PCBs: Old Chemicals Present New Challenges

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ABSTRACT. Polychlorinated biphenyls (PCBs) were banned from production in 1979 and have largely faded from public consciousness as a contaminant that individuals should be concerned about. With the possible exception of homeowners on Lake Hartwell, and possibly a few community members in the Six Mile Creek area, PCBs are not a chemical family that comes up for discussion often.

This was largely true until stories starting breaking in late summer 2013 about the millions of dollars local wastewater treatment utilities were going to have to spend to clean up from illegal dumping of PCBs into upstate South Carolina sewer systems. What does this recent spate of illegal activity teach us about environmental risk and liability? Should managers of water resources take steps to change management of the resources they protect to address this activity or was it one time, not to be repeated?

This paper provides a summary of the publically available background information regarding what happened and how the utilities in the Upstate have responded. Revisions made to public sewer ordinances in the wake of these events will be presented, as well as the impact to private businesses that were targets of the unauthorized disposal. Potential implications for future economic impacts and considerations that water resources managers can incorporate into future plans and procedures will be addressed. Finally, a consideration of how this information may apply to a broader perspective of the possibility of other contaminants entering the sewer system and the subsequent implications following such incidents.

INTRODUCTION

In January 2013, Renewable Water Resources (Re-Wa) performed a routine scan for an extensive list of parameters on the sludge generated from the Pelham Road waste water treatment plant. This scan is required to evaluate the presence of a wide variety of contaminants that may be found in wastewater discharged into a public wastewater treatment utility. This particular list included analysis for various PCBs as standard analytes. Routine PCB analysis typically result in non-detect concentrations. However, in January 2013, a low detected concentration of the PCB congener Arochlor 1260 was measured.

Re-Wa continued to perform analyses for PCB in wastewater sludge throughout the spring of 2013, observing an increasing trend of PCB concentrations. Additionally, Re-Wa was investigating the various collection lines leading to their Pelham Road Waste Water Treatment Plant (WWTP) but were unable to detect a pattern that identified the location of the contaminant source in the collection system. In May 2013, Re-Wa notified both South Carolina Department of Health and Environmental Control (SC DHEC) and United States Environmental Protection Agency (US EPA) that PCBs had been detected in the system at concentrations that were of potential concern.

During the summer of 2013, Spartanburg Sanitary Sewer District (SSSD) and the Town of Lyman, South Carolina also detected PCB in the sewage sludge. Both utilities were also not successful in identifying the source material locations. A break in the case came in late July 2013, when a citizen complaint lead the investigators to collect samples from the grease interceptor (GI) located at a closed restaurant served by the town of Lyman, South Carolina sewage facility. The Town of Lyman arranged surveillance of the site and eventually identified the company discharging waste into the out-of-service GI to be American Waste Septic Tank Service. Grease interceptors are typically 1,000 gallon and larger concrete tanks installed on a branch of the service line from food service establishments (FSE).

SC DHEC inspected the company operations and collected samples for PCB analysis from three septic trucks and appurtenances on the trucks (valves and hoses). Those samples contained detected concentrations of both Arochlor 1254 and Arochlor 1260. SC DHEC issued a cease and desist order to American Waste Septic

Tank Service in August 2013. The owner of American Waste Septic Tank Service was arrested by the Town of Lyman and charged with obstruction of justice and perjury in December 2013.

TIMELINE OF RESPONSE EVENTS

In mid-August 2013, SC DHEC was directed to collect samples from grease interceptors located at several commercial businesses. These commercial businesses were notified by US EPA in late August that their grease interceptors had been contaminated with PCB above regulatory thresholds under the Toxic Substances Control Act (TSCA) and operation of the grease interceptor serving the business was to cease immediately. Throughout September and October 2013, Re-Wa and Spartanburg Water investigated a number of sites in an effort to determine the scope of the vandalism. By February 2014, a total of fifteen sites had been identified. Sites included one location within the Spartanburg Water service area, two locations in the Town of Lyman and twelve within the Re-Wa service area. Impacted businesses included a combination of restaurants, residential care facilities and grocery stores.

Re-Wa conducted some informational meetings with stakeholders impacted by the Fats, Oils and Grease (FOG) program and proposed some immediate changes to the procedures used to manage use oil and septage. The primary change impacting haulers of used oil and septage was an immediate prohibition on hauling both septage and used grease in the same transport vehicle. Re-Wa had required the use of a "manifest" to identify the source and hauler for each load of waste brought into the treatment facility for several years. Re-Wa changed the requirements to tighten up on the tracking paperwork. Re-Wa also implemented a sampling program for collection of a sample from each load and "day" tank sample from holding tanks daily to identify where contaminated waste coming into the facility had come from.

In October 2013, a restaurant in Columbia, South Carolina was identified as impacted and in February 2014, a grocery store was identified in Charlotte, North Carolina. There was also an alleged case of direct discharge of PCB containing wastes into a sewer manhole in the Charlotte area.

In December 2013, Spartanburg Water amended their sewer use ordinance to require securement of all grease interceptors in their service area. Additionally, Spartanburg Water performed some additional sampling and analysis but no additional sites were identified in Spartanburg.

In February 2014, Re-Wa passed amendments to the sewer use ordinance and required a one-time sampling event to be conducted once the grease interceptor had been secured. Re-Wa also required FSEs to obtain coverage under a General Permit in order to provide a mechanism to identify and verify that the various food service operations had secured the grease interceptor and confirmed that the interceptor had not been contaminated by an outside source.

In May 2014, a septic tank at a commercial business was identified as being contaminated with PCBs through the testing that occurred at the Re-Wa external waste receiving facility. Similarly, in June, another store was identified through testing of the hauled grease taken at the Re-Wa external waste receiving facility. During June and July 2014, an additional five grease interceptors were identified due to the sampling required for coverage under the general permit.

As of late September 2014, at least twenty-three food service establishments in the Greenville-Spartanburg area and another three sites outside the region have been impacted by the unauthorized disposal of PCB containing wastes into the on-site waste systems. In addition to these sites, there were also a handful of used oil reclamation companies, a biofuel company and a handful of septage and used oil haulers that have also been impacted.

SUMMARY OF IMPACTS

PCBs have a strong affinity for organic materials; therefore, PCBs were typically found in the grease accumulated inside the grease interceptors and in the sludges and organic solids in the wastewater treatment facilities. For this reason, a large part of the impacts were the cost of disposal of contaminated materials and remediation of contaminated sites.

Both Spartanburg Water and Re-Wa incurred large equipment decontamination and disposal costs for the sludges that became contaminated with PCBs in their water treatment processes. Both utilities had to isolate septage and grease that had been received at the external waste receiving systems, remove the contaminated materials, and decontaminate the equipment. Both utilities had some solid waste with PCB concentrations in excess of 50 part per million (ppm) and were required to send wastes to the PCB licensed landfill in Emelle, AL for disposal. Both utilities also had large disposal costs associated with solid wastes going to a subtitle D landfill for less contaminated wastes.

Re-Wa incurred additional charges and, perhaps even future liability, because the sludges from the Re-Wa treatment processes had been land applied for beneficial reuse of the sludges. The sludges derived from the treatment of sanitary waste can be used for soil amendments in certain applications and, unfortunately,

some of the PCB contaminated sludges ended up on designated beneficial reuse sites. Re-Wa has worked with EPA to resolve this issue but the removal and disposal of those sludges has also been expensive for Re-Wa to mitigate.

For the private businesses, the cost to remove and dispose of the PCB contaminated liquids in the grease interceptor and clean and remediate the grease interceptor itself has been very expensive. Based on guidance provided by the US EPA's regional TSCA coordinator, the liquids removed from the grease interceptors with a PCB concentration of 1 mg/kg (1 ppm) by weight or more were required to be incinerated in a PCB-licensed incinerator. Grease interceptors had to be cleaned of the contaminated greases and then the concrete of the tank had to be sampled to determine if the cleaning was adequate. In many cases, the grease interceptor concrete was either deteriorated to a point that the tank could not be cleaned adequately to be placed back into service or the tank itself was badly corroded such that there was little continued service life remaining. Several facilities had to demolish and replace the grease interceptors. In one case, due to the location of the interceptor, additional support piers had to be installed prior to demolition of the tank to both stabilize the excavation for worker safety and to prevent damage to the building.

Many of the impacted private businesses were family-owned restaurants that had neither the cash flow nor the pollution liability insurance to pay the cost of material disposal and tank remediation. For this reason, a number of sites have not been cleaned or remediated in as much as a year after first discovery. One site was in receivership and the bank that had underwritten the mortgage has incurred the liability for the clean-up and remediation. For this site, the clean-up has been delayed due to the processes of the bankruptcy court.

Both Spartanburg Water and Re-Wa made changes to their FOG programs and required that FSE's secure grease interceptors so unauthorized persons could not introduce materials into the tanks. These private businesses were required to pay for securement of the interceptor.

Businesses located within Re-Wa's service district were also required to collect samples after the grease interceptor had been secured and demonstrate that their grease interceptor was free of PCBs. In several cases, concentration of PCBs were detected at levels below the TSCA regulatory threshold. In these instances, the utilities required the business owners to have the grease interceptors cleaned of PCBs because the utilities could not knowingly accept PCB contaminated wastewaters at any measureable concentrations.

FSE businesses have incurred on-going costs related to the unauthorized disposal of PCBs including the on-going securement of the interceptor, increased hauling and disposal fees due to the increases sampling and surveillance costs imposed on the haulers, and increased operating costs for the haulers and disposal facilities.

UNAUTHORIZED DISCHARGE INTO SEWER SYSTEM

Available information indicates the PCBs that were introduced into the sewer collection network through the unauthorized disposal of PCB containing wastes into grease interceptors. The apparent disposal method was to haul the PCB containing oils to a grease interceptor and discharge it into the GI under the guise of "pumping" the GI. There were a few situations where the PCBs were likely introduced into the grease interceptor by a contaminated hose.

In response to the unauthorized disposal actions, the local sewer utility took the unusual step of prohibiting discharge from impacted businesses, often with a very short response time. Discharge was prohibited until remediation of PCB contaminated GIs could be performed. Local utilities allowed businesses to install a temporary by-pass around the contaminated grease interceptor; however, they limited the number of days a by-pass could be utilized due to concerns related to other deleterious impacts on the downstream collection system caused by excess FOG in the lines.

The utilities required installation of temporary grease removal equipment when the temporary by-passes were going to be utilized for more than 30 days. On the whole, the utilities made efforts to accommodate the various entities impacted by the unauthorized discharges while considering the potential future impacts to the downstream systems from the discharge of excess quantities of FOG.

CONTAMINATION OF SEWER SLUDGE AND RESIDUALS

As previously mentioned, due to the affinity of PCBs for organic materials, PCBs partitioned into the FOG components and into the sewer sludge from the treatment facilities. As a result, PCBs tended to accumulate on the solids from the bar screens, primary clarifiers, secondary clarifiers, and digesters. This meant that the utilities had to characterize the solids for disposal and, after removal of the contaminated solids, the equipment in those treatment process units had to be remediated to concentrations below the TSCA regulatory thresholds. In general, the cost of disposal for the sludges was higher

than the normal disposal cost because of the increased requirements for the disposal sites.

As a result of the PCB contamination in sludges designated for beneficial reuse, SC DHEC passed an emergency regulation in late September 2013 requiring additional sampling and analysis of sludges destined for land disposal. The SC DHEC Board has since incorporated the testing requirement into the permanent regulations by Board action.

NPDES PERMIT REQUIREMENTS AND IMPACTED UTILITIES

One of the more onerous details associated with this situation was that none of the upstate sewer treatment utilities has any discharge limitations for PCBs in their current NPDES permits. As a practical matter, such discharge limitations were not included in the permits because, based on the historic nature of PCB prohibition and use patterns, the permit rationales do not include the potential for PCBs to be present in the incoming waste stream. PCBs are highly regulated and the only authorized disposal technology for liquid PCBs is high temperature incineration. Years of past analytical evaluations for the upstate sewer utilities had indicated that the presence of PCBs was not likely based on normal waste loading sources.

Based on the absence of those monitoring parameters in the NPDES permits, the impacted utilities cannot knowingly authorize discharge of these regulated contaminants into their treatment processes. This situation resulted in a number of long and difficult meetings between US EPA and the impacted utilities to work through a way to treat the contaminated sludges to remove water so the sludges could be sent off-site for disposal.

Once a plan was worked out, the utilities were able to dewater significant volumes of contaminated sludges and send it off-site for disposal. After disposal was achieved, the tanks and portable containers used for temporary containment had to be remediated.

IMPACTED GREASE INTERCEPTORS

Commercial kitchens, typically have GI installed during construction to collect wastewaters from kitchen operations that are likely to include FOG components. Typically the multicompartment sinks used in the kitchen and dish washing areas, the floor drains, and sometimes other food related equipment such as steamer tables and dish washers may be included. For grocery stores, the grease interceptor picks up flows from the butcher shops, delicatessen, produce preparation, and floors drains in these areas of the store.

Sewer use ordinances typically aim to collect the sources of FOG from within the food handling operations but try to exclude sources that may include emulsified FOG or other sources that may reduce the effectiveness of the gravity separation provided by the grease interceptor.

Both Spartanburg Water and Re-Wa have required FSEs to secure the grease interceptor at their facility and institute procedures to reduce the potential for future contamination of the grease interceptor. Other utilities in the Upstate have not instituted such policies, although several systems are contemplating these and other actions.

Impacted facilities, as described above, had to remove the PCB contaminated contents, clean the grease interceptor and associated piping, arrange proper disposal of the PCB contaminated contents, measure the residual PCB concentration in the walls of the grease interceptor and in the associated pipelines, and measure surrounding soils for impacts outside the tanks. The impacted facilities had to submit both a remediation plan and a remediation report to US EPA for review and approval in order to satisfy the regulatory requirements. It is important to note that the impacted businesses do not customarily have interactions with US EPA which has made the situation a challenge.

ORDINANCE REVIEW

As mentioned previously, the two hardest hit public utilities have instituted ordinance changes to their FOG programs and have required FSEs to secure the grease interceptors. Re-Wa has specifically instituted a General Permit program that has required each user to secure the interceptor, sample the grease interceptor, and then obtain coverage under the General Permit from Re-Wa. As of October 1, 2014, Re-Wa estimates that about one third of the covered units have fully complied with the General Permit requirements. The next phase for Re-Wa will be additional outreach to bring the remaining units into compliance with their program.

For hauled grease and septage, Re-Wa instituted a shipping paper program several years ago to document the source of each load delivered to Re-Wa for disposal. Additionally, Re-Wa modified the acceptance procedure to isolate each days' hauled waste into a "day tank" and collect a composite sample from the tank to determine whether there were PCBs in the waste. Each load was also sampled and, if the day tank test indicated that the waste was contaminated by PCB, the individual retained samples were analyzed to determine the potential source

of the contaminated material. This system resulted in identification of several additional contaminated sites in 2014. Re-Wa also eliminated the combined shipment of septage and waste grease and oils.

Spartanburg Water instituted a requirement to secure grease interceptors in December 2013 and conducted site inspections and follow-up in the first and second quarters of 2014. They are continuing their outreach program to reach the remaining non-compliance sites. Spartanburg Water has required that each site shipping grease to their grease and septage hauling program sample the grease interceptor at least once per year.

Commercial facilities which manage the recycling or disposal of hauled greases and oils may also be impacted by the unauthorized disposal of PCBs. The largest service provider in the upstate market is Carolina By-Products (CBP) / Valley Proteins. This particular provider has a facility in Gastonia, North Carolina that manages hauled grease. It is unknown the extent that CBP has been impacted by the PCB contamination.

As stated earlier, other sewage systems and the service distracts in the Re-Wa service area have not modified their ordinances to require securement or testing of grease interceptors, although several have contemplated such action. Both Spartanburg Water and Re-Wa have left the method of securement to the user of the grease interceptor. There are two basic methods being employed, prevent access to the grease interceptor by locking down the lid or installing an internal locking mechanism or installing a physical barrier (fence) to prevent access to the grease interceptor manholes.

SECUREMENT AND DISPOSAL OF WASTES

All methods of securement require the user to open or otherwise provide access to the servicing company when service to the grease interceptor is required. Because several grease interceptors were cross contaminated from a grease hauler's vehicle, it is important for the user to know the service provider and have a reasonable degree of confidence that they are managing wastes at sites they are familiar with to reduce the potential for cross contamination. A list of approved haulers may be obtained from the various utilities. The usual rules regarding service providers apply to grease haulers as well. If a deal seems too good to be true, it likely is and there may be expensive consequences to attempting to save a few dollars on a low cost hauler.

Each user should take the time to become familiar with the hauling company selected and should observe the removal of the securement, pumping of the interceptor, and replacement of the securement. Users should not allow the hauler to do this unattended because of the potential costs associated with remediating a contaminated grease interceptor.

There is no reason for a hauler to pump into the grease interceptor prior to pumping the contents out. Occasionally a hauler will pump into the grease interceptor to "break up" the grease layer prior to pumping. This action poses a high risk to the system and the user should really question the hauler as to why he is doing this prior to pumping the grease interceptor. Once an interceptor is contaminated, the remediation costs are high and will consume any potential savings the facility may realize by using a low cost provider who takes short cuts.

One final consideration is to collect a small sample from the grease layer in the grease interceptor immediately before the unit is pumped. This sample should be collected in a clean, glass jar, labeled with the date, and held in a refrigerator until the hauled waste has been properly disposed of. The purpose in collecting this sample is to provide a defense in the event that the load that your material is in is identified as a potentially contaminated unit. The retained sample can be used to determine if the detected contaminants were present in the grease interceptor prior to the hauler removing the contents or were the contaminants from some other source.

NON-OPERATING FOOD SERVICE ESTABLISHMENTS

The current FOG programs will eventually reach all the existing, operational, food service establishments but there appears to be a loophole for closed or non-operating units. One of the original PCB sources that contaminated a sewage treatment system was a closed restaurant. Although the ordinance requires new food service establishments to obtain coverage from the sewage treatment operators, an existing building with an existing grease interceptor is certainly a potential disposal location for PCBs in the same manner and the existing ordinance does not address non-functioning systems.

PROPERTY TRANSACTIONS

Interested parties considering property acquisitions which include closed facilities with grease interceptors or those individuals managing closed properties should certainly consider how to manage the security and contents of the interceptors. It seems prudent for buyers to insist upon testing of the grease interceptor as part of the pre-purchase due diligence process to avoid or at

least make known, potential financial liabilities. Individuals responsible for managing closed properties should give consideration to securing the grease interceptor to prevent vandalism.

Lending agents should also give consideration to requiring testing and securement of the units as a condition of the loan. Real estate agents managing commercial properties should give their clients information regarding this potential so that buyers and sellers can manage their risks intentionally.

FUTURE CONSIDERATIONS

PCBs have not been in the news or in the public consciousness since the mid-1990s when many of the public electric utilities undertook removal of PCB transformers and remediation of such equipment. PCBs have not been used in manufacturing or other industrial applications since the late 1970's. As a result, the unauthorized disposal of PCBs into on-site waste systems has come as a surprise and shock to many involved. Due to the toxicity of these chemicals, the remediation requirements under the regulations are quite burdensome and come at a high cost. It is, therefore, reasonable to assess whether this was a one-time limited occurrence or are there lessons that should be extracted and communicated widely.

The source of the PCB containing liquids has not yet been identified publically and there has been much speculation regarding the same. Regardless of the source, it seems prudent to examine the potential for future similar actions.

The public sewer systems remain largely open systems. Here are some questions that we think should be considered for public debate:

- How should system operators weigh expenses and logistics for securing their systems?
- Are there additional regulatory requirements that should be imposed on system operators with regard to securement of the system?
- How far into the system should such securement extend?
- Should servicers for these utilities be regulated in a different manner than at present?
- Are there measures that should be taken to regulate the hazardous materials at former industrial sites more tightly?
- Should the closure of industrial and commercial sites include additional requirements to secure hazardous materials prior to abandonment?
- Should this burden be placed on purveyors of such properties?
- With regard to water systems, are there particular hazardous materials that pose a greater risk to public water supplies?
- What if these contaminates had been considerably more water soluble and, therefore, more likely to pass through the treatment systems?
- What steps do water supply providers need to consider to secure water intake systems?

Fortunately, PCBs are contaminants that have an affinity for solids and organic phases and; therefore, the contamination was largely limited to the sewage collection system and its components.

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