

MKIII LONG RANGER SUBSEA LEAK DETECTION SYSTEM

Following on from the very successful MKI and MKII versions of the 'Long Ranger' family of subsea leak detection systems, Neptune have introduced their latest MKIII version. As with the earlier versions, the MKIII can detect fluorescent dyes, crude oils, lubricating oils and hydrocarbon based control fluids at depths down to 3000m (6000m as special) but with enhanced performance.

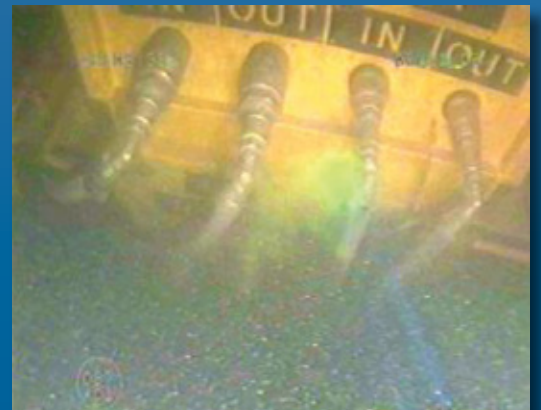
MAIN FEATURES:

- ROV, AUV or PIG mounted or diver held
- Quick and easy remote leak detection from distances up to 10m away
- Easily finds leaks in confined spaces where ROV access is not possible



MKIII LONG RANGE LEAK DETECTOR

The new MKIII sensors can be supplied for detecting: Fluorescein, Roemex red dyes, Rhodamine, Castrol UV dyes, Champion Clear dye, McDermid fluids, Pelagic fluids, crude oil, lubricating oil, hydrocarbon based control fluids and others at distances of up to 10 meters or more. The sensors do not have to pass through the leaked fluid plume to detect, i.e. the sensors detect remotely and thus tidal flow direction in relation to the sensors position is not relevant. Other advantages include riser inspection at a safe working distance and the ability to detect leaks within structures and manifolds where ROV access is not possible.



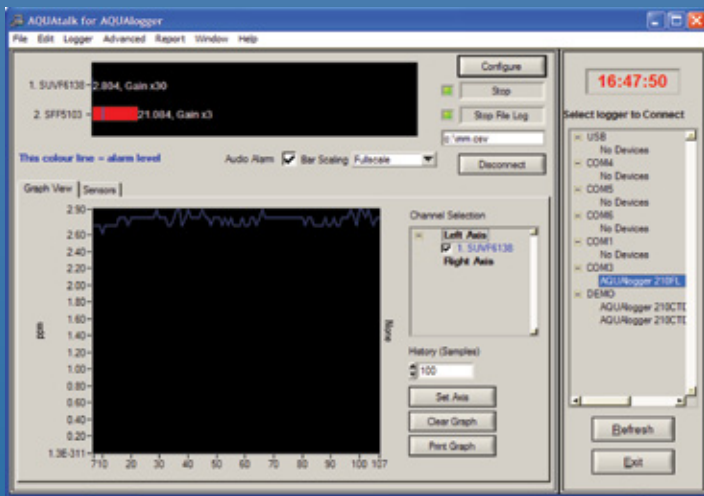
Camera view of excited dye using the Long Ranger Sensor output to graphical display as below
 The blue excitation light beam is visible
 Fluoresced light produced by the dye shows as a green cloud at the leak location
 Tracer dye is Fluorescein

GENERAL SPECIFICATIONS

| | | | |
|-------------------------|--|--------------------------------------|-------------------------|
| Power Requirement | 12-30 vdc, 150 mA avg, 500 mA pk | | |
| Output | RS232 and RS485 | | |
| Minimum Detection Level | 1 µg/l (0.001ppm) | | |
| Sensing Range | 10m+ depending on visibility, dye type and concentration | | |
| Depth Capability | 3,000m standard; (6000m special) | | |
| Excitation Wavelengths | 475 nm (Fluorescein) | 370 nm (UV clear dyes, crude oil) | 530 nm (Roemex, etc) |
| Emission Wavelengths | 530 nm | 440 nm | 583/610 nm |

Neptune's subsea pipeline leak detection systems have been proven worldwide through many successful operations over a number of years. Clients include **BP, Shell, Elf, Total, ExxonMobil, Statoil, Subsea7, Technip, Sonsub, Acergy, Oceaneering, DOF, Rovtech, Bibby Offshore, Haliburton, McDermott, Woodside, Husky Energy, BJ Services** and many others.

SCREEN DISPLAY



The system comprises a two channel unit that can be used with two fluorometers or one fluorometer plus an acoustic sensor operating simultaneously. One or more sensors are connected to a 2 channel pressure housed processor board that is mounted on the ROV and wired through the MUX to the umbilical for data transmission to the surface. The processor produces data in operator selected RS232 or RS485 format for transmission to the surface via the ROV umbilical. Power is supplied by the ROV at 24vdc.

The on-board PC displays data as colour time series plots in real time allowing the operator to easily see changes in signal that indicate the presence of a leak. The software also allows the user to set alarm levels that will provide an immediate response when a leak has been detected and to record data.

SENSOR DESCRIPTION



The sensors have a single forward facing light source (like a torch) producing a 'tuned' high intensity beam of excitation light that spreads to about 45cm diameter at 3m from source (and continues spreading as the distance increases). Fluoresced light is generated when the beam encounters leaked fluid. This fluoresced light is detected by a sensor mounted concentrically round the light source.

By mounting the sensor on the ROV manip or at the forward end of the ROV quick and easy scanning for leaks is achieved without need to consider tidal flow direction to 'capture' dye.

Previously, the MKI and MKII sensors were too sensitive and would often go offscale when a large cloud of fluorescing fluid at high concentration was encountered, i.e., at the standard 10ppm dye concentrations as normally used in control fluids. The high sensitivity is required to detect the presence of a leak at distance but in order to efficiently locate the leak point a short range sensor was used simultaneously in two channel mode. The short range sensor responds to the highest concentration levels (when there is low fluid dispersion) without going offscale and therefore the exact leak location can be determined.

To overcome the need for two sensors, a new feature was developed for the MKIII version. This new feature allows the user to control the excitation light beam intensity through the software. The purpose is to allow the sensor sensitivity to be reduced by lowering the excitation light intensity once a leak is remotely detected. This allows the sensor to be moved in close through the cloud to locate the point of leak without going offscale. By this method, leak location down to component level (eg. bolt on a flange or a seal) is easily achieved with a single sensor.