Next Steps

The Multiple Source Groundwater Response Plan Remedia l Investigation will be used to formulate a comprehensive strategy, called a Feasibility Study and Proposed Plan, to address human health and environmental risks from the Industri-Plex Superfund Site to the Mystic Lakes. The Feasibility Study and Proposed Plan are being prepared as separate documents and are expected to be completed by May 2005. Once the Feasibility Study and Proposed Plan have been released, EPA will be accepting comments from the public on the RI, FS and Proposed Plan documents during 30 day public comment period.

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Aberjona River Study

Comprehensive Multiple Source Groundwater Response Plan Remedial Investigation

INDUSTRI-PLEX AND WELLS G & H SUPERFUND SITES, WOBURN, MA

APRIL 2005

The Industri-Plex Superfund Site is a 245-acre industrial park. From 1853 until 1979, the site was used for manufacturing and then developed for industrial use. The by-products and wastes from nearly 130 years of chemical manufacturing, light industry, and glue manufacturing contaminated soil and wetlands with heavy metals including arsenic, lead, and chromium. The groundwater is primarily contaminated with arsenic and benzene. The first phase of cleanup at the site included placing a protective cap over more than 100 acres of soils contaminated with heavy metals to prevent people from coming into contact with the contamination. Today the industrial park is home to retail, commercial and light industry as well as the Anderson Regional Transportation Center.

The Aberjona River flows from its headwaters in Reading through Woburn and Winchester before discharging into the Mystic Lakes. The Aberjona River flows through the Industri-Plex site and merges with the surface water flow from Halls Brook Holding Area (HBHA) downstream at Mishawum Road in North Woburn. The river continues south underneath Interstate 95, through the Wells G & H Superfund Site and Cranberry Bog Conservation Area in East Woburn, and follows a well-defined channel through Winchester down to the Mystic Lakes.

The second phase of the Industri-Plex Superfund Site cleanup includes the completion of the comprehensive Multiple Source Groundwater Response Plan Remedial Investigation (MSGRP RI) to determine the nature and extent of contamination in the groundwater, surface water, sediment and soil around and including the Industri-Plex Superfund Site and downstream areas along the HBHA and Aberjona River as part of the Industri-Plex Operable Unit 2 (OU-2).

The MSGRP RI incorporates the Wells G & H OU-3, Revised Aberjona River Study Baseline Risk Assessment dated September 2004, which focused on sediments, surface water and soils along the Aberjona River from Interstate 95 in Woburn to the Mystic Lakes in Winchester, Arlington and Medford (known as the Southern Study Area). The MSGRP RI also includes a baseline risk assessment for sediments, surface water, soils and groundwater from Industri-Plex Site to I-95 (known as the Northern Study Area). The Southern and Northern study areas were further divided by reaches along the river which represented areas of similar habitat, species, and accessibility.

The MSGRP RI centers potential contaminant migration pathways and the risks to people and the environment associated with contamination in the Northern Study Area (Reach 0) and Southern Study Area (Reaches 1–6). Based on the conclusions of this comprehensive report, EPA will evaluate cleanup options for addressing areas that present a significant risk to people or the environment. See Figure 1.
The MSGRP RI collected and evaluated more than 4,800 samples of soil, groundwater, surface water, sediment, soil gas, and various plant and animal tissues to estimate the potential risks to mammals, birds, fish, and invertebrates exposed to contaminants in surface waters, sediment, and soil in the study area. In general, the primary areas of concern are located in the northern portion of the RI study areas (reaches 0, 1, and upper 2).

The major conclusions from the RI report include the following:

**FATE & TRANSPORT:**
As shown in Figure 2, groundwater at the Industri-Plex Site is primarily contaminated with arsenic and benzene (called plumes). As these plumes flow south and discharge into the HBHA Pond and HBHA Wetlands, both arsenic and benzene impact the surface water and sediments in the HBHA Pond. While benzene’s impact is primarily on the pond; arsenic continues to travel downstream of the HBHA Pond and impacts surface water and sediments in the HBHA Wetlands and Aberjona River.

Concentrations of arsenic in surface water were greatest in the Northern Study Area, north of I-95, with the highest levels exceeding National Ambient Water Quality Criteria (NAWQC) in the deep surface water of the HBHA Pond. Downstream of I-95, arsenic is present in the surface waters of the Aberjona River; however, the concentrations decrease throughout the entire length of the Southern Study Area, as arsenic settles out of the surface water and deposits in the sediment. The highest concentrations of arsenic in sediments are found in the northern portion of the RI study area in portions of the HBHA (Reach 0); Wells G&H Wetland (Reach 1); and Cranberry Bog Conservation Area (Upper Reach 2).

**HBHA Pond:** A man-made flood storage area approximately 175 feet wide x 900 feet long and up to 20 feet deep with a very shallow outlet (1 to 2 feet deep), helps limit the migration of arsenic downstream. The geological and chemical conditions in this man-made pond have resulted in two distinct layers of surface water. As shown in Figure 2, the shallow surface water in the pond contains low arsenic and benzene concentrations while the deeper surface water contains high concentrations of both chemicals. Between these two layers is a transition layer, called a chemocline, which separates the more contaminated deep surface water from the less contaminated shallow surface water. As long as this chemocline is stable in the HBHA Pond, contaminants are partially sequestered in the deeper surface water and sediments, limiting their migration downstream. However, during significant storm events, contamination throughout the pond becomes mixed causing the chemocline to breakdown and increased concentrations of arsenic to migrate downstream.

**AS SHOWN IN FIGURE 2, GROUNDWATER AT THE INDUSTRI-PLEX SITE IS PRIMARILY CONTAMINATED WITH ARSENIC AND BENZENE (CALLED PLUMES). AS THESE PLUMES FLOW SOUTH AND DISCHARGE INTO THE HBHA POND AND HBHA WETLANDS, BOTH ARSENIC AND BENZENE IMPACT THE SURFACE WATER AND SEDIMENTS IN THE HBHA POND.**

**CONCLUSIONS:**
The table highlights which media present a risk and whether these risks are carcinogenic or non-carcinogenic. EPA’s feasibility study will evaluate potential cleanup alternatives to address these areas of concern.

**RISKS PRESENTED TO PEOPLE AND THE ENVIRONMENT:**
- The arsenic and benzene plumes beneath the Industri-Plex Site may cause future health risks to people who come into contact with the water. See Figure 3.
- The arsenic plume from the Industri-Plex Site, contributes to the migration of arsenic downstream where its presence in shoreline sediments presents a health risk to people who might come into contact with the sediment. See Figure 3.
- High concentrations of arsenic in both the surface and deep soils in the area of the former Mishawum Lake Bed may cause future health risks to people who come into contact with the soil. See Figure 4.
- High concentration of arsenic in sediments located in three distinct areas along the shoreline of the Wells G&H Wetland and Cranberry Bog Conservation Area present a current and/or future health risk to people recreating along the shoreline. See Figure 4.
- The arsenic and benzene plumes contribute to significant environmental risks in the HBHA Pond sediments and deep surface water contamination in the sediment presents significant environmental risk to the benthic invertebrate community (organisms residing in the sediments) in the HBHA Pond. High concentrations in the deep surface water presents a risk to aquatic organisms in the HBHA Pond. See Figure 4.
FIGURE 4. SEDIMENT AND SOIL LOCATIONS WITH HUMAN HEALTH RISK AND ECOLOGICAL RISK AREAS

LEGEND

Rail Lines
Study Area Reach
Superfund Site Boundary
Wetlands
Former Cranberry Bog

Sediment Locations with Current and Future Risk
Sediment Locations with Future Risk
Sediment Core Locations with Future Risk
Soil Locations with Future Risk

Represents the Same Sediment Area

Locations with Ecological Risk
Unacceptable Ecological Risk

FACT SHEET

Reach 0
Reach 1
Reach 2

Wells G & H Superfund Site
Wells G & H Wetlands

Unacceptable Ecological Risk

Aberjona River
Bodies of Water
Former Mishawum Lakebed

INDUSTRI-PLEX SITE

Halls Brook Holding Area

Reach 1

Well G
Well H

Locations with Human Health Risk
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**Figure 1: MSGRP RI Study Areas**