Letter Health Consultation

Vapor Intrusion Investigation of the Residential Area Adjacent to the Former

OCONOMOWOC ELECTROPLATING COMPANY, INC. SITE

CITY OF ASHIPPUN, DODGE COUNTY, WISCONSIN

Prepared by
Wisconsin Department of Health Services

JANUARY 29, 2016

Prepared under a Cooperative Agreement with the
U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Agency for Toxic Substances and Disease Registry
Division of Community Health Investigations
Atlanta, Georgia 30333

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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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LETTER HEALTH CONSULTATION

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To: Jody Langfeldt, Public Health Officer, Dodge County Health Department

From: Adam Streiffer, Health Assessor, Wisconsin Division of Public Health

Date: January 29, 2016

Subject: Vapor Intrusion Investigation of the Residential Area Adjacent to the Former Oconomowoc Electroplating Company, Inc. Site, City of Ashippun, Dodge County, WI

In 2011, the Wisconsin Department of Health Services (DHS) and Department of Natural Resources (DNR) requested the U.S. Environmental Protection Agency (EPA) to conduct an investigation for vapor migration and intrusion at homes adjacent to the Oconomowoc Electroplating Company Inc. (OECI) Superfund site in Ashippun, Wisconsin. In April 2013, the EPA requested assistance from DHS to review and provide comments on the vapor intrusion (VI) investigation results and report to evaluate whether there are potential VI issues that warrant further evaluation or mitigation.

Under a cooperative agreement with the federal Agency for Toxic Substances and Disease Registry (ATSDR), DHS reviewed the investigation's findings and concludes that contaminants in the groundwater near the OECI site are not expected to harm people's health because people are unlikely to be exposed to contaminants through the vapor intrusion pathway. A 2012 groundwater investigation using shallow temporary monitoring wells around these homes did not find any site-related contaminants that exceeded screening criteria. Multiple lines of evidence are generally a best practice for making health determinations in vapor intrusion cases. While only one line-of-evidence was used in making the determination, DHS concurs with the EPA investigation's finding that it is unlikely that contaminants in nearby groundwater could cause indoor air levels to be above health-based guidelines.

DHS recommends continued groundwater monitoring near the homes. If groundwater conditions or contaminant levels change in the future, DHS recommends the vapor migration and intrusion pathway be re-evaluated at these homes via multiple lines-of-evidence (e.g. indoor air sampling, sub-slap vapor sampling, soil-gas sampling).

Background and Public Health Concerns

Site History

Oconomowoc Electroplating Company, Inc. (OECI) is a former electroplating site that operated from 1957 to 1990 and used various chlorinated solvents, cyanide, and heavy metals, including chromium, cadmium, copper, nickel, tin and zinc in its electroplating and metal cleaning processes. OECI is located in Ashippun, Wisconsin, in the southeastern portion of Dodge County. When operating, OECI discharged untreated wastewater from the facility and into nearby wetlands and Davy Creek. Plating-related activities also contaminated groundwater and soils with solvents and heavy metals. Cleanup actions were conducted by the U.S.

Environmental Protection Agency (EPA) beginning in 1990 with the listing of OECI as a Superfund Site and the issuance of the Record of Decision (ROD). In 1996, a groundwater extraction and treatment system was built, and was run until 2004 when EPA authorized its shutdown.

A Public Health Assessment (PHA) of the site was performed in 1994 by the Wisconsin Department of Health Services (DHS) (then the Department of Health and Social Services) under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR)[1]. The PHA reviewed all existing contamination data related to the OECI site, including off-site sampling data. A number of potential pathways of exposure were identified, including ingestion of contaminated groundwater and surface soils, inhalation of contaminated dust, dermal absorption of contaminated soils from contact with the nearby contaminated wetland area, and ingestion and dermal absorption of contaminated lagoon liquids and sludge. It was concluded that the OECI site posed a public health hazard, with the primary hazard being ingestion of possible future increased levels of contaminated groundwater.

Based on the previous site review and conclusions, DHS recommended continued regular monitoring for contaminants in the on- and off-site wells, including residential groundwater wells, to provide early warning of possible migration of site contaminants off-site towards the residential area, and to reduce the possibility of ingestion exposures. Regular monitoring of nearby private wells has not detected any site-related contaminants above state or federal drinking water standards, or ATSDR Comparison Values (CVs) for drinking water.

In 2011, EPA amended the ROD to allow for natural attenuation going forward at the site. DHS and the Wisconsin Department of Natural Resources (DNR) raised concerns regarding the possibility of a completed vapor intrusion (VI) pathway into the nearby residential homes northwest of the site. Trichloroethylene (TCE) levels in shallow groundwater monitoring wells in the vicinity of these residential homes demonstrated the potential for a VI pathway to exist.

At the request of DHS and DNR, the EPA initiated a VI investigation of the off-site residential area in November and December 2012. The purpose of the VI investigation was to determine if certain volatile organic chemicals (VOCs) related to historic OECI operations, including TCE, were present in the shallow groundwater in the residential area, and if so, to evaluate the potential for these VOCs to cause indoor air concentrations above target levels within the residences via the VI pathway.

In April 2013, the EPA requested assistance from DHS to review and provide comments on the VI investigation results and report[2] to evaluate whether there are potential VI issues that warrant further evaluation or mitigation. This letter serves as that review.

Conceptual Site Model

A number of VOCs have historically been identified at the OECI site, and detected in shallow groundwater near or within the residential area. The majority of the VOCs historically found in

1) http://www.atsdr.cdc.gov/hac/PHA/oconomowoc/oec_p1.html

the residential area have been below health-based Wisconsin Enforcement Standards (ES) and ATSDR CVs. Wisconsin ES are regulatory limits for contaminants in groundwater that are protective of public health. ATSDR CVs are non-regulatory guidelines for levels of contaminants in drinking water that are below levels protective of public health. All VOCs found in permanent shallow monitoring wells in the vicinity of the residential area during the 2012 sampling event were below their respective ES and CVs; however, several wells had TCE or vinyl chloride levels above Wisconsin Preventative Action Limits (PALs). In addition, one deep private well had TCE above the Wisconsin PAL. Wisconsin PALS are regulatory guidelines for contaminants in groundwater that are more conservative than Wisconsin ES and are intended to indicate that further review or action may be necessary.

The residential area is down and cross-gradient from the OECI site, which is to the east of the residential area (see **Figure 1** from the EPA consultants' report[2], reproduced below). Historically, shallow groundwater flowed to the south from the OECI site; however, monitoring in November 2012 indicated the flow was more westward, towards the residential area. It is speculated that the drought conditions in 2012 contributed to this change in flow direction and it is likely a temporary change. Deeper, bedrock groundwater generally flows in a more westward direction toward the residential area from the Site.

Groundwater elevations also have fluctuated over time, partially as a result of the drought conditions in 2012. The April 2013 EPA report[2] examined these fluctuating water levels, and concluded that the potential exists for groundwater levels in some years to be in contact with some of the building foundations. DHS agrees with this assessment and the use of this conceptual approach as appropriate and the most conservative and protective conceptual approach for contaminant volatilization and assessing for potential human exposure via the vapor migration and intrusion (VI) pathway.

Discussion

Groundwater Sampling, Results and Screening Criteria

Groundwater samples were collected and analyzed for VOCs from 15 temporary wells installed on a grid pattern in the residential area to the west of the site. Sampling was targeted at the top two feet of the groundwater table to best represent the VOC concentrations that could volatilize and pass through the vadose zone of the soil (i.e., the uppermost, unsaturated soil zone) and through building foundations, into the homes' indoor air.

In typical circumstances, groundwater VOC concentrations can be evaluated for potential impacts to indoor air by comparing to generic VI groundwater screening levels (GWSLs), derived from the current EPA VI Screening Level (VISL) Calculator[3]. However, for this site, the GWSLs cannot be accurately used for evaluating potential VI, as the water table is less than 5 feet below building foundations; thus, the assumptions used in the calculator are not stringent enough to screen out potential VI risks. Based on this shortcoming, EPA's report evaluated for

2) CH2M HILL. April 26, 2013. Vapor Intrusion Investigation Results, Oconomowoc Electroplating Company, Inc., Ashippun, Wisconsin. WA No. 145-RDRD-05M8/ Contract No. EP-S5-06-1

3) Found at this online location: www.epa.gov/oswer/vaporintrusion/documents/VISL-Calculator.xlsm

VI by comparing groundwater concentrations Federal Drinking Water Standard Maximum Contaminant Levels (MCLs), with the assumption that the drinking water standards are "sufficiently protective of inhalation exposure since volatilization occurs during potable use of drinking water" [4].

In order for an individual to be exposed by vapor intrusion, the VOCs in the groundwater need to penetrate through a building's foundation. However, there is no VI screening value for direct groundwater to foundation contact (GWSLs are calculated with the assumption that there is at least 5 feet of soil between the groundwater and the building foundation). As such, DHS concurs with EPA's report, with one slight variation: that using the lower of the MCL or the GWSLs is an appropriate screening value available for this scenario (when only groundwater VOC concentrations are available).

Table 1 below, modified from the recent consultant's report[4], summarizes the recent VOC groundwater detections and compares them to Federal MCLs, as well as EPA and Wisconsin reference comparison values. It is worth noting that although vinyl chloride was not detected in the recent sampling event, the laboratory detection limits for vinyl chloride are higher than the Wisconsin ES and EPA VI GWSLs. While VOC constituents were detected in several temporary monitoring wells, no detected VOC concentrations exceeded the screening criteria. As a result, based on this single line-of-evidence, it does not appear that volatile organic contaminants in shallow groundwater near homes pose a health concern for the VI pathway, if the limited available sampling is representative of the actual exposure scenario.

Multiple lines of evidence are generally a best practice for making health determinations in vapor intrusion cases. However, it appears that due to the drought conditions, the change in groundwater flow toward the residential area is likely a temporary change, and a worse case than normal groundwater flow conditions. In addition, the use of the lower of MCLs or GWSLs is a more conservative approach than use of either value alone. However, because only one line of evidence was used, DHS recommends continued groundwater monitoring near the homes. If groundwater conditions or contaminant levels change in the future, DHS recommends the vapor migration and intrusion pathway be re-evaluated at these homes via multiple lines-of-evidence (e.g. indoor air sampling, sub-slap vapor sampling, soil-gas sampling).

Lastly, it is worth noting difficulties were encountered by EPA in obtaining the shallow temporary monitor well samples. The original sampling plan had to be modified, and well screens were placed an additional foot into the groundwater saturated zone (below the top of the water table) in order to obtain sufficient flow to sample. Even with this modification, the flow was too low to obtain water quality field indicator parameters (i.e. turbidity, temperature, specific conductance, pH, Eh, dissolved oxygen). Without these water quality parameters, we are unable to adequately determine if the samples had equilibrated, and thus were representative of groundwater, and if the samples were of low enough turbidity for laboratory results to be accurate. While these conditions are not ideal, because of the consistency of results with prior

4) CH2M HILL. April 26, 2013. Vapor Intrusion Investigation Results, Oconomowoc Electroplating Company, Inc., Ashippun, Wisconsin. WA No. 145-RDRD-05M8/ Contract No. EP-S5-06-1

investigations DHS feels the sample results are adequate to use as screening data for evaluating the VI pathway.

Child Health Considerations

In communities faced with air and water contamination, the many physical differences between children and adults demand special emphasis. Children are often at greater risk when exposed to hazardous substances because their lower body weight and higher intake rate results in a greater dose of hazardous substance per unit of body weight. If toxic exposure levels are high enough during critical stages of development or growth, the developing body systems of children can sustain permanent damage. Finally, children are dependent on adults for access to housing, food, medical care and risk identification. Thus adults need as much information as possible to make informed decisions regarding their children's health.

Conclusions

DHS concludes that the contaminants in the groundwater near the OECI site will not harm people's health because people are unlikely to be exposed to the contaminants through the vapor intrusion pathway.

A 2012 groundwater investigation using shallow temporary monitoring wells around these homes did not find any site-related contaminants that exceeded screening criteria. Multiple lines of evidence are generally a best practice for making health determinations in vapor intrusion cases. While only one line of evidence was used in this instance, DHS concurs with EPA's investigation's finding that it is unlikely that contaminants in nearby groundwater are causing indoor air levels to be above health-based guidelines, if the limited available sampling is representative of the actual exposure scenario.

Recommendations

In the future, EPA plans to conduct treatment activities in the source area on the OECI property, which is intended to address residual VOCs in soil and groundwater. Our experience at similar sites has been that such treatment can mobilize and allow fugitive VOCs to escape and migrate in soils and groundwater.

- DHS strongly recommends continued groundwater monitoring at OECI to assist with evaluating the impact of this treatment and to document changes in VOC concentrations in groundwater near homes.

- If the groundwater quality or the plume extent changes in the future, including increases of VOC concentrations near homes, DHS recommends that the vapor migration and intrusion pathway be re-evaluated in the residential area near OECI via multiple lines of evidence (e.g. indoor air sampling, sub-slab vapor sampling, soil-gas sampling).

Public Health Action Plan

- DHS will continue to respond to and address health questions and concerns raised by the public and partner agencies regarding contamination from the OECI site.

I trust that the above information will be of help to you. Should you have any additional questions please contact me by phone at (608)-266-9337 or by email: adam.streiffer@wi.gov.

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Wisconsin Department of Health Services
Division of Public Health
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cc: A. Parham, ATSDR/DCHI
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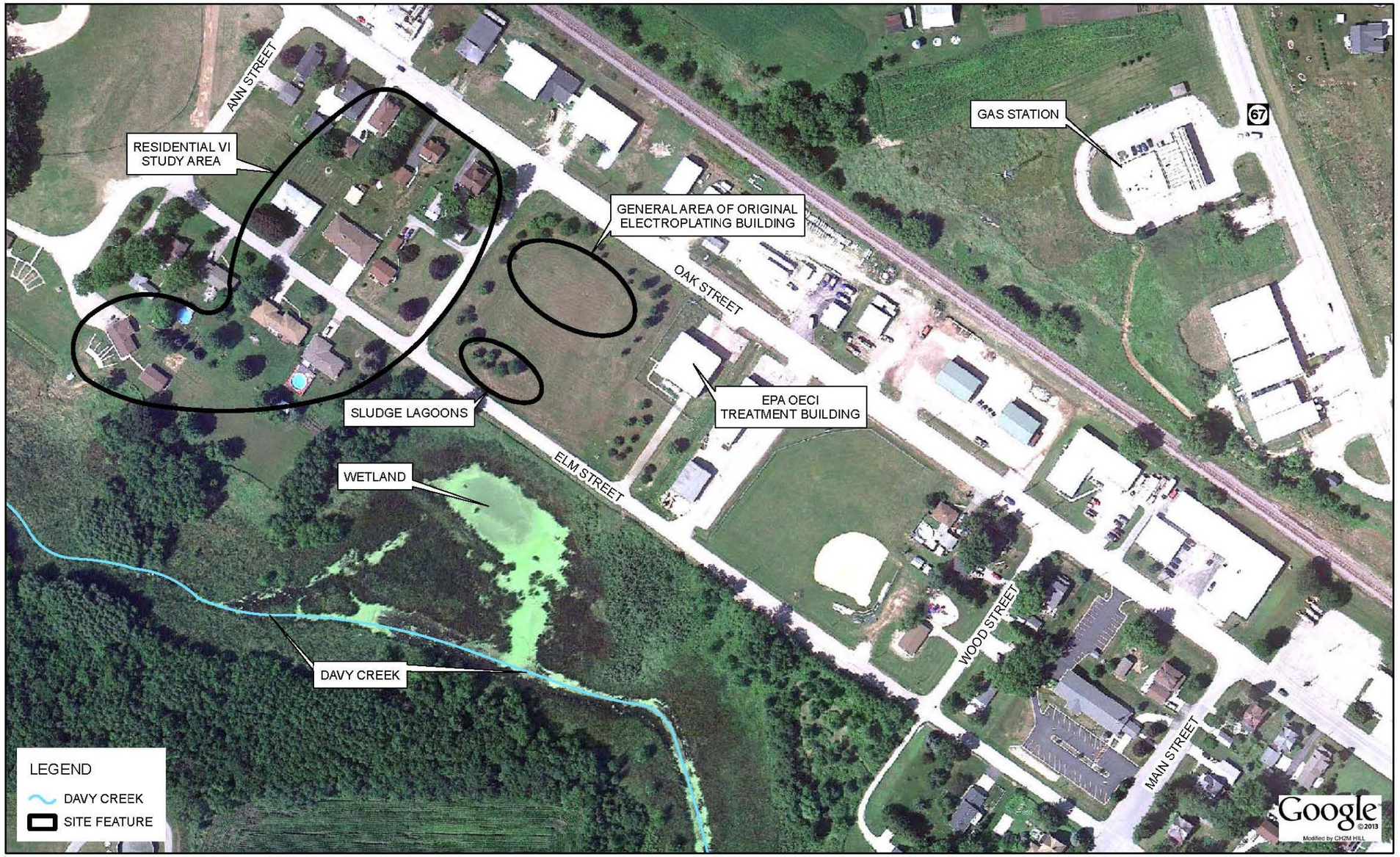

FIGURE 1
General Site Map
VI Groundwater Grab Investigation
OECI Site

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E:\GIS\OECI\MAPFILES\2013\VI_GW_GRAB_INVESTIGATION\FIGURE 01 - GENERAL SITE MAP.MXD JHANSEN1 3/20/2013 1:21:52 PM

Table 1. Maximum Detected VOCs in Shallow Temporary Groundwater Wells vs. Drinking Water Standards

Oconomowoc Electroplating Company, Inc. Residential Vapor Intrusion Groundwater Investigation, December 2012

VOCs Detected in Groundwater	Maximum Detected Groundwater Concentration (µg/L)	Federal Drinking Water Standards		EPA VI GWSL[a] (for reference only) (µg/L)	Wisconsin Public Health Groundwater Quality Standards (For reference only)	
		MCL (µg/L)	Is MCL Exceeded?		Enforcement Standard (µg/L)	Preventive Action Limits (µg/L)
Benzene	0.34	5	No	2.7	5	0.5
Cyclohexane	0.24	13,000[c]	No	2,000	---	---
Dibromo-3-chloropropane, 1,2-	0.016	0.2	No	0.075	0.2	0.02
Dichloroethane, 1,1-	1.5	5	No	12	850	85
Dichloroethylene, 1,2-cis-	0.21	70	No	690[b]	70	7
Ethylbenzene	0.22	700[d]	No	7	700	1,401
Methylcyclohexane	0.27	---	No	---	---	---
Methyl Ethyl Ketone (2-Butanone)	2.6	10,000[c]	No	4,500,000	40,000	800
Tetrachloroethylene	0.32	5	No	29	5	0.5
Toluene	0.75	1,000	No	41,000	800	160
Trichloroethlyene	< 0.5 U	5	No	2.2	5	0.5
Trichloroethane, 1,1,1-	2.1	200	No	14,000	200	40
Vinyl Chloride	< 0.5 U	2	No	0.21	0.2	0.02
Xylene, m-	0.3	10,000	No	870	2,000	2,000
Xylene, o-	0.15	10,000	No	1,200	2,000	2,000
Xylene, P-	0.3	10,000	No	870	2,000	2,000

Notes:

Bold indicates an OEIC Site chemical of concern

"---" Criteria not available

U = Chemical was not detected above the indicated laboratory limit of quantitation

MCL = Maximum Contaminant Level; EPA public drinking water system enforceable standard

VOC = volatile organic compound

[a] The EPA VI GWSLs were obtained from the EPA VI Screening Level Calculator Tool using the November 2012 Regional Screening Levels and an average groundwater temperature of 11°C.

[b] RSL for trans-1,2-dichloroethene was used as an evaluation surrogate.

[c] An MCL is not available; value is the EPA (2012) RSL for inhalation of VOCs from tap water.

[d] The MCL for ethylbenzene does not consider the cancer end point incorporated into the EPA RSLs. However, the maximum detected concentration is less than the RSL for inhalation of VOCs from tap water.

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