TEN-MILE/LANGE/REVERE CANAL (ST. CLAIR SHORES, MI) (MCSS DATABASE PROJECT 05-44)

Site Description

The Ten-Mile/Lange/Revere Canal is located in the eastern section of the City of St. Clair Shores that is located on the western shore of Lake St. Clair. The Ten-Mile/Lange/Revere Canal comprises two parallel canals that are connected at their western ends by a small length of canal (creating essentially a U-shaped canal), each leg approximately 40 feet wide by 2,200 feet long and bordered by Ten-Mile Road/Lange Avenue/Revere Avenue. Water depth within the canal is generally less than five feet. In October 2001, routine sediment sampling was performed in the canals as part of the permitting process in preparation for maintenance dredging of the canal. The results of the sediment sampling indicated the presence of PCBs in the canal sediment ranging from non detect ("ND") to 4,900 ppm. PCB contamination in the canal was believed to have originated from the Ten-Mile Drain (TMD) storm water system.

As a result of the observed PCB levels in the canal sediments, an emergency investigation was initiated in Spring 2002 to determine the extent of PCB contamination within the TMD system and the canal sediments. The TMD system comprises storm water sewers and catch basins that discharge to the head of the Ten-Mile/Lange/Revere Canal. The TMD system drains approximately 260 acres within St. Clair Shores. Results of the investigation of the TMD found residual sediment containing up to 121,000 ppm PCBs. The results of this investigation concluded that these PCB-containing materials had migrated over time through the TMD system and discharged into the Ten-Mile/Lange/Revere Canal.

Sediment sampling in the canals indicated PCB levels in each six inch interval within the top two feet of sediment to be as follows: 0 to 6", 1.4 to 150 ppm; 6 to 12", ND to 4,900 ppm; 12 to 18", 0.36 to 140 ppm; and 18 to 24", 1.5 to 140 ppm. Water samples from the canal ranged from ND to 5.8 ppb PCBs and one sample collected from Wahby Park Pond, which receives periodic overflow discharges from the canal, showed 52 ppb PCBs.

The site was addressed through implementation of a time-critical removal action (TCRA) from July 2002 to March 2003.

Potentially Responsible Parties (PRPs)

To date no specific PRPs have been identified. The City of St. Clair Shores has assumed responsibility for the investigation and maintenance/remediation of the TMD to address the ongoing source of PCBs to the TMD and to mitigate the migration of the PCBs to the canal.

Threats and Contaminants

The primary contaminant is PCBs, which have continued to leach into the TMD. The source of PCBs to the canal has been traced back to PCBs seeping into the TMD from contaminated soils around the bedding material along Bon Brae Street and Harper Avenue.

Selected Remedy

Between July 2002 and March 2003, 24,230 tons of contaminated sediment from the canals and sediment and soils from the TMD system were removed during the TCRA. The contractor for the

TCRA was Environmental Quality Management. Canal sediments were removed by a combination of barge-mounted excavator and long-reach excavator. Approximately 5,915 tons of TSCA soil and sediment were disposed of at the Wayne Disposal Landfill, Belleville, MI and the remaining 18,315 tons of non-TSCA soil and sediment were disposed at the Lenox, MI landfill. The cost of the TCRA was $7 million, or $292 per ton disposed.

A follow-up remedial action was performed between October and December 2003 that resulted in the removal of an additional 17,500 cy of canal sediment that was originally targeted for maintenance dredging of the canal. Malcolm Marine was the dredge contractor and performed the dredging using a single barge-mounted excavator. The removed sediment was barged to the USACE Pointe Mouillee, MI disposal facility for placement in disposal cells designated to accept PCB-contaminated sediments. The cost of the remedial action was $1 million (approximately $57 per cy removed; of this amount, T&D was estimated at $7.50 per cy).

Following the TCRA and remedial actions for the TMD and canal, a quarterly monitoring program was initiated for the TMD to include the collection of storm water samples during both dry and wet weather conditions, assessment of the level of material accumulation in a sediment trap, and the collection and analysis of a trap sediment sample for PCBs.

Water samples were collected from downstream to upstream, at 1) the outlet of the TMD where it discharges into the canal, 2) at the intersection of Jefferson and 10 Mile, 3) at the intersection of Jefferson and Bon Brae, and 4) at the intersection of Harper Avenue and Bon Brae Street. Initial dry sampling efforts in July 2003 indicated concentrations of PCBs in storm sewer water from 3.8 ppb at the outlet, and up to 2,000 ppb at the intersection of Harper and Bon Brae. Based on these concentrations, additional investigations were initiated throughout the TMD system. These investigations included the collection of additional sediment, soil, storm water, and groundwater samples at multiple locations to attempt to locate the PCB source.

In May 2005, a TMD 4th Quarter Monitoring Status report was issued that concluded:

1. Concentrations in sediment from within the TMD range from 59 to 260,000 ppm PCBs; approximately 2 cy of sediment have accumulated in the outlet structure with an average concentration of 586 ppm PCBs, and a canal sediment sample collected from just outside the outlet has concentration of 350 ppm PCBs. Additional canal sediment sampling conducted by MDEQ in 2004 indicate that PCB concentrations at locations away from the TMD outlet structure are generally below 10 ppm;
2. PCBs are present in groundwater within the underlying TMD trench at concentrations exceeding the MDEQ groundwater direct contact criteria of 3.3 ppb;
3. PCBs are present within the backfill of the TMD trench at concentrations up to 31,000 ppm;
4. PCBs were detected in stormwater from within the TMD; and
5. Further site assessment should be conducted to understand the full nature and extent of PCB contamination in the soils surrounding the TMD.

Based on the preliminary findings from the above quarterly monitoring status report, from April to May 2005 USEPA and MDEQ performed additional investigations along the TMD sewer system. These additional investigations identified a 100 foot by 125 foot area at the intersection of Harper Avenue and Bon Brae Street where the sewer line passes through contaminated soils. In this area

soil PCB levels as high as 31,820 ppm were identified at depths of 9 to 15 feet below ground surface in the sand/gravel fill and adjacent clay soils.

To eliminate the continued introduction of PCBs to the drainage system and subsequently to the canal, the EPA funded a $1.1 million pipe lining and slurry wall project that was completed between May and August of 2006 and resulted in 750 feet of synthetic pipe liner being installed within the 66 inch diameter storm drain system along Harper Avenue and Bon Brae Street. Additionally, three jet-grouted slurry walls (30' deep by 6' wide by 22' long) were also installed at select locations along this segment of storm drain.

In 2007, EPA coordinated the removal of PCB-contaminated soil from nine nearby residential yards or public easements along the TMD.

Future Activities

Based on continued identification of PCBs within the TMD, the City of St. Clair Shores has prepared a TMD Work Plan which proposes additional investigative efforts and response activities to periodically remove accumulated sediments from within the TMD. The City proposes to install weirs at select locations, and periodically remove trapped storm water and sediments using a diaphragm pump and filtering the discharge through a 0.1 micron filter to remove particulates. The filtrate will then be passed through activated carbon filters prior to discharge back to the sewer. Accumulated sediments will be dried using cement kiln dust or lime, drummed and disposed at Wayne Disposal in Belleville, MI.

There are currently no plans for additional dredging activities associated with the identified recontamination of the Ten-Mile/Lange/Revere Canal.

References

10 Mile Drain 4th Quarter Monitoring Status Memorandum, Environmental Consulting & Technology, Inc., May 27, 2005.

Monitoring, Investigation and Response Activities for the 10 Mile Drain, Environmental Consulting & Technology, Inc. 2007.

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