Scottish & Southern Electricity Networks



# Scottish Hydro Electric Power Distribution

# Operation, Inspection, Maintenance and Decommissioning Strategy

# Shapinsay - Stronsay

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## Definitions and Abbreviations

The following definitions are used within this document:

| | |
|---|---|
| SHEPD | Scottish Hydro Electric Power Distribution plc |
| SSEN | Scottish and Southern Electricity Networks |
| Cable | SHEPD submarine electricity cable network |
| Coiling | Where the submarine cable is wrapped in a circular manner for storage or transportation |
| Mechanical Strength | The physical capacity of the submarine cable to undergo forces generally in tension (horizontal, lifting) or compression (vertical weight above the cable) |

The following abbreviations and definitions may be used within this document:

| | |
|---|---|
| AUV | Autonomous Underwater Vehicle |
| CFLO | Company Fisheries Liaison Officer |
| HDD | Horizontal Directional Drill |
| KIS-ORCA | Kingfisher Information Service Offshore Renewables and Cable Awareness |
| LAT | Lowest Astronomical Tide |
| MBES | Multibeam Echosounder |
| MCA | Maritime and Coastguard Agency |
| MLWS | Mean Low Water Spring |
| NLB | Northern Lighthouse Board |
| ROV | Remotely Operated Vehicle |
| RPL | Route Position List |
| SBP | Sub Bottom Profiler |
| SSS | Side Scan Sonar |
| UKHO | United Kingdom Hydrographic Office |

## 1. Introduction

1.1. SHEPD propose to install a replacement cable from Shapinsay to Stronsay within the Orkney Isles.

1.2. The purpose of this document is to outline our strategy in relation to the following aspects of the project:

- Operation: Following installation of the cable, connection and energisation to the SHEPD network.
- Inspection: The visual inspection or tracking of the cable following installation.
- Maintenance: Remedial works driven by condition based information following inspections in the marine, inter-tidal and/or land environments.
- Decommissioning: Follows de-energisation of the cable at the end of its operational life.

1.3. This document should be read in conjunction with the *Marine Licence Application Form* and supporting documentation.

# 2. Operation strategy

2.1. Following successful completion of the cable installation within both marine and land environments, the cable will be commissioned and energised onto the SHEPD network. Under normal operation, the cable will remain energised until replaced or following a fault occurrence on the cable or network itself (this includes onshore faults). The cable may also be de-energised to carry out planned maintenance on the cable or SHEPD network.

2.2. The effects of cable operation on the environment are covered within the *Construction Environment Management Plan*.

# 3. Inspection strategy

## 3.1. General

3.1.1. As part of the planned cable replacement, as-built records will be prepared and recorded as part of the project handover documentation. This will form the baseline data for the cable. This is also applicable for any planned maintenance or emergency repairs on the cable.

3.1.2. Following installation of the cable, our inspection strategy will be used to monitor the behaviour and integrity of the cable. Each subsequent inspection will help to build a better understanding of operational risk and condition of the cable. This will therefore dictate the ongoing maintenance plan and influence cable replacement decisions.

## 3.2. Cable inspections - Offshore

3.2.1. The cable inspection in the marine environment allows us to record:

- accurate cable position
- any degradation, damage, exposure, suspensions, burial or other significant events which may affect the integrity of the cable
- external condition of the cable, including any external protection in place
- condition of any cable crossings including third party crossings
- depth of burial, both in terms of adjacent seabed levels and absolute levels
- visibly locate any debris in contact or close proximity to the cable

3.2.2. Asset monitoring inspection and planned route surveys include geophysical, geotechnical and benthic which may comprise the following methods:

- Multibeam Echosounder (MBES)
- Side Scan Sonar (SSS)
- Video and still images
- Cable tracker
- Sub Bottom Profiler (SBP)

- Grab samples

3.2.3. The surveys and inspections will utilise either vessel based instruments or traditional methods such as divers, Remotely Operated Vehicles (ROVs) or Autonomous Underwater Vehicles (AUVs) which have been equipped with suitable sensor packages.

3.2.4. The frequency of marine inspections will be risk dependant; based on ongoing gathering of asset data and network operational risks. We propose that the first cable inspection is carried out within a period of eighteen months after the completion of the planned installation to firstly ensure the installation meets the expectations of our own internal standards and specifications and those of Marine Scotland but also to ensure the safety of navigation for legitimate users of the sea.

3.2.5. All subsequent inspections are proposed to take place in maximum eight yearly intervals in line with our existing submarine electricity cable plan. Following any evidence of wear/abrasion or interference, the frequency of inspections may be increased.

3.2.6. Route Position Lists (RPLs) of cables and landfall locations will be communicated to the UKHO and KIS-ORCA in order that relevant charts are updated and disseminated.

3.2.7. Prior to the commencement of, during and after any route surveys or cable inspections, the Company Fisheries Liaison Officer (CFLO) shall establish and maintain effective communications between SHEPD, any contractors or sub-contractors, and legitimate sea users and this will be documented in the *Fishing Liaison Mitigation Action Plan*.

## 3.3. Cable inspections – Onshore

3.3.1. We will ensure that shore end condition inspections are undertaken for all our cable locations. This will include the warning signs/beacon. For cable shore ends, or landfalls, inspections are proposed to take place an annual basis throughout the operational life of the cable. We plan to undertake the inspections during the Spring months to capture any remedial works required following the Winter period. The inspection will be undertaken during a period of low water after spring tides to ensure that any cable exposure has been captured down to the MLWS limit.

3.3.2. During this inspection, the cable warning markers at the landing sites will be inspected for condition to ensure that they are fit for purpose and if necessary, replaced and thereafter maintained in good condition.

3.3.3. Where we observe a requirement for increased shore end inspection frequencies we shall modify our practices as required.

# 4. Maintenance strategy

4.1. Maintenance requirements are driven by physical information gathered on our assets. This information is obtained through inspections of our cable both in the marine environment and at shore end landfall locations where the cable comes ashore.

4.2. Maintenance solutions will be project dependant on the nature of the issue. We will enter into discussion with Marine Scotland and relevant parties to determine the licencing and communication requirements for undertaking any maintenance or remedial works where necessary through the operational life of the cable.

4.3. Where our inspection programme identifies that the cable has become a danger to navigation or protection of legitimate users of the sea, we will immediately inform Marine Scotland, Maritime and Coastguard Agency (MCA), UKHO, Northern Lighthouse Board (NLB) and KIS-ORCA to communicate the hazard to the maritime community.

4.4. Where shore end landfall inspections reveal that the cable is exposed down to the tidal level of MLWS, we will enter into discussion with Marine Scotland and relevant parties to determine the licencing and communications required for undertaking any remedial works where necessary.

4.5. We will ensure that appropriate steps are taken to minimise disruption and damage to the beach, foreshore and seabed by any remedial works and aim to restore to the current condition prior to the works commencing.

## 5. Decommissioning strategy

5.1. The existing cable is in poor physical condition within the marine environment which has been verified through recent inspections.

5.2. Where the cable is in poor condition, cable recovery operations are very difficult due to a lack of mechanical strength and coiling ability. Where mechanical strength of the cable is compromised the lifting operation will likely cause the cable to break. The operations are time consuming to undertake resulting in increased offshore working for personnel involved and vessel presence in the marine environment.

5.3. The physical cable handling on board the vessel is hazardous to personnel involved with the recovery operations. It is not possible to re-coil the cable on board the recovery vessel. Once the cable is recovered on-board a vessel, this would need to be cut into shorter, manageable lengths.

5.4. In situations where the existing cable is not recovered, there is the potential for the cable to present a navigational hazard to mariners and sea users. To manage this potential health and safety issue, periodic inspections are required to ensure the cable does not pose a risk to snagging. The position of the cable can also be accurately recorded and updated onto navigational charts.

5.5. Similarly to cable recovery, cable dismantling is a difficult and hazardous task requiring a large space on land. With the cable cut into sections, there will be numerous lifting operations to deliver the cable to a disposal contractor. The dismantling of the cable is difficult due to the cable's physical construction and layered design. The costs incurred for dismantling of the cable greatly outweigh the conductor material scrap value.

5.6. With the high costs associated with cable recovery and disposal operation, the overall project costs would increase as well as the representative element of SHEPD distribution customer's bills. The types of socio-economic impacts that this increase in projects costs would have has been modelled our *Cost Benefit Analysis* model. The expenditure incurred through continued inspection of the cable is also assessed in relation to the cable recovery costs within our *Cost Benefit Analysis* model.

5.7. An additional, important consideration for the removal of cables is the environmental impact and disruption that can be caused by the cable recovery process due to the length of time that the asset has been in place. We have heard conflicting views from statutory stakeholders in relation to cable recovery operations. Stakeholders have recognized that recovering cables leads to more damage to the environment than leaving the cable in-situ particularly in areas with sensitive habitats and marine features.

5.8. A grapnel (cable hooking device) will likely be needed to intentionally snag the cable for recovery to the vessel. The grapnel is much smaller than most commercial fishing gear and is pulled across the seafloor. If existent, seabed vegetation may be uprooted in a very narrow corridor defined by the grapnel size.

5.9. Based on the issues noted and impacts, we do not propose to recover the existing cable at the end of its operational life following the installation of the proposed cable. We propose to continue to inspect the existing cable within the marine environment and at shore landfall locations in accordance with our inspection requirements for the proposed cable.