South Municipal Well Site
Peterborough

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The South Municipal Water Supply Well Superfund site is located approximately two miles south of downtown Peterborough. The South Municipal Water Supply Well was installed in 1952 and provided water to the town of Peterborough for nearly 30 years. The New Hampshire Ball Bearings (NHBB) manufacturing facility, located about 1,200 feet west of the South Well, has manufactured ball bearings at the Site since 1957.

In October 1982, a study conducted by NHDES identified NHBB as a potential source of contamination found in the South Well. Under an administrative order issued by the EPA on July 22, 1986, NHBB agreed to conduct a remedial investigation/feasibility study (RI/FS) under the supervision of EPA and NHDES. The field studies for the RI/FS began in August 1986 and were completed in March 1989.

EPA's September 1989 Record of Decision (ROD) for cleaning up the Site consisted of cleaning contaminated soils on the property by vacuum extraction and installing a groundwater pump and treat system to clean contaminated groundwater at the Site. A third component of the cleanup plan required excavating contaminated sediments from a small on-site wetland area near the NHBB plant for removal to a permitted hazardous waste disposal facility.

Construction activities were completed in mid-December 1993, with start-up and commissioning of the treatment system in January 1994. Cleanup of the sediments in the wetlands was completed in late fall of 1994. The impacted wetlands were re-vegetated so as to achieve a similar plant density/diversity in comparison to the adjacent wetland. The re-vegetation project was completed in the spring of 1995.

EPA issued an Explanation of Significant Differences in the winter of 1997 that explains a technical impracticability (TI) waiver for the portion of the Site immediately adjacent to the NHBB facility. Due to the presence of contamination in the form of Dense Non-Aqueous Phase Liquids (DNAPL), and the limitations of available remedial technologies, it was deemed technically impracticable to achieve groundwater cleanup goals in the area of the DNAPL in the foreseeable future. Three groundwater extraction wells operated at the Site to contain contaminated groundwater within the "waiver area" on NHBB property. Also, a Groundwater Protection Overlay Zone has been established to facilitate the management of the contaminated groundwater.

NHDES' Drinking Water Source Protection Program worked with NHBB and the town of Peterborough to provide approval for use of the South Municipal Well as a drinking water source. NHBB and the town entered into an agreement in late spring 2003 to begin reactivation of the South Well. The agreement, in part, established protocols and

communication procedures between NHBB and the town in the event that volatile organic compounds (VOCs) migrated beyond capture zones for NHBB's containment system during the pumping of the South Well. A regular preventive maintenance schedule was also developed in conjunction with the agreement for the reactivation of the South Well.

The EPA completed a second Five-Year Review Report in June 2003. The five-year review determined that the containment remedy selected for the Site remained protective of human health and the environment and recommended that the preventive maintenance schedule be implemented prior to reactivation of the South Well.

In the process of returning the South Well to useful service, the town conducted a long term pumping test in 2003-2005. The pumping test data were used to assess differing pumping rates and durations over various times of the year to help evaluate if the South Well could continue to operate without affecting the containment system for contaminated groundwater at the NHBB property. Analytical results associated with a spring 2005 sampling event for the South Well and early-warning wells indicated negative affects had been observed during the pump test at a rate of 150 gpm. The configuration and performance of the containment system is not capable of hydraulically containing the contaminant plume during extended pumping of the South Well at 100 to 150 gpm. Per NHBB's operations protocol, and agreement with the town, detection of VOCs above cleanup levels outside of NHBB's containment system required that the South Well be shut down until re-sampling confirmed that VOCs were no longer detected above cleanup levels.

Following the cessation of the South Well test, EPA, NHDES, NHBB and the town met regularly to discuss strategies for evaluating groundwater sampling data at selected bedrock wells to aid in determining whether or not bedrock was serving as a source area for VOCs migrating to the South Well prior to and during periods when the South Well was pumping. Pursuant to these discussions, NHBB prepared a Work Plan for vertical groundwater profiling and associated field activities for characterization of the suspected source areas at the Site. A number of field sampling activities described in the Work Plan were performed in late fall 2006 through early spring 2007. Data obtained from field sampling activities were provided in a Source Delineation Report completed in the fall of 2007 that described the vertical and lateral extent of potential source concentrations of VOCs at the Site.

EPA completed the third Five-Year Review Report for the Site in the summer of 2008. The report's conclusions underscored that the containment remedy is not protective because it cannot contain all portions of the contaminant plume at the NHBB property boundary while operating the South Well.

The data presented in the Source Delineation Report was used to complete a Groundwater Focused Feasibility Study (FFS) at the Site. The FFS process allowed for a

comparative analysis between each screened remedial alternative process option for the future implementation of aggressive source reduction technologies to decrease VOC loadings to the containment system at the Site.

The final FFS was completed in August 2009 and an Amended ROD was issued in September, 2010. The amended ROD changed the original remedy set forth in the original ROD for the Site. Specifically, the amended remedy includes the following major components:

- In-situ thermal treatment of contaminated soil and groundwater in identified source areas.
- In-situ bioremediation of contaminated soil and groundwater after completion of the in-situ thermal treatment program.
- In-situ treatment of contaminated groundwater via a permeable reactive barrier (PRB).
- Monitoring and maintenance of existing institutional controls (ICs) that prohibit the use of groundwater.
- Long-term monitoring of site groundwater.
- Five-Year Reviews to ensure that the selected remedy remains protective of human health and the environment.

The amended remedy is designed to address the principal and low-level threat wastes at the Site by reducing the contaminant mass within the identified source areas, including any dense non-aqueous phase liquid (DNAPL), to reduce risks presented by source areas. It is also designed to achieve a level of groundwater restoration that will permit the return of the South Municipal Water Supply Well to the town of Peterborough as a drinking water source without the implementation of wellhead treatment. The new remedy also eliminates the extraction and treatment requirements for contaminated groundwater, which has thus far failed to provide a level of hydraulic control required to protect the South Municipal Water Supply Well.

The planning stages of pre-design studies for the new remedies occurred during 2011 and the field data collection activities to support remedial design were initiated in 2012 and completed in 2013. The 100% design document for the PRB was approved by US EPA in December, 2013 and installation of the PRB was completed in the spring and summer of 2014. Design and construction activities for the thermal portion of the remedy were completed during 2015 and the thermal remedy was implemented in 2016.

The Fifth 5 Year Review was completed in September 2018 and identified the following action items

- Further assessment of the PRB wall is needed.

- Perform studies to determine if vapor intrusion at two off-site structures is of concern.
- Perform additional studies to identify and delineate additional source areas and perform a Focused Feasibility Study to identify remedial options for the identified source areas.
- Completed additional bedrock investigations.
- Continue to monitor contaminant concentrations and evaluate the need for changes to the existing monitoring well network.
- Additional studies are needed to demonstrate that the full-scale application of in-situ enhanced bioremediation is feasible at this Site, after aquifer parameters return to ambient conditions.
- PFAS sampling to be conducted at the site.