Health Consultation

WV-ABCA WAREHOUSE SITE
HUB INDUSTRIAL PARK
INDEPENDENT AVE, BLDG 99
NITRO, PUTNAM COUNTY, WEST VIRGINIA 25143

EPA FACILITY ID: WVXCR3ABM000

AUGUST 25, 2005

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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Foreword

This report summarizes public health concerns related to possible vapor intrusion from contaminated groundwater and soil into the WV-ABCA (West Virginia Alcohol Beverage Control Administration) Warehouse. People who could come into contact with chemicals from this source are the workers at the warehouse.

A number of steps are necessary to complete this report.

Evaluating exposure: The West Virginia Department of Health and Human Resources (WVDHHR) starts by reviewing available information about environmental conditions at the site. The first task is to find out how much contamination is present, where it is found on the site, and how people might be exposed to it. The WVDHHR generally does not collect environmental samples. WVDHHR relies on information provided by the West Virginia Department of Environmental Protection (WVDEP), U.S. Environmental Protection Agency (EPA), other governmental agencies, businesses, and other sources of valid information.

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

Developing recommendations: In this report the WVDHHR outlines its conclusions regarding any potential health threat posed by this site. The role of the WVDHHR at this site is primarily advisory.

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 sites, and the people affected by conditions at the site. Any conclusions about the site are shared with people that provided the information.

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

write: Program Manager
ATSDR Cooperative Partners Program
West Virginia Department of Health and Human Services
Bureau for Public Health
Office of Environmental Health Services
Capitol and Washington Streets
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Statement of issues

West Virginia Department of Health and Human Resources (WVDHHR) prepared this health consultation under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR).

The Alcohol Beverage Control Administration (ABCA) of the State of West Virginia operates the WV-ABCA Warehouse in an industrial area of Nitro, West Virginia. Many chemical plants operated in the area in the past. Some chemical manufacturing still occurs in this area.

Employees of the warehouse suspect that exposures to chemicals in this area may be affecting their health. As a result of employee concerns, ABCA requested that WVDHHR evaluate the potential for chemicals in the groundwater and soil under the WV-ABCA Warehouse facility to affect the health of their employees via vapor intrusion.

The exposure pathway evaluated for this health consultation is the possible vapor intrusion from chemicals in the groundwater and soil near the WV-ABCA Warehouse site. Workers at this warehouse might inhale chemicals that enter the warehouse from contaminated groundwater or soil under the building.

Vapors from volatile chemicals in the soil can accumulate in buildings built over groundwater or soil containing these chemicals.[1] People in these buildings can breathe the vapors that accumulate inside them. The name for this process is vapor intrusion. If chemicals are not volatile, their vapors do not move through the soil and cannot accumulate inside buildings. For this reason, only volatile chemicals were reviewed for their potential in the vapor intrusion pathway.

Background

Site description and history

The first use of the property where the WV-ABCA Warehouse is located for an industrial use was as a munitions plant for the United States government. U.S. Explosives Plant “C”, covering 1,772 acres, was constructed in 1917. It made nitroglycerin (“nitro”) from 1918 to 1919. The property was divided into many parcels after the plant was demolished in the 1960’s. Foundations from this building are located under the warehouse and parking lots.

The warehouse is located in Building 99 on Independent Avenue in the HUB Industrial Park, Nitro, West Virginia. The warehouse is near several former and current chemical plants. The warehouse was built in the late 1970’s. Five feet of fill was used to raise the floor of the warehouse level so that the loading doors are level with the floors of tractor-trailers. The soil used for the fill was not from this property.

The State of West Virginia purchased this property in January 1996 [1]. The warehouse and surrounding parking areas are located on 9.4 acres of the 12.2 acres owned by the state. A fence was constructed behind the warehouse in December 2002 to restrict access to contaminated soil on 2.8 acres of land to the west of the warehouse. This area was used as a chemical disposal area

1 Volatile chemicals are those that readily evaporate and become a gas or vapor. Gasoline is an example of a volatile chemical.

by the former owners. The area contains a pond, impoundment, marsh, heavy vegetation, and dry but vegetated areas [2].

The WV-ABCA Warehouse site (the site) is a 150,000 square foot facility owned by the Alcohol Beverage Control Administration of the State of West Virginia. The warehouse stores and distributes liquor for the State of West Virginia. The warehouse has several doors used to load and unload tractor-trailers. Many of these doors are open during working hours. Given the nature of the product stored at this warehouse, access to this area is closely monitored. The facility is enclosed by a chain link fence. Trespassing does not occur at this facility.

The facility is bound to the south by the Flexsys America L.P. chemical plant, to the west by a former chemical disposal area owned by Flexsys and the Kanawha River beyond, to the north by a capped landfill and a pipe storage warehouse facility with Interstate 64 beyond, and to the east by various industrial and warehouse facilities.

Demographics

The warehouse employs 22 people. At least six of these employees have worked at this facility since 1990.

Health concerns

Employees of the warehouse are concerned that past and present chemical exposures from the chemicals present in the area are impacting their health. The presence of dioxins in the area is of particular concern to the employees. Manufacturing of 2,4,5-T at the chemical plant located south of the warehouse is believed to be the source of much of the dioxin in the Nitro area.

Discussion

Data review

WVDHHR reviewed groundwater and soil data collected from the monitoring wells located in front of and behind the warehouse. The soil was collected when the monitoring wells were drilled. EPA-approved sampling and analytical methods were used to collect and analyze the samples. All sample data from the 2003 sampling event was reviewed [1]. The conclusions in this report are affected by the availability and reliability of the data that was reviewed.

Samples of the soil, sediment, and surface water were taken in June of 2004. The samples were taken inside and along the fenced-in area between the warehouse and the Kanawha River. The exposure to this material does not involve a risk from vapor intrusion pathway because of the distance from the warehouse. These sample results are not reviewed in this health consultation.

The six groundwater samples were each analyzed for 190 different chemicals; 17 dioxin and furan compounds, 50 volatile compounds, 68 semi-volatile chemicals, 31 pesticides, 23 metals, and cyanide. Volatile chemicals were detected in only one of the six samples. Groundwater was sampled at two levels. Shallow samples were taken between 20 and 40 feet below the ground surface. The deeper samples were taken between 38 and 54 feet below the surface. The groundwater table starts at 11-16 feet below the ground and extends to 55 feet where there is bedrock. The greatest amount of volatile chemicals in the groundwater was found in a monitoring well at the front of the warehouse 40-50 feet below the surface of the ground.

The six soil samples taken from the wells when they were drilled were each analyzed for four pesticides, 16 volatile chemicals, 12 semi-volatile chemicals, and 20 metals. Six dioxin and furan compounds were found in these samples. Soil samples were taken at depths up to 32 feet. The greatest amount of volatile chemicals were primarily found in a monitoring well at the rear of the warehouse in soil five feet below the surface of the ground. Volatiles were not analyzed in the soil from this monitoring well at depths less than 5 feet from the soil surface.

Dioxins and furans are not volatile enough to be considered for the vapor intrusion pathway. It may be of interest that no dioxins or furans were detected in the filtered groundwater from the monitoring wells (at detection limits ranging from 1.2 to 61 picograms per liter or parts per trillion). The highest concentration of dioxins and furans in the soil was 20 parts per trillion. The two compounds found at this level are called 2,3,7,8-tetrachlorodibenzo-*p*-dioxin (2,3,7,8-TCDD) and 1,2,3,4,6,7,8-heptachlorodibenzo-*p*-dioxin [1].

Model used to evaluate the vapor intrusion pathway

The Draft Guidance for evaluating vapor intrusion to indoor air pathway from groundwater and soils from the EPA (the model) was consulted to determine if there was a potential for an unacceptable risk from vapor intrusion of chemicals at this site [3]. The model is used to determine if there is a completed pathway and, if so, if the potential for risk is great enough so that additional data should be collected to evaluate the specific circumstances at a site.

Selection of chemicals of concern

WVDHHR selected chemicals of concern by comparing data from the site to environmental guideline comparison values (CVs). CVs are established on the basis of a review of toxicology literature for a given substance. Many safety factors are included when these values were developed, making them very conservative (i.e., protective of public health). Exposure to a chemical below its corresponding CV indicates that adverse health effects are unlikely but exposure above its corresponding CV *does not* indicate that adverse health effects will occur. Additional study is needed if chemicals are found at levels above their corresponding environmental CVs.

Only two volatile chemicals were found in the groundwater. Neither was found at levels that are above the CV for drinking water. The chemicals were also below the levels established for evaluation for potential health effects by the model. The model estimates these levels would need to be at or over 3,400 µg/L for 1,2,4-trichlorobenzene and 1,500 µg/L for toluene before evaluation for the vapor intrusion pathway is needed. For these reasons, no chemicals in groundwater were selected as chemicals of concern (Table 1).

All results for volatile chemicals in the soil from the groundwater monitoring wells were below the CVs for soil (Table 2). Not only were the amounts found below the levels to be considered for a vapor intrusion pathway, but also the levels were below consideration for selection as chemicals of concern if this soil was on the surface where there could be direct contact.

The amount of chemicals found in a building located over soil or groundwater containing volatile chemicals is affected by many factors including, the distance to the chemicals, the type of soil, and the size and type of the building. These items generally reduce the amount of vapors found in buildings from what would occur during direct exposure. These factors were not evaluated, however, because the amount of volatile chemicals found in the soil and groundwater are less than what would be likely to cause adverse health effects if the water was used for drinking or

small amounts of soil were eaten during normal hand-to-mouth activity. Nor were the levels high enough to be considered for the vapor intrusion pathway using the model.

The sample results were not compared to CVs for children. This is because children do not work at this warehouse. If this comparison was made, the environmental data were significantly lower than the children's CVs for these chemicals.

Table 1. Volatile chemicals found in groundwater near the WV-ABCA Warehouse

	Sample result (µg/L)	CV for drinking water (µg/L)		Is this a chemical of concern?
1,2,4-Trichlorobenzene	0.68	400	RMEG	no
Toluene	0.65 (estimate)	700	Intermediate EMEG	no

µg/L is micrograms per liter
RMEG = ATSDR's reference dose media evaluation guide
Intermediate EMEG = ATSDR's environmental media evaluation guide for exposures between 15 days to 1 year
Source: [1]

Table 2. Volatile chemicals found in soil in monitoring wells near the WV-ABCA Warehouse

	Sample results (mg/kg)	CV for soil (mg/kg)		Is this a chemical of concern?
Ethylbenzene	0.003 (estimate)	70,000	RMEG	no
Methylcyclohexane	0.0007 (estimate)	2,600	PRG-residential soil	no
Toluene	0.0093	10,000	Intermediate EMEG	no
Cyclohexane	0.0022 (estimate)	140	PRG-residential soil	no
Xylenes, total	0.013	100,000	RMEG	no
Cis-1,2-Dichloroethene	0.17	200,000	Intermediate EMEG	no
Trans-1,2-Dichloroethene	0.0044	10,000	RMEG	no
Acetone	0.100	600,000	RMEG	no
Benzene	0.0011 (estimate)	10	CREG	no
Vinyl chloride	0.0022 (estimate)	0.5	CREG	no
Carbon Disulfide	0.0014 (estimate)	70,000	RMEG	no
2-Butanone	0.026	400,000	RMEG	no
Trichloroethene (Trichloroethylene)	0.015	0.02-0.4	CREG	no

mg/kg = milligrams per kilogram
RMEG = ATSDR's reference dose media evaluation guide
Intermediate EMEG = ATSDR's environmental media evaluation guide for exposures between 15 days to 1 year
PRG = USEPA Region 9 preliminary remediation goal
CREG = ATSDR's cancer risk evaluation guide
Source: [1], all sample results are estimated values

Human exposure pathway analysis

A completed exposure pathway consists of five parts.

1. A source of contamination,
2. movement of the contaminant(s) into and through the environment (in soil, air, groundwater or surface water) to bring it into contact with people,
3. a place where humans could be exposed to the contaminant(s),
4. a way for humans to be exposed to the contaminant(s) (such as by drinking the water or breathing the air), and
5. one or more people who may have contacted the contaminant(s).

Exposure pathways are considered *potential* when one or more of the elements are missing or uncertain but could have existed in the past, could be occurring now, or could exist in the future. Pathways are considered *eliminated* when one or more of these five items do not exist or where conditions make exposures highly unlikely.

The minor amount of volatile chemicals found in the groundwater and soil from the monitoring wells near this warehouse make exposure to them through vapor intrusion highly unlikely. The vapor intrusion pathway is eliminated for the present and future because exposures to volatile chemicals would be minimal to non-existent. No additional sampling is recommended at this time. Conditions in the past are unknown and cannot be assessed.

Child health considerations

The many differences between children and adults demand special consideration. This health consultation did not consider potential health effects to children at this facility because children are not known to be present in this area. Of course, if children were present at the site their exposures would have been considered for the following reasons.

Children can be at greater risk than are adults from certain kinds of exposure to hazardous substances. Children play outdoors and often use hand-to-mouth behaviors that increase their exposure potential. Children are shorter than are adults. This means they breathe dust, soil, and vapors close to the ground. Children are smaller than adults which results in a greater 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 sustain permanent damage. Finally, children are dependent on adults for access to housing, for access to medical care, and for risk identification.

Conclusions

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.

The WVDHHR concludes that the WV-ABCA Warehouse site poses *no public health hazard* for the present and future because exposure to site-related hazardous substances is highly unlikely via the vapor intrusion pathway. No chemicals capable of moving from the groundwater or soil

under the WV-ABCA Warehouse were found in high enough amounts to be likely to cause adverse health effects. The conditions in the past cannot be assessed due to a lack of data.

Recommendations

No recommendations are necessary to reduce or eliminate exposures to hazardous substances via the vapor intrusion pathway at the WV-ABCA Warehouse site.

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References

1. Potesta & Associates, Inc. Summary of analytical data results warehouse area groundwater/soil investigation (draft). Charleston, WV: Potesta & Associates, Inc; 2003 Aug.

2. Region III Superfund Technical Assessment & Response Team. WV-ABCA warehouse trip report, June 2004 sampling event, Nitro, Putnam county, West Virginia TDD: SW3-04-04-0001: U. S. Environmental Protection Agency Region III; 2004 Dec.

3. Office of Solid Waste and Emergency Response. Draft guidance for evaluating the vapor intrusion to indoor air pathway from groundwater to soils. U.S. Environmental Protection Agency, 2002 Nov. Available at URL: http://www.epa.gov/correctiveaction/eis/vapor.htm

Certification

The West Virginia Department of Health and Human Resources (WVDHHR) prepared this Public Health Assessment under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with approved methodology and procedures in existence at the time the public health assessment was initiated. Editorial review was completed by the Cooperative Agreement partner.

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

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