Construction of Remedy to Address NAPL Migration to Great Lakes and Meet Michigan Groundwater-Surface Water Interface Criteria

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"This presentation is an overview of the construction of a remedy to address NAPL impacting Lake Michigan sediment and surface water, constructed by Union Pacific Railroad in 2016. The source of the NAPL was a former tie treating plant on the property that was demolished in the 1960â€[™]s. The NAPL had migrated from the upland location and impacted approximately one acre of sediment in Lake Michigan

The remedy consisted of several components. A 1,400 foot slurry wall was constructed to a maximum depth of 60 feet in the upland areas to reduce the groundwater moving through the NAPL impacted areas at the site. A sheet pile wall was constructed along the shoreline to block further NAPL migration to Lake Michigan. The wall was designed to hang in some areas and not continue to the clay layer beneath the site. This allowed windows for the remaining groundwater to discharge.

Five feet of sediment was removed from the lake over approximately 1 acre to address surface impacts. Since the NAPL impacts extended 40 feet below the sediment surface, an impervious layer of a composite bentonite-aggregate product was installed on the excavation bottom. The 6-inch layer prevents underlying NAPL and groundwater to travel to the surface. This elongates the groundwater flow path coming from the upland and discharging through the windows. Groundwater modeling supported the concept that the reduced groundwater flow and elongated groundwater flow path allows significant attenuation of wood treating constituents (primarily naphthalene) before the groundwater discharged to the GSI. A brief review of the modeling performed will be included.

Results/Lessons Learned. As with any construction job, health and safety is an important parameter. An accident occurred onsite that will be included in the presentation as a lesson learned.

For each remedial activity, photographs of the construction work will be used to illustrate the lessons learned from each activity. For example, construction of the slurry wall generated excessive swell that had to be addressed to meet the requirements of the land owner (Canadian National) for access and had to be addressed as a payment issue. Work in the lake was delayed by equipment failures which delayed completion of the project past the normal working season. The measures taken to address these and other issues during the 4 month construction will be presented.

Preliminary data on remedy performance was collected in Spring 2016. Water level data from inside the slurry wall to the lake decreased 75 percent since the slurry wall was constructed. Water quality parameters showed a distinct groundwater venting zone outside the cap. Pore water samples at the groundwater surface water interface were analyzed for naphthalene and other PAHs. The preliminary results indicate that the area above the GSI standard extended 100 feet off the cap compared to 300 feet prior construction. The results are promising so early after construction completion."