

Update on Three-Step Remedial Process to Recover Heavy Oil in Former Underground Tank Pit, Northern California

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Platform Presentation

A three-step process was developed to recover heavy waste oil from a former tank pit at a northern California facility. Free product was measured up to 16-inches prior to the treatment. Weekly free product measurements and bailing were performed. A passive hydrophobic oil skimmer was installed in one well, but the waste oil was too viscous to flow into the trap.

The 3-step remedial process included high-pressure air-injection to displace the trapped oil located within the saturated zone. A high-pressure injection (200-600 psi) of CytoSol® biosolvent was used to thin and increase the mobility of the trapped heavy oil. A high-vacuum extraction (28" Hg) was used to recover both the heavy oil and the biosolvent from the subsurface. The final stage was to separate the heavy oil from the unspent biosolvent and groundwater.

The air/biosolvent delivery/extraction system included nine 4-inch diameter liquid recovery wells and nineteen temporary ¾-inch diameter injection rods on ten-foot centers. High-pressure compressed air was initially used to dislodge the submerged heavy oil from the pore spaces. The floating oil was vigorously mixed with 300 gallons of biosolvent injected into the pit gravels at 200 to 600 psi. A 20-hp water ring vacuum pump extracted the oil, biosolvent and groundwater. The waste oil was skimmed off. The extracted unspent biosolvent was reinjected for three complete tank pit flushes. A thermal oxidizer treated the extracted vapors. A total of 550 gallons of heavy waste oil and 480 gallons of spent biosolvent/water mixtures were recovered from the former UST pit. A total of 7,790 gallons of groundwater was extracted and treated by aqueous-phase

activated carbon vessels, and discharged to the sanitary sewer. One month after treatment, maximum waste oil thickness was 1/2-inch, later turning into a sheen. The property is being evaluated for site closure.

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