PRELIMINARY Health Assessment for

LINEMASTER SWITCH CORPORATION
WOODSTOCK, CONNECTICUT
CERCLIS NO. CTD001153923

JUN 25 1990
THE ATSDR HEALTH ASSESSMENT: A NOTE OF EXPLANATION

Section 104 (i) (7) (A) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended, states "...the term 'health assessment' shall include preliminary assessments of potential risks to human health posed by individual sites and facilities, based on such factors as the nature and extent of contamination, the existence of potential pathways of human exposure (including ground or surface water contamination, air emissions, and food chain contamination), the size and potential susceptibility of the community within the likely pathways of exposure, the comparison of expected human exposure levels to the short-term and long-term health effects associated with identified hazardous substances and any available recommended exposure or tolerance limits for such hazardous substances, and the comparison of existing morbidity and mortality data on diseases that may be associated with the observed levels of exposure. The Administrator of ATSDR shall use appropriate data, risks assessments, risk evaluations and studies available from the Administrator of EPA."

In accordance with the CERCLA section cited, ATSDR has conducted this preliminary health assessment on the data in the site summary form. Additional health assessments may be conducted for this site as more information becomes available to ATSDR.

Use of trade names is for identification only and does not constitute endorsement by the Public Health Service or the U.S. Department of Health and Human Services.
SUMMARY

The Linemaster Switch Corporation site has been proposed for the National Priorities List (NPL) by the U.S. Environmental Protection Agency (EPA). The site is an active manufacturing facility, producing electrical and pneumatic foot switches and wiring harnesses. Painting wastes have been disposed of on site, resulting in volatile organic compound (VOC) contamination of ground water (primarily trichloroethylene or TCE). Private wells in the site vicinity have been impacted; alternate water supplies have been provided since 1986.

Based on the available information, this site is considered to be of potential public health concern because of the risk to human health caused by the possibility of exposure to hazardous substances via contaminated ground water.

BACKGROUND

A. SITE DESCRIPTION AND HISTORY

The Linemaster Switch Corporation site has been proposed for the National Priorities List (NPL) by the U.S. Environmental Protection Agency (EPA). Linemaster Switch Corporation began operations in 1952 on the grounds of an estate. The carriage house was the original focal point of manufacturing operations but has been replaced by the present factory building. The mansion houses the primary office building. The facility produces electrical and pneumatic foot switches and wiring harnesses. Trichloroethylene (TCE) is used as a vapor degreaser to remove production oil and grease before the switches are painted. Solvents are stored in a shed located within the factory building; waste paint solids are stored in a shed in the rear of the building. Originally, solid paint waste was disposed of at the Woodstock Town Landfill. In 1980, the Connecticut Department of Environmental Protection (CTDEP) conducted a Resource Conservation and Recovery Act (RCRA) inspection at the site and found on-site disposal of dried paint solids had occurred. In 1984, a preliminary assessment conducted by CTDEP confirmed on-site disposal of dried paint waste. However, in 1985, a follow-up inspection failed to reconfirm this conclusion. EPA conducted a site inspection in 1985 and 1986. Based on the results of this inspection and sampling, bottled water was provided to the facility, one on-site residence, and several nearby residences. The on-site residence has been connected to the municipal water system. An air stripping tower has been installed to remove volatile organic compounds (VOCs) from the ground water being used at the facility. Linemaster Switch, under Consent Order, has instituted an off-site ground water monitoring program and a hydrogeologic investigation.
In 1986, the Agency for Toxic Substances and Disease Registry (ATSDR) provided a health consultation to EPA regarding the public health significance of ground water, surface water, and soil sampling data. It was concluded that the levels of VOCs in ground water represented an imminent and appreciable public health threat and that measures should be taken to reduce that threat.

The 92-acre site is located within the town limits of Woodstock, on a hill originally called Bald Hill (because of the sparse vegetation). The site is bounded by Plaine Hill Road, State Route 171, and State Route 169 (see the Site Map in the Appendix). One 45-acre parcel is used by Linemaster Switch Corporation, and one 45-acre parcel is in the possession of the founder of the company. Two acres are owned by the town of Woodstock. These two acres do not appear to be either contaminated or a source of contamination. Two man-made ponds and four streams are located on site. A cabin adjacent to one pond is used as a retreat. The manufacturing facility occupies one building and a solvent storage shed. Several aboveground and belowground tanks on the property are used for gasoline. Apparently, there are no underground solvent storage tanks. The primary office building is located approximately 500 feet from the factory. The founder's residence is located approximately 300 feet from the factory. Also on the site are a restaurant, an unoccupied cottage, and a leased, private residence.

The soil on the site consists of gravel, sand, silt, and clay, with the bedrock estimated to be 30 feet below the ground surface. Bedrock outcrops can be seen on site. The direction of ground-water flow cannot be determined from the information available. If the topography is used as a guide, the ground water may flow southeast.

The four named surface water bodies on site are Mancraft Brook, Taylor Brook, and Wappaquasset Pond, all of which feed Mill Brook. An additional seasonal brook is unnamed. The second pond is believed to be spring fed. A stream from this pond feeds Mill Brook. Mill Brook discharges into a wetlands area before reaching Roseland Lake. Roseland Lake empties into Shepard's Pond and subsequently empties into Little River.

B. SITE VISIT

A site visit was conducted by ATSDR and CTDEP representatives on April 4, 1989, during which a brief meeting was held with a representative of Linemaster Switch. Relevant information gained during the site visit has been incorporated in this Preliminary Health Assessment at appropriate places.

C. COMMUNITY HEALTH CONCERNS

The occupants of one residence reportedly have complained of skin irritation (specifically itchy skin) as a result of using their well water for bathing. Periodic sampling of their well had revealed contamination on only one occasion (December 1987, 22 ppb TCE).
DEMOGRAPHICS, LAND USE, AND NATURAL RESOURCE USE

There are two aquifers under the site, the overburden and the bedrock. Ground water on site is used by Linemaster Switch for process water and potable supplies for its employees. In addition, the founder's residence, the leased residence, and the restaurant have private wells. The well at the leased residence is no longer used. Water is supplied to this residence from Linemaster Switch's main production well, which is treated by air stripping and activated carbon treatment. The restaurant's water supply well is now equipped with an iron and manganese treatment system with carbon filtration. The facility wells are believed to be about 300 feet deep and tap the bedrock aquifer. The depth of the other wells is unknown. An apartment building and a private residence located south of the site also have carbon treatment systems. Approximately 2,888 people are served by ground water within 3 miles of the site. Except for the bottled water that was provided to the facility and several residences in 1986, no other alternate water sources exist.

The surface streams noted above are too small to support recreational activities. Little River may be used for trout fishing. A water treatment plant located 3.2 miles downstream of the site on the Little River supplies 50 percent of the drinking water for the town of Putnam (pop. 8,700). Uses of Roseland Lake and Shepard's Pond are unknown.

The land use surrounding the site is primarily residential and business. A middle school and a high school are located in the town of Woodstock. The presence of other specially sensitive populations is unknown.

Linemaster Switch employs approximately 180 workers.

ENVIRONMENTAL CONTAMINATION AND OTHER HAZARDS

A. ON-SITE CONTAMINATION

The environmental contamination on-site consists of VOCs in ground water, soil, surface water, and sediment. The following table lists the contaminants measured, the environmental media in which they were found, and the range of concentrations reported.

<table>
<thead>
<tr>
<th>Media</th>
<th>Contaminant</th>
<th>Range of concentrations (ppb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ground water</td>
<td>trichloroethylene</td>
<td>214-3,900</td>
</tr>
<tr>
<td></td>
<td>trans-1,2-dichloroethylene</td>
<td>240-5,300</td>
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<tr>
<td></td>
<td>total xylenes</td>
<td>570</td>
</tr>
<tr>
<td></td>
<td>arsenic</td>
<td>52- 141</td>
</tr>
<tr>
<td>Soil</td>
<td>trichloroethylene</td>
<td>Detected*</td>
</tr>
<tr>
<td>Surface water</td>
<td>trichloroethylene</td>
<td>4- 38</td>
</tr>
<tr>
<td>Sediment</td>
<td>trichloroethylene</td>
<td>Detected*</td>
</tr>
<tr>
<td></td>
<td>toluene</td>
<td>Detected*</td>
</tr>
</tbody>
</table>

* Reported as detected "in substantial amounts." Quantitative results are unavailable.
The arsenic contamination was measured in 1986. Subsequent sampling results in 1987 and 1988 showed arsenic levels in eight wells to range from nondetectable to up to 40 ppb. The Maximum Contaminant Level (MCL) for arsenic is 50 ppb.

B. OFF-SITE CONTAMINATION

The environmental contamination off site consists of TCE (up to 24 ppb) in ground water. Residential well water has been reported to be contaminated up to 12 ppb TCE. Except for sediment, no other environmental media have been sampled. A trace of benzene was detected in the sediment of the seasonal (unnamed) brook beside the restaurant.

C. QUALITY ASSURANCE AND QUALITY CONTROL

Adequate quality control procedures appear to have been exercised for these data, and the data appear to be adequate for the purposes of this Preliminary Health Assessment.

D. PHYSICAL AND OTHER HAZARDS

No physical hazards are associated with hazardous waste at this site. However, the site is an active manufacturing facility, and work-related physical hazards may be present.

PATHWAYS ANALYSES

A. ENVIRONMENTAL PATHWAYS (Fate and Transport)

Ground water is the environmental pathway of primary concern at this site because of its use as a domestic source of water. In addition, surface water and some sediment have been shown to be contaminated. Apparently, soil contamination on the site is very limited. The contaminants of primary concern are VOCs, in particular, TCE. Because of their relatively high volatility, VOCs can be expected to partition into the atmosphere eventually, unless they undergo either photochemical or microbial degradation, or are in media in which volatilization is retarded (as in ground water or subsurface soil). Vapor pressures for the VOCs of concern at this site range from 28 millimeters mercury (mm Hg) at 20 degrees centigrade (°C) for TCE to 324 mm Hg at 20°C for 1,2-dichloroethylene. These VOCs are expected to adsorb only slightly to moderately to soil particles or organic material because of low organic carbon partition coefficients that range from 49-300. Soils with a higher organic content will retain contaminants more strongly than soils with a lower organic content. All these VOCs are soluble in water, with solubilities ranging from 200 mg/L at 20°C for xylenes to 6,300 mg/L at 20°C for trans-1,2-dichloroethylene.
In summary, one would expect the VOCs discharged onto the surface soil to volatilize into the atmosphere; atmospheric volatilization would be limited in contaminants discharged into the subsurface soil. Leaching from soil to water (surface or ground) would be expected to occur fairly easily. Ground water that recharges surface water would be expected to lose most of its VOC load soon after reaching the surface.

B. HUMAN EXPOSURE PATHWAYS

Discharge of VOCs has led to the contamination of ground water. Ground water in the vicinity of the site is used for domestic purposes--drinking, cooking, bathing, showering, and perhaps other noncontact uses such as irrigation and clothes washing. VOCs can pose a threat to human health by ingestion when contaminated ground water is used for drinking, by inhalation as a result of volatilization from shower and bath water, and volatilization from water used for cooking and clothes washing, and, to a lesser extent, by dermal contact and absorption during showering and bathing.

Ingestion generally is the major human exposure pathway since exposure is quantitative (all the contaminants present in the media are taken into the body). However, inhalation of VOCs during the uses described above often may be of greater importance. Evaluation of this route is difficult from a public health standpoint since the factors of exposure are variable (amount of water used for showering and duration of shower, for example). Because of the low concentrations measured in ground water (the driving force for absorption across the intact skin is the concentration gradient between the contaminated water and body fluid) and the relatively low octanol/water coefficients of VOCs, dermal contact and absorption are not expected to be public health concerns.

PUBLIC HEALTH IMPLICATIONS

Results of repeat sampling for arsenic in ground water do not confirm earlier values. It would appear that arsenic is not a contaminant of concern at this site since current measurements indicate that levels are below the MCL.

The levels of VOCs measured are not expected to pose an acute threat to human health, and no acute health effects (central nervous system disturbances such as headache, dizziness, and fatigue; liver, kidney, heart, and lung damage; skin irritation and rashes; and eye and mucous membrane irritation) are expected from any exposure to these levels. Experimental animal studies have shown certain VOCs to cause effects on the immune system and blood (TCE); birth defects (trans-1,2-dichloroethylene); and cancers of the liver, kidney, and lung (TCE, trans-1,2-dichloroethylene).
Consumption of contaminated ground water containing TCE and trans-1,2-dichloroethylene in concentrations reported at this site may cause an increased risk of cancer in the exposed population. Private wells close to the site have been affected. Private ground-water supplies are the major source of domestic water in the area. All private wells in the area known to be contaminated have either had treatment systems installed or the residents have been provided with alternate water supplies. At least two sensitive population clusters (schools) are near the site. Contaminants have migrated off site via the ground water, and there is evidence that contaminants may be able to migrate via surface water. Although surface water in the area apparently is not used, it does flow to the Little River, which is used for some recreational and water supply purposes.

Dermal contact with contaminated surface soils probably is not a public health problem because of the limited distribution of the contamination. Inhalation as a result of volatilization from soils or surface water is not a public health concern. Consumption of contaminated soils or sediments is not a public health concern.

CONCLUSIONS

Based upon information reviewed, ATSDR has concluded that this site is of potential public health concern because of the risk to human health resulting from possible exposure to hazardous substances at concentrations that may result in adverse human health effects. As noted in the Human Exposure Pathways Section above, human exposure to VOCs may be occurring and may have occurred in the past via ground water. Low level (<1 ppb) TCE contamination continues to be found in off-site wells.

The potential for increased ground-water contamination exists. The extent of ground-water contamination currently is being investigated. Contamination of additional private wells is possible. The water supply well monitoring program being conducted by Linemaster Switch should provide an effective warning of new contamination.

At present concentrations, contaminants in surface water and sediment do not represent a public health threat. However, increased surface water contamination may occur as a result of ground-water recharge. One pond on site appears to be spring fed.

Further environmental characterization and sampling of the site and impacted off-site areas during the Remedial Investigation and Feasibility Study (RI/FS) should be designed to address the environmental and human exposure pathways discussed above. When additional information and data become available, e.g., the completed RI/FS, such material will form the basis for further assessment by ATSDR at a later date.
RECOMMENDATIONS

In accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980, as amended, the Linemaster Switch Corporation site has been evaluated for appropriate follow-up with respect to health effects studies. Although there are indications that human exposure to on-site and off-site contaminants may have occurred in the past, this site is not being considered for follow-up health studies at this time because there is no evidence of current exposure and there is no test available to ascertain past exposure to TCE. When indicated by public health needs, and as resources permit, the evaluation of additional, relevant health outcome data and community health concerns, if available, is recommended.

PREPARER OF THE REPORT

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ATSDR REGIONAL REPRESENTATIVE

Regional Representative: Louise House
Public Health Advisor
Region I
REFERENCES

The following documents were used to prepare this Preliminary Health Assessment. Further information made available after the development of this Preliminary Health Assessment will be addressed in any subsequent Health Assessment.


APPENDIX

Site Map. Linemaster Switch Corporation, Woodstock, Connecticut.