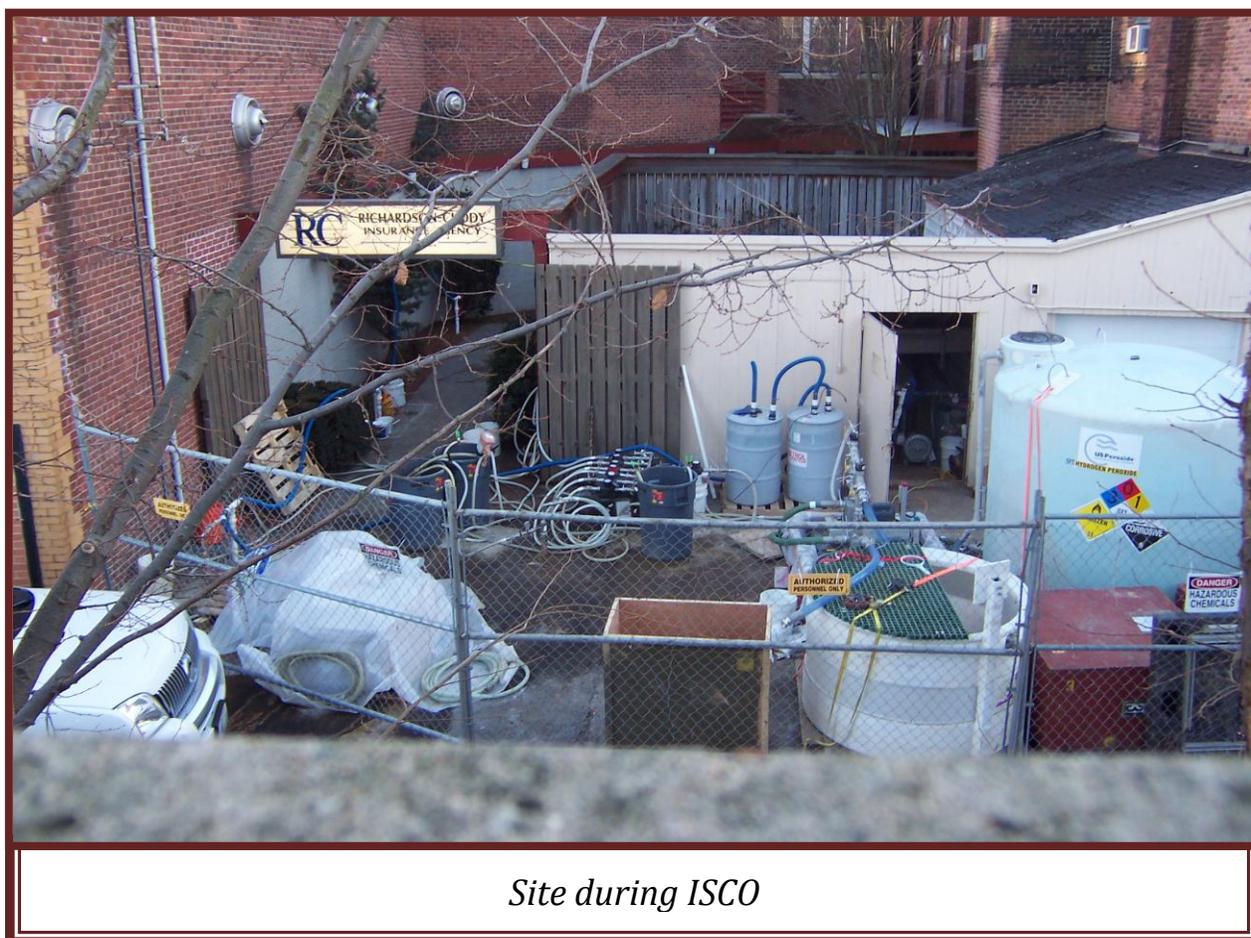


Attleboro, MA Brownfields Site
2002 - 2008

In 2002, BETA Group, Inc. (BETA) of Norwood, Massachusetts directed the removal and closure of three petroleum underground storage tanks (USTs) at a commercial building in the downtown center of Attleboro, Massachusetts. The 100-year old historic four story brick building was occupied by numerous retail, commercial, and residential tenants. Upon removal, one of the USTs was found to have leaked No. 6 fuel oil through multiple corrosion holes. The proximity of the site building and a nearby building on an abutting property prevented the excavation of contaminated soil. This 8,500-gallon UST had been out of service since at least 1980, when the current owner purchased the property. A property line survey conducted shortly after the leaking UST's removal found that while it had been piped to provide fuel to the site, it had been located on the abutting property currently occupied by a bank branch.

As required by Massachusetts Department of Environmental Protection (DEP) regulations, BETA reported the release and assessed its extent. BETA determined that approximately 3,000 gallons of No. 6 fuel oil was present in soil from a depth of approximately 10 feet to 22 feet below grade. The No. 6 oil



was located in an area approximately 28 feet wide and extending approximately 30 feet downgradient of the former UST; including beneath the basement of the boiler house located at the site. Due to the low solubility of the No. 6 oil, the release did not result in significant groundwater contamination. Dissolved fractions of petroleum hydrocarbons and volatile organic compounds in groundwater remained at concentrations ranging from non-detect to well below applicable cleanup standards. However, the total mass of released No. 6 oil was sufficient to cause oil to accumulate in nine site monitoring wells; more than 30 inches thick in one well. BETA completed the assessment of the release in 2006. The presence of the occupied mixed-use site building and the abutting bank



branch made excavation or any disruptive remediation methods infeasible. Any selected cleanup option would have to allow the continued use of both buildings. BETA therefore selected in-situ chemical oxidation (ISCO) as the preferred cleanup option. After a rigorous evaluation of three qualified ISCO firms, BETA retained MEC^x, LP of Houston, Texas to design and conduct the ISCO treatment. MEC^x designed and implemented an eight-day ISCO treatment using hydrogen peroxide activated sodium persulfate. The treatment consisted of the application of 900 pounds of sodium persulfate oxidizer, 9,000 gallons of 17.5% hydrogen peroxide as the oxidizer and activator, and 900 pounds of ferrous sulfate to condition the subsurface. These compounds were injected at low pressure via six two-inch diameter stainless-steel injection wells, specially installed to withstand the 140° to 180°F temperatures generated in the subsurface during the ISCO process. Each well was installed with the well screen located beneath the water table so that the ISCO chemicals could be directed to the oil flowing into the site monitoring wells.

The chemical oxidation was performed in February 2007 and resulted in the destruction of an estimated 1,000 gallons of the No. 6 oil and the reduction of the average petroleum concentration at the site from 13,750 mg/Kg to 8,500 mg/Kg. The oxidation broke the chemical bonds of the oil's complex hydrocarbons into carbon dioxide, water, and inert compounds. The destruction of that quantity of oil reduced the amount of oil in the subsurface so that it could no longer flow into the wells. As a result, post-treatment monitoring conducted by BETA over a nine-month period found that oil was present in only four two-inch diameter wells and at a stable average thickness well below ½-inch.

During the entire ISCO treatment, all site uses continued uninterrupted. BETA and MEC^x performed periodic air monitoring in both buildings to confirm that no oil vapors migrated into occupied spaces. All occupants were notified in advance of the treatment and no complaints were received.

The reduction of oil in site monitoring wells to a thickness of less than ½-inch combined with a reduction of concentrations of oil in groundwater and soil to below allowable limits resulted in the site being closed under Massachusetts DEP regulations. BETA submitted a release closure report to the DEP in February 2008. Because some residual No. 6 oil remained at the Site, the closure included the filing of an Activity and Use Limitation (AUL) with the property deed. The AUL, which only applies to the small portion of the Site in the vicinity of the boiler room, allows all existing uses of the Site, requires that the exterior pavement and basement floor remain in place, and provides notification that exposure to the portion of the Site containing oil must be limited. The entire project from UST removal through closure cost approximately \$300,000.



Site post treatment (2008)

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