

INSTALLATION TECHNIQUES OF SYSTEMS TO DETECT AND CONTAIN LEAKING OIL FROM POWER CABLES

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PURPOSE AND SCOPE

Oil leaks have historically been a problem for oil-filled cables: as oil is a pollutant it is important to minimise the amount lost to the environment. National Grid is committed to the prevention of pollution and continual improvement of environmental performance and will undertake measures, where necessary, to improve the efficiency of leak location and to try to contain any lost oil. At present there are no industry-wide standards to define what measures should be adopted.

To help reduce the impact of oil leaks National Grid continues to support a range of initiatives such as:

- (a) The use of Dralim, a transducer based oil pressure monitoring system
- (b) The use of Perfluorocarbon Tracing (PFT) to detect leaks without the need to dig

This Technical Guidance Note (TGN) describes suitable installation techniques of systems to detect and contain leaking oil from power cables.

PART 1 - PROCEDURAL

1 INTRODUCTION

The measures currently available to speed up the location of cable oil leaks and thereby reduce the volume of oil lost include Perfluorocarbon Tracing (PFT) and Dralim. PFT is a chemical added to cable oil which can be sensed above ground if there is a leak. Further detail about the PFT leak detection methodology can be found in TGN(E) 206. Dralim is an online system for pressure monitoring so circuits can be continually monitored.

When cable oil is lost below ground its impact on the environment is heavily dependent upon its mobility in the surrounding soil type. Clay soils tend to absorb the oil and can prevent any significant movement while sand and chalk soils allow the oil to travel horizontally and vertically until it reaches the water table. When oil is able to reach the water table there is a possible risk of contamination of water supplies.

One measure that can be taken to reduce the risk of an oil leak is joint bay refurbishment at a cost of around £50k per bay. A programme of refurbishment of joints in environmentally sensitive areas was undertaken based upon a risk assessment of the environmental sensitivity of the area surrounding each bay and the circuit condition. When a leak occurs consideration shall be given to refurbish all joints within the bay and the risk mitigation measures detailed in this TGN can be deployed.

The chance of a leak occurring following the refurbishment of a joint bay is low however there are measures that can be installed to minimise the impact of any future leak. During the refurbishment of joint bays it is recommended that the following measures are considered, these are the fitting of conduits to allow access to the base of the joint bays and

the lining of the base of the joint bay with a polyethylene sheet to act as an aid for oil containment within the joint bay.

Installation of the conduit and / or liner should take place during refurbishment of the joint bay, either as part of a refurbishment programme or opportunity as a result of a leak repair at a joint position. The decision for installation of the conduit and / or liner should be made on a case by case basis and should take into account time frames available within the outage and the environmental sensitivity of the area..

2 ACCESS CONDUIT

The advantage of installing conduits is the ability to allow access to the base of the joint bay and in some cases to allow PFT vapour to reach the surface to enable easier leak location without the need for any excavation.

It is recommended that conduits are only installed in cases where PFT vapour may be more difficult to detect, such as concrete, tarmac or areas of hard ground.

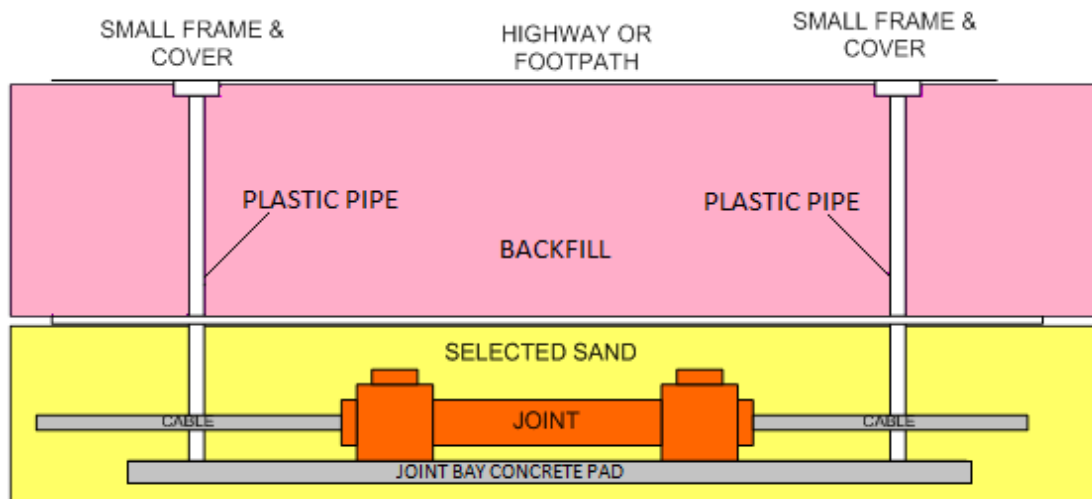


Figure 1 – Conduit Locations: Side View

The conduit is a plastic pipe connecting the base of the joint bay to the surface and is protected by a small frame and cover in the highway or foot path. Ideally conduits should be located as close as possible to any potential leak site, it is therefore suggested that the conduits are located on either side and at both ends of the joint as shown below: