Health Consultation

Health Implications of Farm Workers Exposed to Groundwater Adjacent to

CEDAR CHEMICAL CORPORATION
49 PHILLIPS ROAD 311
WEST HELENA, PHILLIPS COUNTY, ARKANSAS 72342

EPA FACILTIY ID: ARD990660649

AUGUST 1, 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.

You May Contact ATSDR TOLL FREE at
1-888-42ATSDR
or
Visit our Home Page at: http://www.atsdr.cdc.gov

HEALTH CONSULTATION

Health Implications of Farm Workers Exposed to Groundwater Adjacent to

CEDAR CHEMICAL CORPORATION
49 PHILLIPS ROAD 311
WEST HELENA, PHILLIPS COUNTY, ARKANSAS 72342

EPA FACILTIY ID: ARD990660649

Prepared by:

Arkansas Department of Health
Under a Cooperative Agreement with the
Agency for Toxic Substances and Disease Registry

Table of Contents

STATEMENT OF ISSUES AND BACKGROUND

Statement of Issues

In the summer of 2004, the Arkansas Department of Environmental Quality (ADEQ) collected and analyzed groundwater samples as part of a site assessment for Cedar Chemical Corporation (CCC) in Helena, Arkansas. Groundwater in an agriculture irrigation well located off site of CCC had a maximum level of 1, 2-dichloroethane (1, 2-DCA) at 27,100 parts per billion (ppb). ADEQ contacted the Arkansas Department of Health (ADH) for assistance in determining the potential health risk to farm workers exposed to the contaminant.

ADH prepared this health consultation as part of its cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). Specifically this document evaluates available information associated with the release of 1, 2-DCA from the agriculture irrigation well referred to as AGI-1 (Appendix A, Figure 1). Frequently asked questions pertaining to 1, 2-DCA can be found in ATSDR's ToxFAQs in Appendix B of this document.

ADH has determined this site to represent an *Indeterminate Public Health Hazard.* The indeterminate public health hazard category is used in ATSDR's documents when a professional judgment about the level of health hazard cannot be made because information critical to such a decision is lacking. Because ambient air sampling data are not available to assess the most plausible exposure pathway (inhalation from volatilization), ADH could not make a judgment as to the hazard that 1, 2-DCA poses to the farm workers in the area of the AGI-1 agriculture irrigation well. Additional groundwater sampling would also be beneficial to evaluate the current concentration of 1, 2-DCA in the agriculture irrigation wells. The concentration of 1, 2-DCA in the samples collected does warrant further investigation.

Background

The CCC facility manufactured insecticides, herbicides, and polymers used in the agricultural industry from 1986 until the company closed in 2002. In March 2002, CCC filed Chapter 11 bankruptcy and ADEQ was granted control of the facility through the bankruptcy court in October 2002.

The CCC site is located at 49 Phillips Road 311, covering 48 acres within the Helena - West Helena Industrial Park (Appendix A, Figure 2). The industrial park where CCC is located is surrounded by farmland. The closest resident is approximately 650 yards east and slightly up gradient of the site. In general, homes are sparsely located in the area. The neighborhood census block identifies 615 people in a 3.9 square mile area surrounding the facility [1]. Census blocks are the smallest geographic level for which Census 2000 data are tabulated. The homes within the census block are connected to the public water supply. The most recent private well survey, conducted in 1996, identified numerous wells in the surrounding area, none of which were determined to be a source of drinking water.

As part of ADEQ's management of the CCC site, an environmental, human health, and ecological risk assessment was initiated. As part of the assessment process, ADEQ collected and analyzed groundwater samples. During 2001, while CCC was still in operation, two

groundwater-sampling events of four off-site monitoring wells were conducted. The results from this sampling showed concentrations of 1, 2-DCA ranging from 250 to 14,000 ppb in the monitoring wells (Appendix C, Table 1). A set of groundwater samples from four off-site agricultural irrigation wells was collected for analysis in July 2002. The results from this sampling showed 1, 2-DCA levels ranging from 'undetected' to 100 ppb. At the time, the agricultural irrigation well identified as BHAGI-1 had the highest concentration of 1, 2-DCA (100 ppb). In July 2004, a follow-up set of samples was collected and analyzed from the four agricultural irrigation wells and the four monitoring wells. Sample results indicated 1, 2-DCA levels ranged from 'undetected' to 27,100 ppb (Appendix C, Table 1). The maximum concentration of 1, 2-DCA (27,100 ppb) was detected in the agricultural irrigation well identified as AGI-1. Results also suggest that the groundwater containing the contaminant is flowing south to southwest towards the Mississippi River [2].

The AGI-1 irrigation well is located on a tract of land approximately 240 yards south-southeast of the southern most point of the CCC property. The land is used for growing crops such as corn, cotton, rice, and soybeans. Crops are changed year by year in a planned sequence (crop rotation). The AGI-1 well is used for irrigating these crops. Some crops require more water than others (e.g., rice), thus the use of the well is dependent on the crop grown as well as the amount of rain received during the growing period.

ADH performed a site visit in November 2004. The site visit provided ADH with information necessary to initiate a community health assessment in order to address health concerns, should they arise, and to develop greater capacity to work with various federal and state agencies at the site. During the same month, ADH sent – via domestic mail – the property owner/current user and ADEQ personnel a letter of its recommendation that the agricultural irrigation well (AGI-1) not be operated until the concentration of 1, 2-DCA is below levels of health concern. ATSDR's ToxFAQs for 1, 2-DCA also accompanied the letters. ADH later sent a letter to the property owner of the BHAGI-1 agricultural irrigation well, recommending that the use of the well be conditional, pending review of future EPA sampling results. The property owner was informed that if future data indicate significant increases in the levels of 1, 2-DCA for the BHAGI-1 well, then ADH would recommend discontinued use of the well.

DISCUSSION

Between the years of 2001 and 2004, ADEQ collected groundwater samples from four agricultural irrigation wells and four monitoring wells located off site of CCC. The location of the wells can be seen in Figure 1 of Appendix A. The agricultural wells are labeled as AGI-1, AGI-2, AGI-6, and BHAG-1. The acronyms AGI and BHAG were used to identify wells used for agriculture irrigation, and the agriculture irrigation well owned by Blackhawk Leasing and Warehouse, Inc., respectively. Off-site monitoring wells were labeled as OFFMW-1 through OFFMW-4. Groundwater sample results detected a maximum concentration of 1, 2-DCA from AGI-1 in the amount of 27,100 ppb. This concentration is significantly above ATSDR's drinking water health comparison value.

1, 2-DCA, also called ethylene dichloride, is a manufactured chemical that is not found naturally in the environment. It is a clear liquid and has a pleasant smell and sweet taste. Most of the 1, 2-

DCA released into the environment is released into the air. In the air, 1, 2-DCA breaks down by reacting with other compounds formed by sunlight. It can stay in the air for more than 5 months before it is broken down. It breaks down very slowly in surface water and most of it will evaporate into the air. 1, 2-DCA released in soil will either evaporate into the air or travel down through the soil and enter underground water [3]. See Appendix B for additional information about 1, 2-DCA.

To assess the potential health risks associated with contaminants at this site, we compared contaminant concentrations to health comparison values. Health comparison values are media specific contaminant concentrations that are used to screen contaminants for further evaluation. ATSDR's minimal risk levels (MRLs) are estimates of a daily human exposure to a contaminant that is unlikely to cause adverse non-cancer health effects.

Potential exposure pathways to contaminants at the CCC site have been evaluated to determine if persons could be exposed to potentially unsafe contaminants. Exposure pathways consist of the following five elements:

- A source of contamination.
- A release mechanism into water, soil, air, food chain (biota) or transfer between media (i.e., the fate and transport of environmental contamination).
- An exposure point or area (e.g., drinking water well, residential yard).
- An exposure route (e.g., ingestion, dermal contact, inhalation).
- A receptor population (i.e., residents, children, workers).

For a person to be exposed to a contaminant, the exposure pathway must contain all of the elements listed above, resulting in a completed exposure pathway. In some cases, a potential exposure pathway might exist in which at least one of the elements of the exposure pathway is missing, but could exist. Potential pathways indicate that exposure to a contaminant could have occurred, could be occurring, or could occur in the future. Potential exposure pathways refer to those pathways where (1) exposure is documented, but there is not enough information available to determine whether the environmental medium is contaminated, or (2) an environmental medium has been documented as contaminated, but it is unknown whether people have been, or may be, exposed to the medium, or may be exposed in the future. Additionally, an eliminated pathway is one where at least one element of the exposure pathway is missing, and therefore, exposure will never occur.

Potential exposure pathways to 1, 2-DCA at the AGI-1 irrigation well were evaluated to determine if farm workers could be exposed to potentially unsafe levels from the site (Appendix A, Figure 3). ADH considered dermal contact (absorption through skin), ingestion (drinking and eating), and inhalation (breathing) as potential routes of exposure. In considering ingestion, ADH looked at the consumption (eating) of biota or plants grown in the field irrigated by the well containing elevated levels of 1,2-DCA.

Studies show that only small amounts of 1, 2-DCA are taken up by plants (biota). The estimated daily intake of 1, 2-DCA attributed to food ingestion in Japan is 0.004 milligrams per day (mg/day). This level is well below ATSDR's intermediate oral MRL of 0.2 milligram per kilogram per day (mg/kg/day) for 1, 2-DCA. Since the levels of 1, 2-DCA in food products of Japan are similar to those in the United States, the daily intake value would be expected to be similar [4]. Therefore, biota does not represent a completed pathway and is eliminated.

EPA has not developed dermal absorption values for volatile organic compounds such as 1, 2-DCA. Because 1, 2-DCA easily volatilizes, the possibility of dermal exposure is reduced. Furthermore, farm workers are not likely to be standing in the field during irrigation. Therefore, 1, 2-DCA has been eliminated as an exposure pathway.

Ingestion of groundwater contaminants as an exposure pathway is not a concern. Although groundwater in the area is contaminated, residents receive drinking water from a municipal supply. Other means of direct contact with groundwater from non-potable uses of groundwater such as watering gardens, washing cars and filling swimming pools are unlikely because no private wells lie in the path of the contaminated plume. Ingestion of 1, 2-DCA has been eliminated as an exposure pathway.

While the AGI-1 agricultural irrigation well is in operation, a potential exposure pathway does exist for the inhalation of volatilized 1, 2-DCA. ADH requested EPA's assistance in calculating inhalation risk of 1, 2-DCA through site-specific air dispersion modeling. At the time this document was written, the air dispersion modeling had not been completed. Therefore, ADH lacks the necessary data to evaluate adverse health effects related to the inhalation of 1, 2-DCA. ADH will continue to review any new data provided and update the health recommendations as necessary.

The parameters of the AGI-1 irrigation well -when it is operating - are expressed below. The well's pump is believed to discharge 1,000 gallons per minute, which will yield enough water to apply 1 inch to 160 acres in 72 hours. The average acre-inch per year of water for growing rice is 30. The assumption that the farmland surrounding the affected area would be used to grow rice was used, because of the crops' high demand of irrigation water. The maximum time the irrigation pump would be expected to run during the rice-growing season is estimated to be 90 days. It is assumed the individuals involved with the irrigation of the rice field had access to the site for the 90 days during which the well pump was to be operated [4]. All of the above assumptions were intended to represent the worst-case scenario while irrigating rice. The irrigation well was not used during 2004, and its use prior to this year is unknown. Also unknown is the number of farmers that typically work in the area of the irrigation well.

COMMUNITY HEALTH CONCERNS

The area residents presented no health concerns to ADH regarding the CCC site. However, groundwater samples were analyzed as part of a Comprehensive Site Assessment (CSA) by ADEQ following the closure of the facility. The test results detected a concentration of 1,2-DCA

at a level that warranted further investigation. On October 19, 2004, ADEQ requested ADH review the groundwater sampling data that was collected off site to evaluate the potential health risk to area farmers exposed to 1,2-DCA.

CHILD HEALTH CONSIDERATIONS

ATSDR recognizes that infants and children may be more vulnerable to exposures than adults when faced with contamination of air, water, soil, and food. This vulnerability is a result of the following factors:

- Children are more likely to play outdoors and bring food into contaminated areas.
- Children are shorter and their breathing zone is closer to the ground, resulting in a greater likelihood to breathe dust, soil, and heavy vapors.
- Children are smaller and receive higher doses of chemical exposures per body weight.
- Children's developing body systems are more vulnerable to toxic exposures, especially during critical growth stages in which permanent damage may be incurred.

Children are not expected to play in the field surrounding the irrigation well because of the site's limited proximity to any residential area.

CONCLUSIONS

ADH reviewed and evaluated groundwater sampling data from the four agricultural irrigation wells and the four monitoring wells and concluded that the AGI-1 well was the primary well of concern for potential inhalation exposure to 1,2-DCA. The maximum concentration of 1, 2-DCA (27,100 ppb) was detected in the AGI-1 well. The AGI-1 well is used for irrigating crops grown on the tract of farmland located south-southeast of the CCC site. During irrigation, 1, 2-DCA is released from the water into the air creating a potential exposure pathway for farmers that may inhale the volatilized contaminant from the AGI-1 irrigation well. Environmental air sampling data are lacking for the site. Therefore, no ambient air sampling data are available to assess the most plausible exposure pathway (inhalation from volatilization). Additional groundwater data is needed to characterize current levels of 1, 2-DCA in the irrigation well. ADH has determined this site to represent an *Indeterminate Public Health Hazard*. The concentration of 1, 2-DCA in the samples collected does warrant further investigation.

RECOMMENDATIONS

- ADH recommends the property owner and/or user of the irrigation well – identified as AGI-1 – not operate it until such time that the concentration of contamination of 1, 2-DCA is below levels of health concern.
- ADH recommends ADEQ and/or EPA collect additional groundwater samples to evaluate the current concentration of 1, 2-DCA in the BHAG-1, AGI-1, and the AGI-2

irrigation wells. This data would better allow all the potential exposures in the area surrounding the site to be assessed, as well as provide ADH with data necessary to better evaluate public health risk.

- ADH recommends ADEQ and/or EPA conduct air sampling/modeling in order to represent exposure to field workers during the operation of the AGI-1 well.

PUBLIC HEALTH ACTION PLAN

The purpose of the Public Health Action Plan (PHAP) is to ensure that this health consultation not only identifies any public health hazards, but also provides a plan of action designed to mitigate and prevent adverse human health effects resulting from exposure to hazardous substances in the environment. The PHAP implemented by ADH for the Cedar Chemical Corporation site is as follows:

Completed Actions

- ADH personnel met with ADEQ personnel in October 2004, to discuss probable human health risk associated with 1, 2-DCA.
- ADH evaluated groundwater samples collected and analyzed by ADEQ in October 2004.
- ADH conducted a site visit in November 2004.
- ADH initiated a community needs assessment in November 2004.
- ADH informed ADEQ in a letter sent in November 2004 of its recommendation that the agricultural irrigation well – identified as AGI-1 – not be operated until such time that the concentration of the contaminant 1, 2-DCA is below levels of health concern.
- ADH notified the owner/user of the property on which the AGI-1 irrigation well is located of its recommendation that the agricultural irrigation well identified as AGI-1 not be operated until such time that the concentration of the contaminant 1, 2-DCA is below levels of health concern. ATSDR's ToxFAQs for 1, 2-DCA was also sent to the property owner/user. Notification was sent via certified mail in November 2004.
- ADH sent ADEQ personnel a copy of the notification sent to the property owner/user recommending the agricultural irrigation well (AGI-1) not be operated until the concentration of 1, 2-DCA is below levels of health concern. ATSDR's ToxFAQs for 1, 2-DCA was also sent to ADEQ personnel. Notification copies were sent via domestic mail in November 2004.
- ADH sent a letter via domestic mail in July 2005, to the property owner of the BHAGI-1 agricultural irrigation well, recommending that the use of the well be conditional, pending review of future EPA sampling results. The property owner was informed that if future data indicate significant increases in the levels of 1, 2-DCA in the BHAGI-1 well, then ADH would recommend discontinued use of the well.
- ADH requested EPA's assistance in calculating inhalation risk of 1, 2-DCA through site-specific air dispersion modeling.

Future Activities

- ADEQ and/or EPA will continue to collect groundwater data from agricultural wells, identified in this health consultation, until the concentration of 1, 2-DCA is below health comparison values for the potential risk pathway.
- ADH will continue to review any new data provided by ADEQ and/or EPA, and update health recommendations as necessary.
- ADH will update/complete the community needs assessment.
- ADH will conduct health education in the community, as needed and/or requested.

AUTHORS, TECHNICAL ADVISORS

Health Assessor

Dan Seaton
Arkansas Department of Health
4815 West Markham Street, Slot 32
Little Rock, Arkansas 72205

Designated Reviewer

Lori Simmons
Arkansas Department of Health
4815 West Markham Street, Slot 32
Little Rock, Arkansas 72205

ATSDR Regional Representative

George Pettigrew
Division of Regional Operations
Agency for Toxic Substances and Disease Registry - Region 6
1445 Ross Avenue (6SF - L)
Dallas, TX 75202

ATSDR Technical Project Officer

Tammie McRae
Division of Health Assessment and Consultation
Agency for Toxic Substances and Disease Registry
1600 Clifton Road, Mailstop E-29
Atlanta, Georgia 30333

CERTIFICATION

This health consultation for Cedar Chemical Corporation (CCC) site was prepared by the Arkansas Department of Health under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It was completed in accordance with approved methodology and procedure existing at the time the health consultation was initiated. Editorial review was completed by the cooperative agreement partner.

Tammie McRae, M.S.
Technical Project Officer
Division of Health Assessment and Consultation (DHAC)
ATSDR

The Division of Health Assessment and Consultation (DHAC), ATSDR, has reviewed this health consultation and concurs with its findings.

Alan Yarbrough
Cooperative Agreement Team Leader, DHAC, ATSDR

REFERENCES

1. US Environmental Protection Agency. Enforcement & compliance history online (ECHO). Retrieved June 30, 2004, from http://www.epa.gov/cgi-bin/get1cReport.cgi?tool=echo&IDNumber=110006787245&media_tool=ECHOI. Washington. 2004.
2. Arkansas Department of Environmental Quality. (2004). Comprehensive Site Assessment: Cedar Chemical Corporation Plant Site. Revised April 2004.
3. Agency for Toxic Substances and Disease Registry. Toxicological Profile for 1, 2-Dichloroethane. Atlanta: US Department of Health and Human Services; 2001.
4. University of Arkansas, Division of Agriculture, Cooperative Extension Service. (2004). Retrieved October 27, 2004 from URL: http://www.aragriculture.org/agengineering/irrigation/crop/Rice/default.asp.

APPENDICES

Appendix A – Figures

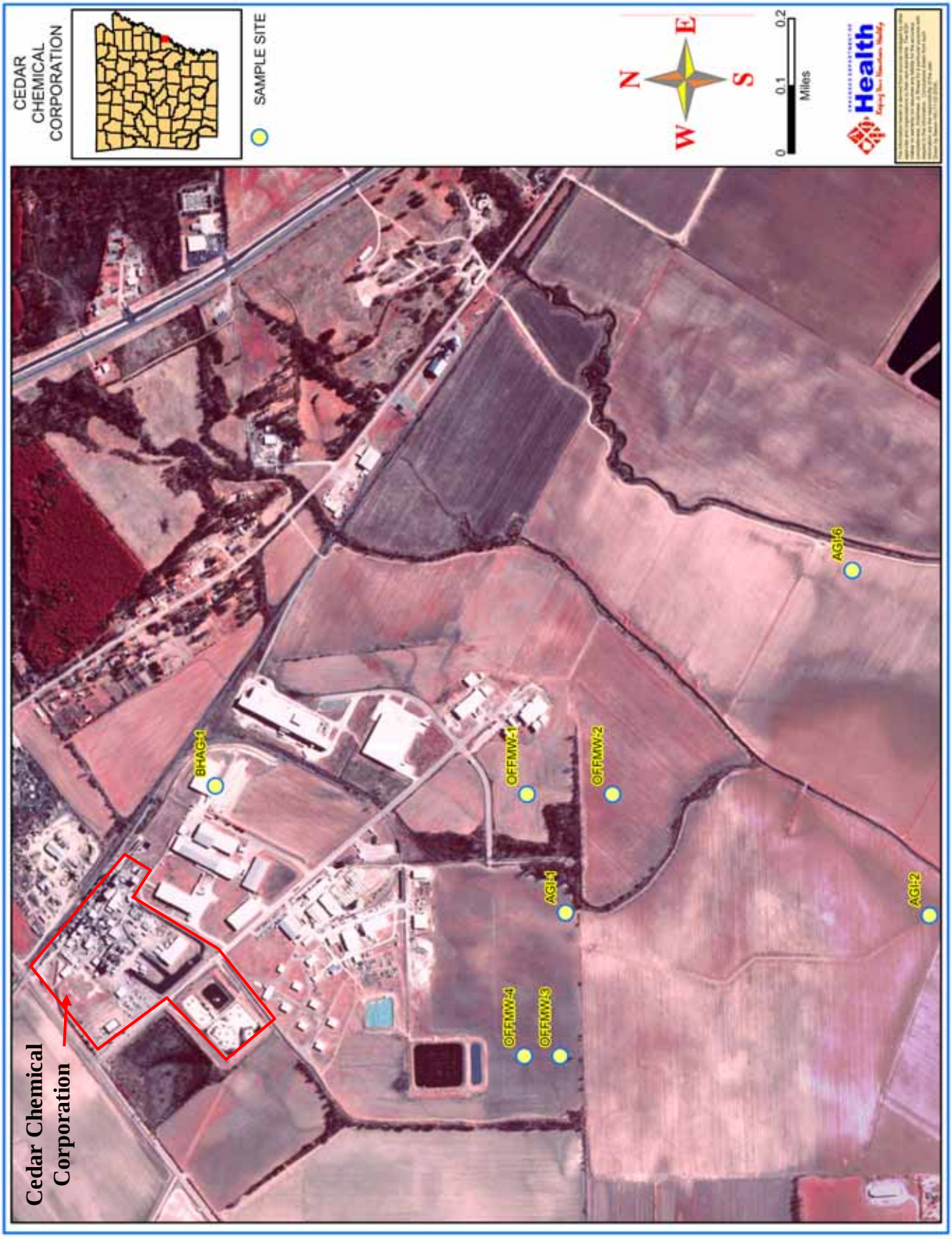

Figure 1. Aerial photo of monitoring well and agricultural well sampling sites

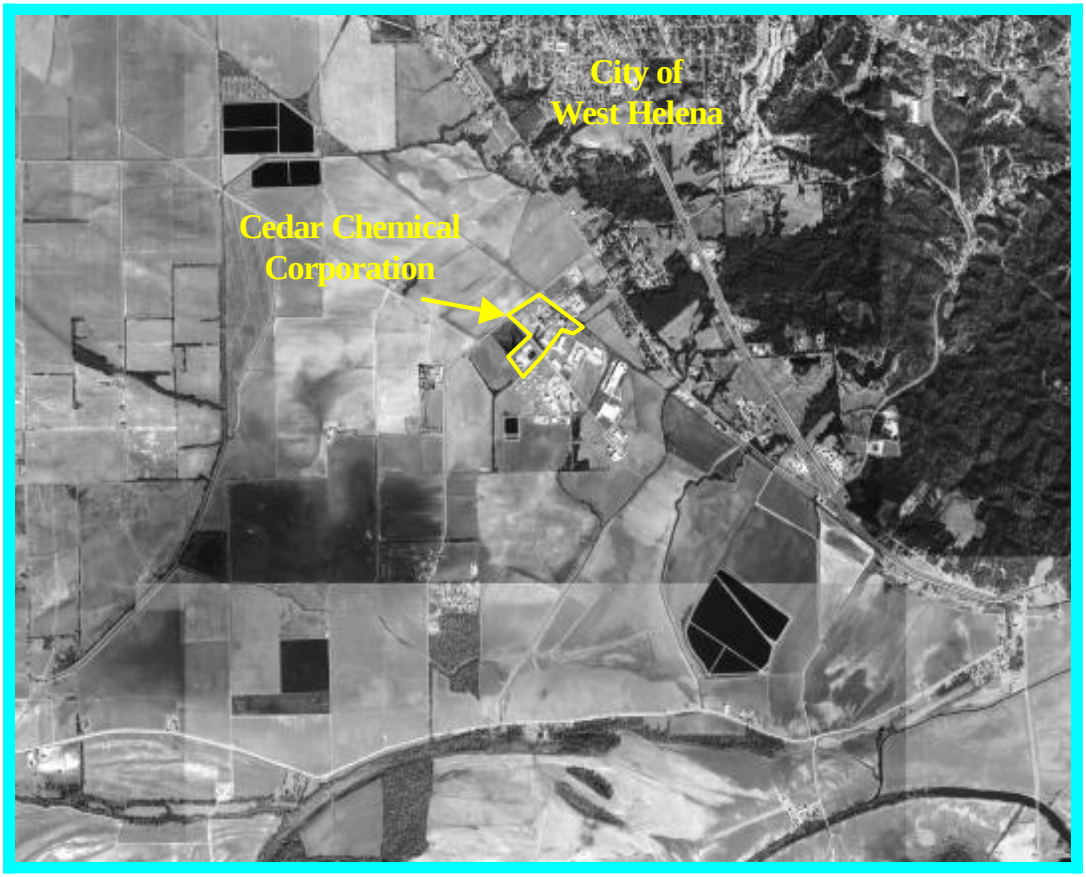

Figure 2. Aerial photo of Cedar Chemical Corporation's proximity to the City of West Helena

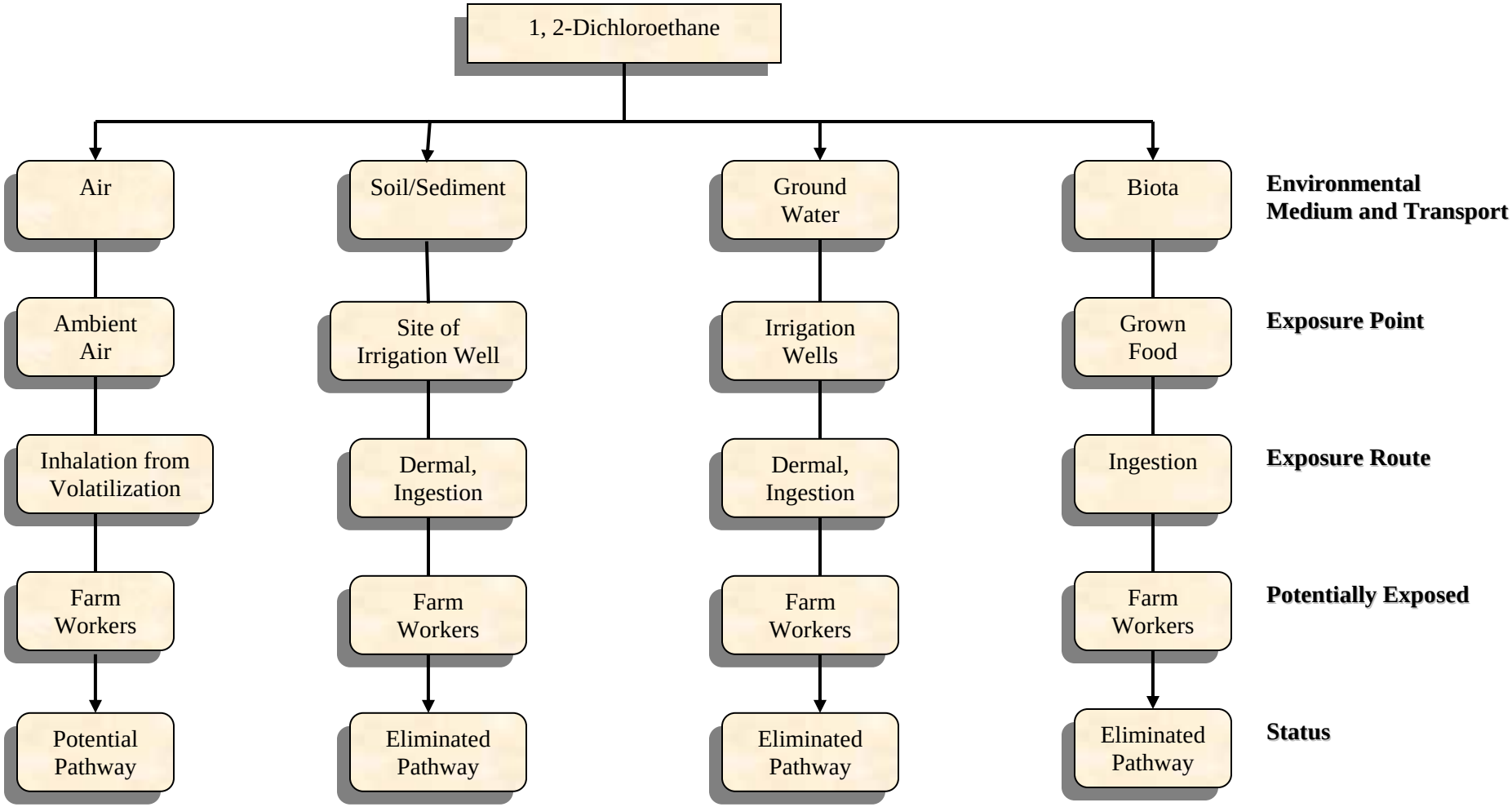

Figure 3. Exposure pathway evaluation

Appendix B – ATSDR's ToxFAQs for 1, 2-Dichloroethane

ATSDR
AGENCY FOR TOXIC SUBSTANCES AND DISEASE REGISTRY

1,2-DICHLOROETHANE

CAS #107-06-2

Division of Toxicology ToxFAQs™ **September 2001**

This fact sheet answers the most frequently asked health questions (FAQs) about 1,2-Dichloroethane. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. It is important you understand this information because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

HIGHLIGHTS: Exposure to 1,2-dichloroethane usually occurs by breathing contaminated air in workplaces that use 1,2-dichloroethane. Breathing or ingesting high levels of 1,2-dichloroethane can cause damage to the nervous system, liver, kidneys, and lungs and may cause cancer. This substance has been found in at least 570 of the 1,585 National Priorities List sites identified by the Environmental Protection Agency (EPA).

What is 1,2-dichloroethane?

1,2-Dichloroethane, also called ethylene dichloride, is a manufactured chemical that is not found naturally in the environment. It is a clear liquid and has a pleasant smell and sweet taste.

The most common use of 1,2-dichloroethane is in the production of vinyl chloride which is used to make a variety of plastic and vinyl products including polyvinyl chloride (PVC) pipes, furniture and automobile upholstery, wall coverings, housewares, and automobile parts. It is also used to as a solvent and is added to leaded gasoline to remove lead.

What happens to 1,2-dichloroethane when it enters the environment?

- Most of the 1,2-dichloroethane released to the environment is released to the air. In the air, 1,2-dichloroethane breaks down by reacting with other compounds formed by sunlight. It can stay in the air for more than 5 months before it is broken down.
- 1,2-Dichloroethane can also be released into rivers and lakes. It breaks down very slowly in water and most of it will evaporate to the air.
- 1,2-Dichloroethane released in soil will either evaporate into the air or travel down through the soil and enter underground water.

How might I be exposed to 1,2-dichloroethane?

- The general population may be exposed to 1,2-dichloroethane by breathing air or drinking water that contains 1,2-dichloroethane.
- People who work or live near a factory where 1,2-dichloroethane is used, may be exposed to higher than usual levels.
- People living near uncontrolled hazardous waste sites may also be exposed to higher than usual levels of 1,2-dichloroethane.

How can 1,2-dichloroethane affect my health?

Nervous system disorders, liver and kidney diseases, and lung effects have been reported in humans ingesting or inhaling large amounts of 1,2-dichloroethane.

In laboratory animals, breathing or ingesting large amounts of 1,2-dichloroethane have also caused nervous system disorders and liver, kidney, and lung effects. Animal studies also suggest that 1,2-dichloroethane may damage the

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES, Public Health Service
Agency for Toxic Substances and Disease Registry

1,2-DICHLOROETHANE
CAS #107-06-2

immune system. Kidney disease has also been seen in animals ingesting low doses of 1,2-dichloroethane for a long time. Studies in animals indicate that 1,2-dichloroethane does not affect reproduction.

How likely is 1,2-dichloroethane to cause cancer?

Human studies examining whether 1,2-dichloroethane can cause cancer have been considered inadequate. In animals, increases in the occurrence of stomach, mammary gland, liver, lung, and endometrium cancers have been seen following inhalation, oral, and dermal exposure.

The Department of Health and Human Services (DHHS) has determined that 1,2-dichloroethane may reasonably be expected to cause cancer. The EPA has determined that 1,2-dichloroethane is a probable human carcinogen and the International Agency for Cancer Research (IARC) considers it to be a possible human carcinogen.

How can 1,2-dichloroethane affect children?

We do not know if exposure to 1,2-dichloroethane will result in birth defects or other developmental effects in people. Studies in animals suggest that 1,2-dichloroethane does not produce birth defects.

It is likely that health effects seen in children exposed to high levels of 1,2-dichloroethane will be similar to the effects seen in adults.

How can families reduce the risk of exposure to 1,2-dichloroethane?

The general population is not likely to be exposed to large amounts of 1,2-dichloroethane. In the past, it was used in small amounts in household products such as cleaning agents, pesticides, and wallpaper and carpet glue. Risk of exposure from this source could be eliminated if these older products were immediately discarded.

Children should avoid playing in soils near uncontrolled hazardous waste sites where 1,2-dichloroethane may have been discarded.

Is there a medical test to show whether I've been exposed to 1,2-dichloroethane?

Tests are available to measure 1,2-dichloroethane in breath, blood, breast milk, and urine of exposed people. Because 1,2-dichloroethane leaves the body fairly quickly, these tests need to be done within a couple of days of exposure. These tests cannot be used to predict the nature or severity of toxic effects. These tests are not usually done in the doctor's office.

Has the federal government made recommendations to protect human health?

The EPA allows 0.005 milligrams of 1,2-dichloroethane per liter of drinking water (0.005 mg/L).

The Occupational Safety and Health Administration has set a limit of 50 parts of 1,2-dichloroethane per million parts of air (50 ppm) in workplace air for 8 hour shifts and 40 hour work weeks.

References

Agency for Toxic Substances and Disease Registry (ATSDR). 2001. Toxicological Profile for 1,2-Dichloroethane. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

Where can I get more information? For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs Internet address via WWW is http://www.atsdr.cdc.gov/toxfaq.html. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

Appendix C – Table

Table 1. Cedar Chemical Corporation area groundwater sample results for 1,2-Dichloroethane (1,2-DCA)				
Sample Location	Year Collected 2001 (Set #1)	Year Collected 2001 (Set #2)	Year Collected 2002	Year Collected 2004
AGI-1	NS*	NS	55	27,100
AGI-2	NS	NS	U†	U
AGI-6	NS	NS	U	U
BHAG-1	NS	NS	100	129
OFFMW-1	990	1,400	NS	1,320
OFFMW-2	10,000	14,000	NS	7,560
OFFMW-3	700	530	NS	93.9
OFFMW-4	250	330	NS	8.1
Unless otherwise stated, all data is reported in units of parts per billion (ppb). * NS = No samples collected † U = Undetected Note – Samples collected by Arkansas Department of Environmental Quality				