SPT Strategic Spares - OFGEM justification paper	
Name of Scheme/Programme	**SPT Strategic Spares**
Primary Investment Driver	Asset Health
Scheme reference/ mechanism or category	SPNLT20116 / SPNLT20117 Lead Asset
Output references/type	NLRT2SP20116 / NLRT2SP20117 Lead
Cost	£ 0.45m / £2.48m
Delivery Year	RIIO-T2
Reporting Table	C0.7 Non-load Master /C2.11 Spares
Outputs included in RIIO T1 Business Plan	No

Issue Date	Issue No	Amendment Details
October 2019	Issue 1	First issue of document
December 2019	Issue 2	Cost updated

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1 Introduction

SP Transmission (SPT) strategic spares policy is set out in document ASSET-1-018. The current SPT position is that if an unrecoverable failure occurs then replacements are procured from the existing SPT capital programme. In the RIIO-T1 period SPT have suffered from such failures of a 132/33kV transformer, a 275kV bulk oil circuit breaker and several 132kV gas circuit breakers. Due to the commitments of the capital programme SPT have broadly been unable to procure replacements from this programme and have had to endure significant risk to customers until replacement units could be made available. SPT also have several circuit breaker types considered to be end of life with no manufacturer or supply chain support. This document outlines the strategic spares to be procured as part of the RIIO T2 process and give the outline costs for these spares.

2 Background Information

SPT has a robust Asset Management process and policy and uses this to develop the investment programmes through the routine price control mechanisms. These asset management processes are constantly reviewed to reflect not only the condition of the fleet but also to reflect the changes in technologies and intervention strategies.

This is apparent for the RIIO-T2 period where the market led refurbishment processes for life extension and replacement deferral for circuit breakers and Transformers have been introduced.

SPT proposes to utilise these interventions in the RIIO-T2 period, however due to the lack of empirical evidence and supporting history of performance, SPT as a prudent Transmission Operator (TO) intend to invest in a small number of strategic spares.

The perceived risk is based on the interventions in equipment that is at least mid-life and usually without OEM Support due to the age of the equipment.

These spares will allow replacement of equipment in the event that either a refurbishment process does not return the plant to a condition that allows the re-energisation, or the failure of an item of plant upon return to service.

These purchases are a prudent investment as the lead time for circuit-breakers is between 6-12 months and transformers between 12-24 months, production line dependant.

3 Optioneering

The following is a summary of the options considered for this project.

	Option	Status	Reason for rejection
1	**Do nothing**:	Rejected	Rejected on the basis that the lead times on equipment ordering would place an unacceptable time delay in any required intervention, along with the unknown consequences of aged, unsupported equipment
2	**Purchase of Small volume of Strategic Spares**	Proposed	-

4 Detailed analysis

4.1 Selected option

SP Transmission's (SPT) strategic spares policy is set out in document ASSET-1-018. The current SPT position is that if an unrecoverable failure occurs then replacement are procured from the exiting SPT capital programme. In the RIIO-T1 period SPT have suffered from such failures of a 132/33kV transformer, a 275kV bulk oil circuit breaker and several 132kV gas circuit breakers. Due to the commitments of the capital programme SPT have broadly been unable to procure replacements from this programme and have had to endure significant risk to customers until replacement units could be made available. This document outlines the strategic spares to be procured as part of the RIIO-T2 business plan and give the outline costs for these spares.

The proposal reviewed all asset classes to determine a realistic level of spares to ensure coverage of the asset base. SPT does hold a large stock of equipment and would also propose that these spares would be used as effectively a "rolling" spare and used in capital projects where an equivalent is ordered to ensure that the spare does not become an aged unit and written off.

4.2 Circuit Breakers

4.2.1 33kV Circuit Breakers

SPT currently have adequate provision for both live tank and dead tank circuit breakers at this voltage level – there are no proposed spare units for this voltage

4.2.2 132kV Circuit Breakers

SPT currently have adequate provision for dead tank circuit breakers. Due to the significant number of failures SPT has experienced with live tank circuit breakers there is a need to purchase one 132kV AIS live tank circuit breaker. In line with SPT's strategy to avoid increases in SF_6 inventory where viable, this spare with be a non-SF_6 unit.

4.2.3 275kV Circuit Breakers

SPT policy document SWG-05-104 Management of End of Life Circuit Breakers outlines the need for the purchase of one 275kV AIS live tank circuit breaker. This will be stored in the Transmission stores at Bonnybridge.

4.2.4 400kV Circuit Breakers

SPT policy document SWG-05-104 Management of End of Life Circuit Breakers outlines the need for the purchase of 1 400kV AIS live tank disconnecting circuit breaker. This will be stored in the Transmission stores at Bonnybridge.

4.3 Transformers

4.3.1 33kV Transformers

SPT do not have any 33kV transformers, no spares are proposed

4.3.2 132kV /33kV Transformers

The RIIO-T2 transformer programme has a small number of transformer replacements but a number of refurbishments are proposed. Transformer refurbishment is new to SPT and with this type of intervention the risk of failure post energisation is increased due to the novelty of the activity.

Due to this increased risk and reduced order book for new transformers it is recommend that a spare 132/33kV transformer with an ONAN rating of 60MVA is purchased and stored on a plinth at Bonnybridge.

4.3.3 275kV/33kV Transformer

The RIIO T2 transformer programme has a small number of transformer replacements but a number of refurbishments are proposed. Transformer refurbishment is new to SPT and with this type of intervention the risk of failure post energisation is increased due to the novelty of the activity.

Due to this increased risk and reduced order book for new transformers it is recommend that a spare 275/33kV transformer with a ONAN rating of 90MVA is purchased and stored on newly constructed plinth at Bonnybridge.

4.3.4 400kV Transformer

No spare unit is proposed at 400kV.

4.4 Environment & Sustainability

The SPT sustainability approach is to prioritise reuse, then refurbish and finally replace if there is no other option. Where there are opportunities to reuse or refurbish equipment they will be taken, and this is clearly evidenced in the adoption of circuit breaker and transformer refurbishment within the RIIO-T2 submission. To ensure that these strategic spares do not become historic stock, the proposal is to use these spares at appropriate capital programmes with a suitable replacement ordered in as part of the project to ensure that the stock level is maintained. These items will not be released until a suitable replacement is ordered / constructed and released for delivery from the manufacturer.

4.5 Innovation

Innovation is a key component to deliver developments in all aspects of work. A prime example of this is with the proposed Refurbishment of transformers. This process follows on from the successful programme of transformer refurbishments within SP Distribution (smaller 33/11kV, 12/24MVA units) delivered under DPRC5 and RIIO-ED1. While the technology used in these projects will be standard, as yet there is no proven track record within the GB transmission network on the life extension and consequences of interference with aged power transformer.

5 Conclusion

As SPT undertakes transformer and circuit breaker refurbishment programmes under the RIIO-T2 Price Control, there is an increased risk of failure of plant that must be mitigated due to the long lead times of transmission equipment. This paper proposes the purchase of two circuit-breakers and two transformers to provide an adequate level of strategic spares to cover the SPT fleet.

- Costs: £ 0.45m Circuit Breakers / £2.48m Transformers
- Timing of investment: RIIO-ET2 period
- Declared outputs: 1 off – 275kV AIS GCB
  1 off – 400kV AIS DCB
  1 off – 132/33kV 60MVA ONAN Transformer
  1 off – 275/33kV 90MVA ONAN Transformer

6 Future Pathways – Net Zero

We have reviewed this project against the criteria set out within the business plan guidance and have assessed that it does not prevent achievement of our Net Zero plans or lead to stranded assets.

7 Outputs included in RIIO T1 Plans

N/A