DEPARTMENT OF HEALTH

memo

DATE: February 11, 2020

TO: Amy Hadiaris, Supervisor, Minnesota Pollution Control Agency

FROM: Emily Hansen, Health Assessor, Site Assessment and Consultation, MDH

SUBJECT: Ford Site Area C Health Consultation

Thank you for sharing community concerns about health risks from Area C at the Ford Site with the Minnesota Department of Health (MDH). At your request, I have reviewed available site data and documents. I provided below what I think may be helpful in communicating MDH's opinion regarding the possibility of exposure to contaminants and health risks related to Area C.

Introduction

MDH's mission is to protect, maintain, and improve the health of all Minnesotans. For communities living near contaminated sites, MDH's goal is to protect health by providing information the community needs to understand any potential risks and take actions to protect themselves. MDH also evaluates site investigation reports and environmental data, and when potential health hazards are identified, we advise state and federal regulatory agencies and local governments on actions that can be taken to protect public health.

Historical Background on Area C

Industrial waste from the former Ford Plant in St. Paul was dumped into Ford's property adjacent to the river just south of the steam plant and west of Mississippi River Blvd, from approximately 1945 to 1966. This property is now referred to as Area C. The industrial waste is known to include paint sludge and solvents used in historical painting operations.

The U.S. Army Corps of Engineers placed a large volume of soil and construction debris, including huge pieces of concrete, around and on top of Ford's industrial waste between 1978-1983, during reconstruction of the Lock and Dam No. 1. Ford later constructed a 3.8 acre paved parking area on top of the construction fill in the mid-to-late 1980s. Additional construction debris was placed around the perimeter of Area C in the late 1980s, during reconstruction of Mississippi River Blvd.

Based on soil investigation results, the industrial waste appears to be 35 to 40 feet thick near the base of the bluff and gradually thins towards the west. The majority of the industrial waste is currently buried under 40 to 60 feet of materials described above.

Community Concerns

MDH is aware of concerns and questions that have been raised, including those listed below:

- Question whether contaminants could spread to or reach the redevelopment site; whether housing planned for the redevelopment will be safe; whether underground tunnels could be a conduit for contaminated soil vapor;
- Assertion that the quantity of toxic waste in drums is immense and has not been adequately investigated to understand its magnitude or to characterize potential health risks;
- Suggestion that contaminants entering the river via groundwater discharge may not be safe for human health;
- Concern that Area C poses risks to people who use Hidden Falls Regional Park or who fish and recreate on the river adjacent to Area C.

Environmental Investigations

Several environmental investigations over the years identified a number of contaminants in soil and groundwater. The most recent and applicable are briefly summarized below.

Contaminants in Soil at Depth from Industrial Waste

In 2015, an investigation was conducted to determine the extent of the industrial waste at Area C. Forty samples were taken in ten locations at different depths – ranging from 12 to 95 feet below the surface. This sampling defined the location of the buried waste. Twelve samples were determined to be within the industrial waste, while 13 were below (in native sand) and 15 were in construction fill above or to the side of the industrial waste. In addition, five trenches were dug along the south slope of Area C and industrial waste was found in three of the five trenches. Additional samples from the three trenches that encountered industrial waste were tested. The main contaminants in soil samples from within the industrial waste are metals and hydrocarbon solvents; both are likely to be from the paint waste.

It is standard practice to compare the concentrations of contaminants in soil to the MPCA's Soil Reference Values (SRVs). Industrial SRVs are typically used for evaluating non-residential soils and are protective for a scenario where a worker may be exposed to soil contaminants for 250 days a year, over 25 years. While this type of exposure is not occurring at Area C, comparing soil sample results to these values provides some context for describing the amounts of contaminants present.

Metals found in soil samples are likely due to their use in paint pigments. In general, metals do not degrade, but can have different degrees of mobility in the soil. Metals that were found above their respective Industrial SRV in more than one soil sample within the buried industrial waste are antimony, arsenic, and lead. Barium and mercury exceeded the Industrial SRVs in one sample, while concentrations of other metals were below the Industrial SRVs.

Painting solvents that Ford used were hydrocarbon-based and contained many of the same volatile organic compounds (VOCs) that are also present in petroleum. Volatile organic compounds are chemicals that can rapidly evaporate into the air. Examples of individual VOCs measured at Area C in soil above Industrial SRVs are trimethylbenzenes, toluene, ethylbenzene, xylenes, and naphthalene.

Polycyclic aromatic hydrocarbons (PAHs) were also found in the industrial waste samples. PAHs are mixtures of contaminants produced by the incomplete combustion of materials such as coal, oil, wood, tobacco, and cooked food. They are also found in petroleum-based products such as asphalt, coal tar, creosote, and roofing tar. Some PAHs are carcinogenic, and these are evaluated as a mixture calculated as benzo(a)pyrene equivalents (BaPE). The BaPE calculated for soil samples in the industrial waste commonly exceeded the Industrial SRV.

Soil samples were also analyzed for diesel range organics (DRO) and gasoline range organics (GRO), which are measures of a mixture of compounds with similar chemical structures. DRO and GRO measurements are compared to the MPCA's Petroleum Remediation Program soil screening criteria during site investigations to gauge the extent of petroleum impacts at a site. At Area C, the GRO measurements associated with industrial waste samples reflect the presence of the solvent-related VOCs described above, and the DRO measurements likely reflect the mixed presence of PAHs and heavy petroleum compounds. Most of the industrial waste samples exceeded the soil screening criteria for DRO and GRO. The DRO and GRO screening criteria are not risk-based values; instead, risk to human health is evaluated by a comparison of individual compounds to health-based criteria, which is provided above for VOCs and PAHs.

Low levels of several other contaminants, including polychlorinated biphenyls (PCBs), were detected in soil samples within the industrial waste, but only at concentrations that were below their respective Industrial SRVs.

Contaminants in Surface Soil Samples from Construction Fill

Also in 2015, 31 samples were taken in surface soils on the south, north, and northwest sides of Area C. Eight of the sample locations contained DRO above the MPCA Petroleum Remediation Program soil screening criteria. It's likely that the DRO reflects a mixture of PAHs and petroleum compounds, both of which are common in urban fill. Three of those eight samples contained carcinogenic PAHs, expressed as BaPE, above Industrial SRVs. The PAH contamination in the shallow soil at Area C is likely from asphalt road construction debris.

Area C Groundwater Contamination

All groundwater where Area C is located eventually flows to the Mississippi River, although the flow direction may be temporarily reversed when river levels are high. Because the groundwater beneath the site is not and never will be used as drinking water, the MPCA's Surface Water Quality Standards (WQS) are used as an initial screening tool to evaluate the

contaminant levels in groundwater. The standards that apply to this situation – Class 2B – are protective of aquatic life and recreation, including swimming and other uses of the river.

There doesn't appear to be a groundwater contamination plume in the vicinity of the site. This is based on a review of the most recent groundwater testing results which covers ten sampling events (May 2018 to September 2019) collected from ten monitoring wells at and around Area C. However, a small number of contaminants were found intermittently above Class 2B WQS in samples from these same wells as shown in the table below.

Exceedances of Class 2B Water Quality Standards from Site Contaminants in Groundwater from Ten Sampling Events – May 2018 to September 2019

Monitoring Well Number	Number of WQS Exceedances	Contaminant(s) and Date
19	none	
20	1	PCBs (Aug 2018)
21	2	copper, bis-2-ethyhexylphthalate (July 2019)
22	none	
22B	none	
23	1	mercury (May 2019)
23B	none	
24	3	cyanide, PCBs (May 2018); mercury (May 2019)
25	6	cyanide (May 2018), cobalt (May 2018, May/June/July 2019), ethylbenzene (May 2019)
26	5	anthracene, fluoranthene (Dec 2018), bis-2-ethylhexylphthalate (Dec 2018, April/May 2019)

While the table above represents the most recent sampling results, historical groundwater data shows a similar pattern of only intermittent detections of small numbers of contaminants that exceed WQS criteria.

The most consistent detections of contamination (VOCs) in the groundwater at Area C is generally found along the south slope (where monitoring wells 24 and 25 are located). This area is not covered by the concrete parking lot, and paint sludge is present a few feet below ground surface. The VOCs in the paint waste can easily move into the shallow groundwater in this area.

Thallium is found at times over its WQS; however, it has been established that this is likely naturally occurring and not a site contaminant. Low levels of other contaminants have been found in groundwater below WQSs.

Health Assessment

The sections below describe some of the environmental pathways for contaminant migration and exposure routes implied in concerns raised about Area C. These include an examination of the potential for exposure via direct contact with contaminated material at the site's surface, recreational use of the Mississippi River, fish consumption, and breathing outdoor air and soil vapor.

The presence of chemicals in the buried industrial waste of Area C does not mean people have been or will be exposed to a health hazard, or that they would be harmed if they were exposed. In order for there to be a health risk due to the chemicals, people must be exposed to amounts of contaminants that can cause harmful effects. Generally, the most common routes of exposure to environmental chemicals are through skin contact, inhalation, and ingestion.

The most common ways historical dumps have resulted in exposures that have the potential to affect health are:

1) chemicals leaching into groundwater and contaminating drinking water,
2) volatile chemicals moving up through the soil, collecting under buildings, and contaminating indoor air (vapor intrusion), and
3) people directly contacting dump material/contaminants.

At Area C, neither of the first two pathways listed above could result in exposures. Groundwater is not used for drinking water, and there are no buildings above or near Area C that could be affected by vapor intrusion. Because the groundwater flows towards the Mississippi River and is not extracted for any use, direct contact with groundwater contaminants does not occur. The potential for exposure to groundwater contaminants discharged to the Mississippi River is discussed below.

Direct Contact with Surface Soil and Physical Hazards (Trespassing)

Trespassers could have direct contact with contaminated soils. The south slope of Area C is adjacent to a Hidden Falls walking trail and is separated by a chain-link fence with barbed wire. The fence has been cut open in several places, and the Area C property is also accessible at the end of the property nearest the river. The extent of contamination in the upper foot of soils is generally low and similar to what may be encountered where asphalt is present. Only one type of contaminant – PAHs expressed as BaPE – was found above Industrial SRVs in a limited number of samples. Physical hazards (i.e., tripping on concrete waste, metal debris, etc.) may be a greater risk to trespassers. In addition, the south slope has eroded and continued erosion may expose waste. For example, four drums were removed from this area in 2011-2012. Three were empty except for some soil that appeared to have washed into the drum and one contained material believed to be solid paint sludge. None of the contents of the drums were determined to be hazardous for disposal purposes. In the current state, the potential for health risks from trespassing on the site is expected to be minimal.

Groundwater to Surface Water (Swimming/Wading/Recreating)

A total of seventeen surface water samples were collected from the river near the site in 1982, 1989, 1990, and 2010. Contaminants in surface water samples have not exceeded the surface water criteria that are protective for recreational uses, including swimming and wading.

Although groundwater potentially affected by site contaminants will eventually enter the Mississippi River, the small amounts of contamination it would contain are not expected to be detected in surface water due to dilution and rapid movement of water away from the site. Very low levels of some contaminants have been detected in the surface water samples, although these are likely not related to Area C. No samples contained any contaminants above Class 2B WQS – although not all contaminants have a Class 2B WQS.

Contaminants in the groundwater discharging to the Mississippi River would need to be present in extremely high concentrations to contribute a significant amount to surface water concentrations. An analysis was done to determine the potential downstream contribution from Area C in accordance with the MPCA's Surface Water Pathway's Evaluation User's Guide. The analysis showed that when groundwater contaminants' concentrations slightly exceed WQSs, as is the case at Area C, they contribute a negligible amount to the Mississippi River.

Potential Impact of Unknown Drums of Waste

The volume of drummed waste remaining in the industrial waste portion of the site is not known. The drums, which were placed there over 50 years ago, are not be expected to be intact. Partial drums that have been found on the western slope in 2011 and the southern slope in 2012 have been empty or contained paint sludge. Open drums found in Sand Tunnel 1A where it intersects Area C (see below for more about tunnels) during an inspection in 2007 were found to be partially filled with paint solids. It seems likely that liquid waste was dumped on the ground, rather than placed in drums.

Ongoing monitoring will help ensure awareness of any potential increase in contaminants in the groundwater from the site. However, any increase in groundwater contaminants is unlikely to cause a health concern. Although such contaminants would likely enter the Mississippi River eventually, it is extremely unlikely that they would contribute enough to cause concentrations in the river to approach or exceed the applicable WQS.

Fish Consumption from the Mississippi River

As stated above, groundwater contaminants from Area C are not expected to be detected in the Mississippi River, and the Class 2B WQS are protective of aquatic life.

MDH develops Safe-Eating Guidelines to help consumers to minimize their exposure to contaminants in fish while promoting the benefits of eating fish. MDH has specific advice on eating fish from the segment of the Mississippi River extending from the Ford Dam to Hastings due to mercury, PCBs, and perfluorooctane sulfonate (PFOS). All four major Minnesota rivers have fish advisories for mercury and PCBs to some extent, due to mercury air pollution and

historical PCB contamination. Most fish have low levels of PFOS, with some Minnesota lakes and rivers requiring Safe-Eating Guidelines. While there is no evidence or expectation that Area C contaminants caused or contributed to the need for the fish consumption advice, anglers who fish near Area C should be aware of and follow the guidelines that can be found on the MDH webpage, Fish Consumption Guidance (www.health.state.mn.us/fish).

Outdoor Air

As expected, there are no contaminants in the top foot of soil that could evaporate into the air and affect air quality.

Soil Vapor in Tunnels

There is an extensive series of tunnels on the main Ford parcel. One tunnel in particular, called Sand Tunnel 1A, ends at the edge of the bluff and intersects the industrial waste near the base of Area C. Concern has been raised that this tunnel may be a conduit for contaminated vapor from Area C to reach the new development. Because shallow groundwater contamination beneath the main parcel is much more likely to be a potential source of soil vapor contaminants, the MPCA has required that soil vapor samples be collected within the footprint of each building before it is constructed to determine if any soil vapors are present and pose a potential hazard and whether a vapor mitigation system is needed. In addition, all new residential construction in Minnesota is required to be built using radon-resistant methods, which reduces or eliminates the entry of soil vapors into homes.

Conclusions and Recommendations

MDH concludes that there are only very limited ways that people can come into contact with the contamination at Area C. The presence of waste buried at Area C does not mean people have been or will be exposed to a health hazard.

Our assessment found that minimal risks are possible if trespassers directly contact contaminants in shallow soils and physical hazards. Other exposure pathways were considered, but none were found to be complete.

MDH recommendations:

- To discourage trespassing, consider repairing the fence and adding signage between the Hidden Falls Regional Park walking trail and the southern boundary of Area C.
- Consider removal of potential physical hazards and soil contamination from the southern slope.
- Continue monitoring the groundwater to demonstrate the ongoing negligible impact of any contamination moving from Area C to the Mississippi River via the groundwater pathway.

If the property use changes, the conclusions and recommendations contained in this document may change.

It is my understanding that additional investigation at Area C is planned for 2020. If you feel MDH evaluation of the additional data will be helpful, please contact me to discuss the need for further health risk evaluation.

Reports Reviewed

Arcadis, 2017. Area C – Comprehensive Site History and Investigation Report II, Twin Cities Assembly Plant, St. Paul, Minnesota.

Arcadis, 2020. 2019 Third Quarter Groundwater Sampling Summary Area C, Ford Twin Cities Assembly Plant, St. Paul, Minnesota.

Minnesota Department of Health
Site Assessment and Consultation
625 North Robert St.
PO Box 64975
St. Paul, MN 55164-0975
651-201-4897
health.hazard@state.mn.us
www.health.state.mn.us

02/11/20

To obtain this information in a different format, call: 651-201-4897.