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Subject: St. Paul Levee health assessment

Mr. Timm,

This Letter Health Consultation is in response to your request to assess the health risk at the St. Paul Levee site in St. Paul, Minnesota. The area in question is owned by the City of St. Paul. It is located immediately adjacent to the Mississippi River, southeast of the intersection of Shepard Road and Randolph Avenue. The site was used as an auto salvage yard from the late 1960's to 1989. The site has been on the state Permanent List of Priorities (PLP, Superfund) list since 1990. Contaminants of concern include lead, polychlorinated biphenyls (PCBs), carcinogenic polycyclic aromatic hydrocarbons (cPAHs), and arsenic.

The owner of the salvage yard placed a variety of fill material on the property to raise the grade to prevent flooding and increase the usable land area. The fill material consisted of soils mixed with debris including concrete, limestone, asphalt, rebar, glass, plastic, and wood. Charred auto parts and battery casing fragments can also be found on the site.

The MPCA asked the EPA to conduct a removal action at the site to eliminate direct exposure risks. The EPA has agreed to remove the top two feet of contaminated soil later this summer. The City of St. Paul would ultimately like to use the property for a park. Given this future land use the MPCA requested that MDH conduct a health assessment and provide recommendations.

We conducted a site visit on May 28th. The property is largely wooded. An overgrown gravel road provides a path through the property. There is also a walking path that may be used by people to get to the site in order to fish in the Mississippi River. There are campfire spots built near the river. A large tent was set up on the property and it is possible that a person(s) may be living there rather than just camping for the night. There was no signage to alert people to the contamination, nor was there signage or fencing to encourage people to stay off of the property. There were battery casings found throughout the site, as well as all kinds of debris.

Soils

Forthcoming MPCA guidance (Bonnie Brooks, personal communication, 5/20/14) states two feet of clean soil is protective of public health for a recreational land use scenario. If contamination is left under a soil depth of two feet, there should be institutional controls that prevent soil disturbance by the public (e.g. erodible bike trails, tree planting, community produce garden). If such uses are desired by the City for the new park, remediation of soils to a further depth may be needed (e.g. four feet for produce gardens or two and a half feet for tree planting) (Bonnie Brooks, personal communication, 5/20/14).

Surficial debris can be a public health hazard. Battery casing fragments throughout the site should be removed. It is unknown if other debris may pose an environmental health hazard, but debris can certainly cause a physical hazard.

Lead is the primary contaminant of concern in the surface soils at the site. Investigations that have taken place from 2011-2014 (Peer, 2011; Peer, 2012; Peer, 2013; and Weston Solutions, 2014) show lead as high as 9,300 mg/kg in the surface soil. These investigations provide fairly comprehensive data set upon which to base excavation needs in the top two feet. The current MPCA recreational Soil Reference Value (SRV) of 300 ppm is a good clean up goal for most park uses. SRVs are levels of chemicals in soil that are safe for the general public. However, if the proposed park plan includes areas where young children may be expected to come into contact with soil, such as playgrounds, effort should be made to provide clean fill without any site-related lead contamination.

PCBs were either not found in the surface soils or were found at very low concentrations. There was one sample of PCBs in surficial soil that just exceeded the recreational SRV, at 1.5 mg/kg. MDH's initial review has found that there is likely not a concern for PCBs in surface soils; however it is difficult to assess the data from multiple reports. MDH recommends that all the PCB data be compiled and mapped. Further, additional samples near the surface are desirable above the estimated extent of subsurface hazardous PCB soil that is shown on Figure 8 of the 2013 report (Peer, 2013).

PAHs have also been found in the surface soil (Peer, 2011; Peer, 2013). Historically, the carcinogenic PAH (cPAH) potency of a mixture has been estimated using the sum of potency equivalents of seven cPAHs typically analyzed in the EPA recommended suite of PAHs. This is the way it has been calculated in site reports. This method has most likely resulted in an underestimation of the potency of cPAHs in a mixture (USEPA, 2010), and therefore comparing site concentrations to the cPAH SRV is not health protective.

MDH 2013 cPAH guidance (MDH, 2013a) recommends that a simple way to estimate the cancer potency of a sample is to multiply the benzo(a)pyrene (BaP) concentration in a mixture by a factor of seven and compare the results to the cPAH SRV. MDH recommends that the cPAH data be compiled and mapped and exceedances in surficial soil removed.

EPA discovered a few arsenic samples in surficial soil that were elevated above the SRVs (between 20-37 mg/kg). These concentrations were co-located with some of the highest lead concentrations, and therefore the arsenic will be removed with the lead from those locations.

Vapor intrusion

PCBs were found in a small area in the subsurface soils. It is possible that buried PCBs could pose a vapor intrusion problem if enclosed buildings are built over areas contaminated with them. In addition, evidence of petroleum contamination was found in one of the test trenches. Any enclosed buildings that may be built on the property in the future may need to consider vapor mitigation, i.e., by installing a passive venting system that could be converted to an active system if needed.

Groundwater

Groundwater underneath the site generally flows out into the Mississippi River, although you indicated that there may be times when the flow is reversed and the River is actually influencing the groundwater. Groundwater data collected at the site in 2011 and 2013 indicate that concentrations of several contaminants (arsenic, selenium, and cPAHs) exceed drinking water guidance values; however, the groundwater is not used for drinking water, nor would it be in the future. In addition, there is some question of whether the results were false positives due to suspended sediment in the samples or analytical method bias (Peer, 2013). It is important to note that neither lead nor PCBs were found in any groundwater sample. If the groundwater data are accurate, the contaminants will not be of concern for fish consumption, nor would they be expected to exceed any surface water standards.

Sediment

Sediment samples taken along the Mississippi River in 2013 found cPAHs in all nine samples (the two highest concentrations were 1.8 and 6.7 mg/kg, while the other seven samples ranged from 0.04-0.6 mg/kg). Mercury was found in eight of the nine samples, ranging from 0.024-0.87 mg/kg. Lead and arsenic were found at level considered natural background, with the exception of one lead sample at 129 mg/kg. No PCBs were detected in the sediments (the detection limit was between 0.039-0.056 mg/kg).

Sediment screening values (SSVs) developed by MDH (methodology can be found in MDH, 2013b) for mercury (0.02 mg/kg) and cPAHs (0.2 mg/kg BaP equivalents) are based largely on fish consumption and are lower than levels found at the site. However, it is expected that ambient background concentrations are above these SSVs; and typical anthropogenic background concentrations along the Mississippi River in St. Paul are unknown. In addition, the major concern is for ecosystem health rather than an expectation that fish caught from the area would contain site-related contamination. Therefore, it is not deemed necessary to conduct remediation activities on the sediment at this time. If future development includes planned direct contact with the sediment, the cPAH data may need to be looked at further.

Conclusions

- The site is not fenced and has no signage to discourage trespassing. There is evidence of people being on site. Currently the site is a public health hazard due to the high levels of lead in the surface soil.
- Surficial debris may pose a physical hazard.
- The health risk from carcinogenic PAHs is underestimated in past site reports.
- Concentrations of contaminants in the sediment are generally low and may be at typical anthropogenic background concentrations in sediments along the Mississippi River.
- The groundwater does not pose a human health concern.
- It is possible that buried PCBs could pose a vapor intrusion problem if enclosed buildings are built over the top of them.

Recommendations

- According to forthcoming MPCA guidance, contaminated soil and debris should be remediated to a depth of two feet to protect public health for a park land use. Institutional controls may be needed to prevent soil disturbance at depth. Some site uses may require further cleanup.
- The current residential/recreational SRV for lead of 300 mg/kg is an appropriate clean up goal for the site. However, no site-related lead should be present in areas that children will be expected to come into contact with bare soil.
- Concentrations of PCBs from past reports should be compiled and mapped. Additional PCBs samples at the surface above the PCB contamination at depth should be considered.
- Concentration of PAHs from past reports should be compiled and mapped. The BaP concentration in soil samples should be multiplied by a factor of seven and compared to the cPAH SRV in order to determine if it is necessary to remove soils in the top two feet.
- If direct contact with the sediment is expected in future development plans, further examination of cPAH data is warranted.
- If enclosed buildings are planned above the areas with PCB contamination at depth, passive venting systems should be installed.

Sincerely,

Emily Hansen, Site Assessment and Consultation Unit

References

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