

Report Name: *Supplemental Investigation Report and Remedial Action Plan Non-Public Properties Study Area, Hamden, Connecticut*

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What Is This Report About?

This report summarizes what Olin Corporation found after carrying out its 2004 DEP-approved Supplemental Investigation Work Plan. The investigation focused on residential properties within the Newhall Remediation Project Consent Order boundary. The report used results from previous investigations as well as recent testing results to form conclusions. The report describes the physical and chemical nature of fill materials, defines the extent of fill, evaluates the condition of groundwater and identifies impacts to surface water in the study area. The report also looks at six cleanup alternatives for the area.

Why Was This Investigation Done?

The soil contamination that has been found in the Newhall Street neighborhood is associated with landfills that were located in the area from the late 1800s through the 1950s. A variety of fill materials (such as household garbage, industrial waste, and soil from other places) was thrown away in dumps. The Connecticut Department of Environmental Protection (CTDEP) has been overseeing efforts to document exactly where and how soil and groundwater contamination exists in the Newhall neighborhood.

Where Did They Investigate?

The Newhall Street residential properties were separated into five large testing areas for the **contiguous fill investigation** where widespread filling was known to have taken place.

1. **Morse Street Area:** The area bounded by the Hamden Middle School athletic fields to the north, Morse Street to the south, 279 Morse Street to the west, and 259 Morse Street to the east.
2. **Southwest Satellite Area:** The area bounded by Morse Street to the north, Goodrich Street to the south, St. Mary Street to the west and Butler Street to the east.
3. **Newhall Street Area:** The area bounded by Newbury Street to the north, Goodrich Street to the south, Newhall Street to the west, and Winchester Avenue to the east.
4. **Bryden Terrace Area:** The area bounded by Mill Rock Park to the north, Morse Street to the south, Winchester Avenue to the west, and Wadsworth Street to the east.
5. **Augur Street Area:** The area bounded by the properties north of Augur Street, Mill Rock Road extension to the south, the Regional Water Authority property to the west, and Newhall Street to the east.

In addition to testing in known fill areas, many more properties where smaller isolated areas of fill might be present were included in the **isolated fill investigation**.

A total of 289 properties out of 303 in the study area were tested.

How Did They Test The Soil And Water?

Soil borings were taken at 119 properties in the five larger, contiguous fill testing areas and at 75 properties for the isolated fill investigation. The borings were used to determine the locations, approximate boundaries and depths of fill materials (in contrast to areas with native soils). Over 700 deep soil borings were drilled and 511 samples were tested for contaminants.

In addition, 162 properties were inspected for bare soil spots. Of the 86 properties where bare spots were found, 167 samples were tested for contaminants.

31 wells (29 new monitoring wells and 2 existing wells) were sampled as part of the groundwater investigation.

What Contaminants Were Tested For?

The contaminants tested for in the soil and water samples were:

- Lead and arsenic
- Other metals
- Extractable Total Petroleum Hydrocarbons (ETPH)
- Volatile Organic Compounds (VOCs)
- Semi-Volatile Organic Compounds (SVOCs)
- Polycyclic Aromatic Hydrocarbons (PAHs)
- Pesticides and Poly-Chlorinated Biphenyls (PCBs)

An additional test was done on some of the soil samples, called a Synthetic Precipitation Leaching Procedure (SPLP). The SPLP test shows how metals might move from soil into water (such as when it rains). The SPLP test was done for lead, arsenic, and other metals when these substances were found in the soil at concentrations higher than state standards for soil (explained in the next paragraph).

The study compared the levels (concentrations) of the contaminants found in the soil and water samples to several different state standards. The standards identify the concentrations of substances that could be potentially harmful to people who come into contact with them. The standards were developed to protect people's health and the environment.

A subset of soil samples containing PCBs or benzo(a)pyrene (a PAH chemical) are being analyzed for dioxins and furans. The results were not available at the time this report was written and will be submitted later.

What Did They Find?

The Supplemental Investigation identified where fill materials were found. These are areas where dumping probably took place, and data from this and previous investigations was found to be in agreement.

194 properties were found to have fill material. The report includes maps showing the extent and depths of the fill in each of the five residential areas, totaling approximately 29 acres and 300,000 cubic yards. Thirty-three isolated areas of fill totaling approximately 3 acres and 8,500 cubic yards were also found and mapped. Because of winter weather and problems with site access, some of the testing in isolated fill areas was not completed in time for the report. The levels of contaminants found were reported for each sample location, so the report includes many pages of scientific testing data.

The fill locations found in each of the five larger, contiguous fill areas are described below. Levels of contaminants measured in the fill samples indicate that any portion of fill has the potential to exceed state remediation standards. The primary contaminants requiring clean-up efforts include arsenic, lead, SPLP lead, PAHs and ETPH. For a complete listing of the study findings please refer to the report itself.

Morse Street Area: The study found two half-circle-shaped areas of fill, located on the northern portion of the properties along Morse Street. The study noted that these areas are probably connected to the fill under the Hamden Middle School athletic field. The fill in this area was noted to be up to eight feet deep.

Southwest Satellite Area: In this area, the study found three oval-shaped areas of fill beneath the ground. These ovals are connected and extend from the east side of Butler Street in a northwest direction nearly to the corner of Morse Street and St. Mary Street. The fill was found to be up to 20 feet deep in some areas.

Newhall Street Area: The study found an oval-shaped area of fill material beneath the ground running north-south on the western part of this area (along Newhall Street). The fill was noted to be up to 13 feet deep in some areas.

Bryden Terrace Area: The study found that there is a lot of fill under the ground in this area. Most of it is north of Morse Street and appears to continue into Mill Rock Park and Rochford Field. The fill was noted to be up to 11 feet deep in some areas.

Augur Street Area: The study found an oval-shaped area of fill beneath the ground running north-south along the western part of this area. The fill was noted to be about six feet deep in some areas.

Shallow and deeper groundwater flow in the study area does not necessarily follow the ground surface contours. Groundwater flow was found to be westward near Prospect Hill to southwestward under the Southwest Satellite Fill Area and southward in the Augur Street area, generally away from the Pine Swamp that lies north of the site. Groundwater quality was found to be slightly degraded.

What Will Be Done To Clean Up the Properties?

The report evaluated six potential remediation alternatives along with costs and schedules. These alternatives will need to be evaluated by DEP and will be discussed with the community before any decisions are made.

Alternative 1: Removing and Replacing Fill

The report recommended Alternative 1 for all areas where fill is less than 4 feet below the ground surface, at 131 properties. This remedy allows for restoration of the property with no restrictions for future use of the land.

Alternative 2A: Removing and Replacing the Top Four Feet of Fill Material, Obtaining a Widespread Polluted Fill Variance with or without Reclassification of Groundwater Quality, and obtaining an Environmental Land Use Restriction

The report recommended Alternative 2A for the remaining fill areas greater than 4 feet below the ground surface, at 90 properties. This remedy would require a variance that could be allowed by DEPs regulations and placement of an Environmental Land Use Restriction on land records to prohibit any disturbance of fill at depths below 4 feet.

Other alternatives were reviewed but not recommended for any properties:

Alternative 2B: Removing and Replacing the Top Four Feet of Fill Material, Obtaining Alternative Pollutant Mobility Criteria with or without Reclassification of Groundwater Quality, and obtaining an Environmental Land Use Restriction

Alternative 3A: Removing and Replacing the Top Two Feet of Fill Material, Constructing a Direct Exposure Criteria Control Measure, Obtaining a Widespread Polluted Fill Variance with or without Reclassification of Groundwater Quality, Providing for Long-term Operation and Maintenance, and obtaining an Environmental Land Use Restriction

Alternative 3B: Removing and Replacing the Top Two Feet of Fill Material, Constructing a Direct Exposure Criteria Control Measure, Obtaining Alternative Pollutant Mobility Criteria with or without Reclassification of Groundwater Quality, Providing for Long-term Operation and Maintenance, and obtaining an Environmental Land Use Restriction

Alternative 4: Removing and Replacing the Top Two Feet of Fill Material, Constructing an Engineering Control, Providing for Long-term Operation and Maintenance, and obtaining an Environmental Land Use Restriction

Alternative 5: Acquisition and Demolition of Homes, Construction of an Engineering Control, Providing for Long-term Operation and Maintenance, and obtaining an Environmental Land Use Restriction

Alternative 6: Acquisition and Demolition of Homes, Excavation and Disposal of Non-compliant Fill Material, and Replacement with Clean Fill.

Editor's Note:

These alternatives are general and only take into account the primarily residential properties in the site. A full and detailed evaluation of all potential cleanup options for the entire Newhall site (residential and Town properties) will be made by the Responsible Parties and DEP. Once all viable cleanup remedies are identified, the community will be included in the selection process.