

Washac Industries
4735 Avenue A
St. Augustine, Florida
County: St. John's
District: Northeast
Site Lead: Waste Cleanup Program
Approved for Cleanup: April 25, 2005
HWC # 120

Site Description and History

The former Washac Industries (Washac) site is located at 4735 Avenue A in St. Augustine, St. John's County in Township 06S, Range 29E, Section 50 at 29° 56' 58.2305" N, 81° 20' 29.6117" W in a mixed commercial and residential area. The approximately 1.6 acre site consists of an approximately 10,200 square foot metal warehouse/building situated on an unpaved lot and a drainage feature located on the northeastern portion of the site. Washac formerly manufactured aluminum components for military aircraft. The manufacturing process included the cutting, punching, alodining, and painting of aluminum sheets. Alodining consists of a six part process in which parts are alternately dipped into six tanks containing alkaline aluminum cleaner, acidic oxidizer, and chromic coating. The paint guns, tools, and small parts used throughout the process were regularly cleaned with toluene and acetone.

In 1990, the Florida Department of Environmental Regulation (FDER, now DEP) determined that Washac Industries personnel had improperly disposed of hazardous waste onto the ground and into drains that led to the facility's septic tank and drain field. Records indicated that several 55-gallon drums of hazardous materials were received every year for use within their processes, but there was no documentation of proper disposal. It was reported that most of the waste streams were discharged directly onto the ground or into the septic system. As a result of these findings, the corporation and four employees pleaded no contest to several felony counts of unlawful disposal and treatment of hazardous waste, willful pollution, and felony littering. Washac Industries subsequently filed for bankruptcy.

Threat

Previous groundwater and soil investigations have revealed contamination of onsite soil as well as the shallow aquifer both onsite and offsite. The shallow aquifer has been contaminated with a variety of volatile organic compounds and metals, primarily trichloroethene (TCE) and aluminum, above groundwater cleanup target levels (GCTLs).

Response Strategy and Status (June 2016)

In July 1994, the DEP Northeast District Office requested the DEP Site Investigation Section (SIS) conduct a site investigation. SIS found that Washac had detrimentally impacted the ground and surficial aquifer through their discharge of industrial waste. SIS found toluene, total recoverable petroleum hydrocarbons (TRPH) with a kerosene odor, aluminum, arsenic, cadmium, chromium, copper, lead, nickel, zinc, and mercury in the soil. The groundwater was found to be contaminated primarily with TCE and *cis*-1,2-dichloroethene (CIS). The groundwater contaminant plume

extended approximately 200 to 300 ft north/northeast of the property and was approximately 40 ft deep.

The Washac Industries site was accepted for cleanup under the State-funded Hazardous Waste Cleanup Program in June 2005. In August 2005, E&E began soil and groundwater assessment activities at the site in order to complete delineation of both the onsite and offsite soil and groundwater contamination. Assessment activities were completed in February 2006, and a Site Assessment Report (SAR) was generated and submitted to DEP in April 2006. Chromium was the most common contaminant found in soil, with concentrations exceeding the leaching Soil Cleanup Target Level (SCTL) of 38 mg/kg. TCE and CIS were the primary contaminants found in groundwater. The major portion of the contaminant mass was found at depths between 25 and 35 feet below ground surface immediately north-northeast of the building. The chlorinated solvent contaminant plume trended east-northeast and extended under the Florida East Coast Railway and the US Highway 1 right-of-way. Groundwater contaminants were not detected in monitoring wells located along the east side of US Highway 1.

In July 2006, DEP met with E&E and determined that a pilot study be conducted to determine the efficacy of biostimulation as a potential remedy for the site. The pilot study work plan was approved by DEP in September 2007. Baseline groundwater sampling was conducted in December 2007, and the pilot study was conducted from January through April 2008. The Pilot Study report concluded that biostimulation was a viable remedial alternative at the site, and should be expanded to a full-scale remedy.

This site was reassigned to Geosyntec Consultants in June 2008. Geosyntec reviewed the site data and proposed to conduct membrane interface probe (MIP) profiling, direct push technology (DPT) groundwater sampling, monitor well sampling, and oxidant demand testing. These field activities were conducted in September 2008. Based upon the collected data, Geosyntec concluded that both in situ chemical oxidation (ISCO) and biostimulation are viable remedial options for the site. Geosyntec recommended conducting both an ISCO treatability study and a biostimulation treatability study to determine which remedy is more suitable to achieving successful site remediation. Geosyntec submitted a Design to DEP in May 2009, focusing on enhanced bioremediation and natural attenuation as the selected remedies for the site. In March 2010, Geosyntec completed delineation of the groundwater aluminum plume and confirmed no completed groundwater aluminum exposure pathway through potable well sampling and analysis. DEP approved the Geosyntec remedial design in May 2010. In May 2010, Geosyntec was tasked to implement the enhanced reductive dechlorination (ERD) and natural attenuation remedy. In June 2011, the DEP Office of General Counsel obtained court-ordered site access.

By the end of July 2011, all required injection well installation and pre-injection activities were completed. The first injection of emulsified oil substrate (EOS) to commence ERD was completed in August 2011. Data from the April 2012 Semi-Annual Post Injection report indicated significant reductions in post-injection TCE concentrations. Decreases in CIS and increases in vinyl chloride concentrations indicated reductive dechlorination was taking place but stalling after the production of vinyl chloride (VC). Laboratory analytical results did not detect the *vcrA* gene in the groundwater *Dehalococcoides ethenogenes* (DHC) bacteria population at the site. This would

account for the VC stall given that subsurface conditions indicate a favorable environment for reductive dechlorination.

Bio-augmentation injection activities were performed at the site in May 2012 using KB-1[®], a natural microbial culture containing strains of DHC. Three performance monitor wells were installed prior to the injection activities to evaluate the post injection impact on groundwater volatile organic compounds (VOCs).

The second Semi-Annual Post Injection and Groundwater Monitoring report summarizing all bio-augmentation, post injection monitoring, and UIC monitoring activities was submitted in January 2013. Data collected from the November 2012 post injection groundwater sampling event showed significant decreases in TCE concentrations and decreases in CIS, and VC concentrations when compared to pre-injection data. This is indicative of reductive dechlorination occurring. Total Organic Carbon (TOC) concentrations observed in the samples remain favorable to the reductive dechlorination process; however, TOC concentrations are declining. It is likely that additional electron donor is will be required for continued dechlorination within the injection zone.

Additional assessment activities downgradient of the initial injection area utilizing direct push technology (DPT) were performed in March 2013. These activities delineated the downgradient VOC groundwater impacts exceeding Natural Attenuation Default Concentrations (NADCs). The highest TCE, CIS, and VC concentrations were observed north and northeast of the injection area. Based upon the results of the additional assessment activities, Geosyntec submitted a Remedial Action Plan Modification (RAP MOD) for additional bio-augmentation injections within the original source area and the newly delineated area exceeding NADCs. The RAP MOD was approved by DEP on July 15, 2013.

Baseline groundwater sampling and additional injection well installation was completed in April 2014. Bio-augmentation injections began in July 2014 in both the previous and newly installed injection wells. A total of 15,735 gallons of EOS buffering agent and electron donor solution and 25 liters of KB-1[®] microbial culture were injected into the subsurface.

Post injection monitoring was performed in December 2015. Additional assessment was recommended in the vicinity of monitoring well MW043 to delineate groundwater contamination above the NADC for CIS.

Schedule

Additional groundwater assessment is scheduled in September 2016.