Health Consultation

Wilson Spring Area Update

CSX/LEWISBURG DERAILMENT

LEWISBURG, MARSHALL COUNTY, TENNESSEE

EPA FACILITY ID: TND987775566

SEPTEMBER 3, 2002

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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LEWISBURG, MARSHALL COUNTY, TENNESSEE

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Prepared by:

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

BACKGROUND AND STATEMENT OF ISSUES

In October 1990, a CSX train derailed in Marshall County. 15,443 gallons of chloroform and 3,660 gallons of styrene were spilled into a region underlain by a karst bedrock setting. Styrene is no longer a contaminant of concern. Data from 1998 indicates that dissolved chloroform concentrations of 2,000 to 4,000 milligrams/liter (mg/L) are still present in the groundwater. The greater part of the dissolved chloroform discharges at Wilson Spring, which is a few feet from Big Rock Creek (Remedial Investigation Report, 1998).

The discharge from Wilson Spring is collected and pumped to a carbon treatment system before being discharged to Big Rock Creek. This current discharge point is approximately 100 feet downstream of the original point of discharge [personal observation, 1998]. The spring area is surrounded by large rocks to form a small pond and is fenced. In 1998, CSX and its consultant, Ogden Environmental and Energy Services Company, Inc., requested permission to stop the carbon treatment and, instead, channel the discharge from Wilson Spring to Big Rock Creek via a system of rip rap or other method to increase volatilization of the chloroform from the water. If CSX was allowed to stop the treatment, the rocks would be removed. This action would eliminate the pond and allow the spring water to flow directly to Big Rock Creek.

The Tennessee Department of Environment and Conservation (TDEC), Division of Superfund (DSF), previously asked the Tennessee Department of Health (TDH) if this proposal would pose a threat to beef cattle drinking water from Big Rock Creek. After viewing the area, TDH drew the following conclusions in a previous health consultation (which are not limited to the threat to beef cattle):

- The risk to humans is unknown from inhalation exposure to air in the vicinity of the pathway from Wilson Spring (untreated water) to Big Rock Creek.

- The risk to humans should be the driving factor in this scenario. If humans, especially children, are protected, then the cows should in all likelihood be protected, also.

The recommendations in the previous health consultation were as follows:

- Determine the potential concentration of chloroform in the air surrounding the pathway from Wilson Spring to Big Rock Creek, if the spring water is no longer treated, but allowed to flow directly to the creek over rip rap or other method to increase volatilization.

- Determine the potential risk to humans, especially children, in the vicinity of the pathway between Wilson Spring and Big Rock Creek [Public Health Consultation, 1998].

The consultant for CSX Transportation, Inc., AMEC Earth & Environmental, Inc. (formerly Ogden Environmental and Energy Services Company, Inc.) prepared an addendum to the Remedial Investigation of 1998 in which they addressed the issues raised in the consultation

[Remedial Investigation Addendum, 2002]. DSF has now asked TDH to comment on the air sampling portion of the addendum.

DISCUSSION

Wilson Spring is located on a private farm. This spring is less than 1/4 mile from the Wilson residence. A cow path which leads to the creek is evident beside the fence around the spring. The walk from the house to the spring and then to the creek is very easy; therefore, Wilson Spring and Big Rock Creek are easily accessible to people, including children.

Ambient Air Sampling

On April 23, 1999, AMEC sampled the ambient air at and near Wilson Spring and the rock-walled pond. Results are summarized in Table 1. More recent samples at Wilson Spring are summarized in Table 2.

Table 1
Concentrations of Chloroform in Ambient Air as Measured by a Drager Tube
Wilson Spring Area, Lewisburg, Marshall County, Tennessee
April 23, 1999

Station	Sample Height (feet)	Concentration (mg/m^3)
A-1	5	>1.3 [1]
A-2	5	0.12
A-3	5	0.045
A-4	5	0.084
A-5	5	Not Detected
A-6	5	0.005
A-7	5	>0.73 [1]
A-7	3	>1.5 [1]
A-7	3 (duplicate)	>1.2 [1]
A-7	3 (Summa canister) [2]	5
QC	Equipment Blank	Not Detected

[1] possible tube saturation, results may be artificially low
[2] sample collected with a Summa canister rather than with sorbent tubes

Stations A-1 through A-4 and A-7 are next to the pond; station A-1 is closest to the spring and station A-7 is at the spring. Station A-5 is upwind of the spring (background); station A-6 is downwind from the pond. Samples were taken with sorbent tubes, except at A-7 where a sample was taken with a Summa canister because the chloroform concentrations exceeded the calibration range of the sorbent tubes.

Table 2
Concentrations of Chloroform in Ambient Air
Wilson Spring, Lewisburg, Marshall County, Tennessee

Date Sampled	**Concentration (mg/m^3)**
April 26, 2001	2.68
June 1, 2001	2.61
June 29, 2001	3.01
July 31, 2001	4.26
August 31, 2001	3.07
September 27, 2001	2.78
November 1, 2001	1.67
November 30, 2001	1.41
January 3, 2002	1.89

The periodic air sampling data confirm that chloroform from Wilson Spring continues to volatilize into the ambient air.

The Agency for Toxic Substances and Disease Registry (ATSDR) has published a unit risk factor for excess cancer risk of $2.3x10^{-5}$ per $\mu g/m^3$ (this is, also, the United States Environmental Protection Agency slope factor) for a life time exposure to chloroform. It is unlikely that anyone would spend a lifetime next to the spring. Children might spend a few hours several days a week playing in Big Rock Creek during warm weather. Access to the spring and collection pond is controlled. ATSDR also has published an acute minimum risk level (MRL) for chloroform of 100 parts per billion (ppb). The concentrations at A-1 and A-7 vary between >1.2 mg/m^3 (>246 ppb) to 5 mg/m^3 (1,024 ppb). However, the concentrations drop off quickly with distance from the spring, with concentrations ranging from 1 ppb to 25 ppb as one walks away from Wilson Spring and along the pond.

Remedial Investigation Report Addendum

The original report and the addendum, prepared by AMEC, are well written. The data is presented clearly and interpreted appropriately. The consultant concluded that realistic cancer risk scenarios did not indicate an unacceptable risk and that acute exposures did not represent a hazard, except in the immediate vicinity of the spring. As long as access is limited to the spring, there is no apparent risk. However, if the configuration of the spring discharge were changed and the fence was removed, a significant hazard could exist, especially to children playing at the spring.

Chloroform was used as an anesthetic during surgery before its harmful effects were recognized. Breathing large amounts of chloroform and drinking liquids that contain large amounts of chloroform can affect the central nervous system, liver, and kidneys of humans. People are exposed to low levels of chloroform every day in their drinking water and in the food they eat. Whether liver and kidney cancer could develop in people after long-term exposure to chloroform in drinking water is not known. Also, whether chloroform causes birth defects or harmful reproductive effects in people is not known (ATSDR 1997b).

ATSDR Child Health Initiative

In 1996, ATSDR launched an initiative to place a special agency-wide emphasis on environmental hazards to children's health and to emphasize child health in all agency programs and activities. The initiative was begun because of the special vulnerabilities children have when exposed to hazardous substances (ATSDR, 1997a; ATSDR 1998).

Children are at greater risk than adults from certain kinds of exposure to hazardous substances at sites with environmental contamination. Children engage in activities such as playing outdoors and in hand-to-mouth behaviors that increase their exposure to hazardous substances. Children are shorter than adults, which means they breathe dust, soil, and vapors close to the ground. Their lower body weight and higher intake rate results in a greater dose of hazardous substance per unit of body weight. The developing body systems of children can sustain permanent damage if toxic exposures are high enough during critical growth stages.

Exposure pathways involving small children were evaluated during the development of this health consultation. In evaluating this data, careful attention was paid to ensure that the health of small children was protected.

CONCLUSIONS

No apparent public health hazard exists as long as control measures limit access. This conclusion is based on the following:

- At Wilson Spring, concentrations of chloroform in ambient air exceed the ATSDR acute MRL of 100 ppb.

- A few feet away from Wilson Spring, the concentrations of chloroform drop quickly to levels well below the ATSDR acute MRL.

- Control measures limiting access to Wilson Spring mitigate the risk at the present time.

RECOMMENDATIONS

Continue to control access to Wilson Spring until remedial options that include methods of eliminating potential exposure to chloroform vapors are decided upon.

PUBLIC HEALTH ACTION PLAN

A copy of this health consultation will be provided to the property owner of the Wilson Farm. The Tennessee Department of Health is available to comment on future data as well as on the appropriateness and efficacy of future actions at this site.

PREPARED BY:

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REFERENCES

Remedial Investigation Report, Derailment Site Near Lewisburg, Marshall County, Tennessee. Prepared for CSX Transportation, Inc., 500 Water Street, Jacksonville, Florida. Prepared by Ogden Environmental and Energy Services Co., Inc., 161 Mitchell Road, Oak Ridge, Tennessee. Ogden Project No. 6-4300-2000-1000. CSX Project No. CSXT9415465. May 6, 1998.

Personal Observation. Bonnie S. Bashor, with Linda D. Locke. Tennessee Department of Environment and Conservation, Division of Superfund, September 18, 1998.

Public Health Consultation. Wilson Spring Site, CSX Derailment, Lewisburg, Marshall County, Tennessee. TDSF 59-506. September 22, 1998.

Remedial Investigation Report. Derailment site near Lewisburg, Marshall County, Tennessee. AMEC Project No. 6-4300-2005; CSX Project No. CSXT9415465. February 19, 2002.

Agency for Toxic Substances and Disease Registry. Toxicological Profile for Chloroform. September 1997.

Photographs 1 & 2

Photograph No. 1 Facing northwest: Ambient air sampling at Wilson Spring. Sampling Station A-7. Sampling heights – 3 & 5 feet above ground surface.

Photograph No. 2 Facing north: Ambient air sampling at Wilson Spring. Sampling Station A-7.

CERTIFICATION

This CSX/Lewisburg Derailment - Wilson Springs Area Health Consultation was prepared by the Tennessee Department of Health under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with approved methodology and procedures existing at the time the health consultation was begun.

Alan W. Yarbrough

Technical Project Officer, SPS, SSAB, DHAC, ATSDR

The Division of Health Assessment and Consultation, ATSDR, has reviewed this public health consultation and concurs with the findings.

Roberta Erlwein

Chief, State Program Section, SSAB, DHAC, ATSDR

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