Health Consultation

Reuse of Former Waste Water Treatment Plant

ASHLAND/NORTHERN STATES POWER LAKEFRONT

ASHLAND, ASHLAND COUNTY, WISCONSIN

EPA FACILITY ID: WISFN057952

NOVEMBER 12, 2003

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

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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

Reuse of Former Waste Water Treatment Plant

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 Health and Family Services was requested to evaluate the public health issues of proposed reuse of the former Waste Water Treatment Plant (WWTP), in the city of Ashland. The former WWTP is situated in the midst of substantial environmental contamination that is probably affecting the indoor air quality of the facility, but the building is not currently in use. The levels of airborne contaminants inside the building may be a health concern in the future for people who would spend time in the building. A 2002 indoor air investigation concluded that certain contaminants were not a health concern, but this investigation did not study all the volatile chemicals that contaminate this area. Indoor air at the WWTP is an **indeterminate public health hazard** because of the insufficient data. If the WWTP is to be reused, a more thorough indoor air investigation is needed. If unsafe contaminant vapors are found in the air of the former WWTP, the complexity of facility and site conditions make it difficult and costly to properly address vapor intrusion issues.

Buildings at the former WWTP are locked and the perimeter is fenced, but trespassers can easily get inside the fence and reach the outdoor treatment/settling tanks. These tanks are a concern because a someone could accidently fall into one and be unable to escape. Additional site control measures are needed to prevent trespassers from getting inside fenced areas of the WWTP.

Background

The Wisconsin Department of Natural Resources (DNR) requested assistance from Wisconsin Department of Health and Family Services (DHFS) regarding the human health implications of the non-residential reuse of the former Ashland Waste Water Treatment Plant (WWTP), in Kreher Park and along Chequamegon Bay, in the city of Ashland. The former Ashland WWTP is part of the Ashland/Northern States Power (NSP) Lakefront Superfund site, which is located in Ashland, Wisconsin.

This Superfund site is bordered by US Highway 2 to the south, Prentice Avenue to the east, Ellis Avenue to the west, and Chequamegon Bay to the north. The contaminated properties cover approximately 12 acres. From south to north, they include Northern States Power Company (now referred to as Xcel Energy), the Wisconsin Central Limited Railroad corridor, Ashland's Kreher Park (including the former WWTP), and contaminated sediments in Chequamegon Bay. The site encompasses two sources of contamination: sediments in Chequamegon Bay and areas where contamination has migrated as a result of activities apparently associated with MGP operations historically conducted at the Xcel Energy property above the bluff.

The upland area that is now Kreher Park was previously in Chequamegon Bay. It was created between the late 1880s and early 1900s by dumping wood wastes, soil, sand, and demolition wastes into Chequamegon Bay. Ashland built the former WWTP at Kreher Park in 1949. In 1991, Ashland shut down the WWTP at Kreher Park and relocated waste water treatment

operations to a new facility on the eastern side of the city. The former WWTP facility at Kreher Park consists of multiple buildings and concrete sludge and treatment/settling tanks. The depth to groundwater beneath the former WWTP is less than 5 feet.

Groundwater beneath the WWTP at Kreher Park and adjacent Chequamegon Bay sediments have moderate to high concentrations of contaminants that are related to wastes from a former MGP (manufactured gas plant) site. These MGP-related contaminants include the lighter fractions single-ringed aromatic compounds, such as BETX compounds (benzene, ethylbenzene, toluene, and xylenes). They also include heavier fractions of multiple-ringed aromatic compounds, which are often referred to as polycyclic aromatic hydrocarbons (PAHs). Groundwater in the immediate vicinity of the former WWTP has benzene concentrations between 450 and 513 micrograms per liter (µg/L) (SEH, 1997). Groundwater in this area has naphthalene (a PAH) levels ranging between 33 and 2,290 µg/L.

Buildings at the former Ashland WWTP include subgrade basement rooms. Because groundwater is fairly shallow at Kreher Park, sumps must be pumped regularly to keep groundwater from infiltrating into the subgrade rooms. In late 2001, Ashland stopped operating sump pumps inside the WWTP, and water has infiltrated these rooms.

In 2002, a consultant for Ashland inspected the inside of the WWTP and collected indoor air samples to evaluate the WWTP "for potential exposures to airborne levels of organic vapors and coal tar pitch volatiles" (Parker Services 2002). This investigation was to address potential inhalation exposure to city workers who regularly return to the WWTP to conduct ongoing operation and maintenance activities. A single round of indoor air samples was collected and analyzed for selected PAHs, trimethylbenzene, and acetic acid. Samples were not analyzed for lighter PAH compounds (such as naphthalene), nor for other single-ringed aromatic compounds, including BETX.

Buildings that comprise the former WWTP are secured, and a chain link fence runs around the perimeter. All windows are boarded and doors are locked. In Sept 2002, DHFS and representatives from DNR and the city inspected outside the WWTP. They observed that a stairway in between two of the WWTP buildings allows easy access inside the fenced area of the WWTP, where empty treatment/settling tanks are located. These tanks are more than 10 feet deep, have vertical walls, and have no ladders or rungs to provide egress or easy rescue if someone falls into a tank. DHFS recommends additional actions be taken to prevent easy access into the internal area of the WWTP.

Discussion

The principal public health question about the reuse of the former WWTP at Kreher Park is whether future workers or occupants may regularly breathe unacceptable levels of volatile contaminants that could be coming into the buildings.

On the basis of what is known about contaminants and conditions at Kreher Park and the former WWTP, solvent vapors of MGP-related compounds are probably in the indoor air of the former Ashland WWTP. Volatile organic compounds, such as BETX and certain PAHs (such as naphthalene), are at elevated concentrations in very shallow groundwater around the building. When groundwater is highly contaminated with solvents, vapors can be released, migrate through soils, and enter nearby buildings. However, at the former WWTP, it is apparent that contaminated groundwater is not only beneath the buildings, but also in direct contact with building foundations. Sump pumps were needed at the WWTP to keep groundwater from infiltrating the building. These pumps are no longer operating, and groundwater has entered the buildings. Standing water is now inside the subgrade portions of the WWTP buildings. Inside some subgrade portions of the former WWTP, water is up to 8 feet deep. The water inside of the subgrade portions of the WWTP is probably contaminated with BETX and PAHs at similar levels as found in nearby groundwater. The lighter fractions of the contaminants in this water can easily partition from water to vapor and then impact indoor air. After the WWTP closed operations, both former WWTP workers and others who entered the building have reported they occasionally noticed strong petroleum and MPG-type odors.

At high concentrations, vapors of MGP-related contaminants in the air inside of the former WWTP could pose an unacceptable inhalation health risk if people regularly breathe the contaminated air. Benzene could be present in the water in the basements at levels as high as 513 µg/L, as found in groundwater monitoring wells. As a comparison, when homes have benzene in tap water greater than 100 µg/L, DHFS recommends residents only use this water for flushing toilets because the benzene that off-gasses from typical domestic water use can be at concentrations in the indoor air that could pose an unacceptable, long-term inhalation health risk for residents. However, in contrast to breathing the air 7 days a week for up to 24 hours a day in a home setting, people at the WWTP would be exposed to contaminants in indoor air, on average, 8 hours a day, 5 days a week.

Sampling standing water inside the WWTP could provide information about contaminants that may be partitioning into air as vapors. However, indoor air sampling at the Ashland WWTP would be more useful in evaluating whether or not there is an unacceptable inhalation health risk. The 2002 indoor air sampling at the WWTP only examined trimethylbenzene and the less volatile PAHs. Air samples were not analyzed for BETX and other PAH compounds with greater volatility, such as naphthalene. As a result, DHFS is unable to fully address human health questions and concerns related to the presence of vapors in the indoor air of the Ashland WWTP with data from that investigation.

If there is a significant indoor air problem at the former WWTP, the existing groundwater conditions and contamination are causing a problem that could be difficult to manage or mitigate. One technical approach available to prevent vapor migration and intrusion is to remove vapors before they reach the outside of a building foundation. In this case, however, groundwater is in direct contact with the sub-grade foundation, and such vapor mitigation would not work for WWTP structures.

Removing all contaminated standing water from inside the WWTP subgrade areas would have a direct and positive impact on reducing indoor air contaminant vapors. Despite this, a portion of contaminants brought inside by groundwater would have been absorbed onto and inside of concrete foundations. Also, contaminants in groundwater would have continuous contact with the outside subgrade foundations. Contaminants absorbed in concrete could continue to off-gas notable vapor concentrations into indoor air.

Another approach is to prevent vapor intrusion by applying a heavy, impermeable membrane on the inside of the existing foundation, which then serves as a physical barrier that blocks vapors from entering through cracks, holes, or other preferential pathways. However, manufacturers of these barriers report an increased failure when the membrane comes in direct contact with contaminants, particularly at moderate to high concentrations. Because contaminants at the Ashland WWTP have already come in direct contact with the inside and outside surfaces of building foundations, the use of such a barrier may not be recommended by manufacturers. Consequently, it is unclear what other options are available to confidently prevent a potential vapor problem at the former Ashland WWTP.

Child Health Considerations

DHFS evaluated the likelihood that children living near the Ashland/NSP Lakefront site may be exposed to contaminants at the former WWTP at levels of health concern. Children are unlikely to enter the former WWTP and breath indoor air. DHFS did not identify any situations in which children were likely to be exposed to harmful levels of chemical contaminants attributed to the site. However, older children could get inside the fenced perimeter, go near and play around the treatment/settling tanks, and fall inside. This further justifies restricting access to inside the fenced area of the former WWTP.

Conclusions

1. Solvent vapors of MGP-related compounds are probably in the indoor air of the former Ashland WWTP, but the building is not currently being used. Vapors may be high enough inside the WWTP to pose an unacceptable inhalation risk in the future for people who might spend time in the building.

2. A previous indoor air investigation at the WWTP ruled out health concerns of certain contaminants, but this investigation did not examine the full suite of MGP-related volatile compounds. This is an **indeterminate public health hazard** because of the insufficient indoor air data.

3. If high levels of contaminant vapors are in the air of the former WWTP, the existing conditions at the facility can complicate mitigation options to address these indoor air issues and allow for the redevelopment and reuse of buildings.

4. Buildings at the former WWTP are locked and the perimeter is fenced, but trespassers can easily get inside the fence and reach the outdoor treatment/settling tanks. These tanks are a physical hazard because a someone could accidently fall into a tank and be unable to escape.

Recommendations

1. A thorough indoor air investigation of the former WWTP is needed before final reuse decisions are made about the facility.

2. Additional site control measures are needed to prevent trespassers from going inside fenced areas of the WWTP where the empty treatment/settling tanks are located.

Public Health Action Plan

1. DHFS will continue to work with the Wisconsin DNR remediation and redevelopment team to ensure that the site recommendations are implemented for the Ashland/NSP Lakefront site.

2. DHFS will continue to conduct public health outreach of community stakeholders, involving them in the decision making about the Ashland/NSP Lakefront site.

3. DHFS will coordinate public health outreach and community involvement activities with the Ashland County Health Department, local citizen groups, and other involved parties.

References

1. Short Elliot Hendrickson, Inc. Comprehensive Environmental Investigation Report - Ashland Lakefront Property. Chippewa Falls, WI: SEH. May 1997.

2. Parker Services, Industrial Hygiene. Technical Report for the City of Ashland WWTP. Project No. 02-100-030. Stevens Point, WI: Parker Services. May 1, 2002.

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CERTIFICATION

This Ashland Former Waste Water Treatment Plant Reuse Public Health Consultation 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.

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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.

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Chief, SPS, SSAB, DHAC, ATSDR