Decommissioning a PCB digester

By Agnes Miczynska

Tri-Phase Environmental Inc. (TPEI) was contracted by the Ministry of Environment (MOE) in December 2010 to remediate a sewage treatment digester tank, with a capacity of three million litres and containing more than 1,500 cubic metres of sludge. The sludge contained high levels of heavy metals, but more importantly, polychlorinated biphenyl (PCB) levels in excess of 50 parts per million (ppm). These high levels classified the sludge as PCB waste as defined by the ministry's regulations.

Prior to commencing work, TPEI designed and prepared detailed health and safety, remediation, and waste management plans. In order to implement these plans, TPEI constructed two decontamination facilities on-site – one for vehicles and equipment, and the other intended for staff. These facilities became an integral component of the project, separating contaminated zones from clean zones.

One of the objectives of the project that was of utmost importance was to minimize the amount of PCB waste being shipped off site for disposal. However, the high moisture content of the sludge presented a considerable challenge in trying to accomplish this task. Although the sludge had been in the tank for more than 15 years, analysis of water content in the sludge showed consistent levels of more than 85 per cent moisture.

PCBs are an oil-based product and dissolve in water to maximum levels of approximately 1.6 ppm. However, the PCB content in the sludge was found to be well over 50 ppm. Therefore, in order to minimize the amount of PCB waste being shipped off site for disposal, it was necessary to separate as much of the solids from the sludge as possible. To this end, TPEI secured and obtained the required Provisional Certificates of Approval in order to process the PCB waste on site and allow the use of proposed technologies in order to separate and treat as much of the PCB waste as possible.

A belt press, basket press and pressure filters (less than 0.1 microns) were used to separate the contaminated water from solids. The filtrate water was treated on site using a mobile treatment system in order to remove all contaminants and bring the PCB levels down to meet the regional discharge criteria. Following regional approval, the treated water was discharged into the sanitary system. In total, more than half a million litres of contaminated water was treated on site and discharged. The successful on-site separation and treatment of contaminated water from the sludge was completed by highly qualified TPEI staff.

The remaining sludge waste, still containing high levels of moisture and PCBs, had to be stabilized prior to shipment for thermal treatment. In order to accomplish this, TPEI staff removed and mixed the sludge with a high-efficiency waste stabilizer in 20 tonne batches. The waste, once stabilized, was placed into dump trucks; double-lined with 6 ml poly, sealed and shipped to a thermal treatment facility for final destruction.

Once all the sludge was removed from the digester, TPEI staff entered the digester to scrub, power wash, and decontaminate the inside walls. The internal digester walls were then swab-tested to verify that all levels were in accordance with MOE criteria prior to demolition and off-site removal. All tools and equipment used for this purpose were also decontaminated, swab-tested and verified prior to their removal from the site.

Throughout the life of the project, all vehicles and equipment leaving the work area were washed, and the resulting wash water was contained in temporary holding tanks pending treatment, testing, and approval for disposal. All workers were decontaminated prior to their leaving the site, and both these practices proved successful and worked in unison to ensure the containment of any residual PCB contamination.

The geographical location and seasonal timelines of the project presented other obstacles. The site was located in a remote area where no source of power or other utilities were available. As the project was awarded in early December with an expected completion date of March 1, 2011, the work had to be completed in sub-zero temperature conditions which proved rather challenging considering the work occurred outdoors and involved the processing of water. To mitigate these obstacles, TPEI equipped the site with external heaters and generators to allow work to continue throughout these cold months.

In order to complete the work, the decontamination facilities were decommissioned and removed, and all equipment demobilized. Proven control measures, expertise, and discipline in the execution of a remediation project were essential for its success. **BS&S**

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