Health Consultation

Exposure to Chemicals in Groundwater

HOLDER CHEMICAL CORPORATION

HOWELL'S MILL ROAD

ONA, CABELL COUNTY, WEST VIRGINIA

JUNE 14, 2007

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Agency for Toxic Substances and Disease Registry
Division of Health Assessment and Consultation
Atlanta, Georgia 30333

Health Consultation: A Note of Explanation

An ATSDR health consultation is a verbal or written response from ATSDR to a specific request for information about health risks related to a specific site, a chemical release, or the presence of hazardous material. In order to prevent or mitigate exposures, a consultation may lead to specific actions, such as restricting use of or replacing water supplies; intensifying environmental sampling; restricting site access; or removing the contaminated material.

In addition, consultations may recommend additional public health actions, such as conducting health surveillance activities to evaluate exposure or trends in adverse health outcomes; conducting biological indicators of exposure studies to assess exposure; and providing health education for health care providers and community members. This concludes the health consultation process for this site, unless additional information is obtained by ATSDR which, in the Agency's opinion, indicates a need to revise or append the conclusions previously issued.

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HEALTH CONSULTATION

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Prepared By:

West Virginia Department of Health and Human Resources
Under a Cooperative Agreement with
The U.S. Department of Health and Human Services
Agency for Toxic Substances and Disease Registry
Atlanta, Georgia

Foreword

This document reported our assessment of public health concerns for residents in newly developed Applewood subdivision who could come into contact with chemicals in groundwater associated with a former pesticide reformulator, Holder Chemical. The steps taken in completing a health consultation are as follows:

Evaluating exposure: The West Virginia Department of Health and Human Resources/ATSDR Cooperative Partners Program (WVDHHR) started by reviewing available information on the environmental conditions at the site. The first task is to determine how much contamination is present, where it is, and how people may be exposed to it. WVDHHR typically does not collect environmental samples. WVDHHR relies on information provided by the West Virginia Department of Environmental Protection (WVDEP), Environmental Protection Agency (EPA), and other governmental agencies, businesses, and additional sources of accurate, factual, and reliable information.

Evaluating health effects: If evidence indicates that people are being exposed, or could be exposed, to hazardous substances, WVDHHR scientists will take steps to evaluate if exposure could be harmful to human health. The evaluation is based on existing scientific information. This report is the health consultation. The health consultation focuses on the health impact on the community as a whole.

Developing recommendations: In the health consultation, WVDHHR outlines its conclusions regarding any potential health threat posed by a site and offers recommendations for minimizing or eliminating human exposure to contaminants. The role of WVDHHR at a site is primarily advisory. Therefore, the health consultation will typically recommend actions to be taken by other agencies, including WVDEP and EPA.

Soliciting community input: The evaluation process is interactive. WVDHHR starts by soliciting and evaluating information from various governmental agencies, the organizations responsible for cleaning up, and the community surrounding the site. Any conclusions are shared with groups and organizations that provided the information.

If you have questions or comments about this report, we encourage you to write:

Program Manager
ATSDR Cooperative Partners Program
Office of Environmental Health Services
Bureau for Public Health
West Virginia Department of Health and Human Services
Capitol and Washington Streets
1 Davis Square, Suite 200
Charleston, West Virginia 25301-1798

or call:(304) 558-2981

Summary

The purpose of this report is to determine if contaminated groundwater associated with Holder Chemical Corporation is affecting the public health in the adjacent Applewood subdivision. West Virginia Department of Health and Human Resources (WVDHHR) prepared this health consultation in response to a request from the West Virginia Department of Environmental Protection (WVDEP) to determine if children and adults at the Applewood subdivision could be exposed to chemical contamination in groundwater, and make appropriate recommendations.

The report concludes that no public health hazard exists from exposure to chemicals in the groundwater under the Applewood subdivision. All residents of the Applewood subdivision use public water from a source unassociated with the local groundwater. In addition, the low volatility of chemicals associated with Holder Chemical eliminated the vapor intrusion pathway.

WVDHHR prepared this health consultation under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR).

I. Background

The Applewood subdivision is a new residential area. The intersection selected for the subdivision address is Applewood Drive and Winesap Way, Ona, West Virginia. The subdivision is being developed by Mr. Forest Donahue, President of Hurricane Plaza, Inc.

The subdivision is on a 120 foot high ridge approximately 100 yards northeast of a former pesticide reformulator, Holder Chemical. The closest house is approximately 150 yards from Holder. About 16 houses have been constructed in the past year, of which six are occupied.

Applewood subdivision is bordered to the north by Interstate 64, to the south by the CSX railroad, to the west by an abandoned truck garage and to the east by the intersection of I-64 and a railroad as well as a wooded area. No other homes are close to the subdivision (Figure 1).

The Holder Chemical Corporation, Howell's Mill Road, Ona, West Virginia (the site, EPA # WVD980693683) reformulated pesticides from 1967 to 1985. The plant purchased chlordane, DDT (dichlorodiphenyltrichlorethane), dieldrin, lindane (gamma-hexachlorocyclohexane), malathion, sevin (carbaryl), silvex [2 (2,4,5-trichlorophenoxy) propionic acid], and mirex and processed them into pesticides for garden and household uses. In addition to the pesticide reformulation business, Holder reformulated acidic and caustic cleaners. Holder obtained their water from a 60 foot deep well adjacent to the building. The depth to groundwater was estimated at 30 foot. Liquid wastes were dumped into a 6 foot deep dry well. A 60 foot by 145 foot concrete slab, the former plant floor, remains on the property [1]. There is no fence around the property.

The EPA and West Virginia Department of Natural Resources (WVDNR) removed pesticides, contaminated soil and miscellaneous debris from Holder in July, 1982 and between June and July 1985.

II. Discussion

1. *Groundwater analysis*

Limited available groundwater data indicated the present of pesticides and polychlorinated biphenyls at the site. No data were available for other chemicals that may have been used or associated with the site such as solvents or other volatile chemicals. From 1979 to 1985, four groundwater samples were collected from the water well at Holder Chemical. Aroclor 1260 (a mixture of polychlorinated biphenyls or PCBs) was found at 0.24 parts per billion (ppb) in one of the two groundwater samples tested for this chemical in 1981. Chlordane was found at 0.046 and 1.0 ppb in 1981 and 1985 respectively in two of four groundwater samples tested for this chemical [2, 3].

No groundwater samples have been taken under the Applewood subdivision. However, a hydrogeologic study for Holder Chemical site conducted by a USEPA contractor in 1982 concluded that the groundwater flow is expected to be to the southwest, toward the Mud River, and away from the Applewood subdivision [1]. The report did not describe the data used to reach this conclusion, but it is consistent with the assumption that most groundwater flows in the same direction as surface water.

2. *Exposure pathway analysis*

WVDHHR's public health assessments are driven by exposure, or contact. One of our major tasks is to identify exposure pathways and characterize the actual exposure situation. For a public health hazard to exist, people must come in contact with contaminants at levels high enough and for a long enough time to affect people's health.

An exposure pathway is a route by which a contaminant travels from its source to human body. An exposure pathway consists of the following five elements:

- a source of contamination,
- media such as air or soil through which the contaminant is transported,
- a point of exposure, where people can contact the contaminant,
- a route of exposure by which the contaminant enters the body, such as ingestion, inhalation and dermal contact and
- a receptor population, one or more people who may have contacted the contaminant(s).

A pathway is considered complete if all five elements are present. If one or more of the elements is (are) missing, the pathway is considered incomplete as no exposure can occur.

2-1. Ingestion pathway - incomplete

All homes in the Applewood subdivision are served by a public water system, Milton Water, which obtains its water source from the Mud River upstream from the site, a source unaffected by local groundwater. Therefore, an incomplete ingestion exposure pathway exists for residents of the subdivision as no one is exposed to chemicals, should they be present in the local groundwater. No exposure to local groundwater by ingestion exists.

2-2. Vapor intrusion pathway - incomplete

Vapor intrusion is the migration of volatile chemicals from subsurface soil or groundwater into overlying buildings. Vapor intrusion can occur when chemicals in the ground or groundwater move as a gas through the ground and accumulate in buildings where people breathe the air. None of the chemicals associated with Holder Chemical are known to be volatile organic compounds [4]. Therefore, the vapor intrusion pathway is incomplete. No exposure to contaminants found in nearby groundwater through inhalation of indoor air is expected.

3. *Soil contamination and the migration potential of the contaminants*

Eight soil samples and one water sample were collected by EPA on May 22, 1985 at Holder Chemical. Soil sample analysis indicated a "pervasive low level of contamination" at Holder by the following chlorinated pesticides: carbaryl (sevin), chlordane, DDE, DDT, heptachlor, malathion and methoxychlor. As a result, soil in areas of high concentration was excavated and disposed off-site [2]. Analytical results of soil samples taken after excavation and disposal of contaminated soil indicated much of chlordane and other chlorinated pesticide contamination had been removed.

Chlorinated hydrocarbon pesticides are not likely to enter groundwater because they tend to stick strongly to soil particles and break down very slowly [5,6]. In addition, other factors that might increase the chance of chemical movement into groundwater are not apparent in this area, such as groundwater near the surface, coarse soil, or underground fractures or cracks. An EPA contractor concluded that serious pesticide contamination of groundwater was not expected from chemicals at Holder Chemical in 1982 [1].

III. Child Health Considerations

The differences between children and adults demand special consideration. Children can be at greater risk than adults from certain exposures to hazardous substances. Children play outdoors and often use hand-to-mouth behaviors which increase their exposure potential. Because children are shorter than are adults, they breathe dust, soil, and vapors that are close to the ground. The fact that children are smaller than adults means they get a higher dose of a substance per unit of body weight. If toxic exposure levels are high enough during critical growth stages, the developing body systems of children can be permanently damaged. Finally, children are dependent on adults for access to housing and medical care, and for risk identification. This health consultation considered potential health effects to children to assist those who make decisions regarding their health.

IV. Conclusion

The five public health hazard categories used by ATSDR are; no public health hazard, no apparent public health hazard, indeterminate public health hazard, public health hazard, and urgent public health hazard.

No public health hazard exists in the Applewood subdivision by contaminated groundwater because the ingestion pathway and vapor intrusion pathways are eliminated. No homes in this subdivision use local groundwater for household use. Chemicals associated with Holder are not known as volatile organic compounds to be considered for vapor intrusion.

V. Recommendations

WVDHHR recommends that chemical contamination in the groundwater at Holder Chemical be characterized, particularly those that may pose a potential for vapor intrusion.

VI. Public Health Action Plan

WVDHHR will provide information about these results to interested people including residents and prospective residents upon request.

WVDHHR will reassess these conclusions should additional data indicate a potential public health hazard at the Applewood subdivision or the site.

Preparers of Report

Barbara J. Smith, M.S., Epidemiologist II
Bin Z. Schmitz, M.S., Environmental Toxicologist

Radiation, Toxics and Indoor Air Division
Office of Environmental Health Services
Bureau for Public Health, WVDHHR

Reviewers of Report

Randy C. Curtis, P.E., Director
Anthony Turner, M.S., R.S., Assistant Director

Radiation, Toxics and Indoor Air Division
Office of Environmental Health Services
Bureau for Public Health, WVDHHR

ATSDR Technical Project Officer

CDR Alan G. Parham, REHS, MPH
Technical Project Officer
Agency for Toxic Substances and Disease Registry
1600 Clifton Road, N.E. MS-E29
Atlanta, Georgia 30333

ATSDR Regional Representative

Lora Siegmann-Werner, MPH
ATSDR Region III Regional Senior Representative

1650 Arch Street Mail Stop 3HS00
Philadelphia, Pennsylvania 19103

Certification

This Holder Chemical Corporation Health Consultation was prepared by West Virginia Department of Health and Human Resources (WVDHHR) under a cooperative agreement with the federal Agency for Toxic Substances and Disease Registry (ATSDR). It was completed in accordance with approved methodologies and procedures existing at the time the health consultation were initiated. Editorial review was completed by the Cooperative Agreement partner.

CDR Alan G. Parham, REHS, MPH
Technical Project Officer
Division of Health Assessment and Consultation (DHAC), ATSDR

The Division of Health Assessment and Consultation of ATSDR has reviewed this Health Consultation and concurred with its findings.

Alan Yarbrough
Team Lead, SPAB
Division of Health Assessment and Consultation (DHAC), ATSDR

References

1. Lee CK, McGovern, JG. Field investigations of uncontrolled hazardous waste sites, FIT project, a hydrogeologic study for Holder Chemical site, Ona, Cabell County, West Virginia. Lancaster, NY: Ecology and environment, inc; November 1982.
2. Triad Engineering, Inc. Executive summary Holder Chemical Corporation site, Ona, West Virginia. St. Albans, WV: for Office of Environmental Remediation, West Virginia Division of Environmental Protection; 2000 Aug.
3. US Environmental Protection Agency. Memorandum to Henry Van Cleave from Bruce P Smith concerning a request for Superfund immediate removal for the Holder Chemical Company incident in Ona, WV. Philadelphia, Pennsylvania. Undated, subsequent to May 1982 inspection.
4. US Environmental Protection Agency. Mid-Atlantic Brownfields, VolatileOrganic Compounds.Washington DC: 2007 Jan [cited 2007 March 2] Available from URL: http://www.epa.gov/reg3hwmd/bfs/regional/analytical/volitile.htm
5. Agency for Toxic Substances and Disease Registry. ToxFAQs for Chlordane. Atlanta: US Department of Health and Human Services; 1995.
6. Agency for Toxic Substances and Disease Registry. ToxFAQs for DDT, DDE and DDD. Atlanta: US Department of Health and Human Services; 2002.

Figure 1. ApplewoodSubdivision