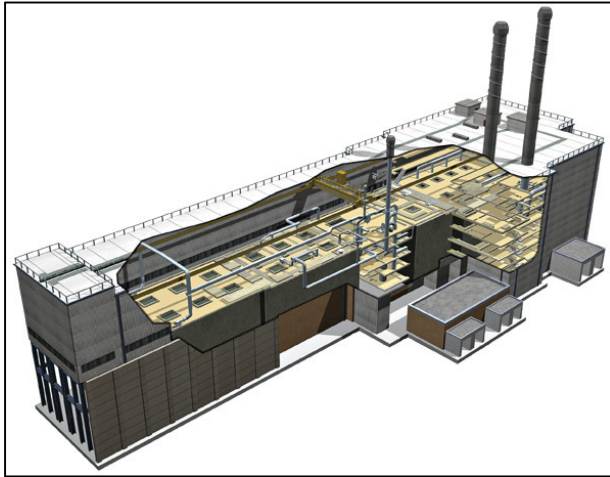
Additional scope has been incorporated into the programme to reduce uncertainty and increase confidence in achieving the benefits. These arrangements include providing additional capability to handle waste skips in the pond, which will reduce the dependency on an ageing skip handler, and alternative solutions for interim storage of waste. The decision to commit fuel to the Fuel Handling Plant (FHP) for interim storage reduces the risk of continued storage in the pond but requires additional investment in skip size reduction in the FHP to create sufficient storage capacity.

### Major Projects

- Bulk Sludge and Fuel Retrievals (BSFR) Capability Project..... See Appendix 3
- SEP Storage Pond 2 & Decanner - Sludge Packing Plant 1 Buffer..... See Appendix 4
- Ponds Solid Treatment Plant Technical Underpinning Project..... See Appendix 5

## Programmes and Major Projects Report: Sellafield (March 2015)

# PROGRAMME: Sellafield Magnox Swarf Storage Silos (MSSS)



The Magnox Swarf Storage Silos (MSSS) is one of four facilities at Sellafield known collectively as the Legacy Pond and Silos and is prioritised for clean up by the NDA as part of our hazard and risk reduction programme.

MSSS is a series of silos into which fuel cladding from the early Magnox programme was tipped. It represents one of the largest hazards on the Sellafield Site. Our objective is to retrieve and package the material into a passively safe form ready for disposal.

This is challenging because the building is old and was not designed to support retrieval of the material, and because the waste is uncertain in composition and in a difficult chemical and physical form.

There are 2 plants that will treat the waste from the silo: Box Encapsulation Plant (BEP) and Silos Direct Encapsulation Plant (SDP). Current plans for SDP indicate that this will be significantly later than anticipated which is causing delays to other projects and programme outcomes.

Recognising this significant delivery challenge, an optioneering exercise is being undertaken as part of a strategic review to investigate other storage options.

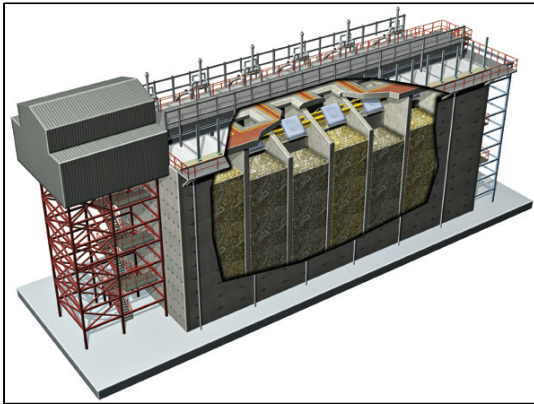
### Major Projects

- Silos Direct Encapsulation Plant..... See Appendix 6
- SEP Solid Waste Storage Retrievals..... See Appendix 7
- Silo Maintenance Facility Construction..... See Appendix 8
- Box Transfer Facility..... See Appendix 9
- Box Encapsulation Plant (BEP) Construction.....See Appendix 10



## Programmes and Major Projects Report: Sellafield (March 2015)

# PROGRAMME: Sellafield Pile Fuel Cladding Silo (PFCS)



The Pile Fuel Cladding Silo is one of four Legacy Ponds and Silos facilities at Sellafield prioritised for clean up by the NDA as part of our hazard and risk reduction programme.

PFCS consists of a series of silos built in the 1950s to store intermediate level waste from the Windscale Pile reactors. A programme of work is underway to safely retrieve this material and package into a passively safe form (in 3m<sup>3</sup> boxes) ready for disposal. This work presents significant challenges because it requires the building of a new superstructure in a small footprint directly adjacent to the silo and because the facility contains high levels of argon gas to prevent possible combustion but prevents human access.

The PFCS Programme Strategy is to retrieve waste, interim store in 3m<sup>3</sup> boxes in BEPPS/DIF subsequent to treatment prior to final disposal in the Geological Disposal Facility (GDF).

In June 2014 the Retrievals Project was paused, this was due to technical complexity issues in the design of the retrievals method, a revised approach is currently being developed. The enabling projects and activities (Sellafield Box Procurement, Box Encapsulated Product Plant / Direct Import Facility (BEPPS/DIF) and Legacy Ponds and Silo Transport Project) are aligned to this date.

### Major Projects

- Pile Fuel Cladding Silo Retrievals and Treatment..... See Appendix 11
- Box Encapsulation Plant Product Store (BEPPS) / Direct Import Facility (DIF) Construction Project..... See Appendix 12

## Programmes and Major Projects Report: Sellafield (March 2015)

# Highly Active Liquor (HAL) Workstream



Highly Active Liquor (HAL) is classed as high level waste and is a by-product of reprocessing spent nuclear fuel. It is treated at Sellafield in the vitrification plant where it is converted into a solid stable form for transport and long-term storage.

Vitrified UK HAL is stored at Sellafield while overseas vitrified residue is returned to the country of origin.

The HAL Workstream previously included mitigating activity against the risk of failure against the existing Highly Active (liquor) Storage Tanks (HAST).

However, this project is now cancelled following the THORP reprocessing decision and work to better utilise the existing assets which resulted in a lifetime saving of >£400m.

### Major Projects

- HALES Replacement HASTs.....See Appendix 13
- Evaporator D - Completion of Construction.....See Appendix 14

## Intermediate Level Waste (ILW) Treatment and Storage



This programme covers the treatment and storage of intermediate level nuclear waste at Sellafield. ILW includes material such as fuel element cladding, contaminated equipment and radioactive sludge.

It comes from current commercial activities as well as historical operations and risk and hazard reduction work.

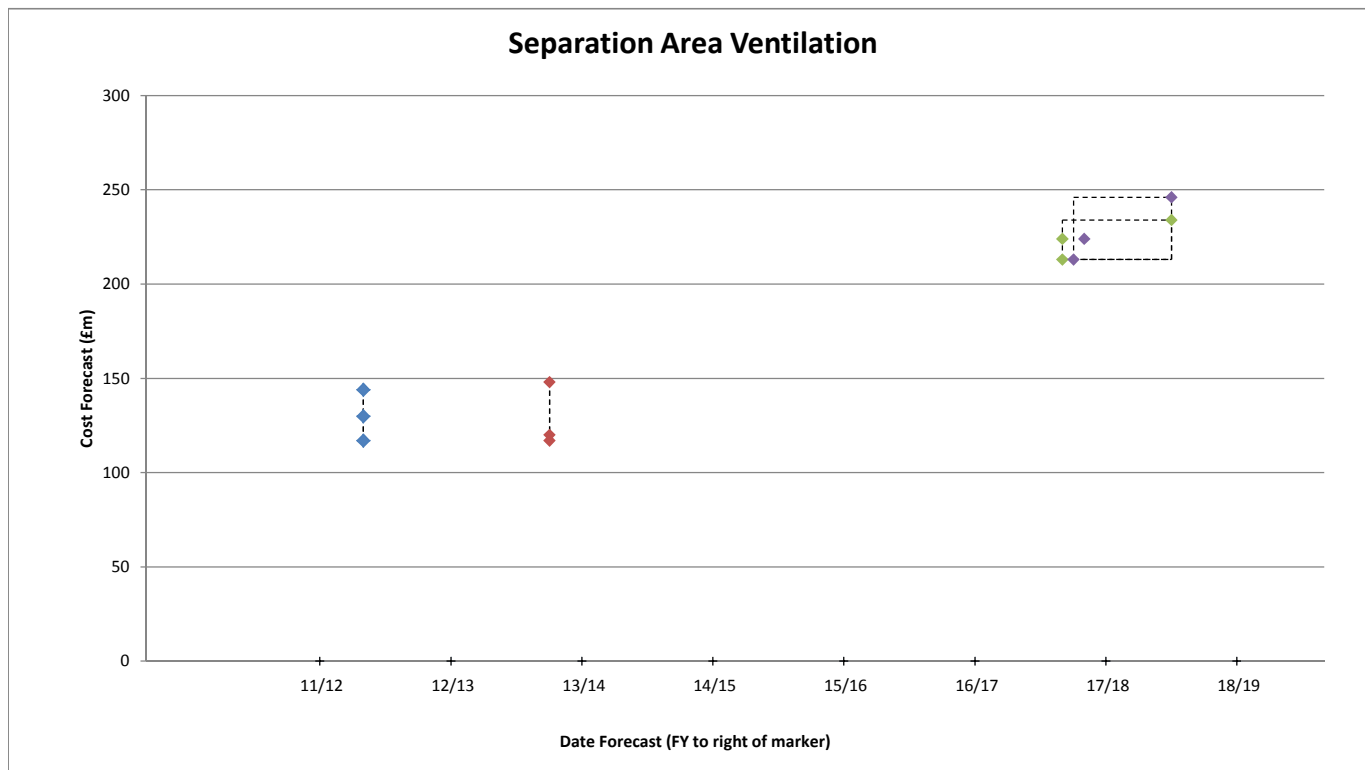
A number of new construction projects are under way to ensure that Sellafield has the necessary buildings to process and provide interim storage for ILW.

### Major Projects

- Encapsulated Product Store 3..... See Appendix 15

## Appendices – Major Project detailed project sheets

<b>Project</b>	<b>Separation Area Ventilation</b>
<b>Programme</b>	<b>02 - First Generation Reprocessing Plant</b>
<b>Description:</b>	
Construct a 120 metre high chimney with associated plant room monitoring room and substation. The project is the key enabler to the demolition of the SEP Head End Plant Stack; which poses a significant seismic risk to the Sellafield site. Across this wider programme waste streams from the SEP Head End Plant are due to be diverted to SAV in 2016 with demolition of the stack commencing in 2016 and scheduled for completion in 2018.	
<b>Phase</b>	<b>Delivery</b>
The project has passed the detail design phase (gate) and moved into Delivery. The focus of Delivery is to complete procurement, manufacture, construction and commissioning activities to provide a facility ready for operations.	



**Chart Data**

Reference Point	Date	Cost (£m)
Design Gate (low)	Aug-11	117
Design Gate (mid)	Aug-11	130
Design Gate (high)	Aug-11	144
PP11 (low)	Jan-13	117
PP11 (mid)	Jan-13	120
PP11 (high)	Jan-13	148
Sep-13 (low)	Dec-16	213
Sep-13 (mid)	Dec-16	224
Sep-13 (high)	Oct-17	234
Dec-14 (low)	Jan-17	213
Dec-14 (mid)	Jan-17	224
Dec-14 (high)	Oct-17	246

The costs in the table above are expressed in the money values from the year in which the estimate was prepared.

**Spend to Date**

Reference Date	Spend (£m)
Mar-12	106
Sep-13	149
Mar-14	166
Sep-14	189
Dec-14	203

**Variance/Movement Commentary:**

Design Gate to PP11:  
The movement to the PP11 value was as a consequence of the understanding of the scope at that point in time.

PP11 to Dec 2014 (PP14):  
There were three key drivers for the cost increases:  
1) Under estimation (46%) £48m; 2) Scope growth (33%) £34m; 3) Performance (21%) £22m.  
Further details below:  
1) Significant initial underestimation by contractor of circa £41m was the largest contributor, caused in part by their unfamiliarity with separation area working environment impacting productivity.  
2) SL scope growth derives from three main factors i.e.  
i) Encountering poor ground conditions (£9m) and some additional scope due to design changes in execution, such as the alarm panel design and relocation of some Instrumentation panels.  
ii) Scope growth derived by contractor is primarily driven by increased management costs over the extended delivery schedule (£15m).  
iii) Scope growth due to additional structural strengthening required in the SEP Head End Plant to allow installation of new ductwork.  
3) Performance issues suffered generally derive from re-work (both design and construction, particularly work to overcome immature design and service clashes during installation), ductwork corrosion quality issues requiring refabrication.

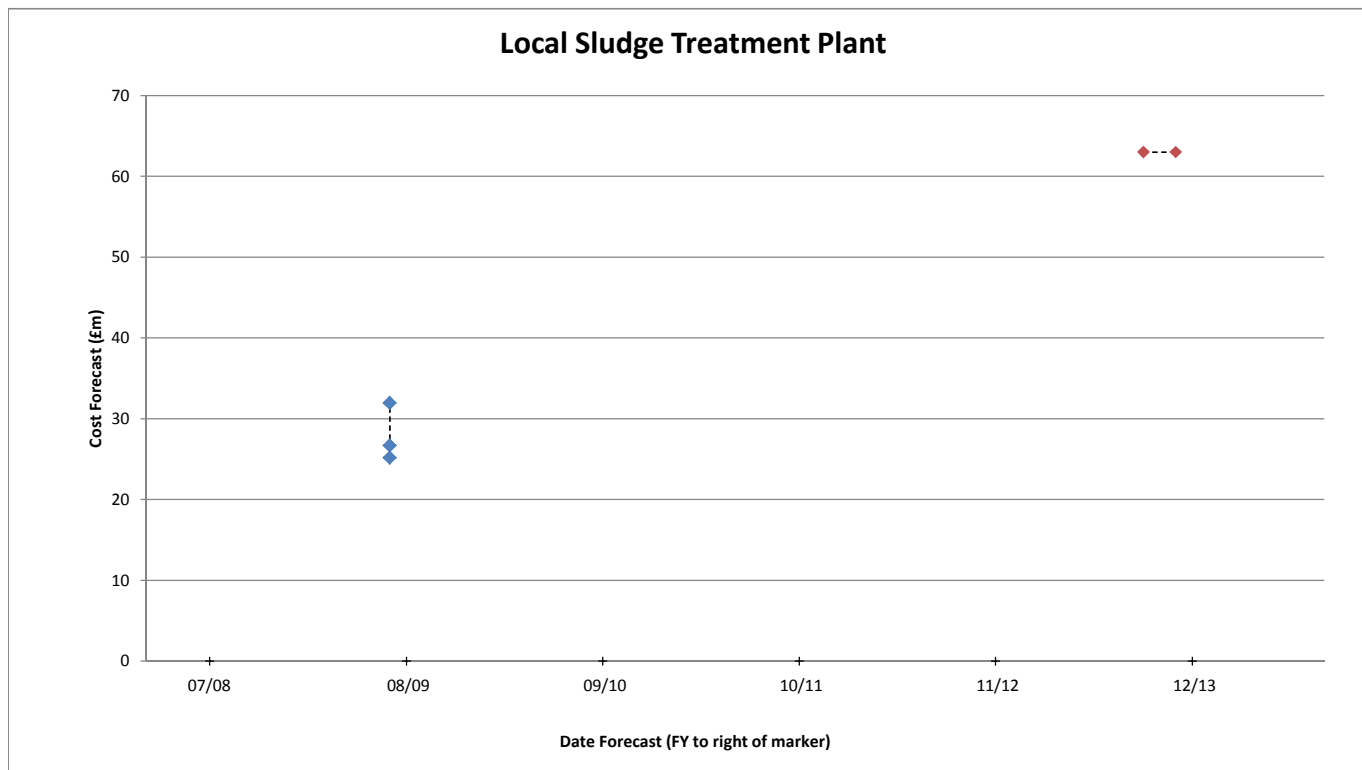
All the above have contributed to the schedule slippage on the project.

Subset of above includes period between Sep 2013 to Dec 2014 specifically covering:  
One month slippage on overall completion from Dec 16 to Jan 17. This followed completion of risk modelling etc. when the business case was finalised rather than a change to the project.

Design Gate to PP11	PP11 to "Sep 2013"	"Sep 2013" to PP14 (@ Dec 2014)
<p>Cat: Note: The P50 number actually went down between these two reference points.</p> <p>A) - A cost reduction target was set for the project which resulted in a reduced mid point forecast number.</p> <p>B) -</p> <p>C) -</p> <p>D) -</p> <p>E) -</p>	<p>Cat:</p> <p>A) - £34m. Costs associated with extended schedule; additional design costs covering ground condition issues design changes, etc.</p> <p>B) -</p> <p>C) -</p> <p>D) - £22m. Re-work during design and construction; service clashes; quality issues; SL design changes.</p> <p>E) - £48m. Underestimation of working in the separation area; underestimated design and construction timescales; temporary structure requirements.</p>	<p>Cat:</p> <p>A) -</p> <p>B) -</p> <p>C) - No change in reported cost numbers during period, however a one month movement in the schedule due to SL sequencing of risk modelling.</p> <p>D) -</p> <p>E) -</p>

Category definition - A) - Inherent unknowables, B) - Complexity at Sellafield, C) - SL Capability, D) - T2/T3 Delivery performance, E) - Unrealistic expectations.

<b>Project</b>	<b>Local Sludge Treatment Plant</b>
<b>Programme</b>	<b>03 - Pile Fuel Storage Pond</b>
<b>Description:</b>	
Construct buffer storage tanks to hold radioactive sludge in modern stainless steel containment prior to conditioning the sludge for final disposal. Tanks can hold full volume of sludge in pond and were built to meet requirements of regulatory specification. Current plans are only to use the main storage tanks if there is an emergency, otherwise the front end of the facility will be used to export sludge from the pond to a local drum filling plant prior to it being encapsulated for storage and disposal using an existing on site facility.	
<b>Phase</b>	<b>Complete</b>
The delivery phase of the project has now been closed out.	



**Chart Data**

Reference Point	Date	Cost (£m)
Design Gate (low)	Mar-08	25
Design Gate (mid)	Mar-08	27
Design Gate (high)	Mar-08	32
PP11 (low)	Jan-12	63
PP11 (mid)	Jan-12	63
PP11 (high)	Mar-12	63
Sep-13 (low)		N/A
Sep-13 (mid)		N/A
Sep-13 (high)		N/A
Dec-14 (low)		N/A
Dec-14 (mid)		N/A
Dec-14 (high)		N/A

The costs in the table above are expressed in the money values from the year in which the estimate was prepared.

**Spend to Date**

Reference Date	Spend (£m)
Mar-12	63
Sep-13	63
Mar-14	63
Sep-14	63
Dec-14	63

**Variance/Movement Commentary:**

**Design Gate to PP11:**  
Increases in cost and schedule since design gate can be attributed primarily to unrealistic initial plans for the defined scope for the project. This led to significant design changes with further associated contractor performance issues. These issues followed the Due Diligence process undertaken during transfer of scope between organisations, the project and was also impacted by further schedule and cost issues.

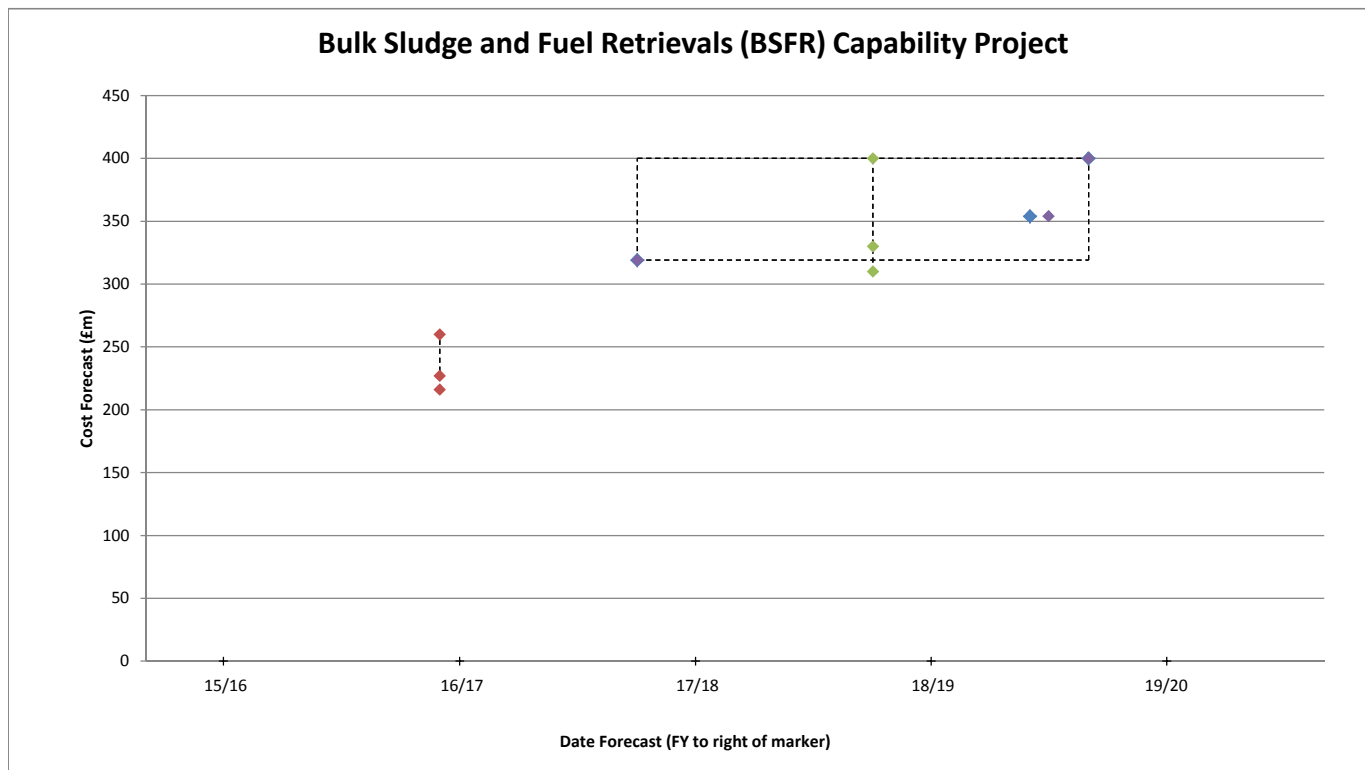
**PP11 to PP14:**  
Performance has been stable since PP11 and the project is now complete (March 2012).

Subset of above includes period between Sep 2013 to Dec 2014 specifically covering:  
N/A - Project complete March 2012.

Design Gate to PP11	PP11 to "Sep 2013"	"Sep 2013" to PP14 (@ Dec 2014)
Cat: A) - B) - C) - D) - E) - Significant design changes to accommodate methane concerns and construction safety case, coupled with poor contractor performance. Project re-baselined as part of sale of BNFL Engineering Services.	Cat: No change in reported numbers during period up to the project completion at March 2012. A) - B) - C) - D) - E) -	Cat: N/A - Project complete March 2012. A) - B) - C) - D) - E) -

Category definition - A) - Inherent unknowables, B) - Complexity at Sellafield, C) - SL Capability, D) - T2/T3 Delivery performance, E) - Unrealistic expectations.

<b>Project</b>	<b>Bulk Sludge and Fuel Retrievals (BSFR) Capability Project</b>
<b>Programme</b>	<b>04 - First Generation Magnox Storage Pond</b>
<b>Description:</b>	
Provides the main infrastructure to recover and export sludge from the First Generation Magnox Storage Pond main pond and D Bay. This includes the skip handler tooling, skip wash capability, sludge recovery heads and deployment systems, sludge export pipework, and effluent return pipework. These systems interface with the SPP1 buffer major project which will be used to store the recovered sludge.	
<b>Phase</b>	<b>Delivery</b>
The project has passed the detail design phase (gate) and moved into Delivery. The focus of Delivery is to complete procurement, manufacture, construction and commissioning activities to provide a facility ready for operations.	



**Chart Data**

Reference Point	Date	Cost (£m)
Design Gate (low)	Jan-17	319
Design Gate (mid)	Sep-18	354
Design Gate (high)	Dec-18	400
PP11 (low)	Mar-16	216
PP11 (mid)	Mar-16	227
PP11 (high)	Mar-16	260
Sep-13 (low)	Jan-18	310
Sep-13 (mid)	Jan-18	330
Sep-13 (high)	Jan-18	400
Dec-14 (low)	Jan-17	319
Dec-14 (mid)	Sep-18	354
Dec-14 (high)	Dec-18	400

The costs in the table above are expressed in the money values from the year in which the estimate was prepared.

**Spend to Date**

Reference Date	Spend (£m)
Mar-12	132
Sep-13	186
Mar-14	202
Sep-14	218
Dec-14	228

**Variance/Movement Commentary:**

Design Gate to PP11:  
Project reached detailed design gate post PP11 in April 2014.

PP11 to PP14:  
£227m to £354m @P50 (Project high range £260m to £400m) movement as a result of scope growth and better understanding of plant conditions.  
Date moved from Mar-16 to Sep-18 based on completion of D Bay retrieval system which is the main focus for delivery of the project rather than the previous A-bay reference point.

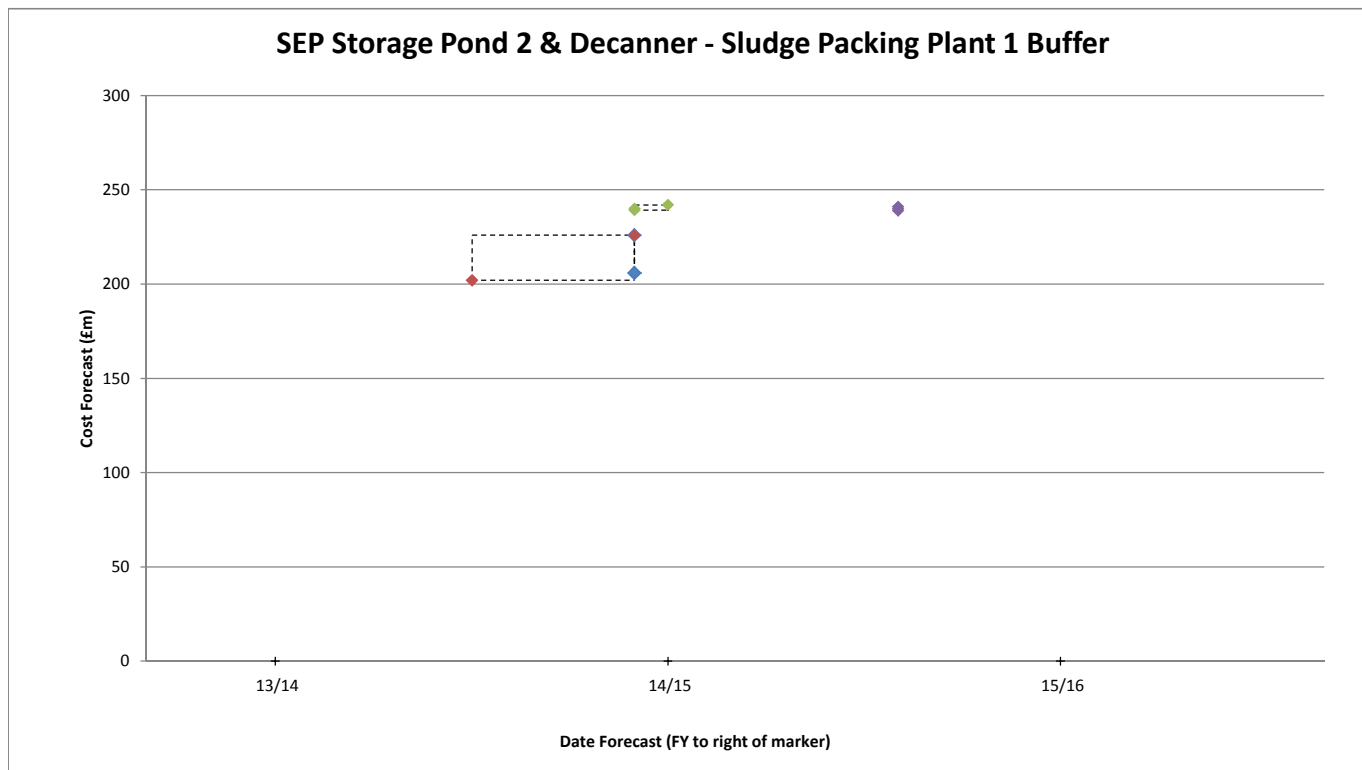
Subset of above includes period between Sep 2013 to Dec 2014 specifically covering:  
The movements have been attributed to the following:  
Further scope growth and associated understanding of plant conditions (this in part reflecting a greater understanding of the difficulties associated with working in the congested and hazardous wet bay area), which have led to a delayed completion timeframe and cost increases for the overall project.

In Sept 2013 the skip handler had not returned to service and the reported numbers were a preliminary view of the project prior to a formal business case submission in March 2014 at completion of detailed design. There were a number of issues that impacted machine availability and performance including system integration. These impacted the project's forward view of the schedule.

Design Gate to PP11	PP11 to "Sep 2013"	"Sep 2013" to PP14 (@ Dec 2014)
Cat: Not applicable as project reached detailed design gate post PP11 in April 2014 and values currently align with PP14 Submission.	Cat: Points A & B are main causes of variance.	Cat: Point C main cause of variance.
A) - B) - C) - D) - E) -	A) - Uncertainty in wet bay environment and return to service of skip handler. B) - Complex logistics on plant. C) - SL capability in terms of closing out design and late return to service of skip handler. Performance of Integrated Works Management (IWM) process. D) - Issues with manufacturing quality and ability to deliver supporting QA documentation. E) -	A) - B) - Complexity in terms of logistics in a difficult environment. C) - Skip handler performance following return to service and use of Plan B's to mitigate impact. D) - E) -

Category definition - A) - Inherent unknowables, B) - Complexity at Sellafeld, C) - SL Capability, D) - T2/T3 Delivery performance, E) - Unrealistic expectations.

<b>Project</b>	<b>SEP Storage Pond 2 &amp; Decanner - Sludge Packing Plant 1 Buffer</b>
<b>Programme</b>	<b>04 - First Generation Magnox Storage Pond</b>
<b>Description:</b>	
This is a key enabling project in the emptying and decommissioning of one of Sellafield's major high hazard programmes. Provides a modern robust storage capability for the majority of the radioactive sludge from the First Generation Magnox Storage Pond and wet bays until it can be processed into a suitable waste form for final disposal. The facility was constructed to meet the requirements of the ONR specification and consists of three large seismically qualified stainless steel tanks with a 1,350m3 storage capacity plus sludge mobilisation technology to support future export of the sludge.	
<b>Phase</b>	<b>Complete</b>
The delivery phase of the project has now been closed out.	



**Chart Data**

Reference Point	Date	Cost (£m)
Design Gate (low)	Mar-14	206
Design Gate (mid)	Mar-14	206
Design Gate (high)	Mar-14	226
PP11 (low)	Oct-13	202
PP11 (mid)	Oct-13	202
PP11 (high)	Mar-14	226
Sep-13 (low)	Mar-14	239
Sep-13 (mid)	Mar-14	240
Sep-13 (high)	Apr-14	242
Dec-14 (low)	Nov-14	239
Dec-14 (mid)	Nov-14	240
Dec-14 (high)	Nov-14	241

The costs in the table above are expressed in the money values from the year in which the estimate was prepared.

**Spend to Date**

Reference Date	Spend (£m)
Mar-12	172
Sep-13	220
Mar-14	231
Sep-14	236
Dec-14	236

**Variance/Movement Commentary:**

**Design Gate to PP11:**  
Between the Design Gate and PP11, plans moved in part due to an element of ambition being adopted at the time. There were aspirations to accelerate the schedule and gain a small reduction in costs. This took into account the better characterisation of the inventory and the need to enable future recovery of the sludge from the tanks.

**PP11 to PP14:**  
Since PP11 the primary cause for variance is poor Tier 2 contractor performance. Contractor performance and emergent work resulting from planned technical underpinning studies indicated that costs were under pressure and would move closer to the P80 value of £241m.

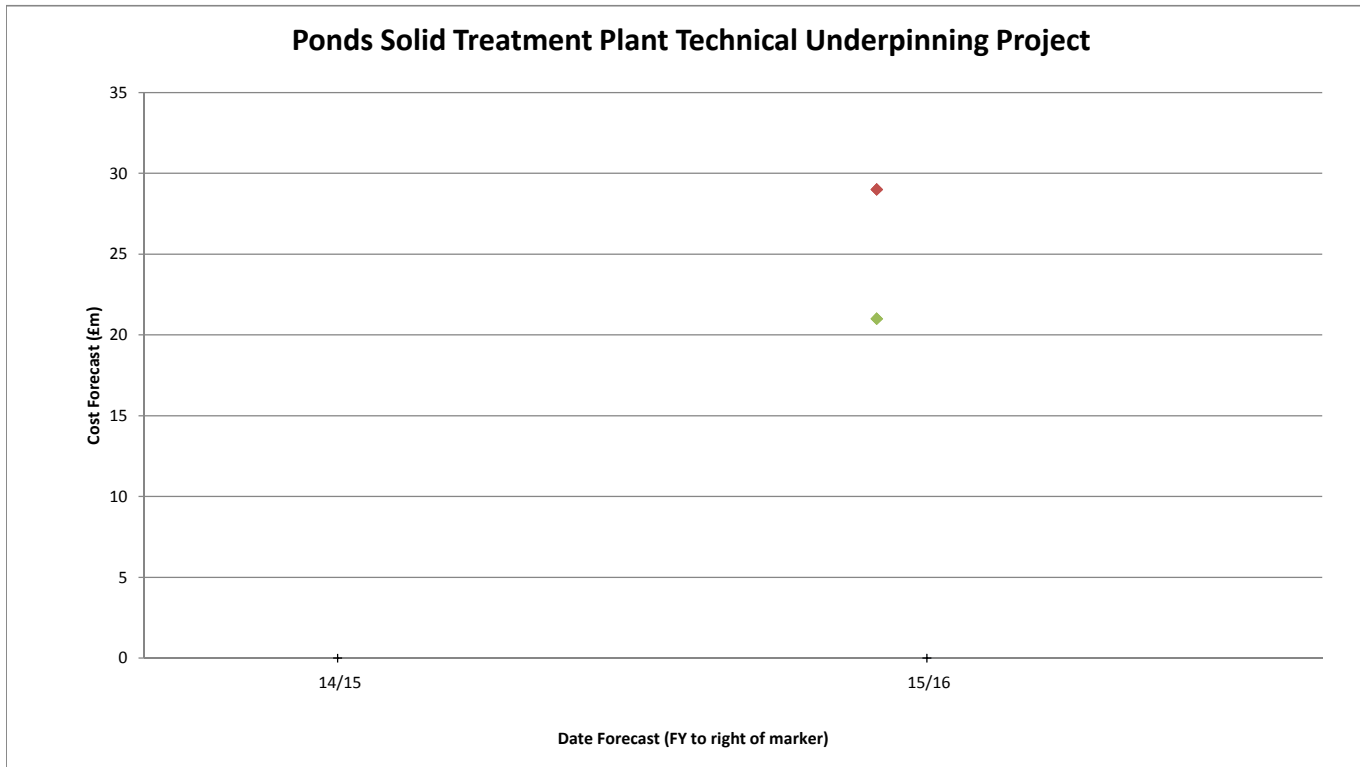
Subset of above includes period between Sep 2013 to Dec 2014 specifically covering:  
Costs have been reasonably stable since September 2013, however, schedule delays have been encountered due to a combination of the workload required during the commissioning phase and issues with delivery from the supply chain.

Design Gate to PP11	PP11 to "Sep 2013"	"Sep 2013" to PP14 (@ Dec 2014)
<p>Cat:</p> <p>A) -</p> <p>B) -</p> <p>C) -</p> <p>D) -</p> <p>E) - SL initially moved the plans due to an element of ambition being adopted at the time. There were aspirations to accelerate the schedule and gain a small reduction in costs.</p>	<p>Cat: Point D main cause of variance.</p> <p>A) -</p> <p>B) - Design changes resulting from tests undertaken on the technical underpinning project (Sludge behaviour using Pulse Jet Mixers).</p> <p>C) - Poor contract management and contract model.</p> <p>D) - Supply chain performance in terms of quality and productivity.</p> <p>E) -</p>	<p>Cat: Point D main cause variance.</p> <p>A) -</p> <p>B) -</p> <p>C) - Commissioning more challenging than anticipated.</p> <p>D) - Supply chain ability to close out LTQRs and performance during commissioning work.</p> <p>E) -</p>

Category definition - A) - Inherent unknowables, B) - Complexity at Sellafield, C) - SL Capability, D) - T2/T3 Delivery performance, E) - Unrealistic expectations.



<b>Project</b>	<b>Ponds Solid Treatment Plant Technical Underpinning Project</b>
<b>Programme</b>	<b>04 - First Generation Magnox Storage Pond</b>
<b>Description:</b>	
Complete a series of studies to define solutions for the management of ponds solids. Particularly fuel, fuel bearing materials and ILW.	
<b>Phase</b>	<b>Study</b>
To assess the feasibility of the project.	



**Chart Data**

Reference Point	Date	Cost (£m)
Design Gate (low)		N/A
Design Gate (mid)		N/A
Design Gate (high)		N/A
PP11 (low)	Mar-15	29
PP11 (mid)	Mar-15	29
PP11 (high)	Mar-15	29
Sep-13 (low)	Mar-15	21
Sep-13 (mid)	Mar-15	21
Sep-13 (high)	Mar-15	21
Dec-14 (low)		N/A
Dec-14 (mid)		N/A
Dec-14 (high)		N/A

The costs in the table above are expressed in the money values from the year in which the estimate was prepared.

**Spend to Date**

Reference Date	Spend (£m)
Mar-12	3
Sep-13	11
Mar-14	14
Sep-14	15
Dec-14	15

**Variance/Movement Commentary:**

Design Gate to PP11:  
 N/A has not passed Detailed Design Gate. This was a Study not a true Project.

PP11 to PP14:  
 See "subset" information below.

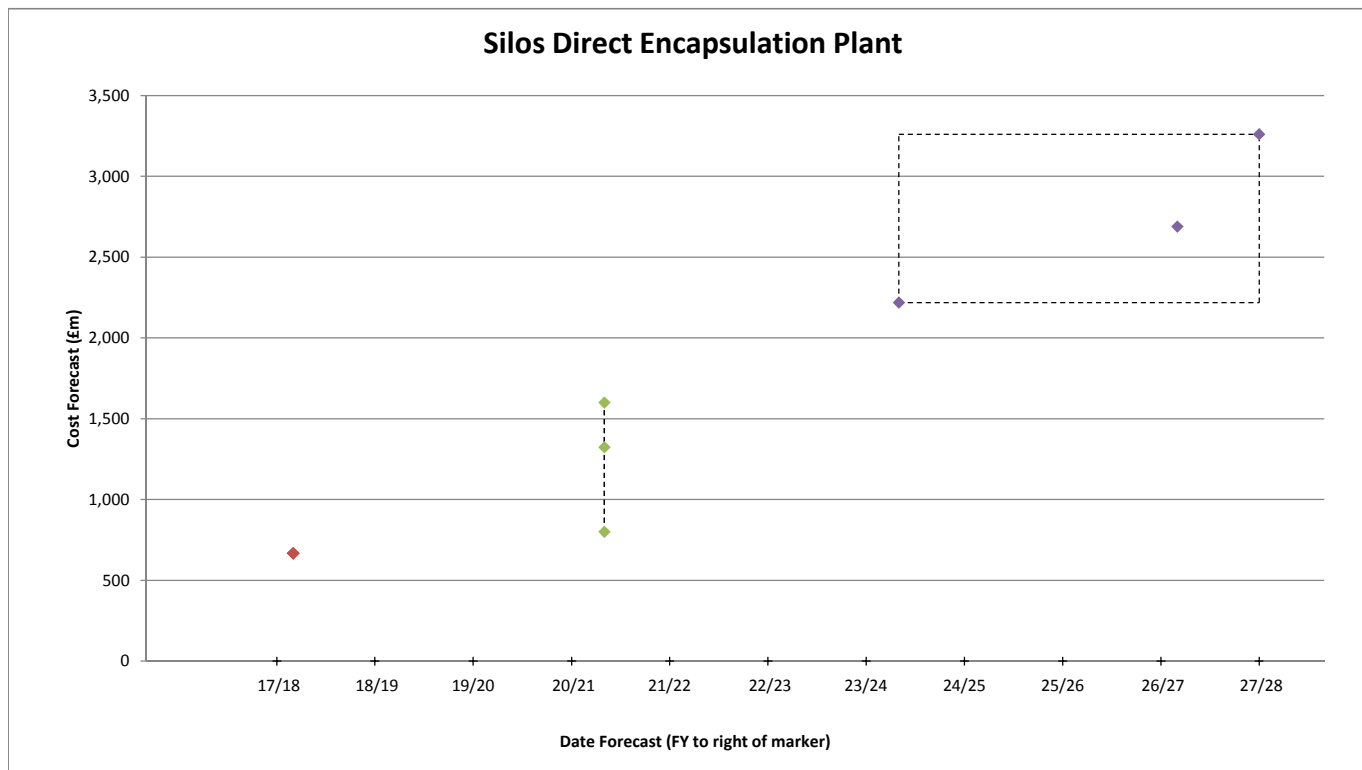
Subset of above includes period between Sep 2013 to Dec 2014 specifically covering:  
 A decision was taken not to pursue rapid fuel drying as part of the PP14 review on the basis of deliverability and availability. The scope was cancelled when the BEP project started (June 2014).

The initial intent of this project covered the review of ponds solids treatment technologies and to look at options to support further decisions on BEP.

Design Gate to PP11	PP11 to "Sep 2013"	"Sep 2013" to PP14 (@ Dec 2014)
Cat: N/A. Has not passed Detailed Design Gate. This was a Study not a true Project.  A) - B) - C) - D) - E) -	Cat: A) - As the scope progressed there was a re-evaluation of the study scope required and an assessment was made to reduce the value. B) - C) - D) - E) -	Cat: A) - B) - C) - D) - E) -

Category definition - A) - Inherent unknowables, B) - Complexity at Sellfield, C) - SL Capability, D) - T2/T3 Delivery performance, E) - Unrealistic expectations.

<b>Project</b>	<b>Silos Direct Encapsulation Plant</b>
<b>Programme</b>	<b>05 - Magnox Swarf Storage Silos</b>
<b>Description:</b>	
SDP will take the raw waste from Magnox Swarf Storage Silos and uses a concrete encapsulation process which ultimately creates conditioned waste as a boxed product for transfer via the Box Transfer Facility into storage.	
<b>Phase</b>	<b>Design</b>
Transforms detailed requirements into complete, detailed systems design specification. Focusing on how to deliver the desired functionality.	



**Chart Data**

Reference Point	Date	Cost (£m)
Design Gate (low)		N/A
Design Gate (mid)		N/A
Design Gate (high)		N/A
PP11 (low)	Jun-17	668
PP11 (mid)	Jun-17	668
PP11 (high)	Jun-17	668
Sep-13 (low)	Aug-20	800
Sep-13 (mid)	Aug-20	1,324
Sep-13 (high)	Aug-20	1,600
Dec-14 (low)	Aug-23	2,219
Dec-14 (mid)	Jun-26	2,689
Dec-14 (high)	Apr-27	3,260

The costs in the table above are expressed in the money values from the year in which the estimate was prepared.

**Spend to Date**

Reference Date	Spend (£m)
Mar-12	207
Sep-13	315
Mar-14	348
Sep-14	369
Dec-14	377

**Variance/Movement Commentary:**

**Design Gate to PP11:**  
N/A. Project has not passed Detailed Design Gate.

**PP11 to PP14:**  
Background to PP11 Submitted Figures:  
The PP11 estimate of £668M was a "placeholder" estimate. This was produced at an early stage in the project design phase and reflected the early maturity and the scope envisaged at the time. The SDP business case was later submitted and the revised figures show a completion date of Jun 2026 and associated costs of £2,689m. The project produced a revised schedule and cost estimate, based on the increased understanding of the process and building footprint and market feedback following an extensive competition process.

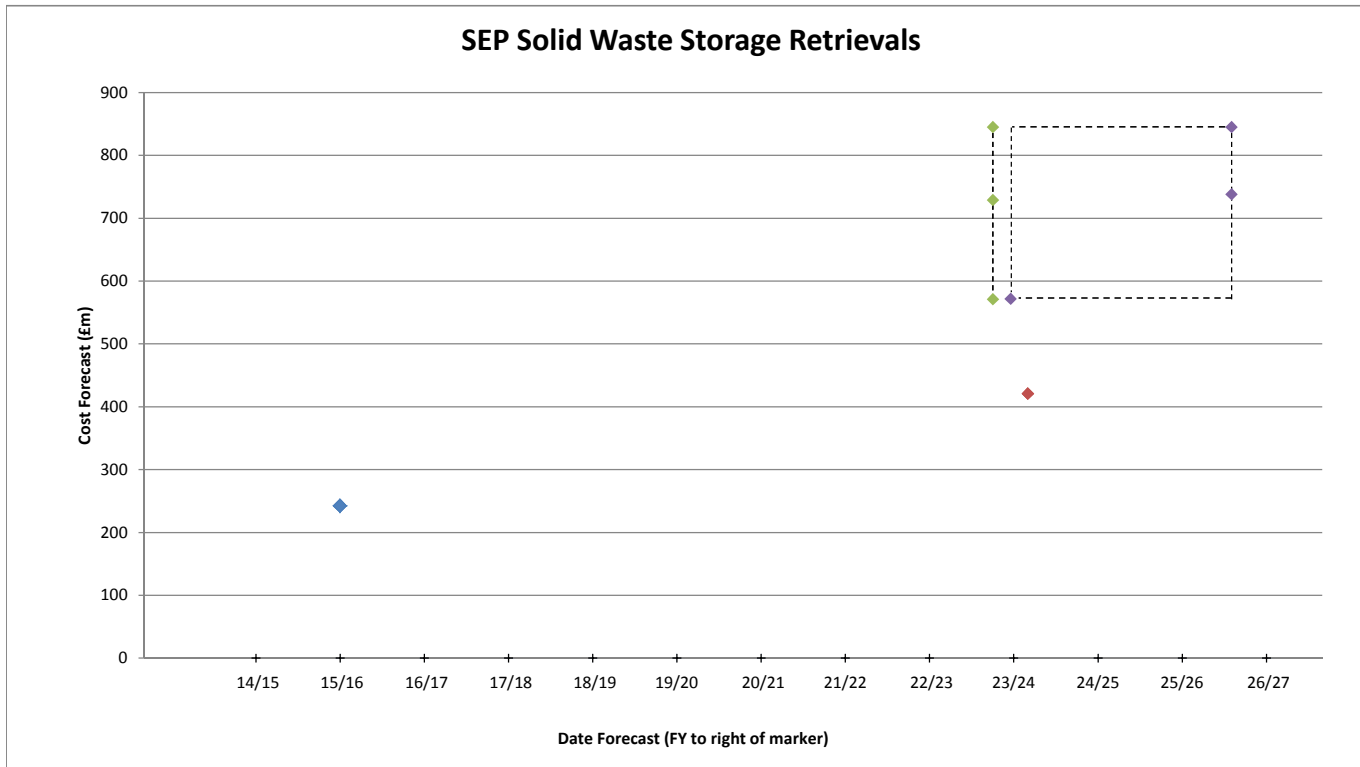
Subset of above includes period between Sep 2013 to Dec 2014 specifically covering:  
The overall project schedule has increased. This being as a result of a number of factors e.g. the competitive dialogue procurement process, business case approval periods and provision for contractor mobilisation. Further schedule increases are seen to the commissioning phase, due to the introduction of a plant performance trial. The new business case now represents the markets view of the project and includes provision for risk and estimating uncertainty. This has had an impact on both cost and schedule.

The main areas of increase are as follows:  
Project Maturity £308m - Increased level of definition / maturity which has enabled improved estimating of cost and time.  
Risk and Estimating Uncertainty £388m - Full consideration for risk and estimating uncertainty.  
Price Changes and Competition £444m - The May 2012 business case was based upon a different acquisition strategy and was an internal SL estimate. The increase is a market view of the project and acquisition strategy.  
Time Related Costs £167m - Cost associated with Schedule increases following market engagement/feedback.  
Escalation and Scope £58m - Escalation from 2012MV's to 2014MV's.

Design Gate to PP11	PP11 to "Sep 2013"	"Sep 2013" to PP14 (@ Dec 2014)
Cat: N/A. Project has not passed Detailed Design Gate.	Cat:	Cat:
A) -	A) -	A) -
B) -	B) -	B) -
C) -	C) -	C) -
D) -	D) -	D) -
E) -	E) - During this period, the business case for SDP was submitted in May 2012 - the range of the project was estimated as £800M - £1,600M. The cost and schedule presented represented a 'baseline' position. This baseline position did not include full consideration of risk and estimating uncertainty (EU) and provided a starting position that the supply chain could respond to as the project had yet to be fully market tested.	E) - The project went out for competitive tender and the bid values suggested and overall project cost around £2.7B. The previous Business Case had minimal contingency and risk allowance. The project set an optimistic baseline as a starting point, in which the supply chain could respond. The market has now provided a response as part of the competition process, and the revised estimate is now based upon a market view, underpinned via a contract.

Category definition - A) - Inherent unknowables, B) - Complexity at Sellafield, C) - SL Capability, D) - T2/T3 Delivery performance, E) - Unrealistic expectations.

<b>Project</b>	<b>SEP Solid Waste Storage Retrievals</b>
<b>Programme</b>	<b>05 - Magnox Swarf Storage Silos</b>
<b>Description:</b>	
Construct equipment and systems that will enable the safe retrieval of radioactive waste from the Magnox Swarf Storage Silos.	
<b>Phase</b>	<b>Delivery</b>
The project has passed the detail design phase (gate) and moved into Delivery. The focus of Delivery is to complete procurement, manufacture, construction and commissioning activities to provide a facility ready for operations.	



**Chart Data**

Reference Point	Date	Cost (£m)
Design Gate (low)	Apr-15	243
Design Gate (mid)	Apr-15	243
Design Gate (high)	Apr-15	243
PP11 (low)	Jun-23	421
PP11 (mid)	Jun-23	421
PP11 (high)	Jun-23	421
Sep-13 (low)	Jan-23	571
Sep-13 (mid)	Jan-23	729
Sep-13 (high)	Jan-23	845
Dec-14 (low)	Apr-23	571
Dec-14 (mid)	Nov-25	738
Dec-14 (high)	Nov-25	845

The costs in the table above are expressed in the money values from the year in which the estimate was prepared.

**Spend to Date**

Reference Date	Spend (£m)
Mar-12	167
Sep-13	235
Mar-14	268
Sep-14	303
Dec-14	322

**Variance/Movement Commentary:**

Design Gate to PP11:  
£243 m- £421m - Movement driven by increased scope to cover pyrophoricity issue. Increase in the design complexity and impact of more realistic engineering schedule and complexity of the final build and better understanding of the installation process.

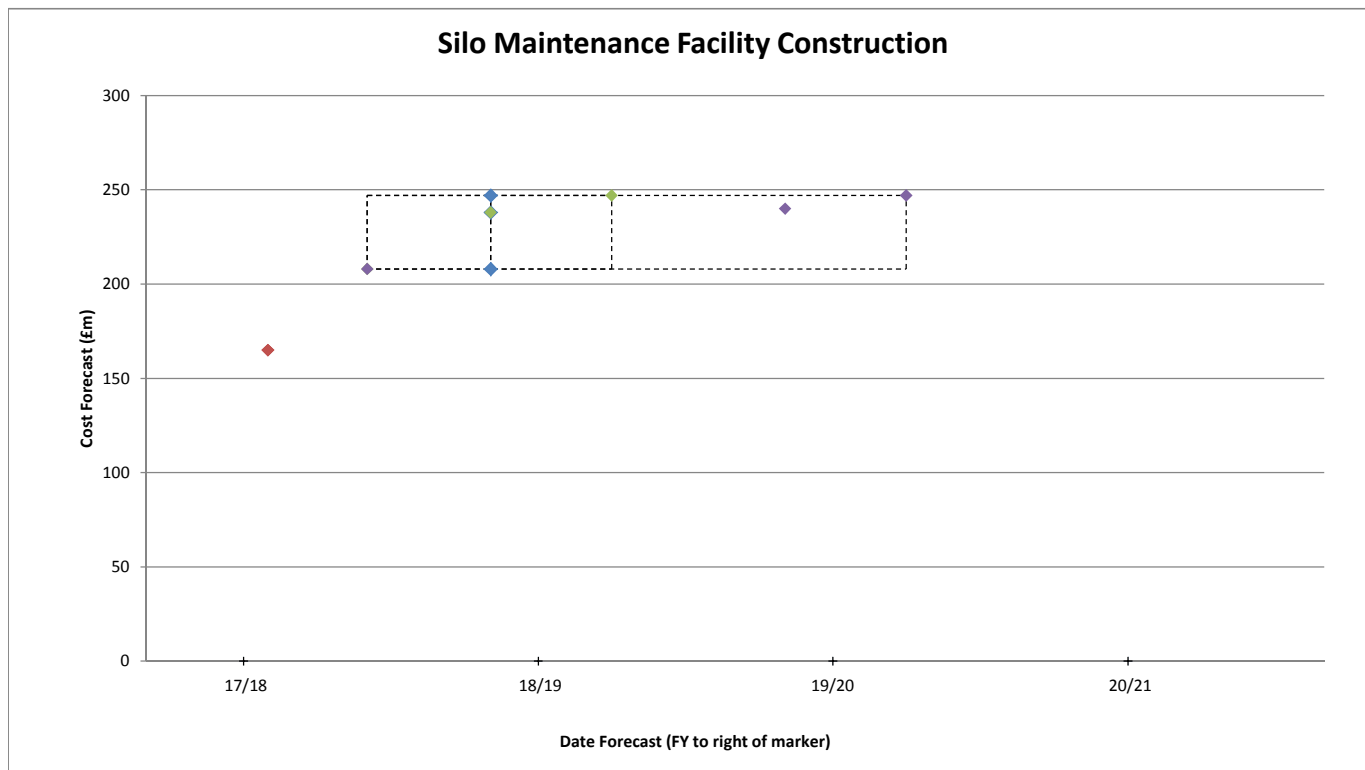
PP11 to PP14:  
£421 m- £738m - In the Spring of 2013 the scope and estimate for the project was revisited in totality culminating in a revised business case (approved by HMT).

Subset of above includes period between Sep 2013 to Dec 2014 specifically covering:  
Cost - Increase is due to a combination of both additional scope for the provision of three extra waste transfer packages (flasks) and escalation to 14/15 mvs. The schedule movement is as a result of the better alignment with the SDP date of availability.

Design Gate to PP11	PP11 to "Sep 2013"	"Sep 2013" to PP14 (@ Dec 2014)
<p>Cat:</p> <p>A) -Cost: £157m; Realised risk of pyrophoricity, resulting in requirement for inerting. Increase in the design complexity and impact of more realistic engineering schedule and complexity of the final build and better understanding of the installation process. Cost drivers being linked to the change in specification and also resource related from the impact of extended duration, increased design effort, and extra testing</p> <p>Schedule (+97 mths): The plan at detail design gate was not a robust, deliverable plan. The plan was constructed to demonstrate compliance against regulatory specifications and did not adequately reflect the technical risks which had emerged since these were set.</p> <p>SL had not previously operated an effective gated process and this resulted in the build operations for the SEP machines commencing prior to a full understanding of the technical complexities of retrieving the Magnox Swarf from the silos. Scientific studies were subsequently undertaken which confirmed that the proposed methods for retrieving swarf with the SEP machines would have to be re-designed. Complexity of installation of SEP Machines 1 &amp; 2 has resulted in a re-prioritisation of resources which has delayed the delivery of SEP 3</p> <p>B) -£21m; The evolving maturity of the capital estimate for a complex project in a legacy plant environment.</p> <p>C) -</p> <p>D) -</p> <p>E) -</p>	<p>Cat: Schedule has been accelerated by 5 mths</p> <p>A) - £165m; the majority (£90m) of the increase has been driven by uncertainty in the design, build and testing of the three SEP machines. An addition of 10 Packages (£22m) for SMF and gamma gates for SMF, BEP &amp; SDP (£6m).</p> <p>B) -</p> <p>C) -</p> <p>D) - £10m; performance issues delivering the SEP machines.</p> <p>E) - £120m; the majority (£44m) of the increase has been driven by price changes in delivering the SEP machines and an increase in the level of contingency required (£60m)</p> <p>Remainder is escalation (£11m).</p>	<p>Cat: Part of the cost movement is due to escalation. Note: The end date range reflects the difference between installation and operation for the third SEP Machine, operation of which is contingent on SDP availability.</p> <p>A) -</p> <p>B) -</p> <p>C) -</p> <p>D) -</p> <p>E) - Additional scope for the provision of three extra waste transfer packages (flasks).</p>

Category definition - A) - Inherent unknowables, B) - Complexity at Sellafield, C) - SL Capability, D) - T2/T3 Delivery performance, E) - Unrealistic expectations.

<b>Project</b>	<b>Silo Maintenance Facility Construction</b>
<b>Programme</b>	<b>05 - Magnox Swarf Storage Silos</b>
<b>Description:</b>	
Construction of a plant, which is part of the Magnox Swarf Storage Silos (MSSS) programme, that provides the capability to: 1. store and change over the necessary tools required to support retrieval operations; and 2. carry out statutory maintenance of the waste transfer flasks.	
<b>Phase</b>	<b>Delivery</b>
The project has passed the detail design phase (gate) and moved into Delivery. The focus of Delivery is to complete procurement, manufacture, construction and commissioning activities to provide a facility ready for operations.	



Reference Point	Date	Cost (£m)
Design Gate (low)	Feb-18	208
Design Gate (mid)	Feb-18	238
Design Gate (high)	Feb-18	247
PP11 (low)	May-17	165
PP11 (mid)	May-17	165
PP11 (high)	May-17	165
Sep-13 (low)	Sep-17	208
Sep-13 (mid)	Feb-18	238
Sep-13 (high)	Jul-18	247
Dec-14 (low)	Sep-17	208
Dec-14 (mid)	Feb-19	240
Dec-14 (high)	Jul-19	247

The costs in the table above are expressed in the money values from the year in which the estimate was prepared.

Reference Date	Spend (£m)
Mar-12	21
Sep-13	39
Mar-14	51
Sep-14	66
Dec-14	75

**Variance/Movement Commentary:**

Design Gate to PP11:  
Not applicable as the detail design gate occurred Oct 2013.

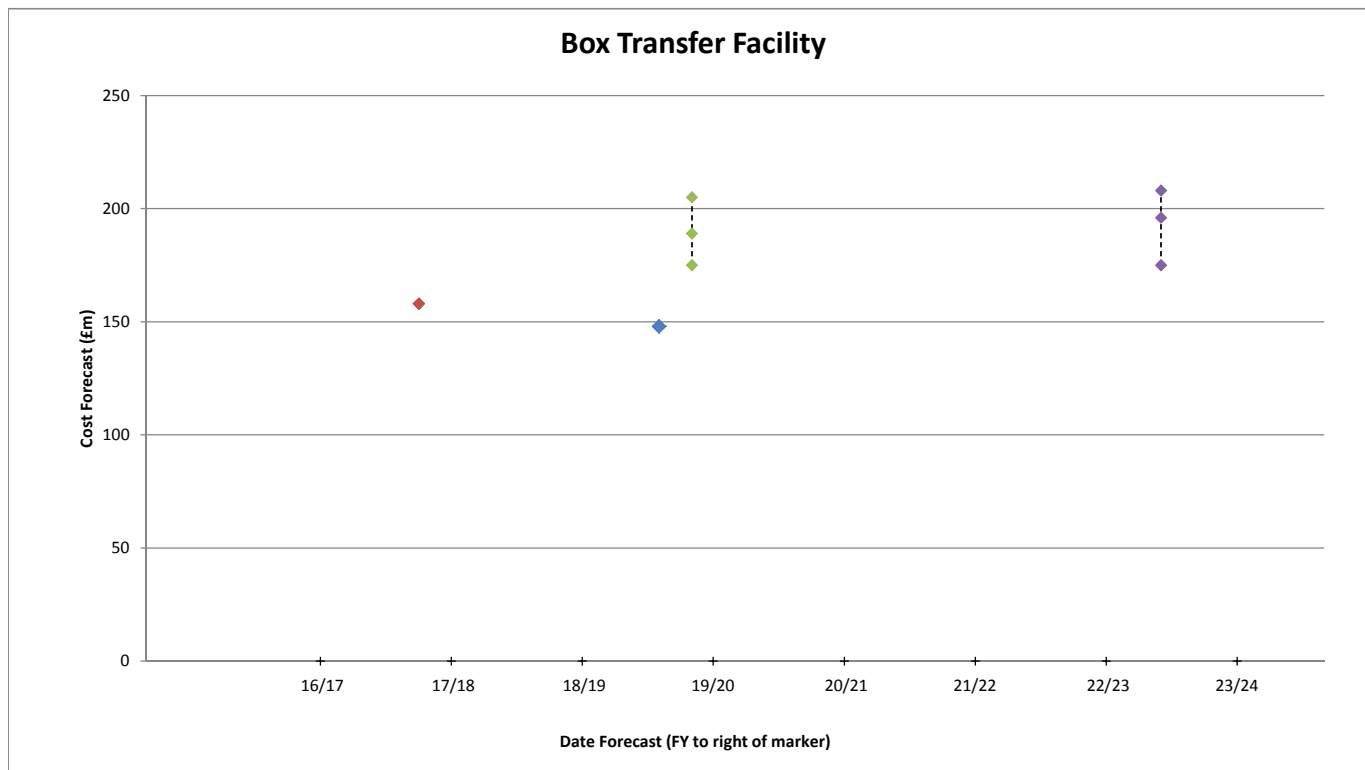
PP11 to PP14:  
1. Cost increase and Feb 18 date (@September 2013) were the outcome of the market tendered price and schedule, which underpinned the business case approved by DECC in Jan 2014. The main reasons for the increase in cost were the additional resources identified by the contractor to deliver the project and an increase in the contingency provision.  
2. The Feb 19 (@PP14) date was the outcome of the deliverability review undertaken as part of the PP14, where SL reassessed the capability of the contractor to deliver against their declared schedule given all the other competing demands at Sellafield.

Subset of above includes period between Sep 2013 to Dec 2014 specifically covering:  
Schedule - The movement in date (Feb 2018 to Feb 2019) was the outcome of the deliverability review undertaken as part of the PP14, where SL reassessed the capability of the contractor to deliver against their declared schedule given all the other competing demands at Sellafield and consequently restated the plan completion date to be 12 months later.  
Costs - Increase is due to escalation to 14/15 mvs. Sanctioned P50 (£238m now 14' MVs- £240m),

Design Gate to PP11	PP11 to "Sep 2013"	"Sep 2013" to PP14 (@ Dec 2014)
Cat: Not applicable as the detail design gate occurred Oct 2013.	Cat:	Cat:
A) - B) - C) - D) - E) -	A) - £16m; new scope identified to carry out maintenance on the waste package door seal. B) - C) - D) - E) - £50m; market feedback on the target price to deliver SMF and increased levels of contingency. Schedule (+9 mths); the PP11 schedule was derived from a parametric estimate and since that time the design progressed, construction methodology has been refined and additional scope has been included. Remainder is escalation (£7m).	A) - B) - +12 months; schedule - SL believe the contractor have under estimated the challenges with respect to delivering on the Sellafield site and an overall assessment of PP14 deliverability and to align with overall MSSS requirement dates. C) - D) - E) - Only cost change is due to escalation.

Category definition - A) - Inherent unknowables, B) - Complexity at Sellafield, C) - SL Capability, D) - T2/T3 Delivery performance, E) - Unrealistic expectations.

<b>Project</b>	<b>Box Transfer Facility</b>
<b>Programme</b>	<b>05 - Magnox Swarf Storage Silos</b>
<b>Description:</b>	
Construction of a mechanical handling plant that will receive conditioned waste from SDP and export it to a waste product store.	
<b>Phase</b>	<b>Delivery</b>
The project has passed the detail design phase (gate) and moved into Delivery. The focus of Delivery is to complete procurement, manufacture, construction and commissioning activities to provide a facility ready for operations.	



**Chart Data**

Reference Point	Date	Cost (£m)
Design Gate (low)	Nov-18	148
Design Gate (mid)	Nov-18	148
Design Gate (high)	Nov-18	148
PP11 (low)	Jan-17	158
PP11 (mid)	Jan-17	158
PP11 (high)	Jan-17	158
Sep-13 (low)	Feb-19	175
Sep-13 (mid)	Feb-19	189
Sep-13 (high)	Feb-19	205
Dec-14 (low)	Sep-22	175
Dec-14 (mid)	Sep-22	196
Dec-14 (high)	Sep-22	208

The costs in the table above are expressed in the money values from the year in which the estimate was prepared.

**Spend to Date**

Reference Date	Spend (£m)
Mar-12	40
Sep-13	61
Mar-14	63
Sep-14	65
Dec-14	66

**Variance/Movement Commentary:**

Design Gate to PP11:  
 Movement driven by increased scope definition to align with maturing design.

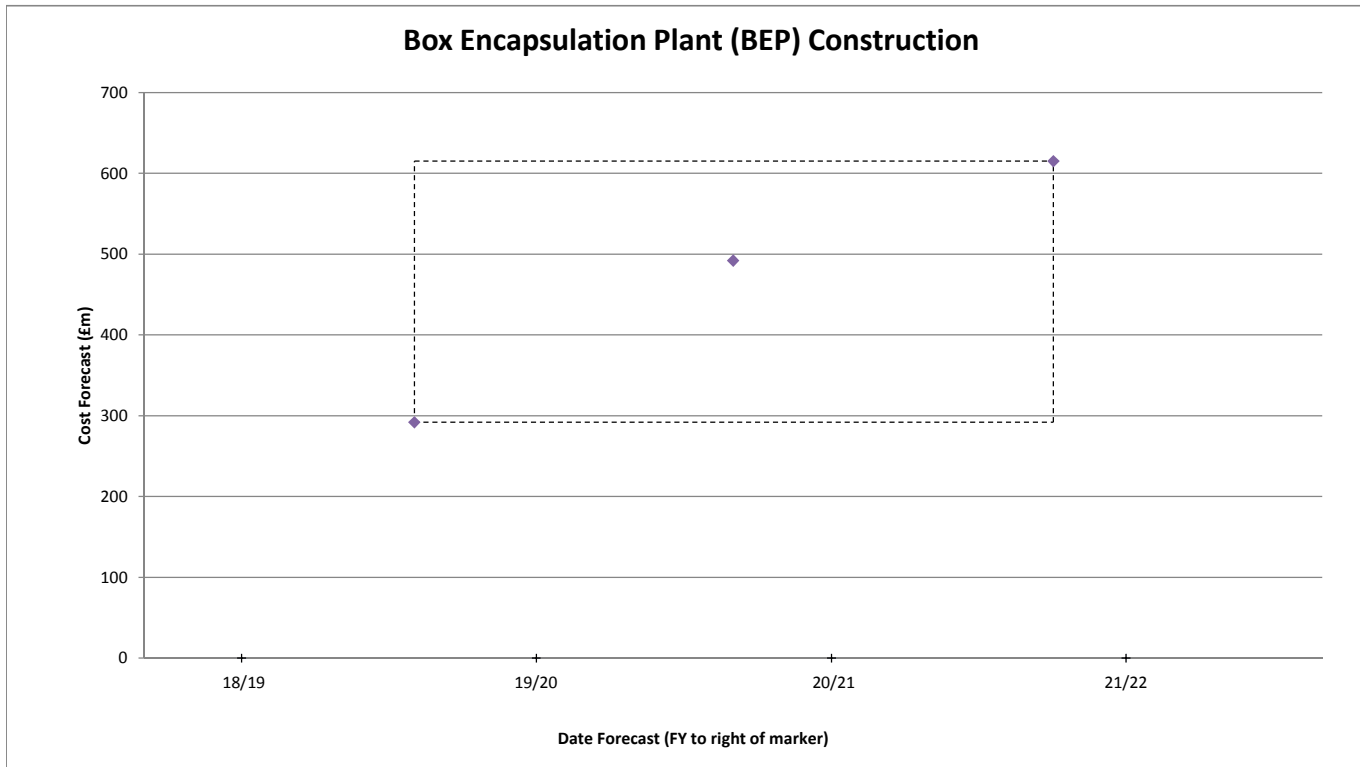
PP11 to PP14:  
 1. Jan-17 to Feb-19 movement (@September 2013) - reflected the revised acquisition strategy of re-tendering the fabrication, installation and commissioning of the mechanical plant and equipment after completing the building structure.  
 2. The revised Sep-22 date reflects a decision in PP14 to defer the project until 2017 leading to completion in 2022. This also drives cost increase to the post PP14 position (£189m to £196m). These cover resource related costs for re-competition and extended care and maintenance.

Subset of above includes period between Sep 2013 to Dec 2014 specifically covering:  
 Schedule - The movement in date (Feb 19 to Sep 22) reflects a decision in PP14 to defer the start of the project until 2017 leading to completion in 2022 (which is still in advance of when it's required to support the inactive commissioning of SDP).  
 Cost - The schedule issue also drives an element of cost increase to the PP14 position (£189M to £196M), which have led to a delayed completion timeframe and cost increases for the overall project.

Design Gate to PP11	PP11 to "Sep 2013"	"Sep 2013" to PP14 (@ Dec 2014)
Cat: A) - Budget increase of £10m, schedule reduction of 22 months resulting primarily from the development of greater definition of Plant and Equipment scope in line with the maturity of the design. The cost drivers being both P & E plus resource related cost covering time on design, fabrication, commissioning and installation. B) - C) - D) - E) -	Cat: A) - +15 mths - change in acquisition strategy for the procurement of BTF as a direct consequence of the uncertainties with the technical risks in SDP and the decision to separate the two projects. In addition, the decision to finish the civil build with the incumbent contractor but re-compete the mechanical plant installation and commissioning stage; +6mths - improved definition on the installation and commissioning schedule. +4 mths - delays in awarding the contract. £27m - increase due the schedule reasons given above. The cost drivers being both P & E plus resource related cost linked to design maturity and a better developed estimate. B) - C) - D) - E) - £4m (retendering and remobilisation); schedule is a consequence of retendering / remobilisation for the Mechanical installation and commissioning The balance is due to escalation.	Cat: A) - £7m & 43 mths - (majority except escalation) is due to a decision to defer the project and re-run the competition in line with contract award circa 2017 to align with SDP availability; this accounts for the schedule delay as well. The cost drivers being resource related cost linked to the re tender exercise and extended care and maintenance. B) - C) - D) - E) -

Category defintion - A) - Inherent unknowables, B) - Complexity at Sellafield, C) - SL Capability, D) - T2/T3 Delivery performance, E) - Unrealistic expectations.

<b>Project</b>	<b>Box Encapsulation Plant (BEP) Construction</b>
<b>Programme</b>	<b>05 - Magnox Swarf Storage Silos</b>
<b>Description:</b>	
Construct a waste sorting and treatment plant for miscellaneous waste from the a number of legacy facilities across the Sellafield site including the Magnox Swarf Storage Silos.	
<b>Phase</b>	<b>Design</b>
Transforms detailed requirements into complete, detailed systems design specification. Focusing on how to deliver the desired functionality.	



**Chart Data**

Reference Point	Date	Cost (£m)
Design Gate (low)		N/A
Design Gate (mid)		N/A
Design Gate (high)		N/A
PP11 (low)		N/A
PP11 (mid)		N/A
PP11 (high)		N/A
Sep-13 (low)		N/A
Sep-13 (mid)		N/A
Sep-13 (high)		N/A
Dec-14 (low)	Nov-18	292
Dec-14 (mid)	Dec-19	492
Dec-14 (high)	Jan-21	615

The costs in the table above are expressed in the money values from the year in which the estimate was prepared.

**Spend to Date**

Reference Date	Spend (£m)
Mar-12	0
Sep-13	0
Mar-14	11
Sep-14	24
Dec-14	32

**Variance/Movement Commentary:**

Design Gate to PP11:  
N/A has not passed Detailed Design Gate.

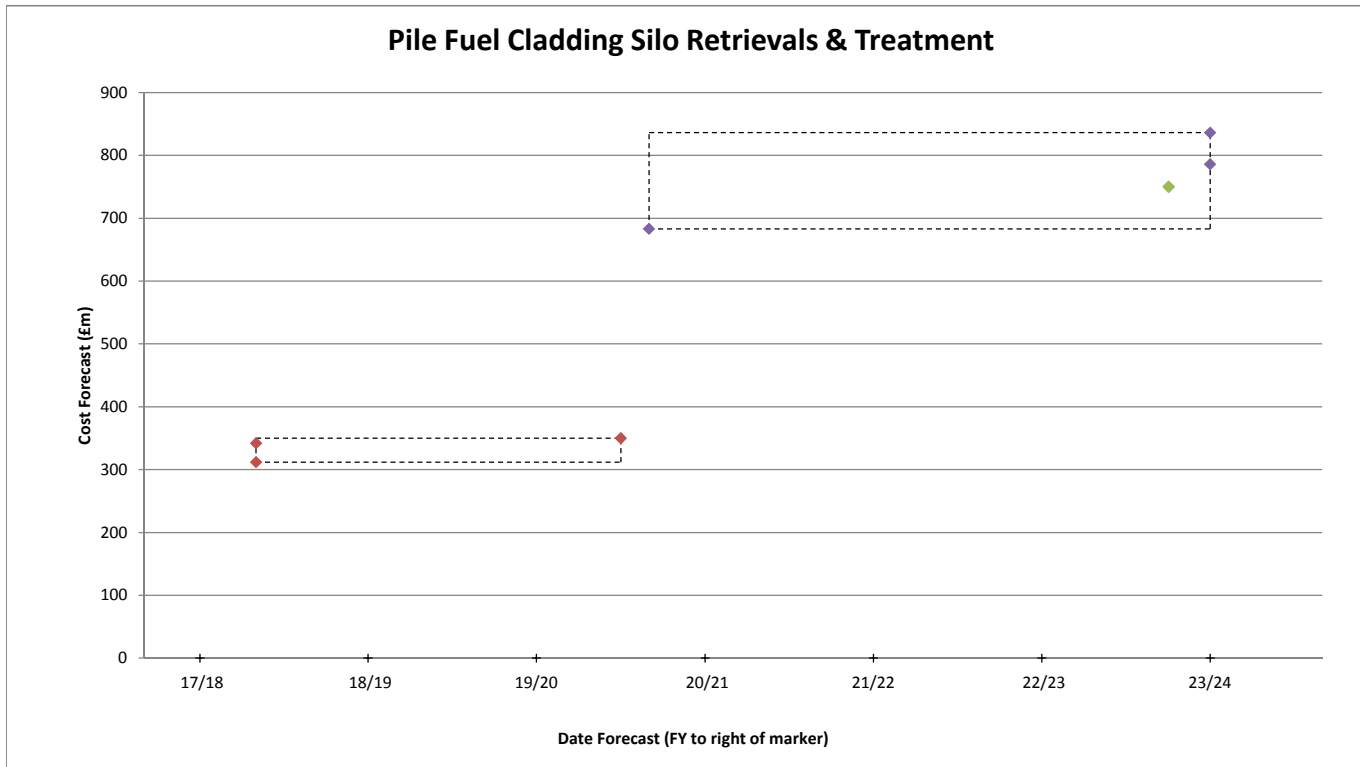
PP11 to PP14:  
N/A - Project initiated in June 2014.  
The Box Encapsulation Plant (BEP) project was initiated to support first waste retrievals from the Magnox Swarf Storage Silos (MSSS) in the absence of SDP availability and also provide waste treatment capability for other key programmes at Sellafield, most notably the First Generation Magnox Storage Pond (FGMSP).

Subset of above includes period between Sep 2013 to Dec 2014 specifically covering:  
N/A - See above.

Design Gate to PP11	PP11 to "Sep 2013"	"Sep 2013" to PP14 (@ Dec 2014)
Cat: N/A has not passed Detailed Design Gate.	Cat: N/A - Project initiated in June 2014.	Cat: N/A - Project initiated in June 2014.
A) -	A) -	A) -
B) -	B) -	B) -
C) -	C) -	C) -
D) -	D) -	D) -
E) -	E) -	E) -

Category definition - A) - Inherent unknowables, B) - Complexity at Sellafield, C) - SL Capability, D) - T2/T3 Delivery performance, E) - Unrealistic expectations.

<b>Project</b>	<b>Pile Fuel Cladding Silo Retrievals &amp; Treatment</b>
<b>Programme</b>	<b>06 - Pile Fuel Cladding Silo</b>
<b>Description:</b>	
Design and build a plant to retrieve waste from the PFCS facility.	
<b>Phase</b>	<b>Design</b>
Transforms detailed requirements into complete, detailed systems design specification. Focusing on how to deliver the desired functionality.	



**Chart Data**

Reference Point	Date	Cost (£m)
Design Gate (low)		N/A
Design Gate (mid)		N/A
Design Gate (high)		N/A
PP11 (low)	Aug-17	312
PP11 (mid)	Aug-17	342
PP11 (high)	Oct-19	350
Sep-13 (low)	Jan-23	750
Sep-13 (mid)	Jan-23	750
Sep-13 (high)	Jan-23	750
Dec-14 (low)	Dec-19	683
Dec-14 (mid)	Apr-23	786
Dec-14 (high)	Apr-23	836

The costs in the table above are expressed in the money values from the year in which the estimate was prepared.

**Spend to Date**

Reference Date	Spend (£m)
Mar-12	117
Sep-13	186
Mar-14	206
Sep-14	223
Dec-14	236

**Variance/Movement Commentary:**

Design Gate to PP11:  
N/A. Project has not passed Detailed Design Gate.

PP11 to PP14:  
Project had a design pause Jun - Dec 2013 after it became apparent the selected approach had significant design, construction, commissioning and operational challenges which were trending significant growth in cost and schedule.

As alternative options have been developed the date has fluctuated up to the submission of PP14 which forecast Apr 2023. The extension in schedule was driven by the high degree of uncertainty and risk with the new, immature concept design.

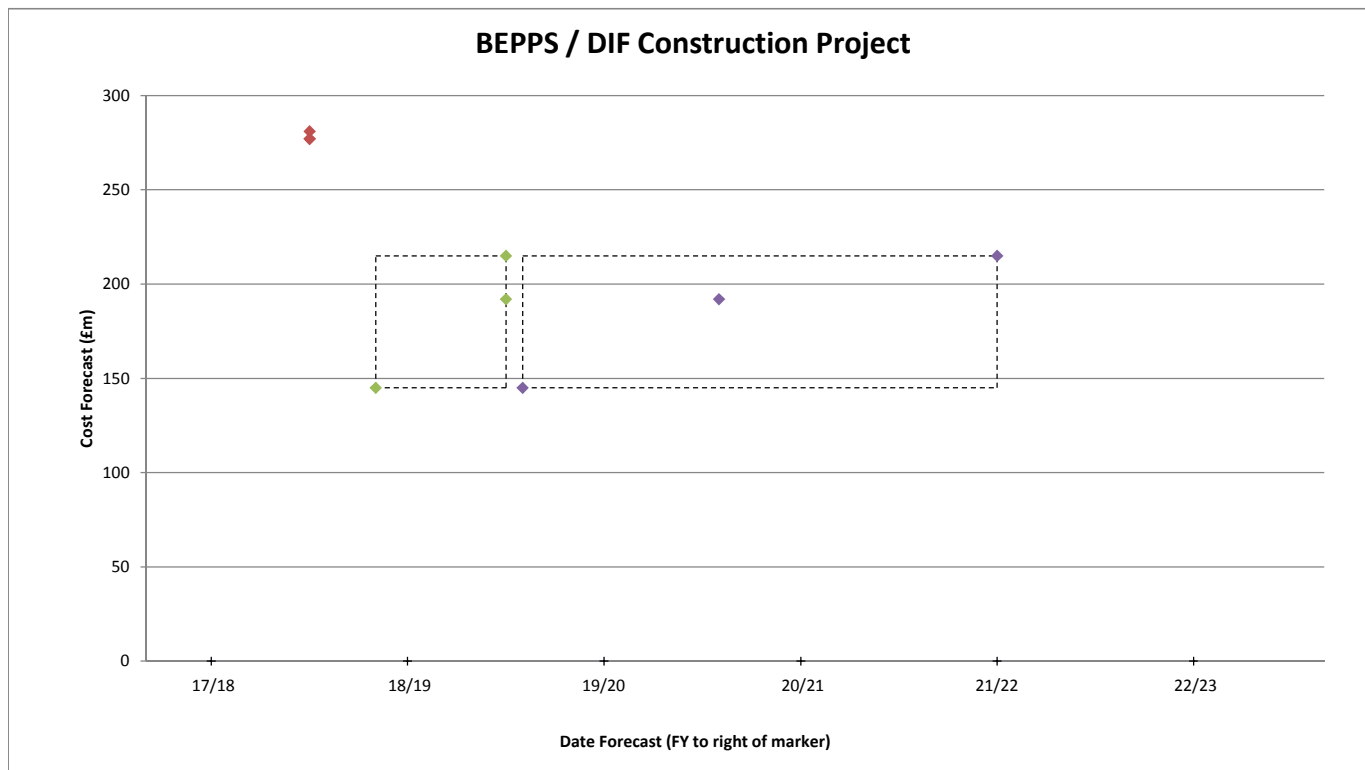
NDA did not accept the PP14 submission and a revised plan is under development (due Mar 2015), underpinned with the development work completed in the last year. This is expected to reduce the overall range of schedule to 2019 (Base) and 2022 (P50)

Subset of above includes period between Sep 2013 to Dec 2014 specifically covering:  
The Sep 2013 cost and schedule was an estimate of the current position during the design pause (which lasted Jun - Dec 2013) in the absence of a clear, underpinned forward direction. Under PP14, whilst the revised approach for retrievals had been selected at this time, the design was still at very early stage and concept design not completed. The April 2023 date and £786m cost was primarily driven by uncertainty around the new approach and a number of key risks associated with the immature design. The submission for PP14 was not accepted and is currently being reviewed by SL, the concept design work completed during 2014/15 will enable a much more robust baseline to be established.

Design Gate to PP11	PP11 to "Sep 2013"	"Sep 2013" to PP14 (@ Dec 2014)
Cat: N/A. Project has not passed Detailed Design Gate.	Cat:	Cat:
A) -	A) -	A) -
B) -	B) -	B) -
C) -	C) - 15 months, £96m design work previously completed by Sellafield was the cause of the design pause where the concept was found to be undeliverable and ultimately potentially not able to meet the functional specification. This, in conjunction with the deliverability concerns and underestimation of later stages were the contributory factors to the design pause and change of direction.	C) - 3 months, £36m. The PP14 submission (not accepted by NDA) took a very conservative view as to uncertainties in the project, mainly as a result of the recent exit of the design pause and lack of underpinning.
D) -	D) - 10 months, £62m subcontractor schedules had slipped in the completion of the superstructure and were beginning to be evident in the manufacture of the silo doors and hole cutting machine, affecting project critical path.	D) -
E) -	E) - 40 months, £250m. The PP11 plan failed to recognise the engineering complexity and logistical challenges, whilst work was able to be accelerated in the near term, the true volume of scope to be completed later in the plan (retrievals and waste handling modules) had been underestimated.	E) -

Category definition - A) - Inherent unknowables, B) - Complexity at Sellafield, C) - SL Capability, D) - T2/T3 Delivery performance, E) - Unrealistic expectations.

<b>Project</b>	<b>BEPPS / DIF Construction Project</b>
<b>Programme</b>	<b>06 - Pile Fuel Cladding Silo</b>
<b>Description:</b>	
Design and build a store with an import facility for containerised intermediate-level waste. Provide shared services and utilities for BEP and proposed future stores.	
<b>Phase</b>	<b>Design</b>
Transforms detailed requirements into complete, detailed systems design specification. Focusing on how to deliver the desired functionality.	



**Chart Data**

Reference Point	Date	Cost (£m)
Design Gate (low)		N/A
Design Gate (mid)		N/A
Design Gate (high)		N/A
PP11 (low)	Oct-17	277
PP11 (mid)	Oct-17	277
PP11 (high)	Oct-17	281
Sep-13 (low)	Feb-18	145
Sep-13 (mid)	Oct-18	192
Sep-13 (high)	Oct-18	215
Dec-14 (low)	Nov-18	145
Dec-14 (mid)	Nov-19	192
Dec-14 (high)	Apr-21	215

The costs in the table above are expressed in the money values from the year in which the estimate was prepared.

**Spend to Date**

Reference Date	Spend (£m)
Mar-12	43
Sep-13	60
Mar-14	65
Sep-14	69
Dec-14	72

**Variance/Movement Commentary:**

Design Gate to PP11:  
N/A. Project has not passed Detailed Design Gate. Project did not exist in PP11, The predecessor project was BEPPS/CIEF.

PP11 to PP14:  
The Comprehensive Import/Export facility for the BEPPS (Box Encapsulation Plan Product Store) store has now been cancelled and has made way for a simpler and more cost effective solution, the Direct Import Facility. Whilst the PP11 costs and schedule represented the CIEF option, the more recent data is for DIF. Based on current estimates this appears to save around £90m and has extended the schedule by one year.

Initial slippage from PP11 was due to change of acquisition strategy, due to time take to change plan and then execute tender process. Further slippage in PP14 was due to site wide deliverability issues - SL view of resource constraint impact on project delivery.

Subset of above includes period between Sep 2013 to Dec 2014 specifically covering:  
No cost change in the period.

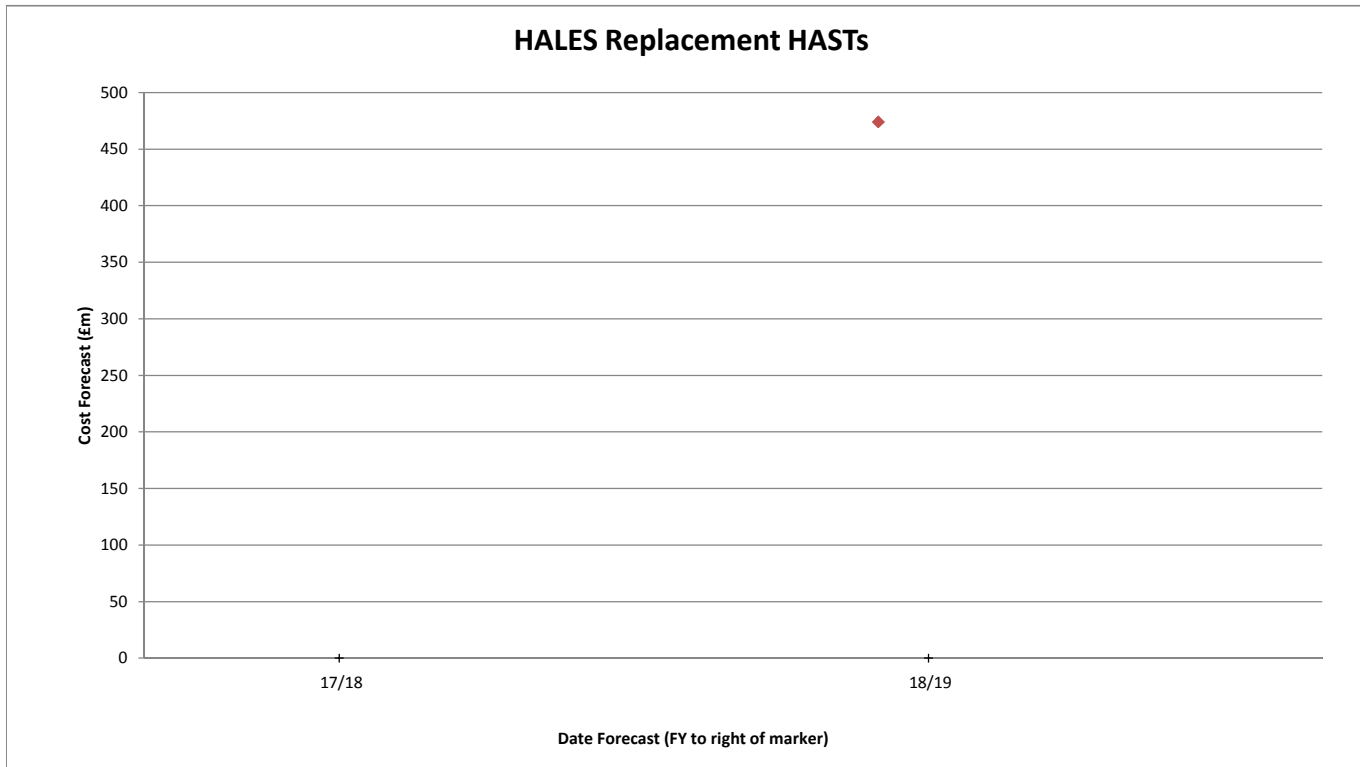
12 months additional schedule was due to overall view from SL of their capability and that within the supply chain for delivery of major projects over the period 2014-2019 would add 12 months to the project schedule. This view was reached as part of the overall review of deliverability undertaken as part of development of PP14 and to align with overall MSSS Programme needs which is to be available for the commencement of retrieval operations and the inactive and active commissioning of the Box Encapsulation Plant (BEP).

Design Gate to PP11	PP11 to "Sep 2013"	"Sep 2013" to PP14 (@ Dec 2014)
Cat: N/A. Project has not passed Detailed Design Gate.	Cat: Note: Project did not exist in current form in PP11 (previously BEPPS/CIEF).	Cat:
A) -	A) -	A) -
B) -	B) -	B) -
C) -	C) - Schedule slippage from PP11 was due to change of acquisition strategy, due to time take to change plan and then execute tender process.	C) -
D) -	D) -	D) - 7 months £nil. Overall view from SL of the supply chain capacity for delivery of major projects over the period 2014-2019 which lead to a subsequent impact on the likely timelines.
E) -	E) - Based on current estimates this appears to save around £90m and has extended the schedule by one year. The Comprehensive Import/Export facility for the BEPPS (Box Encapsulation Plan Product Store) store has now been cancelled. This has made way for a simpler and more cost effective solution, the Direct Import Facility, that will be ready in time for MSSS Retrievals and Operations of BEP.	E) - 6 months £nil. SL completed an assessment on the overall view of their capability for delivery of major projects over the period 2014-2019. This led to a re-evaluation of the timelines involved, whilst still aligning with the MSSS programme requirements for Retrievals and active operations of BEP.

Category definition - A) - Inherent unknowables, B) - Complexity at Sellafield, C) - SL Capability, D) - T2/T3 Delivery performance, E) - Unrealistic expectations.



<b>Project</b>	<b>HALES Replacement HASTs</b>
<b>Programme</b>	<b>07 - HAL Workstream</b>
<b>Description:</b>	
Mitigating activity against the risk of failure of the existing HAST tanks. Build replacement tanks to hold highly active liquid waste from reprocessing pending Vitrification.	
<b>Phase</b>	<b>Design</b>
Transforms detailed requirements into complete, detailed systems design specification. Focusing on how to deliver the desired functionality.	



Reference Point	Date	Cost (£m)
Design Gate (low)		N/A
Design Gate (mid)		N/A
Design Gate (high)		N/A
PP11 (low)	Mar-18	474
PP11 (mid)	Mar-18	474
PP11 (high)	Mar-18	474
Sep-13 (low)		N/A
Sep-13 (mid)		N/A
Sep-13 (high)		N/A
Dec-14 (low)		N/A
Dec-14 (mid)		N/A
Dec-14 (high)		N/A

The costs in the table above are expressed in the money values from the year in which the estimate was prepared.

Reference Date	Spend (£m)
Mar-12	39
Sep-13	44
Mar-14	44
Sep-14	44
Dec-14	44

**Variance/Movement Commentary:**

**Design Gate to PP11:**  
The project did not progress beyond design gate. Good development of strategic alternatives, to support continued reprocessing, removed the need for this facility, thereby saving >£400m.

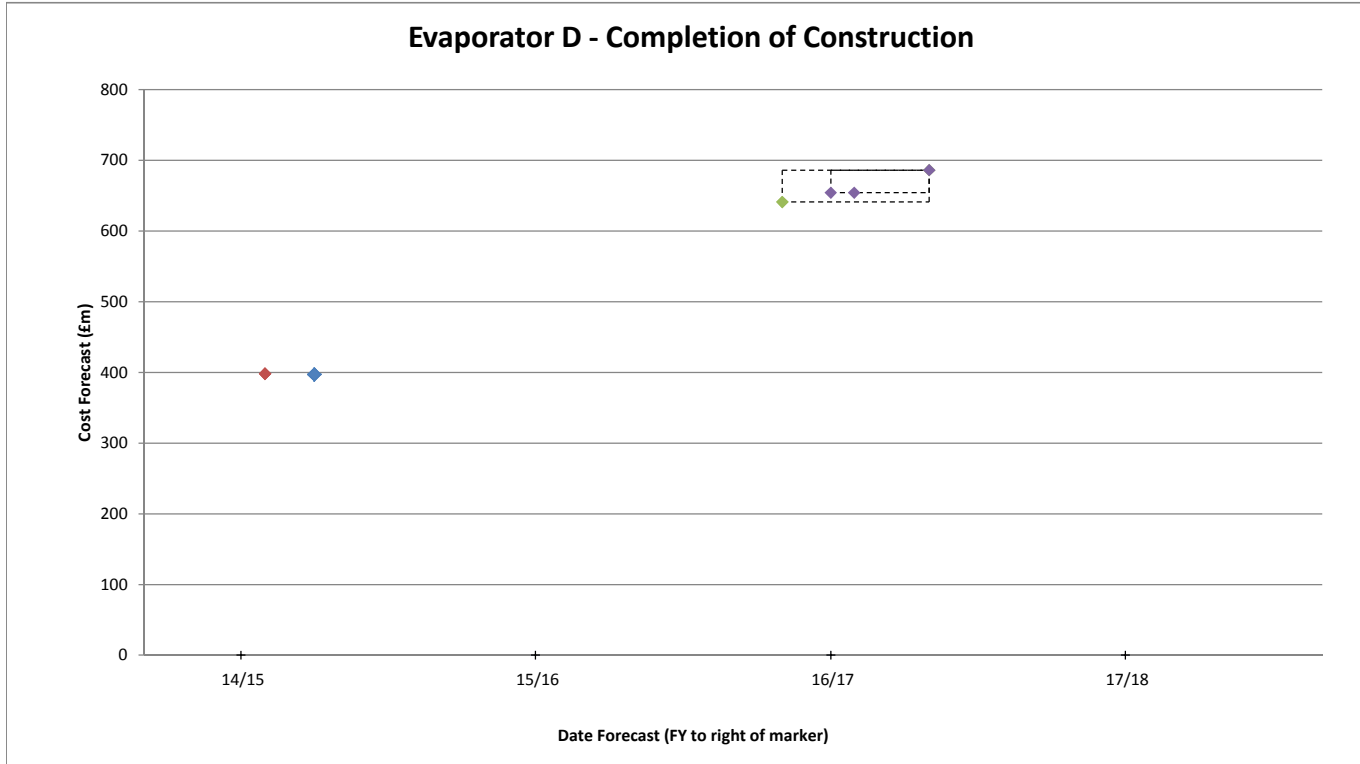
**PP11 to PP14:**  
Project now cancelled following THORP reprocessing decision and work to better utilise the existing assets which resulted in a lifetime saving of >£400m. Approximately £50m was expended on the project development prior to cancellation. In this case, until the strategic decision was landed in 2012, the HASTs were critical to Plan A for reprocessing and HAL stock management, therefore, progress was required and maintained.

Subset of above includes period between Sep 2013 to Dec 2014 specifically covering:  
See PP11 to PP14 comment above.

Design Gate to PP11	PP11 to "Sep 2013"	"Sep 2013" to PP14 (@ Dec 2014)
Cat: N/A. Project has not passed Detailed Design Gate.	Cat: Project now cancelled and cost removed from the Plan.	Cat: Project previously cancelled and cost removed from the Plan.
A) -	A) -	A) -
B) -	B) -	B) -
C) -	C) -	C) -
D) -	D) -	D) -
E) -	E) -	E) -

Category definition - A) - Inherent unknowables, B) - Complexity at Sellafield, C) - SL Capability, D) - T2/T3 Delivery performance, E) - Unrealistic expectations.

<b>Project</b>	<b>Evaporator D - Completion of Construction</b>
<b>Programme</b>	<b>07 - HAL Workstream</b>
<b>Description:</b>	
Evap D is being constructed to mitigate the risk of failure of the existing fleet to allow completion of reprocessing activities and to introduce the capability to handle POCO arising's. The Sellafield site has three operating Evaporators A, B & C which are essential to support reprocessing and hazard reduction. The existing evaporators were built between 1970 and 1990 and are all nearing the end of their safe operational life. Additional evaporative capacity is required to support contracted commitments to re process fuel and to introduce POCO solids capability and allow the decommissioning of the Sellafield site.	
<b>Phase</b>	<b>Delivery</b>
The project has passed the detail design phase (gate) and moved into Delivery. The focus of Delivery is to complete procurement, manufacture, construction and commissioning activities to provide a facility ready for operations.	



Reference Point	Date	Cost (£m)
Design Gate (low)	Jul-14	397
Design Gate (mid)	Jul-14	397
Design Gate (high)	Jul-14	397
PP11 (low)	May-14	398
PP11 (mid)	May-14	398
PP11 (high)	May-14	398
Sep-13 (low)	Feb-16	641
Sep-13 (mid)	Feb-16	641
Sep-13 (high)	Aug-16	686
Dec-14 (low)	Apr-16	654
Dec-14 (mid)	Apr-16	654
Dec-14 (high)	Aug-16	686

The costs in the table above are expressed in the money values from the year in which the estimate was prepared.

Reference Date	Spend (£m)
Mar-12	375
Sep-13	532
Mar-14	573
Sep-14	609
Dec-14	628

**Variance/Movement Commentary:**

Design Gate to PP11:  
 Cost increase £1.75m mainly from revised SL tariff rates.  
 In the same period the schedule was reduced by 2 months, 1 month due to minor efficiencies, 1 month as a stretch target against the contract baseline.

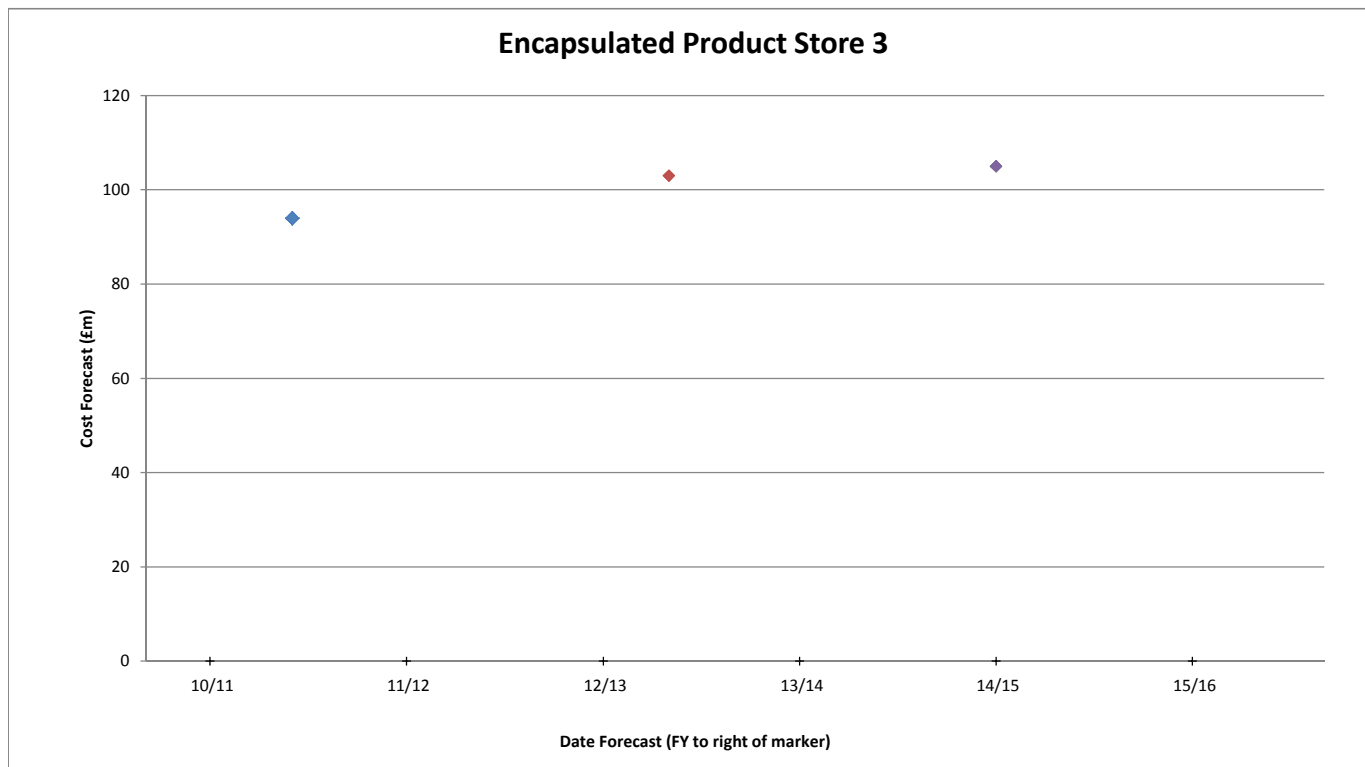
PP11 to PP14:  
 +£41m Increase due to Seismic / FEA Modelling and stress analysis resulting in amended engineering/specification requirements and design impact. Cost drivers being design increases with additional material costs, plus extra resource allocation.  
 +£50m Delays in release of design information and supply chain performance. Cost drivers being increase resource requirements, and supply chain performance impacting resources and material usage/quality.  
 +£153m Consequential schedule impact from above and delivery performance. Cost drivers being materials and resources including extra resources required to gain control with subcontractor costs being significant.  
 -£1m Project insurance now covered by NDA.  
 The issues above also introduce a 23 month delay to the schedule (May-14 to Apr-16).  
 Following resanction in 2012, further poor performance and quality issues have increased both cost and schedule, with late delivery of the final module and performance of on site works being the key drivers for the PP14 baseline.

Subset of above includes period between Sep 2013 to Dec 2014 specifically covering:  
 Further issues with supplier performance have resulted in additional scope being transferred to site, and further remedial action being required.  
 This specifically in relation to the fabrication of the modules, many of which were transferred to site incomplete, therefore, significant additional welds have been required. There has also been an increase in overall weld numbers required due to access issues requiring pipe spools to be cut.

Design Gate to PP11	PP11 to "Sep 2013"	"Sep 2013" to PP14 (@ Dec 2014)
Cat: A) - B) - C) - D) - E) - Minor increases due to tariff rates.	Cat: A) - B) - C) - £153m poor control and misaligned incentives on the supply chain resulted in an over-pessimistic seismic design and consequential engineering and construction complexities. D) - £50m Delays in release of design information had a knock on effect to the construction and fabrication elements of the project. Quality issues led to rework and increased scope moving to site with consequential impacts. E) - £40m The majority of the increases in cost and schedule can be attributed to the design developments regarding seismic qualification which impacted both material and resource costs. Constrained footprint adjacent to existing active facilities led to design and construction complexities and poor delivery efficiency.	Cat: A) - B) - C) - £6m SLs ability to manage the contractor and hold them to schedule has had an impact on both schedule and cost. With the main elements associated with SL and subcontractor resource costs. D) - £7m Further delays have been incurred due to supplier performance, specifically in terms of the module fabrication, with a knock on effect of scope transferred to site. This has created significant resource demands on the site contractor and increased issue with congestion in the facility which impacted site productivity and efficiency levels in comparison to those estimated. Increase in overall weld numbers due to access issues requiring pipe spools to be cut. E) -

Category definition - A) - Inherent unknowables, B) - Complexity at Sellafield, C) - SL Capability, D) - T2/T3 Delivery performance, E) - Unrealistic expectations.

<b>Project</b>	<b>Encapsulated Product Store 3</b>
<b>Programme</b>	<b>19 - ILW Waste Treatment &amp; Storage</b>
<b>Description:</b>	
EPS3 is an extension to the existing suite of ILW Encapsulated Product Stores (EPS1, EPS2). The main feed for these is the waste arising's from reprocessing operations, with feed also from high hazard clean up activities. (When the project was initiated the existing stores were forecast to be full in 2010).	
<b>Phase</b>	<b>Complete</b>
The delivery phase of the project has now been closed out.	



Reference Point	Date	Cost (£m)
Design Gate (low)	Sep-10	94
Design Gate (mid)	Sep-10	94
Design Gate (high)	Sep-10	94
PP11 (low)	Aug-12	103
PP11 (mid)	Aug-12	103
PP11 (high)	Aug-12	103
Sep-13 (low)	Apr-14	105
Sep-13 (mid)	Apr-14	105
Sep-13 (high)	Apr-14	105
Dec-14 (low)	Apr-14	105
Dec-14 (mid)	Apr-14	105
Dec-14 (high)	Apr-14	105

The costs in the table above are expressed in the money values from the year in which the estimate was prepared.

Reference Date	Spend (£m)
Mar-12	99
Sep-13	103
Mar-14	105
Sep-14	105
Dec-14	105

**Variance/Movement Commentary:**

Design Gate to PP11:  
 £9m and 23 month delay increase due to Contractor delays and disputes, accepted CENs (Compensation Event Notices) and PMIs (Project Management Instructions)

PP11 to PP14:  
 £2m and 20 month delay due to further contractor performance issues resulting in scope being removed from the contractor and final activities being completed by SL.

The schedule slipped (without programme impact) with a related £2M impact on costs, however, the contractor did not achieve the desired results and might not be willing to work at SL in the future. Contractor wished to introduce innovation (in terms of greater off-site fabrication work), but this was not possible under the constraints of working at the Sellafield site. Major issues with the contractor's progress in the effective completion of the works extended the completion date for the facility by around 20 months.

Proactive management between SL and NDA saw the contractor exit the works and SL take on the completion activities.  
 Note: Because of delays in reprocessing and effective management of the existing stores then this project was still delivered ahead of the operational need date.

Subset of above includes period between Sep 2013 to Dec 2014 specifically covering:  
 During this period the schedule and costs remained unchanged.

Design Gate to PP11	PP11 to "Sep 2013"	"Sep 2013" to PP14 (@ Dec 2014)
Cat: A) - B) - C) - D) - £9m Resource related costs due to contractor delays and claims resulted in the contract being renegotiated. E) -	Cat: A) - B) - C) - SL Project Manager was able to robustly challenge the majority of claims from the contractor, but were unable to control the contractor to complete the project. D) - £2m Significant challenges experienced with contractor behaviour in terms of claims and willingness to complete the project, SL subsequently removed the contractor from site and delivered the remaining activities with direct contracts which resulted in additional delivery costs with the delivery contractor to enable the work to be completed. E) -	Cat: - Project was delivered in April 2014. A) - B) - C) - D) - E) -

Category definition - A) - Inherent unknowables, B) - Complexity at Sellafield, C) - SL Capability, D) - T2/T3 Delivery performance, E) - Unrealistic expectations.