

## NORTH SEA OPERATOR

Avoiding threat to  
production with  
V-LIFE





# Insulation Resistance Recovery

A preventative and active 'healing' solution for low insulation resistance caused by water ingress.

The most common cause of subsea electrical failures is the ingress of water into the cable insulation, which decreases the insulation resistance and may produce short circuits or leakage to earth. These faults often lead to loss of power and/or communications to subsea equipment and have the potential to halt production from subsea wells.

It has also been demonstrated that prolonged operation of subsea power circuits with particularly low insulation resistance can lead to the loss of copper from the conductor at the fault site which in turn can lead to the complete loss of operability of the system. Before **V-LIFE** became available expensive subsea fault-finding interventions and the replacement of cables, equipment and umbilicals were the only solutions to this problem.

The **V-LIFE** effect is achieved by the application of a low voltage passivation signal to the faulty line which through an electro-kinetic and electrochemical process generates and sustains a solid precipitate at, and only at, the location or locations in the subsea circuit where seawater has ingressed. The precipitate produced is electrically insulating and its propagation at the source of the fault results in an increase in the insulation resistance of the circuit often by more than 100x.

A **V-LIFE** application involves the installation of a **V-LIM** line insulation monitor (the hardware) and the enabling of its **V-LIFE** passivation signal by the upload of a software config file. **V-LIM** and **V-LIFE** can typically be installed and commissioned within 2 to 3 shifts offshore. The installation work is all topside. No subsea intervention is required.

# V-LIFE ENABLES AVOIDANCE OF THREAT TO CONTINUED PRODUCTION.

**V-LIFE** can make a dramatic impact on systems with failing electrical insulation resistance. It has been used to recover systems where production has stopped and has been extensively used to avoid subsea interventions and the need to replace umbilicals. The case study looks at a North Sea Operator with degrading insulation resistance.

## Overview

How Viper used **V-LIFE** to avoid a threat to continued production of a Subsea Production Control System, resulting in a 20 times insulation resistance increase within the first 6 hours and providing a value-added solution.

## Problem

Viper have been involved with the North Sea Operator since 2016 regarding the Integrity Management of their Subsea Production Control System. As part of that interaction, Viper have been compiling Asset Condition Assessments, which involve looking at all aspects of the control system 'health'.

It was noted that the insulation resistance had been degrading and that **V-LIM/V-LIFE** could offer a solution to this problem. The Operator therefore decided to trial **V-LIFE** after the issue was highlighted as a threat to continued production.

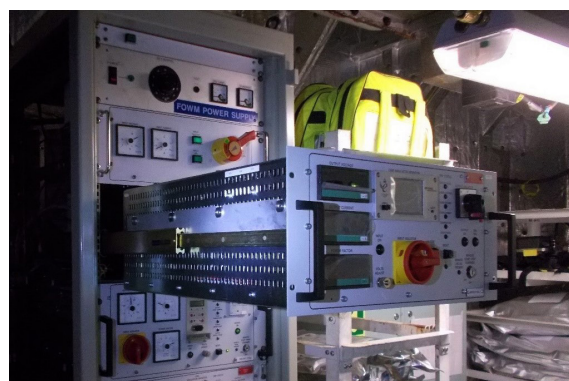
## Solution

Aker Solutions were tasked with installing a **V-LIM** onshore into the spare subsea controller. Meanwhile Viper's Field Service Engineer was mobilised offshore on the Operator's FPSO to get the **V-LIFE** system online, which was activated within the agreed time-frame.



## Outcome

The installation resulted in an insulation resistance increase of 20 times within the first 6 hours of **V-LIFE** being activated. After 4 weeks of **V-LIFE** activation, the insulation resistance levels continue to improve. This helped the Operator to avoid a threat to continued production and provided a value-added solution.



Furthermore, the **V-ASSURE** portal is now being utilised by the Operator to manage the integrity of their Subsea Production Control System. The portal enables Subsea Engineers and Asset Integrity Managers to monitor and assess threats to asset goals by centralising information in one place through a user interface uniquely developed by Viper Innovations.



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