

**INNOVATIVE ENGINEERING
PRODUCTS AND SERVICES FOR
THE INTERNATIONAL SUBSEA
OIL, GAS AND OFFSHORE
RENEWABLES INDUSTRIES.**

**V-LIFE: A means of rejuvenating
failing umbilicals and subsea
electrical distribution systems**

**Neil Douglas
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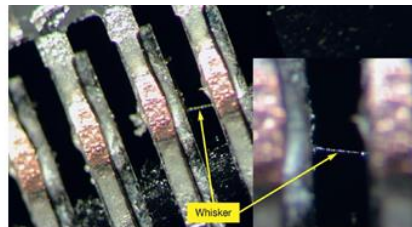
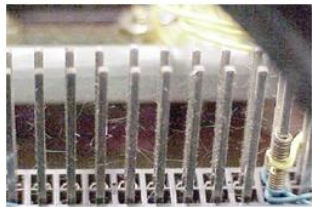




Subsea electrical failures in ageing systems

Subsea electrical failures are caused by:

- Tin whiskers causing short circuits $\approx 2\%$ of all subsea electrical failures



Courtesy: NASA Electronic Parts and Packaging (NEPP) Program

- Dendrites in electrical connectors $\approx 5\%$



- Electrical component failures in Subsea Electronic Modules $\approx 20\%$
- Water ingress into umbilicals, cables and connectors $\approx 73\%$



Water ingress into electrical cables

Moisture Intrusion can occur in long-term wetted cables in the majority of commonly used insulation materials. The intrusion results in:

- Decrease in dielectric strength
- Increase in leakage currents
- Continual degradation leading to eventual failure

The cost of subsea electrical failures is significant –

- Marine intervention costs
- Replacement hardware
- Lost production

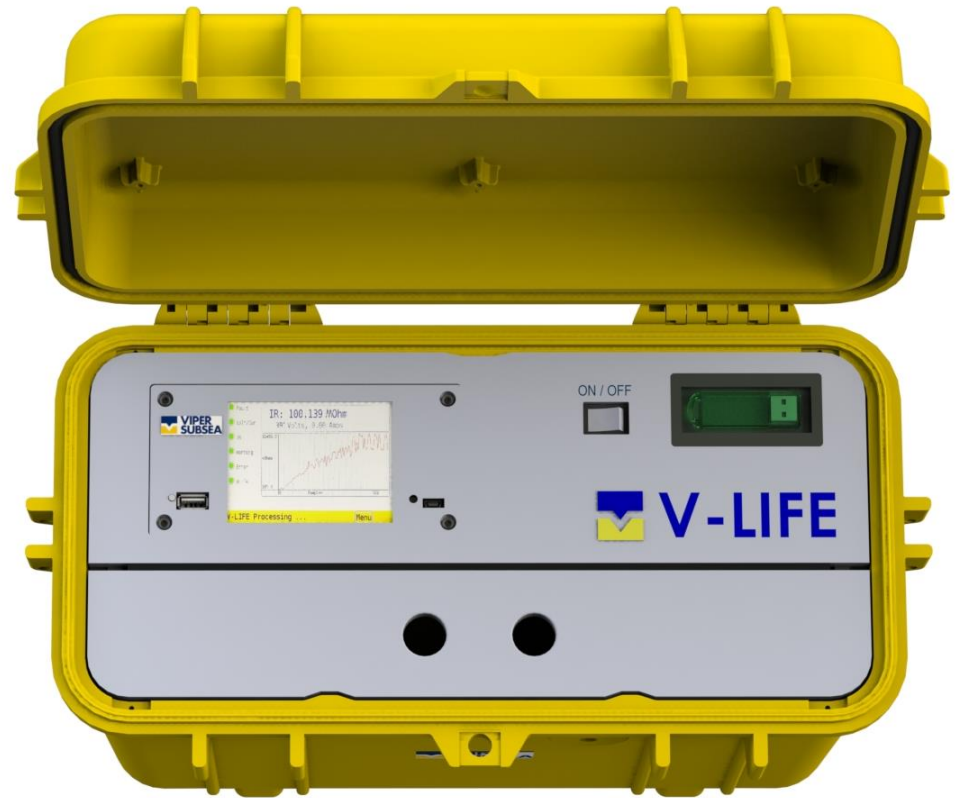


A scientific breakthrough to reverse low insulation resistance

- The Solution – V-LIFE
- The Process – Utilises electro-kinetic & electro-chemical phenomena to increase the resistance of the conductive path between the copper conductors and ground.
- The Result – Increased Insulation Resistance, extending the life of the failing cable / connectors, increasing system availability and reducing the need for subsea interventions and equipment replacement.



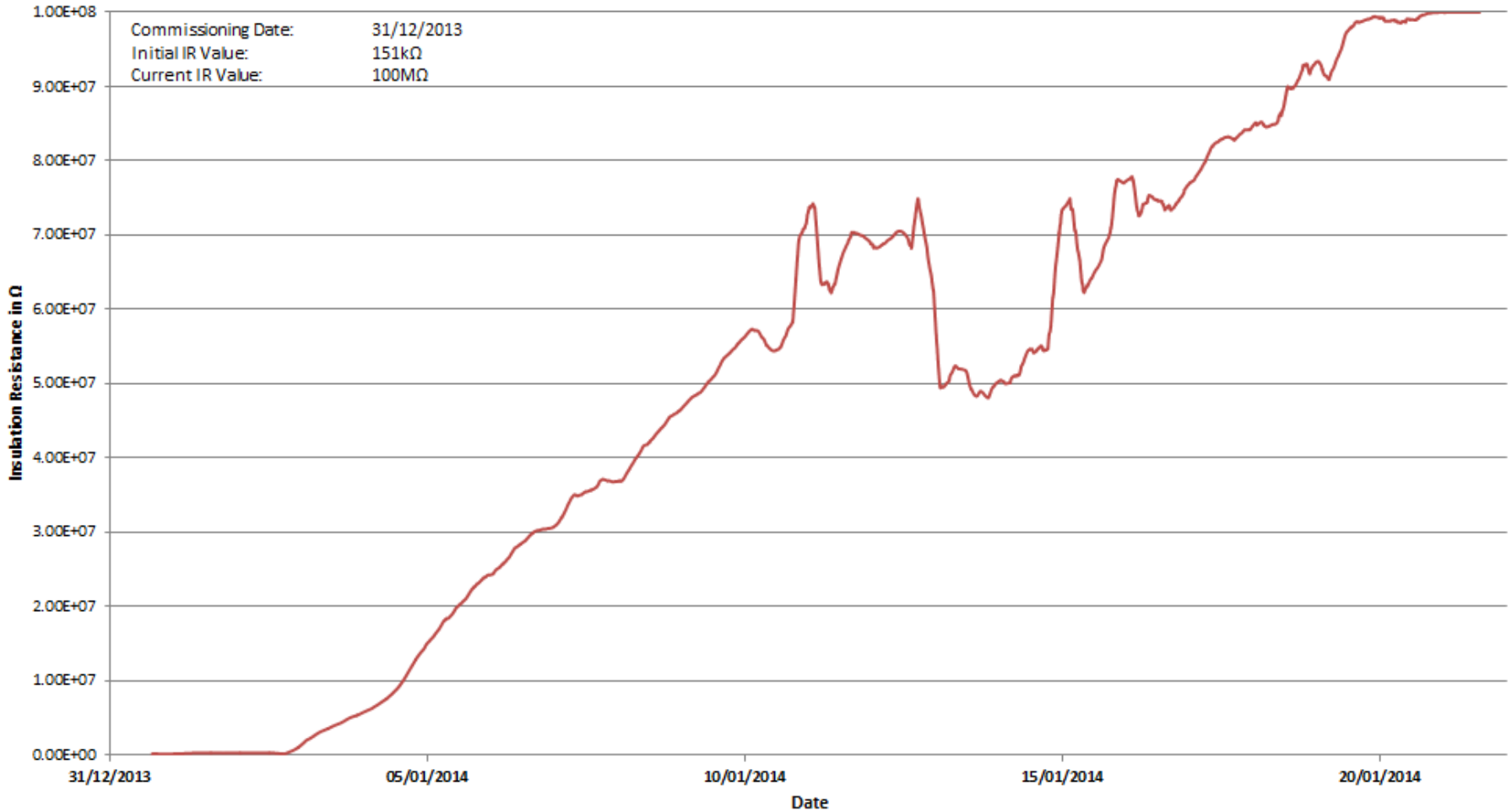
V-LIFE hardware – in portable form





Example of restorative effect

V-LIFE IR Results System 4





V-LIFE benefits

- Reverses the effects of water ingress into electrical cables and equipment
- Can extend the life of failing umbilicals:
 - 'Buys time' whilst a new umbilical is procured
 - Used instead of installing a new umbilical
 - Can be used to postpone field abandonment
 - Can increase technical margins to allow additional wells to be added
- Can rejuvenate other subsea distribution equipment and components