Letter Health Consultation

Evaluation of groundwater data from the Electroplate-Rite Corporation site for public health implications via vapor intrusion pathway

DUBLIN, VIRGINIA

Prepared by
Virginia Department of Health

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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

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.

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LETTER HEALTH CONSULTATION

Evaluation of groundwater data from the Electroplate-Rite Corporation site for public health implications via the vapor intrusion pathway

DUBLIN, VIRGINIA

Prepared By:

Virginia Department of Health
Division of Environmental Epidemiology
Under a cooperative agreement with the
Agency for Toxic Substances and Disease Registry

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Myles Bartos
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Federal On-Scene Coordinator
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Dear Mr. Bartos,

Thank you for providing the available environmental data to determine if the levels of volatile organic compounds (VOCs) in groundwater at the Electroplate-Rite Corporation site located in Dublin, VA pose a hazard to public health. On January 7, 2015, the U.S Environmental Protection Agency (EPA) requested that the Virginia Department of Health (VDH) review the available groundwater data from the site property and nearby offsite locations, as well as the September 2014 final trip report to *determine if the concentrations of VOCs in groundwater are a public health risk to nearby residents via the vapor intrusion pathway*. Through a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR), VDH reviewed the groundwater data and concludes that the detected concentrations of VOCs are not expected to harm people's health because there is no evidence that residents are being exposed to contaminants through the vapor intrusion (VI) pathway. This conclusion is based on the fact that the nearest down gradient residence is over 700 feet north of the site and there is no evidence of a contaminant plume coming from the facility. The lack of available data for groundwater under residential houses and residential indoor air is a limitation of this review; however, multiple lines of evidence suggest that VI is not expected to be a problem for nearby residents at this time. VDH does not recommend further environmental sampling at this time. However, VDH recommends that any new property development in close proximity to the electroplating facility evaluate the vapor intrusion potential and take necessary actions to mitigate potential vapor intrusion pathway if deemed necessary. We are available to evaluate additional data upon request.

BACKGROUND AND STATEMENT OF ISSUES

Electroplate-Rite Corporation specializes in all types of metal finishing, including zinc, iron, chrome, nickel, copper, brass, tin, and silver to specialty coatings such as anodizing, passivating, phosphating, black oxide, and chromating on aluminum. The facility is located at 5529 Lee Highway in Dublin, Virginia. Highland Memory Gardens Cemetery is located on the north and east of the site, while Cemetery Road lies immediately to the west of the site. Across the street to the west are two commercial buildings, one of which currently houses the businesses Elegant Styles and Patty's Kitchen. Abutting the south side of the site is US Route 11, and Norfolk Southern Railroad.

On December 6, 2011, the Virginia Department of Environmental Quality (DEQ) conducted a Focused Compliance Inspection after EPA received a complaint regarding the release of electroplating wastes to the environment. The inspection showed that groundwater at the Electroplate-Rite Corporation site has been impacted with organic and inorganic contaminants due to electroplating activities. Though the site is still impacted by organic and inorganic contaminants, groundwater in this area is not being used as a source of drinking water. Groundwater elevation measurements indicate that the direction of groundwater flow is towards the north-northeast. There are no residences immediately adjacent to the site or down-gradient (north) of groundwater flow from the site. The nearest home in this direction is approximately 700 feet from the site.

DISCUSSION

Environmental sampling and results

EPA conducted groundwater sampling at the site in September 2014.[1] One groundwater sample was taken from each of four onsite monitoring wells (Figure 1). Also, one duplicate groundwater sample and one blank sample were collected for VOCs, metals, and cyanide analysis. In addition, one trip blank sample was collected for target compound list VOC analysis, and one matrix spike and duplicate sample was collected for target analyte list metals and cyanide analyses. All samples were shipped to the appropriate laboratories for analyses.

Previous groundwater sampling events conducted in November 2012 and June 2013 indicated that VOCs were detected only in well MW-02 (Table 1). In the September 2014 groundwater sampling event, chloroform (the only chlorinated VOC detected) was detected in three of the four sampled wells (MW-01, MW-02 and MW-04) (Table 1). The highest concentration of chloroform (15 µg/L) was detected in MW-02, located on the southeast portion of the site. VOCs were not detected in well MW-03 during any sampling event. See attachment for location of monitoring wells.

[1] Robert Helverson (Personal communication January 7, 2015).

Table 1. Concentration of VOCs in groundwater and groundwater vapor intrusion screening level (µg/L)

Contaminant	Well IDs and Sampling Dates					VISL
	MW-01	MW-02			MW-04	
	Sep 2014	Nov 2012	Jun 2013	Sep 2014	Sep 2014	
Chloroform	**5.8**	ND	ND	**15**	**7.8**	0.287
Cyclohexane	ND	37	ND	ND	ND	979
Ethylbenzene	ND	85	6.3	ND	ND	807
m,p-Xylene	ND	240	19	ND	ND	1038
o-Xylene	ND	83	11	ND	ND	1038
Toluene	ND	32	8.4	ND	ND	1107

(Data Source: EPA). **VISL**=vapor intrusion screening level. **ND** = indicates VOCs were not detected during this sampling event. Values in bold exceed the EPA's groundwater vapor intrusion screening level.

Exposure pathway

Chemicals present in the environment above their respective comparison values (CVs) can impact public health only if people are exposed to the chemicals for a sufficient length of time. VDH determines if an exposure to environmental contamination occurred in the past, is occurring, or might occur in the future by identifying if a completed or potential exposure pathway exists. There is no completed exposure pathway for this site and the potential for future VOC migration into homes and buildings off site is very low.

VDH determines if the concentrations of chemicals in environmental samples pose a potential public health risk by comparing them to CVs. CVs are conservative environmental contaminant concentrations calculated from health based values developed by the ATSDR, EPA, and other federal or state agencies. They are used to screen environmental results and determine if further analysis is needed. If a contaminant's concentration exceeds the comparison value then it is selected for further evaluation. Contaminants found in concentrations below their CV are not expected to pose a health risk to the public, including sensitive receptors.

Vapor intrusion is the migration of volatile chemicals from the subsurface into buildings. Volatile chemicals in groundwater can migrate through soils into indoor air spaces of buildings. Groundwater screening levels for the VI pathway were derived using ATSDR air CVs and EPA's suggested attenuation factor for screening (0.001). These vapor intrusion screening levels (VISLs) were used to screen contaminants at the site to evaluate the potential for vapor intrusion exposures. Screening levels are used to determine whether chemicals found in environmental media can pose a significant risk and, if so, whether a site-specific investigation is warranted.

Comparing the concentrations of VOCs in on-site monitoring wells to VISL indicated that only chloroform exceeded its VISL (Table 1).

The concentrations of chloroform detected in three of four monitoring wells exceeded the VISL of 0.287 µg/L. The VISL for chloroform equals the air CV of 0.043 µg/m^3 divided by (the Henry's Law Constant of 0.15 x Groundwater Attenuation Factor of 0.001 x Unit Conversion Factor of 1000 L/m^3).

Contaminants identified in groundwater at the Electroplate-Rite Corporation are primarily VOCs and metals. See lists 1 & 2 in the attachments for a complete list of analytes. However, residents are connected to municipal water; therefore, the direct groundwater ingestion pathway is currently eliminated. The presence of VOCs in groundwater indicates that there is a potential for vapor intrusion to occur. VOCs may be present in groundwater due to a historic gasoline spill that occurred up gradient. Chloroform was the only chemical identified in groundwater that may potentially pose a vapor intrusion health risk off site. Given the distance of over 700 feet from the nearest down gradient residence to the site, vapor intrusion is not expected to be occurring at this time and, therefore, is not a current public health concern. Vapor intrusion is also not a concern in the commercial building housing Patty's Kitchen and Elegant Styles because the direction of groundwater flow is northward and in the opposite direction of these businesses (see Figure 2).[2]

LIMITATIONS

A limitation of this data review is the lack of data on groundwater under homes and residential indoor air. However, multiple lines of evidence suggest VI is not expected to be a problem for nearby residents at this time.

CONCLUSION

VDH concludes that the detected concentrations of VOCs are not expected to harm people's health because there is no evidence that residents are being exposed to contaminants through the vapor intrusion pathway.

RECOMMENDATION

VDH does not recommend further sampling at this time; however, VDH recommends that any new property development in close proximity to the electroplating facility evaluate the vapor intrusion potential and take necessary actions to mitigate potential vapor intrusion pathway if deemed necessary.

I trust that the above information will be of help to you. Should you have any additional questions please contact Dwight Flammia by phone at (804) 864-8187 or by email: dwight.flammia@vdh.virginia.gov.

[2] Myles Bartos (Personal communication July 16, 2016)

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ATTACHMENTS

Figure 1. Aerial map of Electroplate-Rite Corporation site and monitoring well locations

(Source: EPA)

Figure 2. Map of Electroplate-Rite Corporation site with direction of groundwater flow and location of Patty's Kitchen

(*Source*: EPA)

List 1. List of VOCs tested for at Electroplate-Rite Site	List 2. List of inorganics tested for at Electroplate-Rite Site
Dichlorodifluoromethane	Aluminum
Chloromethane	Antimony
Vinyl chloride	Arsenic
Bromomethane	Barium
Chloroethane	Beryllium
Trichlorofluoromethane	Cadmium
1,1-Dichloroethene	Calcium
1,1,2-Trichloro-1,2,2-trifluoroethane	Chromium
Acetone	Cobalt
Carbon disulfide	Copper
Methyl acetate	Iron
Methylene chloride	Lead
trans-1,2-Dichloroethene	Magnesium
Methyl tert-butyl ether	Manganese
1,1-Dichloroethane	Nickel
cis-1,2-Dichloroethene	Potassium
2-Butanone	Selenium
Bromochloromethane	Silver
Chloroform	Sodium
1,1,1-Trichloroethane	Thallium
Cyclohexane	Vanadium
Carbon tetrachloride	Zinc
Benzene	Mercury
1,2-Dichloroethane	Cyanide
1,4-Dioxane	
Trichloroethene	
Methylcyclohexane	
1,2-Dichloropropane	
Bromodichloromethane	
cis-1,3-Dichloropropene	
4-Methyl-2-Pentanone	
Toluene	
trans-1,3-Dichloropropene	
1,1,2-Trichloroethane	
Tetrachloroethene	
2-Hexanone	
Dibromochloromethane	
1,2-Dibromoethane	
Chlorobenzene	
Ethylbenzene	
o-Xylene	
m,p-Xylene	
Styrene	
Bromoform	
Isopropylbenzene	
1,1,2,2-Tetrachloroethane	
1,3-Dichlorobenzene	
1,4-Dichlorobenzene	
1,2-Dichlorobenzene	
1,2-Dibromo-3-chloropropane	
1,2,4-Trichlorobenzene	
1,2,3-Trichlorobenzene	

Greetings,

You are receiving a document from the Agency for Toxic Substances and Disease Registry (ATSDR). We are very interested in your opinions about the document you received. We ask that you please take a moment now to complete the following ten question survey. You can access the survey by clicking on the link below.

Completing the survey should take less than 5 minutes of your time. If possible, please provide your responses within the next two weeks. All information that you provide will remain confidential.

The responses to the survey will help ATSDR determine if we are providing useful and meaningful information to you. ATSDR greatly appreciates your assistance as it is vital to our ability to provide optimal public health information.

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