Title of Article: Fiber Optic based Pipeline Oil and Gas Leak and Intruder Detection System with Security Intervention Plan


Abstract: The accurate and timely localization of vandalization and leak points on an oil/gas pipeline provides operators with information to aid the development of robust security response and intervention plans. These plans have the potential of reducing the impact of leaks on the environment by enabling operators take actions to mitigate their effect. A major challenge with current leak and vandalization detection systems is the generation of spurious signals which in time slows down the response to these alerts. This paper presents results of the field trial of a Fiber Optic Cable based Oil/ Gas leak and intruder detection system. Oil and Gas leaks were simulated on a pipeline section buried in a swamp location with 1mm and 2mm orifices located at the 0°, 90° and 180° positions on the pipe. A section of the pipe was exposed for third party intruder detection tests. The orifices were connected to compressed air and water used in place of gas and oil respectively. The fibre optic cable was buried on both sides of the pipeline and hooked up to the Helios Integrator. The intrusion/leak activities around the pipeline were detected, reported real time with the actual location and interpreted to show the type of intruder or leak, based on intensity of the activity. The spurious free results coupled with adequate security intervention plan will reduce oil loss, environmental pollution, and damage to asset.