

**V-LIFE** technology  
supporting  
operators for  
over a decade

**10**  
**YEARS**

# **V-LIFE**

## **Insulation Resistance Recovery**



**V-LIFE®**

A VIPER INNOVATION

**#powered by purpose**

## Supporting 30+ global operators, spanning 5 continents

# V-LIFE

**V-LIFE** is the only 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 (IR) 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 been demonstrated that prolonged operation of subsea power circuits with particularly low IR 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 IR 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. The only solution other than costly subsea repair or total umbilical replacement.

## Key benefits:

- Increases IR without subsea intervention
- Recovers multiple IR failures throughout the system
- Extends the life of failing umbilicals and electrical distribution equipment
- 'Buys time' whilst a new umbilical is procured
- Used as an alternative to installing new, costly and long-lead time umbilicals
- Used to delay early field abandonment
- **V-LIFE** 'finds' the points of water ingress, no diagnostics required
- Environmentally friendly alternative to CO<sub>2</sub> heavy umbilical replacement methods

**V-LIFE** - Supporting businesses with the critical supply of gas.



# The leading alternative to subsea interventions

## Key features

- Compatible with comms on power systems
- Provides all the features of a Line Insulation Monitor including IR measurements and configurable alarms/trips
- Compatible with power and/or signal lines
- A range of installation options to suit all field applications
- Displays IR measurements graphically in real time
- Compatible with single or three phase systems
- Graphical touch screen LCD
- Advanced control and configuration via USB and Ethernet interfaces
- Typically recovers IR from k $\Omega$  to M $\Omega$  within a few days



#powered by purpose

# Are you experiencing low IR?

If you are experiencing low IR, a timely decision is essential, as ignoring the issue can be costly and results in health & safety mitigations.

## What are your options?

1

### Commission V-LIFE

Simple and easy to install.

V-LIFE technology is embedded within the V-LIM, a LIM device with a difference.

As well as continuously monitoring IR levels, this proven technology uses an electro-kinetic and electrochemical process to actively heal and improve cable insulation that is failing due to water ingress.

2

### Replace hardware

The traditional approach.

The decision to replace failed hardware is affected by many factors – ranging from technical to economic. The cost of subsea intervention can be substantial.

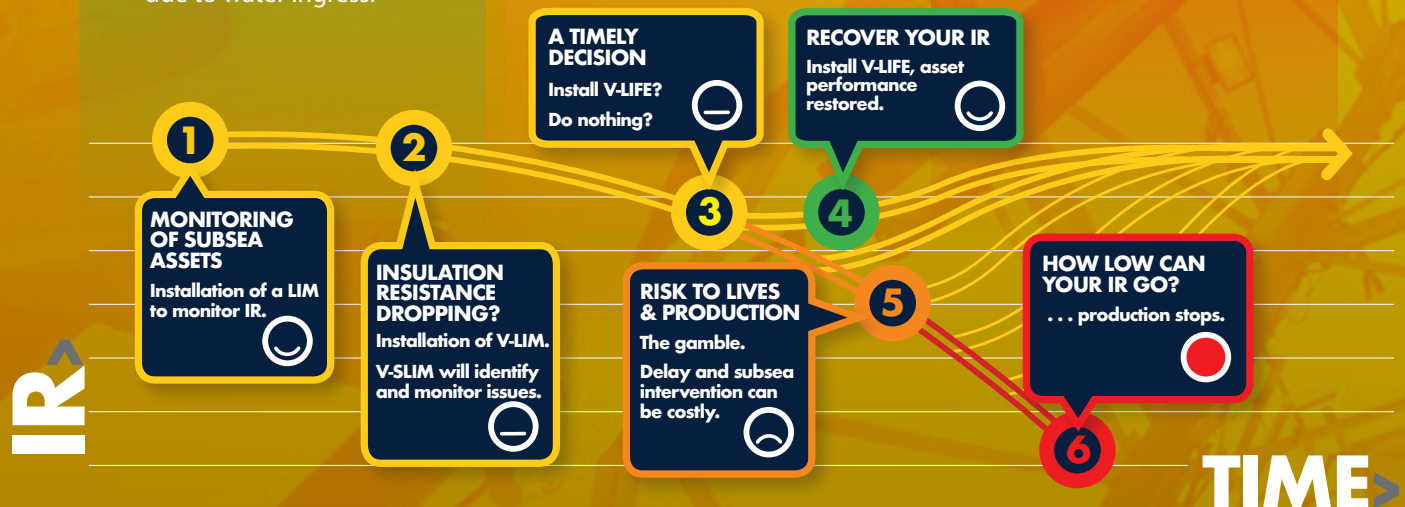
The decision-making process is complex with no guarantee of a successful outcome.

3

### Mitigate the issue

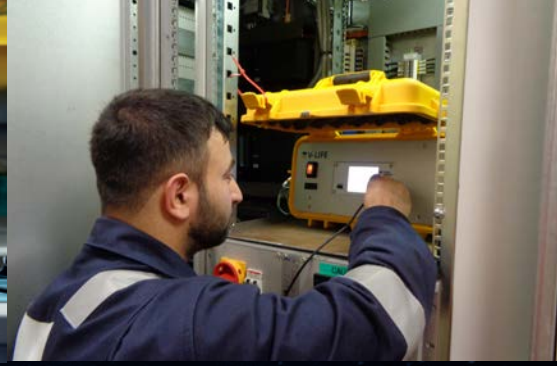
Choosing to ignore the issue can lead to a risk to production and potentially the safety of personnel.

It can also result in damage to the electrical conductor due to copper loss, which could ultimately lead to an unrecoverable system failure.



**V-LIFE** - a solution that's proven & successful.





## Life with V-LIFE

A solution that's proven and successful, **V-LIFE** is currently implemented on control systems supplied by six different OEMs. Widely used by 30+ operators globally, **V-LIFE** is the leading alternative to subsea interventions.

### Ease of installation

As an alternative to mobilising a Viper engineer for our **V-LIM** hardware retrofit installations, we have developed enhanced **V-LIM** installation procedures; enabling existing competent offshore personnel to fit the monitor themselves while being guided from onshore by one of our expert team members.

Customers can send their Subsea Output Modules (SOMs) to our Portishead facility, where our skilled engineers can upgrade the SOMs by installing a **V-LIM** for precise and accurate monitoring and making them '**V-LIFE ready**'; as well as carrying out other general refurbishment activities.

# Supporting 30+ global operators, spanning 5 continents

**V-LIFE** - is being used around the world to restore and protect subsea electrical systems experiencing low IR.



## Case study

# Keeping the lights on in East Java

**V-LIFE** was used to keep the lights on in East Java by recovering a failed gas field electrical system with an 18-month replacement umbilical lead time.

## Terang, Sirasun & Batur (TSB) gas fields

The Terang, Batur, and East & West Sirasun (TSB) gas reservoirs are located approximately 100km north of Bali in water depths ranging from 90 to 230m. Collectively, the reserves amount to 1 Trillion Cubic Feet (TCF) of recoverable gas (mostly methane), which is equivalent to 170 million barrels of oil.

The produced natural gas flows through the East Java Gas Pipeline. At 370km in length, the pipeline runs past the Kangean Islands, through the Madura Strait, and onshore to Surabaya (Indonesia's second-largest city). The gas from the field contributes to the stable natural gas supply to consumers in East Java.

Some of the biggest clients for the gas are fertiliser factories in the outlying area of Surabaya. As well as the steady supply of energy to these clients, gas production from the field is critical to the region's economic growth. The criticality of the gas supply from the TSB fields is immense for the province and the country as a whole. The vast majority of the gas produced is used as fuel by the region's gas-fired power stations and indirectly accounts for 50% of the region's power generation.

The Subsea Control System was designed to be 'fail as is' on the loss of electrical power; this meant that all subsea actuators, and therefore valves, remained in the same state as when power and communications were lost. On the upside, this meant that gas production continued, but if there were to be a loss of hydraulic power or an Emergency Shutdown, then gas production would stop, and the field could not be restarted. Lights would go out in East Java!

Having gone out for a quote for a replacement, a lead time of 18 months meant that KEI were in an untenable position in terms of the surety of gas production. **Viper** was initially contacted by KEI, as they had lost control and monitoring of the Terang subsea wells due to low Insulation Resistance (IR) and a subsequent power trip at the Electrical Power Unit.

Following a quick assessment by Viper, both parties moved to get a contract in place. Terms and Conditions were agreed, and the interface engineering was completed all within six weeks of the initial contact. The hardware was dispatched from stock from the UK to Indonesia, and a **Viper** engineer was mobilised to arrive at the same time as the hardware. Within two shifts offshore, the **V-LIM** was installed in the EPU rack, and **V-LIFE** was enabled on the second shift.

The IR failure reacted quickly to the application of **V-LIFE**, and KEI had full control and monitoring capability returned after two hours of **V-LIFE** commencing. The Insulation Resistance increased from 170kΩ to 63MΩ within 4 hours and then reached 1GΩ within a day. Further **V-LIM** and **V-LIFE** installations recovered each failed channel.



Some call it  
maintaining  
production

We call it

# KEEPING THE LIGHTS ON

Find out more...



 **V-LIFE®**

#powered by purpose



Get in touch with one of our experts today and learn what **V-LIFE** could do for you.

For more information visit:

**[www.viperinnovations.com/v-life-technology](http://www.viperinnovations.com/v-life-technology)**

or speak to one of our experts on:

**+44 1275 78 78 78** or

**[enquiries@viperinnovations.com](mailto:enquiries@viperinnovations.com)**

**[www.viperinnovations.com](http://www.viperinnovations.com)**