



Additional information

Provide additional information to justify investment in FFC and submit leakage reduction target (%), and litres)

Ref: A1.33-35

1. Our stakeholders continue to challenge us to improve our environmental impact in terms of oil lost to the environment. Historically, we have achieved these improvements through a combination of leak repair and oil cable replacement. Our replacement programme in ED1 was designed to address both poorly performing cables that contribute to our immediate oil loss rate and to reduce our long-term risk by population reduction.
2. As described in our EHV and 132kV cables (oil) EJP, as we move into ED2 we are planning to change our historical approach to the management of oil filled cables through increased use of PFT in our cable asset to reduce the amount of oil filled cable replaced. PFT-tagging enables leak repairs to be completed with significantly less oil loss than with traditional ‘cut and freeze’ techniques. Going forwards, we will be able to continue to meet the environmental expectations of our stakeholders while reducing the amount of cable being replaced by up to 60% compared to our ED1 average annual replacement rate.
3. Long term stewardship will still be achieved by earlier intervention on leaks and through targeted replacement of those oil filled cables presenting the highest risk.
4. The trigger for replacement works will continue to be by level of asset risk. Our proposals for ED2, listed in appendix 1, are determined from analysis of the population of the oil filled cable asset base as a whole, as well as analysis of individual circuits primarily using established asset risk indicators that we report in accordance with the requirements of CNAIM v2.1.
 - a. Asset Health for this asset group is assessed against one “Observed Condition Modifier” (Crystalline lead) and one “Measured Condition Modifier” (Oil leakage). A “Reliability Modifier” is available to use in our models in accordance with CNAIM v2.1, but we have not applied this to any of our assets for oil filled cables.
 - b. Asset Criticality is assessed against four areas:

DD Additional information – fluid filled cables

- i) Network Performance: assessment of the load at risk during asset failure.
 - ii) Safety: based on the probability of failure results in injury).
 - iii) Financial: relating to the typical cost to repair a failure.
 - iv) Environmental: a significant impact for oil filled cables including proximity to water courses.
- 5. Our prioritisation also considers the potential future load growth. We will therefore take the opportunity to proactively prepare the network so that it has additional capacity to accommodate this significant increase in demand due to decarbonisation where economic, particularly where there are synergies with other benefits, such as reliability. We will do this by prioritising cable section overlays (driven by condition using the asset risk indicators above) where additional network capacity is required.
- 6. In summary, our ED2 annual cable replacement volumes are 60% lower than in ED1 due to a change in our approach to stewardship of oil filled cables, whereby improvements in oil leak rates will be achieved through earlier leak location and repair where economic to do so, rather than accelerating the long term reduction in the population size to reduce the overall leak rate.
- 7. We will continue to reap the benefits from the large volumes of fluid-filled cable replaced in ED1 and as already indicated we believe we will be able to continue to meet the environmental expectations of our stakeholders while reducing the amount of cable being replaced by up to 60% compared to our ED1 average annual replacement rate. In real terms this translates to a fluid reduction of 15% from 27,300 litres (at the start of ED2) down to 23,200 litres by the end of ED2. See appendix 2 for an breakdown of the annual fluid reduction forecast.



Appendix 1 – ED2 Oil Cable Asset Replacement Candidates

Northeast						
Circuit Name	Category	Length (km)	Health Index Band (2028)	Criticality	Probability of Failure Explanation	Consequence of Failure Explanation
MALTON GRID - SCARBOROUGH GRID 1 & 2 (DUAL CIRCUIT)	132kV UG Cable (Oil)	3.65	H15	C2	H15 - Highest Leak rate per km within asset category	C2 Moderately Close to a Watercourse (between 80m and 120m)
SPENCERBECK - LACKENBY	66kV UG Cable (Oil)	1.32	H15	C2	H15 - Highest Leak rate per km within asset category	C2 Moderately Close to a Watercourse (between 80m and 120m)
SPENCERBECK - LACKENBY	66kV UG Cable (Oil)	3.78	H15	C4	H15 - Highest Leak rate per km within asset category	C4 Very close to a watercourse (<40m)
GRANGETOWN - BRAN SANDS	66kV UG Cable (Oil)	1.65	H15	C2	H15 - Highest Leak rate per km within asset category	C2 Moderately Close to a Watercourse (between 80m and 120m)
MADDISON STREET - BEDLINGTON SW (PART DUAL CIRCUIT)	66kV UG Cable (Oil)	3.13	H15	C2	H15 - Highest Leak rate per km within asset category	C2 Moderately Close to a Watercourse (between 80m and 120m)
PANDON - GOSFORTH 1 & 2	33kV UG Cable (Oil)	8.27	H15	C2	H15 - Highest Leak rate per km within asset category	C2 Moderately Close to a Watercourse (between 80m and 120m)

Appendix 1 – ED2 Oil Cable Asset Replacement Candidates Continued

Yorkshire						
Circuit Name	Category	Length (km)	Health Index Band (2028)	Criticality	Probability of Failure Explanation	Consequence of Failure Explanation
ELLAND-BRIGHOUSE 1 & 2	132kV UG Cable (Oil)	0.53	H15	C4	H15 - Highest Leak rate per km within asset category	C4 Very close to a watercourse (<40m)
ELLAND-HALIFAX 2	132kV UG Cable (Oil)	0.50	H15	C4	H15 - Highest Leak rate per km within asset category	C4 Very close to a watercourse (<40m)
GRIMSBY WEST-IMMINGHAM 1	132kV UG Cable (Oil)	0.14	H15	C4	H15 - Highest Leak rate per km within asset category	C4 Very close to a watercourse (<40m)
HULL EAST 1-WESTCOTT STREET 1	33kV UG Cable (Oil)	3.56	H15	C2/C3/C4	H15 - Highest Leak rate per km within asset category	C2 Moderately Close to a Watercourse (between 80m and 120m); C3 Close to a Watercourse (between 40m and 80m); C4 Very close to a watercourse (<40m)
WHINGATE 2-FARNLEY CRESCENT 2	33kV UG Cable (Oil)	1.95	H15	C3/C4	H15 - Highest Leak rate per km within asset category	C3 Close to a Watercourse (between 40m and 80m); C4 Very close to a watercourse (<40m)
NEEPSEND 1-CLAY WHEELS LANE 1	33kV UG Cable (Oil)	1.92	H15	C2/C3/C4	H15 - Highest Leak rate per km within asset category	C2 Moderately Close to a Watercourse (between 80m and 120m); C3 Close to a Watercourse (between 40m and 80m); C4 Very close to a watercourse (<40m)
STAYGATE 1-DUDLEY HILL 1 & 2	33kV UG Cable (Oil)	3.13	H15	C2/C3	H15 - Highest Leak rate per km within asset category	C2 Moderately Close to a Watercourse (between 80m and 120m); C3 Close to a Watercourse (between 40m and 80m)
CLAYWHEELS LN 2-RAWSON SPRING RD 2	33kV UG Cable (Oil)	1.06	H15	C3/C4	H15 - Highest Leak rate per km within asset category	C3 Close to a Watercourse (between 40m and 80m); C4 Very close to a watercourse (<40m)
FEATHERSTONE-PRINCE OF WALES 1 & 2	33kV UG Cable (Oil)	5.75	H15	C2/C3/C4	H15 - Highest Leak rate per km within asset category	C2 Moderately Close to a Watercourse (between 80m and 120m); C3 Close to a Watercourse (between 40m and 80m); C4 Very close to a watercourse (<40m)

Appendix 2 – Fluid loss Reduction forecast

ENVIRONMENT ACITON PLAN		ED1	ED2				
			2022/23	2023/24	2024/25	2025/26	2026/27
KPI	Unit	Forecast	Target	Target	Target	Target	Target
1. OUTPUTS							
FFC - replacement	km	224	8	16	24	32	40
FFC - dosing (PFT)	km	109	53	107	160	214	267
Oil/Fluid lost	Litres	27,300	26,500	25,700	24,900	24,100	23,200
Variance	Litres		-800	-1,600	-2,400	-3,200	-4,100
Variance	%		-2.9%	-5.9%	-8.8%	-11.7%	-15.0%