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Abstract: This paper presents the report of a pipeline intruder detection system using the Optical Time Domain Reflectometry (OTDR) based Distributed Vibration Sensor technology (DVS). A 12 Km optic fiber cable was buried under a 0.9m thick slab of concrete buried 1.6m deep along an SPDC 18” pipeline within the pipeline right of way (ROW). The application of the OTDR was to detect some predefined types of intrusion (walking, digging, driving, etc.,) normally associated with vandalism and bunkering activities along the pipeline ROW. The system was able to identify with sufficient signal clarity, the footsteps of a man weighing about 80kg walking up to 3m near the buried sensor, digging activities at about 3m away from the optic fiber cable, a moving herd of cattle crossing the pipeline ROW from 15m to the ROW and the presence of a wheeled 4x4 vehicle 10m away from the buried cable while a 5 ton truck 50m away from the cable was detected. The results were displayed on a graphical user interface with different colour codes for each intrusion event or category. The system was found to be able to detect the different possible types of intrusion activities prevalent around pipelines. The concrete slab was found to have minimal effect on the sensitivity of the optic fiber with respect to its ability to detect intrusion activities up to 5m from the optic fiber cable, but for areas without the concrete slab, the system sensitivity much better, hence the received intrusion signal strength was found to be very high. This system can be deployed along our pipeline ROW to provide intrusion detection for SPDC pipelines and provide an early warning system for malicious intents on

the pipelines.