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To: Jody Langfeldt, Public Health Officer, Dodge County Health Department
CC: Aristeo Pelayo, Project Manager, Wisconsin Department of Natural Resources

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

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Subject: Public Health Consultation for Oconomowoc Electroplating Company, Inc.

Summary

In 2011, the Wisconsin Department of Health Services (DHS) 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. Superfund site in Ashippun, Wisconsin. A 2012 groundwater investigation using shallow temporary monitoring wells around these homes did not find any site-related contaminants that exceeded screening criteria. While only one line of evidence was used in making the determination, DHS concurs with the investigation's finding that it is unlikely that contaminants in nearby groundwater could cause indoor air levels to be above health-based thresholds. 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-slab vapor sampling, soil-gas sampling).

Background

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 this 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 technical assistance from DHS to review and provide comments on the VI investigation results and report 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 the residential area have been below health-based Wisconsin Enforcement Standards (ES) and ATSDR CVs. All VOCs found in permanent shallow monitoring wells in the vicinity of the residential area during the recent 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.

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 recent consultants report, reproduced below). Historically, shallow groundwater flowed to the south from the OECI site, but monitoring in

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

November 2012 indicated the flow was more westwards, towards the residential area. It is speculated that the drought conditions in 2012 contributed to this change in flow direction and it is 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 report² 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.

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) Calculator³. 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, and thus the assumptions used in the calculator are not stringent enough to screen out potential VI risks. Based on this shortcoming, the report evaluated for VI by comparing groundwater concentrations to 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.

While this is not the exact intended use of the drinking water standards, as the report points out, the use of drinking water standards is more protective as a pathway than an ES or ATSDR CV that would evaluate direct contaminated groundwater contact with building foundations, due to the higher volatilization of chemicals from drinking water usage. There is no VI screening value for this direct groundwater to foundation contact, and as such the use of the MCLs is the most appropriate regulatory screening value available for this scenario when only groundwater VOC concentrations are available.

Table 1 below, modified from the recent consultant's report, 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

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

4) Refer to footnote #2.

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 contaminants in shallow groundwater near homes pose a health concern for the VI pathway.

Lastly, it is worth noting difficulties were encountered 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, DHS feels the sample results are adequate to use as screening data for evaluating the VI pathway.

Conclusions

Based on a review of the results and report of the groundwater investigations of the shallow temporary wells in the residential area adjacent to OECI, DHS makes the following conclusion:

DHS concurs with the report's conclusion that "it is unlikely that VOCs could migrate through the VI pathway and cause indoor air concentrations above regulatory target levels within the buildings in the residential area." Thus, the Vapor Intrusion pathway is not a complete pathway, and there is no public health hazard for indoor air vapor exposure.

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 recommend 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 should change 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 OECl site.

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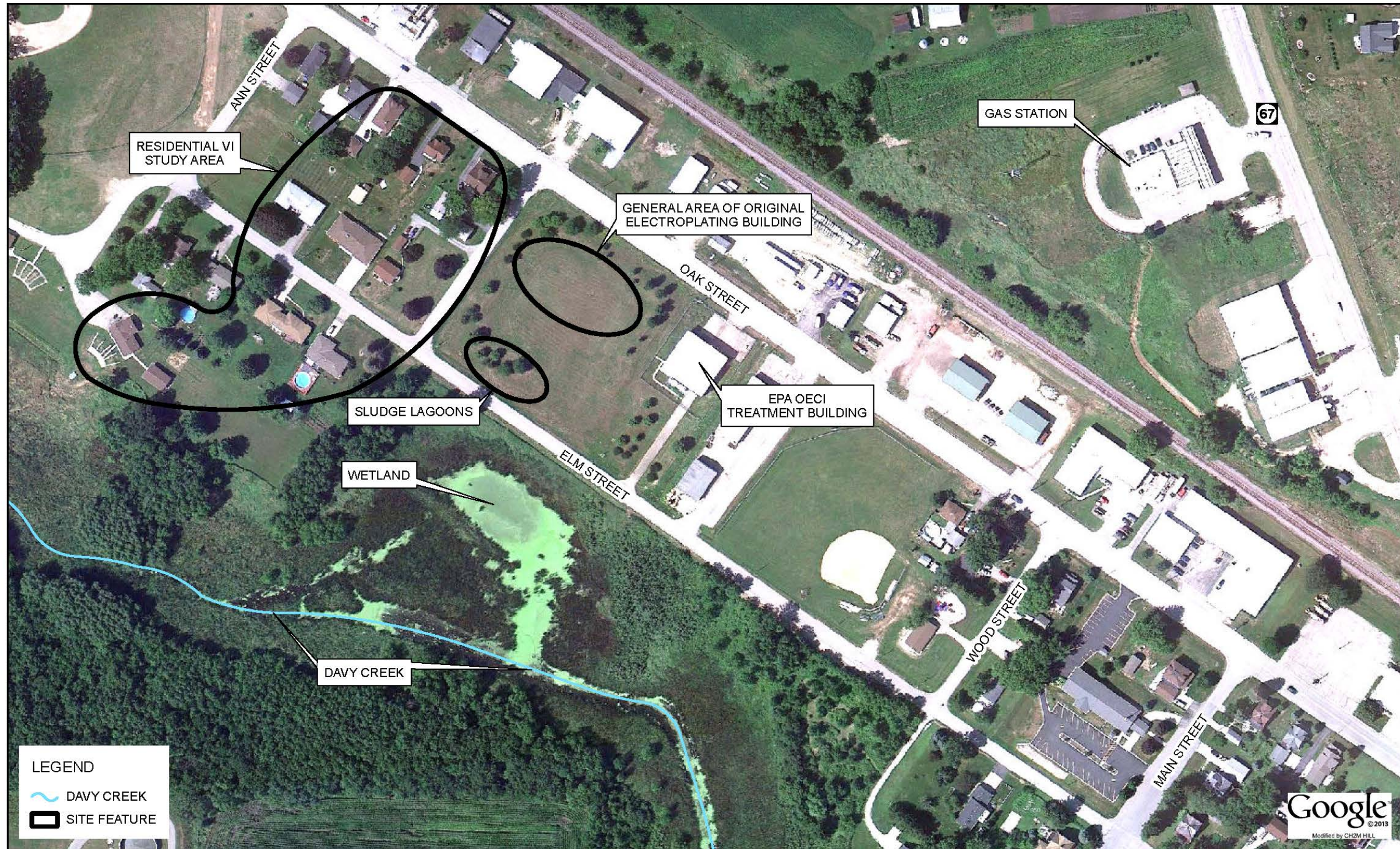


FIGURE 1
 General Site Map
 VI Groundwater Grab Investigation
 OECI Site

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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
Trichloroethylene	< 0.5 U	5	No	2.2	5	0.5
Trichloroethane, 1,1,1-	0.21	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.