Mottolo Pig Farm Site
Raymond

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The Mottolo Pig Farm Superfund site (Site) is an abandoned pig farm located on a 50-acre undeveloped wooded lot in Raymond, New Hampshire. From 1975 to 1979, the owner of the property disposed of chemical manufacturing wastes from two companies in a 1/4-acre fill area adjacent to the piggery buildings. During this 4-year period, over 1,600 drums and pails of wastes, including volatile organic compounds (VOCs) such as trichloroethylene, toluene, xylene and methyl ethyl ketone, were disposed of at the site.

Studies by the State showed that the groundwater beneath the Site was contaminated and that contaminants were seeping into a brook that empties into the Exeter River. The Exeter River is a drinking water supply for the downstream communities of Exeter, Hampton and Stratham. It was estimated that 1,600 people within three miles of the site depended on groundwater as a source of drinking water.

Between November 1980 and January 1982, the Environmental Protection Agency (EPA) excavated and removed the drums and pails found at the Site, along with 160 tons of contaminated soil. The Site was subsequently added to the National Priorities List of sites eligible for cleanup under the Superfund program in July 1987.

In 1991 EPA selected groundwater, surface water, and soil cleanup remedies which included installing a groundwater interceptor trench; installing and operating a vacuum extraction system to remove volatile organic compounds (VOCs) from the soils; installing a security fence to limit access to contaminated areas; monitoring the natural attenuation of contaminants in groundwater; and institutional controls, which restrict the use of contaminated groundwater and prevent disturbance of cleanup activities.

Construction of the vacuum extraction system was completed in 1993 and the system operated until December 1996 when soil cleanup levels were attained, as determined by EPA.

In September of 2003, the responsibility for operating and maintaining the remedy was officially transferred from EPA to the State.

In 2003, the New Hampshire Department of Environmental Services (NHDES) instituted a residential well sampling program to monitor newly installed residential wells within a new subdivision directly abutting the southern border of the Site. Residential well sampling in this area has been on-going since 2003 with analysis showing no exceedances of drinking water quality standards for site-related VOCs.

Every five years, following implementation of the selected remedies (1993, for the Mottolo Site), EPA conducts a review of the Site to determine the protectiveness of the remedy. Although the first two five year reviews (in 1998 and 2003) found contaminant concentrations in groundwater declining, the Third Five-Year Review in 2008 found that the estimated cleanup times had not been achieved and called into question the protectiveness of the remedy. This determination was primarily due to the

persistent and slightly increasing concentrations of several contaminants in groundwater in some on-site monitoring wells and increasing residential development pressure to the west of the Site. The Review also considered the natural attenuation component of the remedy and found inconsistent levels of attenuation and that the estimated cleanup times had not been achieved. The Third Five-Year Review recommended improving on-site monitoring, expanding off-site monitoring of residential wells, investigating on-site subsurface soils for residual contamination, and finalizing institutional controls to fully assess and ensure protectiveness.

To begin addressing the issues identified in EPA's Review, in 2009 NHDES implemented a Site-wide groundwater, surface water and sediment sampling event and expanded the residential sampling program to include additional residences in the immediate vicinity of the Mottolo property. Sampling results revealed that many of the residential wells, located mostly west of the Mottolo property on Windermere Drive and Blueberry Hill Road, had concentrations of arsenic above the drinking water standard and four residential wells had detectable concentrations of VOCs. Two of the affected residential wells had a concentration of TCE slightly exceeding the drinking water standard of 5 micrograms per liter (µg/L). NHDES immediately provided bottled water (and in some cases point-of-entry treatment systems) to residences where water samples exceeded the drinking water standard for arsenic and/or TCE, and were viewed as potentially having a hydraulic connection to the Mottolo property.

Arsenic is a naturally occurring metal that exceeds the drinking water quality standard of 10 µg/L in approximately 20% of the bedrock wells in southeastern New Hampshire[1]; however, review of the data showed that the elevated concentrations of arsenic could not be disassociated from the past disposal activities that occurred on the Mottolo property. NHDES began an extended effort to assemble a technical team that could assist in planning investigative activities and associated data interpretation that would assist NHDES and EPA in evaluating the full extent of site-related impacts.

A 2009 Data Report provided a summary, analysis, interpretation, and findings of the residential sampling programs, on-site subsurface investigation and overburden and deep bedrock groundwater sampling events. The report generally concluded that the combined presence of TCE and associated geochemical changes to groundwater likely mobilized naturally occurring arsenic, resulting in concentrations above background levels in the area adjacent to the western boundary of the Mottolo property.

[1] USGS Fact Sheet 051-03 titled "Arsenic Concentrations in Private Bedrock Wells in Southeastern New Hampshire," dated July 2003.

The 2009 Data Report identified homes located west and south of the Mottolo property where supplied alternate water options would be considered in a focused feasibility study (FFS), as the next phase of evaluating an appropriate long-term solution to these newly discovered groundwater impacts. The FFS was completed in July 2010 followed by EPA's preparation and release of the selected remedy, extending the municipal water system, in a Proposed Plan. The components of the final remedy selected by EPA, as described in an Amended Record of Decision (AROD) dated September 22, 2010, include: (1) extension of public water supply approximately 2 miles to provide drinking water to approximately 25 residences; (2) a long-term groundwater monitoring program to monitor groundwater levels and groundwater quality in residential areas to assess whether migration of the contaminated groundwater will change once these 25 homes are placed on the public water supply system and to confirm that other residential wells are not at risk given the changes to groundwater hydrology; and (3) institutional controls to prevent the use of existing wells and the installation of new wells.

Consistent with the AROD, the approximate 2-mile water main extension was completed during the summer of 2012, and the 25 residential bedrock water supply wells, located to the west and the south of the Mottolo property, were disconnected from service.

The Town of Raymond, through its Board of Selectmen and Board of Health, hereafter "Board," adopted an ordinance in April 2013, to prevent the withdrawal of groundwater within the limits of a Groundwater Management Zone (GMZ) including and surrounding the Mottolo Superfund Site (Site). The GMZ includes the Site and select properties to the south (Strawberry Lane), west (Blueberry Hill Road and Windmere Drive) and north-northwest (Perimeter Road subdivision) as well as an undeveloped lot to the west-southwest and conservation land between the Site and the Exeter River. The ordinance prevents the use of groundwater, installation or reactivation of any wells for any purpose excepting closed-loop geothermal, and disturbance to wetlands within the GMZ, unless approved in advance by the EPA, NHDES, and the Board. The ordinance will not prohibit a property owner within the GMZ from developing property provided that any development proposal demonstrates the ability to connect to town water or other acceptable off-site water supply. The extent of the GMZ shall be reviewed no less frequently than every five years and possibly with greater frequency depending on test results. The ordinance will remain in affect until Site groundwater achieves cleanup goals or the stakeholders determine that it will no longer be a necessary component of the remedy.

Groundwater analytical results collected from Site and surrounding area monitoring wells confirms that the plume has receded back to within the Site boundaries since the completion of the water main extension. This was anticipated from the data collected during the remedial investigation supporting the waterline extension, due to the decommissioning of 25 area residential water supply wells that resulted in a significant reduction in off-site hydraulic influence on the plume. Sampling and analysis for per- and polyfluoroalkyl substances (PFAS) was also performed in 2018. PFAS was detected in Site monitoring wells above applicable standards; therefore, residential wells currently included in the monitoring program were sampled for PFAS. All but one private well sampled had no detections of PFAS. The private well where PFAS was detected was very low and is considered background level. Again, data confirm that the plume remains within the Site boundaries.