

APPLICATION OF AN INNOVATIVE IN-SITU OXYGEN INFUSION PROCESS TO REMEDIATE PETROLEUM HYDROCARBONS AND ETHYLENE DIBROMIDE (EDB) IN A CLAY AQUIFER

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In January 2003, WRS Infrastructure & Environment, Inc. (WRS) implemented an oxygen infusion remediation system at a Florida Department of Transportation (FDOT) site located in Tallahassee, Florida. Groundwater and soil contamination was caused by a former underground storage tank (UST) at this active farm facility. This innovative technology was implemented after 4 years of multiphase extraction (MPE). The MPE system was successful in recovering free product and a significant amount of hydrocarbon mass; however, the tight clay formation and the depth of contamination to 190 feet within a sinkhole feature limited the success of this remedial technology. In order to overcome the low permeability conditions and supply oxygen (the limiting electron acceptor in the biodegradation of petroleum hydrocarbons) at sufficient radii's from the point of injection, the situ Submerged Oxygen Curtain (iSOC[®]) technology was implemented. The iSOC[®] system has the ability to enrich the dissolved oxygen content of the groundwater without creating bubbles, which subsequently allows the molecular diffusion of oxygen into low permeable formations. The iSOC[®] probes are made of an inert polymer matrix made of micro porous hollow fibers (MHF). These MHFs provide a large surface area for gas transfer into the probe. Another advantage to this technology is its inherent simplicity. A compressed oxygen cylinder (located within the well vault) provides the oxygen via a supply line to iSOC[®] probes that are installed in existing 2-inch diameter monitor wells at the site. First quarter monitoring data indicates a 65% reduction in groundwater concentration in monitor wells located 10 feet away from the oxygen infusion wells. Furthermore, first order decay rates indicate that the time to cleanup has been reduced by six years by switching to the enhanced bioremediation system.

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