Health Consultation

Management of Air Releases

ASHLAND LAKEFRONT/NSP SITE
(a/k/a ASHLAND/NORTHERN STATES POWER LAKEFRONT)

ASHLAND, ASHLAND COUNTY, WISCONSIN

EPA FACILITY ID: WISFN057952

DECEMBER 13, 2001

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

Management of Air Releases

ASHLAND LAKEFRONT/NSP SITE
(a/k/a ASHLAND/NORTHERN STATES POWER LAKEFRONT)

ASHLAND, ASHLAND COUNTY, WISCONSIN

EPA FACILITY ID: WISFN0507952

Prepared by:

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

Summary

The Wisconsin Department of Natural Resources (DNR) requested advice from the Department of Health and Family Services (DHFS) regarding potential human health issues related to air releases from investigations and remediation at the Ashland former manufactured gas plant (MGP). Environmental actions at former manufactured gas plants have caused airborne releases elsewhere that adversely affected human health. The Ashland MGP site is very close to homes and an elementary school. Air management and action levels at the Ashland MGP site should focus on benzene releases and be designed to protect both occupational and public exposures. DHFS recommends adjusting the perimeter and work zone action levels for volatile organic compounds and adding monitoring of particulates. Compound-specific air sampling should be conducted along the perimeter when the worst contamination is encountered. Additional parameters should be considered for worker zone air monitoring. A 24-hour telephone hotline should also be established to help address community concerns.

Background

A manufactured gas plant (MGP) operated at 300 St. Claire Street, Ashland, Wisconsin, from the 1880s until 1947. Environmental investigations in the 1990s revealed extensive contamination from volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs) in the Chequamegon Bay sediments, groundwater, and soils beneath Kreher Park. The former MGP site is located on a clay bluff immediately above the park and is associated with contaminants in sediments. In 1995, the Wisconsin Department of Health and Family Services (DHFS) evaluated the contamination at Kreher Park and concluded that SVOCs in Chequamegon Bay sediments pose a public health hazard to people who come in contact with coal tar slicks released from affected sediments and recommended that people avoid direct contact with contaminated sediments and tar slicks *(1)*. In 1999, DHFS evaluated SVOCs in fish from Chequamegon Bay at Kreher Park. DHFS found that SVOCs are not a health concern for people who eat these fish daily *(2)*. Current investigations at Kreher Park and at the former MGP site (currently owned by Xcel Energy) are attempting to clarify the relationship between contamination at these locations and the sources.

Contaminated soils, sediments, and groundwater at MGP sites typically contain a complex mixture of coal tars and inorganic wastes. Such coal tars are represented by 500 to 3000 separate semi-volatile aromatic compounds of three to six benzene rings, phenolics, volatile aromatic compounds of single and double benzene rings, and inorganic compounds of sulfur and nitrogen. Additionally, MGP oxide box wastes contain high concentrations of sulfoxides and metal cyanides. Contaminant conditions depends upon the location and method of disposal of MGP wastes, as well as the depth and confinement of perched water and groundwater aquifers at individual sites. Coal tar contaminants in soils, sediments, and surface water at former MGP sites can be substantial and can represent a human health concern for people who come into direct contact with the contaminants. Furthermore, the airborne releases of volatile chemicals are common when the affected media is uncovered at former MGP sites, for example, during site excavation and remediation.

The URS Corporation has proposed to search for a buried pipe in an area immediately adjacent to the former MGP site, on the north side of St. Clare Street, which is owned by Xcel Energy *(3)*. This investigation was estimated to take five days and was planned to start on September 17, 2001. The work plan describes excavating a trench, up to 60 feet long and 10 feet deep, in order to discover this buried pipe. The work might result in encountering non-aqueous phase liquids (NAPL) or pure products of MGP wastes. Such NAPL wastes, if encountered, will be stockpiled and disposed. Airborne releases are likely during the investigation. In anticipation, the URS Corporation work plan described air action levels for the work area. The URS on-site worker breathing zone action levels for *total VOC* exposure durations greater than one minute are: (1) > 15 parts per million (ppm) – workers use respiratory protection; (2) > 75 ppm – increase worker respiratory protection; and (3) > 150 ppm – halt site activities and exercise emission controls. URS Corporation does not propose compound-specific action levels.

Discussion

Investigations and remedial actions at former MGP sites have shown that air releases can be significant and can adversely affect human health. Elsewhere in Wisconsin, DHFS has responded to odor and health concerns from people who live or work in homes and businesses adjacent to a MGP undergoing investigation and remediation. Many MGP sites have been remediated without health complaints, even though strong odors have been released. However, MGP odor complaints and inhalation exposures have been linked to immediate reports of acute, but reversible, symptoms. In one instance, workers of a bank adjacent to a MGP site undergoing cleanup reported they breathed smelly air from the site and shortly afterwards developed head aches, sore throats, coughing, body aches, and headaches. Several of the bank employees reported they soon after developed flu-like symptoms (fever and chills). At another site, employees of a commercial facility were exposed to dust and odors escaping from an adjacent thermal desorption process that was treating MGP waste soils. Several workers complained of tar odors, headaches, and an unpleasant taste in their mouth. Indoor air tests revealed the presence of trace amounts of benzene, toluene, and unpermissible levels of xylenes. The source of the exposure was traced to the untreated MGP soil staging area and was blamed partly on unseasonably warm and windy conditions. Although a number of MGP remedial actions have been successfully undertaken over the past several years, health and environmental agencies in other states have reported similar inhalation exposures and subsequent health symptoms in people who worked or lived near the MGP sites undergoing an investigation or cleanup. Such human health concerns may also be encountered during excavations and remediation at the Ashland former MGP site.

DHFS recognizes that airborne releases and odor problems from investigative or cleanup actions at MGP sites vary. Factors that affect these releases or problems include:

(1) encountering NAPL, coal tars, or pure MGP wastes;
(2) minimizing excavations to small-sized or limited, open face areas;
(3) ambient temperatures during excavation:
    a. cold weather-timed actions minimizes volatilization and airborne releases;

b. cold weather-timed actions reduces non-worker exposures because windows and doors in nearby homes are usually closed, and spectators are less likely to spend time watching actions at the site;

(4) remote site location with no nearby homes or businesses resident or workers; and,

(5) rigorous air management actions.

A particular concern at the Ashland MGP site is the close proximity of homes and a school. Houses east of the Xcel Energy property are within 100 feet of the planned trench. The playground of Our Lady of the Lake Catholic School is within 200 feet of the planned trench.

The most malodorous compounds released during investigation and excavation of MGP sites are naphthalene and sulfur-based compounds. Those compounds typically have odor threshold concentrations that are much less than concentrations known to cause human health effects. However, people with respiratory conditions tend to be more sensitive than the general population.

People with existing respiratory ailments can be affected by airborne releases from MGP-affected media. In Wisconsin, nine percent of children and seven percent of adults suffer from asthma. Ten percent of older adults and five percent of all adults have emphysema or chronic bronchitis *(4)*. Therefore, some nearby residents and students are likely to suffer from such respiratory ailments. Those individuals are the most sensitive to effects from airborne releases that can come from planned actions at the Ashland Lakefront/NSP site.

Airborne releases from the investigation or remedial excavation of MGP sites often includes benzene, a known human carcinogen and a sensitive trigger for air management. Consequently, MGP air management decisions and action levels should focus on the potential for a benzene release. The total VOC action levels proposed by URS are apparently intended to protect workers, but are well above occupational exposure guidelines for benzene. For benzene, the ACGIH time-weighted average (TWA) for benzene is 0.5 ppm, the NIOSH TWA is 0.1 ppm, and the OSHA TWA is 1.0 ppm. Furthermore, the ACGIH 15 minute short-term exposure limit for benzene is 2.5 ppm, and the NIOSH immediately dangerous to life or health limit is 500 ppm.

Where schools or homes are near a MGP work site, such as in Ashland, air management considerations should consider public as well as occupational exposures. DHFS recommends perimeter air monitoring in addition to worker breathing zone monitoring. Based on the occupational guidelines, DHFS recommends the following preliminary action levels.

Preliminary Action Levels

URS Action Level (ppm)	Recommended DHFS Action Level (ppm)	Location	Actions
-	0.1 total VOCs	perimeter	worker breathing protection test for benzene initiate vapor control measures
	or		
15.0 total VOCs	0.5 total VOCs	worker breathing zone	worker breathing protection test for benzene initiate vapor control measures
-	0.5 total VOCs	perimeter	halt site activities
	or		
-	0.5 benzene	worker breathing zone	halt site activities
	or		
150.0 total VOCs	5.0 total VOCs	worker breathing zone	halt site activities

ppm = parts per million

These preliminary DHFS action level recommendations take into consideration the close proximity of nearby homes and the school, the small size of the area targeted for excavation, and the short time frame planned for this investigation. Future MGP remediation action levels from DHFS may be adjusted based on different circumstances or conditions.

Particulates should also be screened at the work area and at the perimeter because SVOCs adsorbed to particulates are an important route of distribution and human exposure. DHFS recommends that the particulate action level be set at 1.0 milligram per cubic meter (mg/m^3). An exceedance of the particulate action level should initiate reduction of site activities and aggressive dust suppression.

Within DHFS, the Bureau of Environmental Health does not typically provide guidance on occupational safety and protection measures. However, DHFS suggests that at MGP sites undergoing remediation, the worker breathing zone is regularly screened for: (1) lower-explosive limit; (2) carbon monoxide; (3) percent oxygen; (4) hydrogen sulfide; and (5) hydrogen cyanide. While significant releases of hydrogen cyanides are uncommon during the remediation of former MGP sites, elevated metal-complexed cyanides are often found at such sites. Certain environmental conditions can exist at former MGP sites that allows release of hydrogen cyanide, and this calls for appropriate air monitoring.

Finally, when the investigators encounter product or NAPL conditions, air should be tested for a full screen of volatile organic compounds. Such quantitative data can provide valuable information that supplements the less sensitive data collected with handheld instrumentation.

DHFS recommends upwind and downwind ambient air sampling that employs Environmental Protection Agency methods TO-14 or TO-15, which uses Summa® canisters.

Public outreach is important prior to and during any MGP site remediation. This outreach avoids problems, alleviates concerns, answers questions, and addresses complaints. Public meetings and fact sheets can improve the public's knowledge of anticipated odors and other air emissions, and as well as related issues. Special efforts should be made to identify and inform sensitive populations in the affected area. A 24-hour telephone number should be available to the public and businesses so they can call with questions or complaints.

Child Health Issues

DHFS recognizes that children are especially sensitive to some contaminants. Children were considered the most sensitive population when preparing in this health consultation. Children have not been exposed to site-related contaminants, but because of the proximity of the proposed excavation area to an elementary school, children could be exposed to contaminants at that time. The DHFS recommendations documented in this document are protective of children and young students near the planned investigation site.

Conclusions

Environmental actions at former manufactured gas plants have caused airborne releases that can be significant and can adversely affect human health. The Ashland MGP site is very close to homes and an elementary school.

Recommendations

1. Air management and action levels at the Ashland MGP site should focus on the potential for benzene releases.

2. DHFS recommends preliminary action levels for managing releases of volatile organic compounds and particulates. Worker zone air monitoring should include lower-explosive limit, carbon monoxide, percent oxygen, hydrogen sulfide, and hydrogen cyanide. Quantitative air sampling should be considered when the worst contamination is encountered.

3. In addition to the planned public outreach, a 24-hour telephone hotline should be established for the public.

Public Health Action Plan

1. DHFS will continue to work cooperatively with DNR and the Ashland County Health Department to ensure that public health concerns and issues are addressed about the Ashland Lakefront/NSP site.

2. DHFS will continue to respond to requests from the public and other agencies about the human health concerns and questions related to the Ashland Lakefront/NSP site.

References

1. Memorandum from K Bro (Department of Health and Social Services) to J Dunn (Department of Natural Resources). Health Consultation on Exposure to Coal Tar Associated with the Manufactured Gas Plant site in the City of Ashland. October 23, 1995.

2. Agency for Toxic Substance and Disease Registry. Public Health Consultation - Fish Tissue Exposure Investigation, Contaminated Chequamegon Bay Sediments at Kreher Park, Ashland, Wisconsin. Atlanta, GA: ATSDR. October 25, 1999

3. URS Corporation. Correspondence to J. Dunn. Work Plan to Perform Pipe Investigation. Madison, WI: URS. August 17, 2001.

4. Department of Health and Family Services, Bureau of Health Information. Wisconsin Family Health Survey - 1999. PHC-5281. Madison, WI: DHFS. July 2001.

Consultation Preparer

Henry Nehls-Lowe, MPH
Epidemiologist
Bureau of Environmental Health
Division of Public Health
Wisconsin Department of Health & Family Services

CERTIFICATION

This Ashland Lakefront/NSP public health consultation on Air Management Issues was prepared by the Wisconsin Department of Health and Family Services 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 public health consultation was begun.

_____

Technical Project Officer, SPS, SSAB, DHAC

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

_____

Chief, SPS, SSAB, DHAC, ATSDR