

PRELIMINARY

Health ^{H.H.} (extra copy)
Assessment
for

VELSIGOL CHEMICAL CORPORATION (ST. LOUIS PLANT SITE)

CERCLIS NO. MID000722439

GRATIOT COUNTY, MICHIGAN

Agency for Toxic Substances and Disease Registry
U.S. Public Health Service

THE ATSDR HEALTH ASSESSMENT: A NOTE OF EXPLANATION

Section 104(1)(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, risk 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 site summary form. Additional health assessments may be conducted for this site as more information becomes available to ATSDR.

Introduction

An ATSDR Health Assessment is an evaluation of data and information on the release of hazardous substances into the environment. These assessments, one for each of the National Priorities List toxic waste sites, have been mandated by the Superfund law in order to accomplish several objectives. Among these objectives are: 1.) To assess any current or future impacts on public health, 2.) To develop health advisories or other health recommendations and 3.) To identify actions, including studies, that are needed to either mitigate and evaluate human health effects, or to prevent them from occurring.

A health assessment for a facility or a particular release of substances consists of the evaluation and interpretation of available information and analytical data. The process is iterative, that is, the assessment constantly builds upon existing material and is subject to change as more information and data become available. The assessment process does not wait for completion of all possible studies relevant to a site but instead builds a report based on the best available information from all relevant sources and distributes it in a timely manner.

New information provided by the public following their review of this document will be taken into consideration during preparation of any subsequent updated assessments for the site. Such information can be sent to:

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VELSICOL CHEMICAL CORPORATION (ST. LOUIS PLANT SITE)
GRATIOT COUNTY, MICHIGAN
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Prepared by:
Center for Environmental Health Sciences
Michigan Department of Public Health

Prepared for:
Office of Health Assessment
Agency for Toxic Substance Disease Registry

Background

The Velsicol Chemical Corporation (Velsicol) site is currently listed on the U.S. Environmental Protection Agency (U.S. EPA) National Priorities List (NPL); however, it has been nominated to be delisted.

Velsicol is located at 500 Bankson Street in the City of St. Louis, Michigan and was previously known as the Michigan Chemical Company. The 52-acre site is located adjacent to the Pine River. The company was a chemical processing plant which produced a variety of organic and inorganic chemicals from 1936 to 1978. The site was used by other companies from the mid 1800's to 1936, but it is not known what activities took place on the site during that time.

In 1974, the Michigan Department of Public Health (MDPH) issued a fish consumption advisory for fish caught within a 29 mile stretch of the Pine River downstream of the site to where the Pine River joins the Chippewa River. The advisory is still in effect although polybrominated biphenyl (PBB) levels in fish have decreased. As late as 1979, fish kills were occurring in the river and a red leachate was observed oozing into the river from the site.

In 1976, the Michigan Department of Public Health (MDPH) recruited many of the Velsicol workers for a long-term PBB health study which is in operation. The study placed participants in a registry to study the long-term effects of PBB exposure.

In 1982, a Consent Agreement among the U.S. EPA, Michigan Department of Natural Resources (MDNR) and Velsicol provided for the demolition, salvage and removal of some building materials and scrap; construction of a two foot thick slurry wall groundwater containment system; construction of a clay cap; a groundwater collection system with deep well injection; and a long term maintenance and monitoring program. Maintenance and monitoring reports continue to be submitted quarterly by Velsicol to the MDNR.

Environmental Contamination and Physical Hazards

More than 60 contaminants were found throughout the site, but PBB is the contaminant that caused the most concern. Located on the site were two injection disposal wells, a dredge pond, a hydrotreater lagoon, a radioactive waste disposal area and one or more drum storage areas. Contaminants were also found off-site, especially in the sediment of the Pine River which borders on the northern and western edges of the site.

The disposal wells were used to inject waste brine, process water, cooling water and wash water from clean-up operations. Phenols, calcium, magnesium, sodium (as chloride or bromium salts) and PBB were among the constituents suspected to be present in the wastes.

A five-acre dredge pond was built to receive sludge dredged from the Pine River in the early 1970's. The sludge contained mostly magnesium oxide, magnesium hydroxide and calcium hydroxide, however, 1,1,1-trichloro-2,2-bis(p-chlorophenyl)ethane (DDT), hexabromobenzene (HBB), PBB and 2,3-dibromo-1-propanol phosphate (TRIS) were also detected in samples.

A seepage lagoon (hydrotreater lagoon) was used to trap solids from the lime water softener which treated incoming water from the river. This lagoon was also used to collect waste from the magnesia operation prior to discharge into the river. The lagoon collected wastes during cleanup operations and contained mostly calcium carbonate; however, brine salts, magnesium hydroxide and PBBs were found in samples.

The radioactive disposal area received waste materials from rare earth operations.

Soil samples collected on-site in October 1978 had the following maximum concentrations (parts per million - ppm): PBB, 1,100; phenol, 4.2; lead, 11,100; HBB, 56; TRIS, 4,700; and dimethylaminoethylchloride hydrochlorite (DMAE), 53.

On-site groundwater samples from a shallow aquifer collected at the same time as the soil samples contained the following maximum concentrations (ppm): PBB, 0.013; chloride, 82,000; sulfate, 650; phenol, 1.2; DMAE, 20 and carbon tetrachloride, 0.080.

Of various species of fish sampled from the Pine River in 1974 and 1976, carp had the highest maximum PBB concentrations of 1.33 and 0.75 ppm, respectively. Sediments sampled from the Pine River in the mid 1970's showed maximum PBB concentrations of 77.0 ppm for sediments adjacent to the site. Sediment PBB concentrations showed a gradual decline from 6.2 ppm immediately below the nearby St. Louis dam to 0.1 ppm 29 miles downstream. River water sampled in 1974 showed PBB concentrations as great as 9.8 parts per billion (ppb) and as much as 0.07 ppb as far as twelve miles downstream. PBB was not detected in water samples collected

in 1979, however. Wildlife (mice, earthworms, a racoon and ducks) in the area were found to be contaminated with PBB (up to 17.1 ppm, wet weight) and/or DDT in 1974 and 1979.

Public access to the site is adequately restricted.

Potential Environmental and Human Exposure Pathways

Remedial actions at this site have diminished the potential for human exposure to the contaminants of concern. However, the potential may still exist for humans to be exposed to contaminants via the ingestion of contaminated fish and wildlife. The potential also exists for human exposure to occur by direct contact with river sediments.

Demographics

The population within a one mile radius of the site is approximately 4,100; this includes the population of the City of St. Louis. The site is located next to a residential area (to the east) and the nearest residence is less than 500 feet away. The Pine River, which flows toward the northeast, borders the site to the west and north, and a dam is located 1,500 feet downstream. The river is used for fishing, boating, swimming, and other recreational purposes, but not as a water supply. Water for drinking and other purposes is supplied from six municipal wells located to the east and southeast of the site, and the nearest well is approximately 1,500 feet away. A number of schools are in the area.

Evaluation and Discussion

The geology of the area is complex and consists of lacustrine deposits, outwash and till. It is suspected that a clayey till layer underlies the site and separates the contaminated groundwater from other aquifers. Bedrock is reached at approximately 300 feet, however, groundwater from the bedrock contains high concentrations of many minerals, and therefore is not used as a drinking water supply. The six municipal wells tap an aquifer above bedrock at depths greater than 200 feet. The groundwater flows to the northwest toward the river.

Exposure to contaminants via food sources (fish and wildlife) has occurred and may possibly still be occurring. The MDPH has issued a consumption advisory for fish taken from the Pine River because of the levels of PBB found in fish samples. PBBs, although not very soluble in water, are known to bioaccumulate and are persistent in the environment.

Prior to remedial actions, PBBs probably migrated off-site via erosion and track out. PBB contamination in surficial soils has been identified throughout the entire St. Louis area.

Human exposure to contaminated groundwater does not seem to be occurring at this time. The remedial investigation and monitoring activities indicate groundwater contamination has not migrated off-site. The six municipal wells in the area have not been contaminated.

Human exposure to on-site soil is not a concern because contaminated soil was sealed in a specially designed on-site disposal area.

River sediments represent a potential route of human exposure either by direct contact or contamination of fish and wildlife. It was once proposed that the dam be removed, however, this might have caused the river sediments to be redistributed and possibly become more of a threat to human health.

Occupational health effects are being monitored by the Michigan Long-Term PBB Health Study which has established a registry to keep track of PBB exposed populations. One of the populations registered includes workers exposed to PBB on the job and their families. The study was established by the MDPH, the Center for Disease Control (CDC), the Food and Drug Administration (FDA), and the U.S. EPA.

Conclusions and Recommendations

Based upon the information reviewed, this site is of potential public health concern because of the risk to human health that could result from possible human exposure to hazardous substances at levels that may result in adverse human health effects over time. As noted in the Potential Environmental and Human Exposure Pathways section above, occupational exposure to many harmful contaminants, including PBB and DDT, has occurred and exposure to the general population may possibly still be occurring via ingestion of contaminated fish and wildlife.

Fish and wildlife (especially game animals) in the area should be periodically sampled and analyzed for contaminants of concern, particularly PBBs. The sediments of the Pine River should not be disturbed or the downstream dam removed without careful consideration of the potential redistribution of contaminants in sediment deposits. Currently, the MDNR is overseeing U.S. EPA approved maintenance and monitoring operations. These operations include weekly inspections for signs of deterioration, quarterly monitoring of gas vents, measurements of groundwater levels within the contained site and slurry wall permeability testing. Groundwater monitoring should periodically be done on-site and off-site to identify and track any contaminant plumes that may occur.

In accordance with the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) as amended, the Velsicol site has been evaluated for appropriate follow-up with respect to health studies.

Although there are indications in the information and data reviewed for this Health Assessment that human exposure to on-site/off-site contaminants has previously occurred, this site is not being considered for follow-up health studies at this time because a long-term health study is currently established.

Sources:

MDFH files

ATSDR Site Summary Sheet, May 1988

MDNR Site Status Sheet, February 1988

U.S. EPA Site Inspection Report, May 1982

Hazard Ranking Sheets, July 1982

Investigation for Hazardous Waste Contamination, Velsicol Chemical Corporation Plant Site, St. Louis, MI, 1980

Dames and Moore: Investigation of Potential Contamination of the St. Louis Plant Site, April 1979

Summary of Medical Report, Health Hazard Evaluation, Velsicol Company, St. Louis, MI, 1979

Environmental Health Perspectives, Vol. 23, 1978, related articles

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