SPDES PERMIT MODIFICATION REQUEST FOR RMU-2

DEC NO. 9-2934-00022/00049
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CWM CHEMICAL SERVICES, LLC
MODEL CITY FACILITY

ANTIDEGRADATION DEMONSTRATION SUPPLEMENT FOR BIOACCUMULATIVE CHEMICALS OF CONCERN

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1.0 INTRODUCTION

CWM Chemical Services, LLC (CWM) operates a fully permitted hazardous waste treatment, storage and disposal facility (TSDF) near Model City, Niagara County, New York (Model City Facility). Facility operations include hazardous and industrial waste approval, receipt, storage, treatment and disposal. Waste received may be stored in permitted storage areas and shipped off-site for recycling or disposal. Waste may be treated prior to disposal in the on-site landfill, RMU-1. Site generated leachate from closed and active landfills and aqueous wastes received from customers are treated in the Aqueous Waste Treatment (AWT) facility; the treated wastewater is ultimately discharged to Niagara River under the facility's SPDES Permit (NY 007 2061). Copies of the Sitewide 373 RCRA permit No. 9-2934-00022/000097 (issued August 21, 2013), the application to the New York State Department of Environmental Conservation (NYSDEC) for a new landfill designated RMU-2 (submitted on February 17, 2013, last updated on November 8, 2013), as well as all the permit Attachments such as the facility's Waste Analysis Plan, Contingency Plan, Training Plan, Inspection Plan, Surface Water Sampling and Analysis Plan, etc. and the permit reference documents, such as the Groundwater Sampling and Analysis Plan are posted and available for reference at http://modelcity.wm.com. The facility encompasses approximately 710 acres of rural land, of which, 630 acres are permitted for the management of hazardous wastes. Figure 1 is a map showing the facility layout.

CWM has applied for a major permit modification to the Sitewide Part 373 Permit (Sitewide Permit) to construct another landfill (RMU-2). Similar to the other on-site landfills at the site, the facility has requested a TSCA (PCB) Approval from the Environmental Protection Agency (EPA Region 2), to allow the management of PCB wastes. On April 23, 2015, CWM submitted a modification application to the facility's recently (April 22, 2015) modified and renewed SPDES permit (NY0072061). The only modification sought is to update the facility diagram showing the future locations of RMU-2 and Facultative (Fac) Pond 5, both of which are key components in CWM's efforts to modify its Sitewide Permit. The leachate from RMU-2, which is expected to be very similar to that of RMU-1 (excluding Cell 6), will be treated at the AWT Facility. Each batch will continue to be sampled, tested, pre-qualified, reviewed and approved by NYSDEC prior to discharge to the Niagara River in accordance with all conditions currently included in the SPDES permit (issued April 22, 2015). While the volume of leachate from RMU-1 has diminished as the cells have been capped, additional volume of leachate will be generated from RMU-2. The AWT Facility is expected to work equally effectively on the RMU-2 leachate; the treated effluent is expected to meet the limits currently in the permit, thus no changes to the discharge volume or limits are necessary.

As the leachate from RMU-2 is expected to contain low levels of PCBs and trace levels of mercury, the NYSDEC issued a Notice of Incomplete Application on June 18, 2015 and requested CWM prepare an Antidegradation Demonstration for these Bioaccumulative Chemicals of Concern (BCCs). An Antidegradation Demonstration is required by state and federal regulations if a change in a SPDES permit may result in an increased loading of BCC pollutants discharged to the Great Lakes System resulting in a lowering of the water quality in the receiving water. In Section III. A.2. (WQBELs & Anti-Degradation) of the Fact Sheet issued with the facility's SPDES permit (issued April 22, 2015), NYSDEC states that "[a] SPDES permit cannot be issued that would result in the water quality criteria being violated. The permit for the facility contains effluent limits which provide the maximum level of assurance that the existing beneficial uses of the receiving waters will be maintained." CWM is subject to Technology Based Effluent Limits (TBELs) pursuant to the Centralized Waste Treatment (CWT) regulations (40 CFR 437.44(e)). The SPDES permit issued for the facility on April 22, 2015 included a new internal outfall 01A with TBEL limits. The parameters include mercury, which is also a BCC and has a more stringent Water Quality Based Effluent Limit (WQBEL) of 0.7 nanograms per liter (ng/L). As the WQBEL is lower than background in regional waters, the permit includes a final limit of 50 ng/L based on New York's statewide mercury Multiple Discharge Variance issued October 2010. See NYSDEC Technical and Operational Guidance Series (TOGS) 1.3.10. This limit also applies to Outfall 001, CWM's batch discharge to the Niagara River. A Pollutant Minimization Plan (PMP) for mercury is also required by the permit.

The recently issued SPDES permit also includes limits for Aroclors in the discharge from Outfall 001. As the WQBEL of 0.001 ng/l is lower than can be detected by EPA approved analytical methods, the permit includes a detection limit based effluent limit of 65 ng/L. A PMP for PCBs is also required by the permit. Samples of the Fac pond for prequalification and approval to discharge are routinely non-detect for PCB Aroclors. The SPDES permit also includes some new parameters including WQ/ML based limits for four chlorinated pesticides, three of which are BCCs (gamma-BHC, 4,4'-DDE and 4,4'DDT). This permit and previous versions include analysis for chlorinated pesticides by EPA Method 608. This method includes ten chlorinated pesticides that are BCCs. Samples of the Fac pond for prequalification and approval to discharge are routinely non-detect for chlorinated pesticides. Samples collected from Fac Pond 3 in July 2015 confirmed that all organic BCCs were non-detect (results are included in Table A).

No change to the effluent limits has been requested to accommodate the treatment of RMU-2 leachate. CWM does not believe that there would be an increase in BCCs in the discharge from the facility after the construction of RMU-2, or that there would be a lowering of the water quality in the receiving water. Indeed, CWM expects to achieve a net decrease in the mercury load to the AWT Facility by redirecting a portion of the site generated leachate off-site to a non-Clean Water Act (CWA) facility. With the redirection of a portion of the leachate off-site and the reduction in the volume of leachate generated by RMU-1, CWM also expects to achieve a net reduction in the PCB load to the AWT facility. Nevertheless, in order to obtain a Notice of Complete Application for CWM's SPDES Permit Modification request, this Antidegradation Demonstration has been prepared, in general accordance with TOGS 1.3.9 and Supplement A:ANTIDEG of Form NY-2C.

2.0 SITE HISTORY

A site history of CWM's property is presented in Section 1 (General Site Description) of the facility's SPDES Best Management Practices (BMP) Plan. CWM's property was part of the Lake Ontario Ordinance Works (LOOW). During the 1960s, initial efforts were made by the Atomic Energy Commission (AEC) to decontaminate these areas and, in the early to mid-1980s, additional areas on site were remediated by the Department of Energy (DOE). The New York State Department of Health and the NYSDEC oversaw these remedial efforts by the AEC and DOE. The Model City Facility property was sold to a real estate group in 1966 and subsequently sold to Chem-Trol Pollution Services in 1971. The current facility began commercial waste management operations in 1971 as Chem-Trol Pollution Services, Inc. Initial facility operations included reclamation of waste oils, distillation of spent solvents, treatment of aqueous waste and land disposal. In 1973, Chem-Trol Pollution Services, Inc. was purchased by SCA Services, Inc., and the facility name was changed to SCA Chemical Waste Services, Inc. In 1984, part of SCA Services, Inc. was purchased by, and ownership was transferred to, Waste Management, Inc. (WMI), including the Model City Facility. CWM, a wholly owned subsidiary of WMI, is the present owner and operator of the Model City Facility. WMI is based in Houston, Texas. CWM's first RCRA permit issued by NYSDEC in 1985 required that the facility perform a RCRA Facility Investigation (RFI). 146 Solid Waste Management Units (SWMUs) were potentially identified; 83 were investigated and included in a report titled "RCRA Facility Investigation Summary Report, Model City TSDR Facility," January 1993. A Sitewide Corrective Measures Study was submitted in January 1995. Corrective Measures included the design, construction and operation of ground water extraction systems (GWES) in areas where the VOCs in the shallow groundwater exceeded the threshold level. Additional GWES systems have been installed; there are currently nine GWES systems. PCBs are present in the groundwater from some of the GWES systems, and thus are source material for the AWT plant. The RFI included 110 surface soil samples, five had PCB concentrations above 10 ppm and were remediated. CWM's efforts to eliminate and/or control historical PCB contamination from the Department of Defense and/or early TSDF activities throughout the years is chronicled in a document titled "Continuous Improvement in Storm Water Controls (to Reduce PCBs)" March 2005, last updated December 2014. From 2015 on, PCB tracking is covered by the facility's PCB Minimization Plan.

The facility has five closed (capped) landfills: SLF 1-6 (1972-1978, pre-RCRA), SLF 7 (1978-1983), SLF10 (1982-1984), SLF11 (1984-1990) and SLF12 (1990-1994). All landfills received RCRA hazardous waste, TSCA waste (PCBs) and NYS hazardous waste (PCBs >50 ppm) after the effective date of each program. Starting in 1986, EPA promulgated the various phases of the Land Disposal Restrictions (LDR) regulations. This rule prohibited land disposal of certain constituents and restricted the concentration of various constituents in hazardous waste destined for landfill disposal. As a result of this rule, the leachate from later landfills has lower levels of constituents. The leachate from the active landfill (RMU-1, 1994-present) only contains trace levels of organics, however, the leachate from Cell 6 contains an elevated level of PCBs compared to the other nine cells. The leachate from the new landfill RMU-2 is expected to be very similar to that generated by RMU-1, excluding Cell 6. Table A lists the BCCs detected in the leachate from the various landfills.

- All of the landfill leachates contain PCBs and thus they are source material being processed at the AWT Facility. The PCB concentration ranges from <0.26 – 142 ug/L (ppb) in RMU-1 leachate to 46.2-4,295 ug/L (ppb) in SLF 1-6 aqueous phase.
- All of the landfills have detectable mercury (= or > 1 ng/L) except for SLF 10. SLF 7, SLF 11 and RMU-1 have <10 ng/L mercury in their leachate.
- The leachate from SLF 1-6, a pre-RCRA landfill in operation from 1971 to 1978 also has had detections for 4,4'DDD, 4,4'-DDT, BHCs, Dieldrin, pentachlorobenzene and 1,2,4,5-tetrachlorobenzene.
- The leachate from SLF 10 had one detection (1.76 ug/L) of delta-BHC.
- The leachate from the latest landfills, SLF 12 and RMU-1, had detections for PCBs and mercury. A query of waste profiles from 1998-present confirmed that there are no profiles listing Mirex or Photomirex on wastes approved for disposal in RMU-1.
- Samples of RMU-1 leachate and aqueous phase leachate from SLF 1-6 (worst case leachate) were collected for BCC analysis in July 2015. Results are included in Table A.
- The leachate from the new landfill RMU-2 is expected to be very similar to that generated by RMU-1, with the exception of Cell 6 (standpipe L60, see section 4.3.6)

As part of the Corrective Measures program, the facility has installed nine GWES systems to collect contaminated groundwater in various locations at the facility. Several of the systems include removal of groundwater contaminated with PCBs. Chlorinated pesticides have been detected in some of the GWES. The groundwater collected from the GWES is treated in the AWTS along with landfill leachate.

3.0 COST EFFECTIVE POLLUTION PREVENTION ALTERNATIVES

NYSDEC's antidegradation guidance advises that pollution prevention activities should be considered and identified in determining whether or not reasonably available alternatives exist that would eliminate or reduce the anticipated discharge of BCCs. TOGS 1.3.9, § 2.1, pp. 6-7. The examples given, however, are mostly inapplicable to a facility such as Model City, where manufacturing or production does not occur. Nevertheless, an evaluation of the examples provided in NYSDEC's guidance follows:

- CWM does not operate a manufacturing process and does not use BCCs, hence substitution of a non-bioaccumulative or non-toxic chemical is not a consideration. As described above, BCCs are present in the leachate generated by the facility's hazardous waste landfills.
- Water conservation to reduce wastewater generation in a manufacturing process is not applicable. The majority of the leachate in RMU-1 is produced by precipitation. The quantity of leachate generated is minimized by a "cap as you go" program and the use of interim clay capping, which allows clean storm water to be shed off the capped areas of the landfill.
- Source reduction for closed landfills may be effective. Adding additional soil and improving the storm water drainage from the cap on SLF 1-6 in 2014 appears to have been effective in reducing the amount of leachate generated by that landfill (203,108 gallons in 2013, 114,783 gallons in 2014, 43% reduction). Cap enhancement/drainage improvements may be effective for the other capped landfills.
- Recycle or reuse of leachate is not applicable.
- Manufacturing Process Operational Changes does not apply.
- Restriction of the treatment of CWT metals category wastewaters in the new SPDES permit has reduced the load of mercury and other metals into the AWT Facility.

4.0 ALTERNATIVE OR ENHANCED TREATMENT TO REDUCE THE DISCHARGE OF BCCS

NYSDEC's antidegradation guidance next advises that treatment alternatives should be identified and evaluated that would or have minimized the amount of BCCs to be discharged. TOGS 1.3.9, §2.2, pp. 7-8. However, the purpose of the facility is in part to treat wastewater and leachate, which occurs in CWM's AWT Facility. Treated wastewater is monitored in accordance with the facility's Waste Analysis Plan and SPDES Permit. Routine monitoring is performed on samples collected at the new internal Outfall 01A. The treated effluent is accumulated in a facultative pond and batch qualified and discharged via Outfall 001. Even though BCCs are present in the leachate from various landfills, the pre-qualification analysis from the discharge pond (Fac Pond 3) has been consistently non-detect for the following organic BCCs : 4,4'DDD, 4,4'DDE, 4,4'-DDT, BHCs, Chlordane, Dieldrin, Heptachlor, Toxaphene, hexachlorobenzene, hexachlorobutadiene, pentachlorobenzene, PCBs and 1,2,4,5-tetrachlorobenzene. The SPDES permit includes a condition that the next pond qualified for discharge will also be tested for dioxins and furans. As no discharge is planned for 2015, due to low effluent volume, samples were collected from Fac Pond 3 in July (pond in progress) for BCC analysis to support this demonstration. The results are attached in Table A.

The PCB limit for Outfall 001 is non-detect with a maximum method detection limit (MDL) of 65 ng/L using EPA Method 608. Non-contact storm water from the site, which may contain trace levels of PCBs from historical contamination (see Section 2.0 above), is released and monitored via Outfalls 002, 003 and 004. The PCB limit for these Outfalls is 300 ng/L until 6/1/19, then 200 ng/L. The recently issued SPDES permit includes three additional internal stormwater outfalls, 02A, 02B and 02C. Weekly monitoring is to be performed at these outfalls for the first 4.5 years of the permit (monitor only); after this time, the limit will be set at 200 ng/L. See Figure 2, for a map of the SPDES Outfalls locations. A PMP for PCBs (PCBMP) is required because the permit limits of 65 and 200 ng/L per PCB Aroclor exceeds the WQBEL of 0.001 ng/L for Total PCBs. The goal of the PCBMP is to reduce PCB effluent levels in pursuit of the WQBEL. The basis for the 200 ng/L per Aroclor is the EPA Method 608 analytical Minimum Level (ML) for the Aroclors. The PCBMP will also employ a more sensitive PCB congener method in pursuit of reduction of PCBs that may be present at less than the MDL for Method 608. The first round of congener sampling in June 2015 detected eight congeners to be present above the MDL, but below the reporting limit (RL or ML) at Outfall 002. The estimated concentration of total PCBs was reported as 3.15 J ng/L PCBs. For Outfall 004, seven congeners were detected above the MDL, but below the reporting limit (RL or ML) for an estimated concentration of total PCBs of 2.69 J ng/L PCBs. These levels are similar to those found in precipitation samples reported in the Draft TMDL Support Document for PCBs in Lake Ontario. [1]

Any treatment enhancement steps taken to improve PCB removal will also be effective for reduction of the other organic BCCs. All are removed by carbon adsorption.

[1] Draft TMDL Support Document for PCBs in Lake Ontario, prepared for USEPA Region 2 by LimnoTech, Ann Arbor, MI, July 2011

A PMP for Mercury (MMP) is required because the final SPDES permit limit of 50 ng/L exceeds the WQBEL of 0.7 ng/L for mercury. The goal of the MMP is to reduce mercury effluent levels in pursuit of the WQBEL. In order to monitor mercury at <1000 ng/L (parts per trillion (ppt)) concentrations, a low level mercury analytical method (EPA Method 1631E) must be employed. This method will be performed by an off-site certified lab and will replace or supplement mercury analysis by EPA Method 7470A performed by the CWM laboratory. A special sampling technique (EPA Method 1669) should also be employed. With additional contamination control steps employed in 2014, the lowest level mercury results for pre-qualification sampling of Fac pond 3 were obtained (see Table 1). The results for low level mercury samples collected weekly (June – mid-November) at new internal Outfall 01A are included in Table 3. All results thus far are <20 ng/L.

4.1 Treated Effluent from the AWT Facility (Outfall 001)

As noted in NYSDEC's guidance, "[t]he objective of the alternative or enhanced treatment analysis is to ensure that the discharge of pollutants is reduced to the greatest extent practicable." TOGS 1.3.9, §2.2, p. 7. The discussion below provides a detailed description of the treatment processes already being implemented at the facility. This description includes (i) a thorough step-by-step explanation of the treatment train; (ii) BCC sources in the waste streams; (iii) a discussion of the most effective treatment methods for the waste stream; and (iv) sampling and analysis efforts. Part of the discussion of the most effective treatment methods include identifying potential additional treatment or disposal which would go above and beyond the treatment currently being undertaken <u>and</u> the minimization programs the facility is required to implement under its SPDES permit.

4.1.1 Treatment Process

Wastewater is treated in accordance with the Sitewide Permit (Tanks, Module IV and Exhibit D) and the AWT O&M Manual, which is a reference document of the Sitewide Permit. Wastewater includes site generated wastes such as landfill leachates, groundwater from the GWES, water from containment areas, lab sink water, carbon back wash water, etc. Wastewaters are also received from off-site customers. All customer generated waste streams require submittal and approval of a Waste Profile that accurately represents the waste prior to shipment (see Waste Analysis Plan, Attachment C of the Sitewide Permit). The waste profile customers are required to complete specifically asks if the waste contains PCBs. All waste shipments of approved waste streams are scheduled into the facility. These programs prevent the acceptance of unauthorized waste.

The treatment process includes physical, chemical and biological treatment. Figure 3 is a flow chart of the treatment process. The treatment train includes the following steps:

- Oil/Water (O/W) separation (optional) – biphased material such as the leachate from SLF 1-6 is pre-treated through the O/W separator. pH adjustment and addition of a flocculant are used to enhance phase separation. Gravity separation is employed; the layers are decanted from a cone bottom tank.

- Leachate and GWES collection and storage tanks - RMU-1 and SLF 12 have transfer lines to the Leachate Tank Farm (new landfill leachate storage tank, usually, T-101). Aqueous phase is decanted from O/W separator to T-103 (T-103 usually designated as the tank for aqueous from O/W separator) in the Leachate Tank Farm (LTF). LTF has an underground transfer line to AWT. T-8001 GWES storage tank has a transfer line to AWT. The other collection/storage tanks are emptied and contents transferred by vacuum truck.

- Batch reactor – wastewater is added from the LTF, vacuum truck, inbound tank truck or drum shipment, wastewater is acidified, oxidizer (e.g. hydrogen peroxide or Fenton's reagent) may be added to reduce phenolics and other organics, reducer (e.g. ferrous sulfate or bisulfite) may be added if waste contains hexavalent chromium.

- Lime slurry – calcium oxide/magnesium oxide slurry is added to wastewater to raise pH and precipitate metals. Other contaminants (including PCBs) adsorb to calcium sulfate precipitate and are also removed in the filtercake.

- Filterpress – plate and frame filter presses installed in 1985 are used to filter out solids (filtercake).

- Filtrate tank (T-100) – RMU-1 leachate, site generated wastewaters and gate receipts that only require organic removal treatment may be added at this point in the treatment train.

- Biotowers – wastewater may be recirculated from T-100 through the biotowers until the concentration of organics is reduced. Daily samples are monitored for VOCs and COD to monitor the treatment efficiency.

- Granular Activated Carbon (GAC) – two 15,000 pound GAC beds run in series remove residual organics including PCBs. The capacity of each tank is 7600 gallons. At the usual processing rate of 30 to 50 GPM, the empty bed contact time is 152 to 253 minutes for each tank. At the maximum processing rate of 200 GPM, the empty bed contact time would be 38 minutes in each bed. Daily samples are collected of the feed, midpoint and effluent for VOC analysis. The most predominant compound in the site generated leachate is acetone. Acetone has a lower affinity for carbon than other larger compounds such as PCBs, so acetone will "breakthrough" before the carbon beds are loaded. As the effluent must meet the RCRA LDR standard for acetone (280 ug/L or ppb) in order to be discharged to the Fac pond, the carbon bed is changed as soon as acetone starts to breakthrough. Spent carbon is sent for recycling and returned to CWM.

- Arsenic Removal Media (ASG) – two particulate filters (currently 25 um, then 5 um) followed by two ASG filters are used at the end of the treatment train to reduce the arsenic concentration. ASG has been found to be most effective in removing As+5 as found in the RMU-1 leachate. Suspended solids and other metals are also removed by this system.

- Outfall 01A – end of treatment train, new SPDES sampling location added to permit in 2015

- Batch qualification tanks (T-58 and T-125) – sampling and analysis of completed batches in accordance with the Waste Analysis Plan (WAP) (volatiles, metals and cyanide). One batch per month is also analyzed for mercury, semi-volatile organics and PCBs; Historical batch qualification data for mercury and PCBs is included in Tables 2 and 3. Semi-volatile BCCs hexachlorobenzene and hexachlorobutadiene are routinely monitored and reported as non-detect.
- Fac Pond 3 discharge pre-qualification sampling and analysis – Fac pond is sampled and tested to demonstrate compliance with SPDES limits for Outfall 001. Data is submitted to NYSDEC for review and approval to discharge to the Niagara River. PCBs, chlorinated pesticides by EPA Method 608 and semi-volatile by EPA Method 625 are historically non-detect. Mercury levels have been reduced due to improved sampling technique.
- Leachate from SLF 7 contains high arsenic levels (As+3/organoarsenic), PCBs and low level mercury. SLF 7 leachate is currently treated with powdered carbon, lime slurry and then filtered through the filter press to reduce the PCBs to <100 ug/L (F039 WW standard) and to qualify the wastewater as non-TSCA regulated. The treated material may then be shipped for deepwell disposal at a facility in Vickery, Ohio or another permitted non-CWA off-site disposal facility. Aqueous leachate from SLF 1-6 and other closed landfills may be processed in a similar manner. The filter cake containing the PAC with PCBs, pesticides and other adsorbed organics is shipped to the Veolia RCRA/TSCA incinerator in Port Arthur, Texas for disposal.

4.2 BCC Sources

The sources listed below are known to contain PCBs and mercury. Historical PCB concentrations using various methods are summarized in Table 4. Mercury concentrations are summarized in Table 5.

- Leachate from SLF 1-6
- Leachate from SLF 7 [currently shipped off-site]
- Leachate from SLF 10
- Leachate from SLF 11
- Leachate from SLF 12
- Leachate from RMU-1
- GWES West Drum Area and Process Area I and II
- GWES SLF 3 Area
- GWES east of SLF 12
- GWES near PCB warehouse
- GWES Process Area IV
- Customer gate receipts (drums, tank trucks), whose waste profile that indicates PCBs are present in the wastewater

The aqueous leachate from SLF 1-6 also contains 4,4'DDD, 4,4'-DDT, BHCs, Dieldrin, pentachlorobenzene, 1,2,4,5-tetrachlorobenzene and mercury. The aqueous material after O/W separation was sampled for BCC analysis in July 2015. The results are in Table A.

SLF 12 has two standpipes that appear to have elevated levels of mercury: L51 (945 ng/L) and L54 (2764 ng/L). These standpipes generate very low volumes of leachate.

4.3 Most Effective Treatment Methods for various sources

4.3.1 Leachate from SLF 7

Leachate from SLF 7 is collected in T-107 and transferred by vacuum truck to the AWT Facility. SLF 7 leachate is accumulated in one of the lime slurry tanks for treatment. Leachate from SLF 7 contains high arsenic levels (As+3/organoarsenic) as well as PCBs. After numerous years of shipping the leachate to a RCRA/TSCA incinerator, the facility shut off the wastestream due to high arsenic levels. Even with the addition of the ASG filters, the arsenic could not be removed down to the SPDES limit successfully. CWM determined that SLF 7 leachate could be treated with powdered carbon, lime slurry and then filtered through the filter press to reduce the PCBs to <100 ug/L (F039 WW standard) and the treated wastewater tested and qualified as non-TSCA regulated in accordance with CWM's TSCA Authorization. The treated material may then be shipped to Vickery, Ohio for deepwell (Vickery deepwell) disposal or another permitted disposal facility. Thus, the residual PCBs (<100 ug/L) in the treated wastewater are disposed of off-site at a non-CWA facility. The PCBs incorporated in the filtercake are sent to a RCRA/TSCA incinerator for destruction/disposal. No additional treatment is needed for wastewater that is disposed of off-site in a deep well or other non-CWA facility or for the filtercake going to an incinerator.

4.3.2 Leachate from SLF 1-6

The leachate from SLF 1-6 is bi-phased and goes through an O/W separator. The organic phase is sent to a RCRA/TSCA incinerator for destruction/disposal. The aqueous phase is accumulated in the Old Landfill Leachate tank (usually T-103) in the LTF. The wastewater from this tank can be transferred by a double walled underground transfer line to the AWT Facility. The material is received in a batch treatment tank (T-210, T-220 or T-230). As the most heavily contaminated leachate (with both organics and inorganics), the leachate would go through the full treatment train: acidification, optional treatment with Fenton's reagent, lime slurry, filterpress, filtrate tank, recirculate through biotowers for 2-7 days to reduce the biodegradable organic content, then GAC, particulate filters, ASG media and into the batch qualification tank. See Section 4.1.1 above. The key PCB removal steps are filtration with the filterpress and carbon adsorption by the GAC. PCBs and other organics are adsorbed onto the lime slurry solids and collected by the filterpress. The filtercake routinely fails to meet the F039 LDR standards for PCBs and other organic compounds and is sent off-site for treatment by incineration. Each batch of treated effluent from AWT is sampled and tested in accordance with the facility Waste Analysis Plan for VOCs, metals and cyanide in order to qualify it for release to the Fac pond. One batch per month is also analyzed for mercury, semi-volatile organics and PCBs; Historical batch qualification data for mercury and PCBs is included in Tables 2 and 3. Semi-volatile BCCs hexachlorobenzene and hexachlorobutadiene are routinely monitored and reported as non-detect.

Alternately, the aqueous leachate can be processed in the same manner as the SLF 7 leachate and qualified for off-site disposal at the Vickery deepwell. This alternative is evaluated in Section 4.5 (and Table B) below. PCBs and other organic BCCs captured in the filter cake are sent to the Port Arthur incinerator for destruction. The load of PCBs, mercury and other residual BCCs going through the AWT Facility could be reduced by sending the qualified pre-treated leachate off-site for deepwell or other permitted disposal.

4.3.3 Leachate from SLFs 10 and 11

These landfills are from the 1980s and thus the LDR standards had not yet been implemented. The leachate requires treatment through the full treatment train. The leachate is transferred by vacuum truck from the collection tanks to the AWT batch treatment tanks. Treatment will include acidification, lime slurry, filterpress, filtrate tank, recirculation through biotowers if necessary to reduce the biodegradable organic content, then GAC, particulate filters, ASG media and into the batch qualification tank. The key removal steps are precipitation followed by filtration with the filterpress and carbon adsorption by the GAC

4.3.4 Leachate from SLF 12

As a result of the promulgation of the RCRA LDR treatment standards for waste being disposed of in a landfill, the leachate from this later landfill contains low level metals and organics. The leachate from SLF 12 has historically been accumulated in the New Landfill Leachate tank (T-101) in the LTF along with the leachate from RMU-1. The wastewater from this tank can be transferred by a double walled underground transfer line to the AWT Facility. The water has routinely been added to the filtrate tank (T-100) for just organic treatment. Depending what else is in T-100, the water may be processed through the biotowers, GAC, then ASG or through GAC and ASG or possibly, just GAC. The key PCB removal step is carbon adsorption by the GAC. Two of the four standpipes have recently been identified as having elevated mercury: L51 (945 ng/L) and L54 (2764 ng/L). CWM is currently pumping the standpipes manually to a vacuum truck and monitoring the volume from each standpipe. CWM is evaluating the treatment plan for L51 and L54 (or all four standpipes) and whether metals precipitation should be added or off-site disposal may be possible, which could reduce the mercury load going into the AWT Facility.

4.3.5 Leachate from RMU-1

As a result of the LDR treatment standards for waste being disposed of in a landfill, the leachate from this later landfill contains low level metals and organics, predominantly acetone, methyl ethyl ketone and PCBs. The leachate from RMU-1 is pumped by sump pumps in the standpipes to a lift station and then accumulated in the New Landfill Leachate tank (T-101) in the LTF. During operation, contact storm water could also be pumped from the basin(s) in the landfill. In November 2015, waste receipts were completed for RMU-1 and interim capping applied to all active areas and the basins were eliminated. The wastewater from the New Landfill Leachate tank can be transferred by a double walled underground transfer line to the AWT. The water is added to the filtrate tank (T-100) for organic treatment. Depending on the season, the acetone level and what else is in T-100, the water may be processed through the biotowers, GAC, then ASG or through GAC and ASG or possibly, just GAC. The key removal step is carbon adsorption by the GAC.

The leachate from RMU-1 was sampled in July 2015 for BCC analysis. A composite was prepared for the leachate from the open (not fully capped) cells and the closed (capped) cells. The results are included in Table A. PCBs in the leachate are routinely monitored by sampling the standpipes semi-annually in the cells for which capping has not been completed and annually for capped cells. The PCB results for samples collected 2006-2015 are included in Table C. The leachate in L60 (cell 6) is an anomaly. However, CWM has been unable to determine the source or identify the cause of the unexpectedly high concentration of PCBs. A weighted average calculation using the average standpipe concentrations from 2006-2015 and the leachate level trends and pump run times from fall 2015 estimates that 45% of the leachate comes from cell 11/13 (L63), 45% of the leachate comes from the supplemental pumps in cells 7/8 through 12/14 (L61, L62, L63 and L64) with the remaining 10% from the capped cells 1-6 (L55-L60), which results in an average concentration of 208 ng/L. Although the exact source of the elevated PCB concentration in L60 is not known, CWM does not expect RMU-2 to contain any cells similar to Cell 6. The average PCB concentration without L60 is 2.90 ug/L. This value is used for the RMU-2 estimates.

4.3.6 Leachate from RMU-2

The leachate from RMU-2 is expected to be similar to that of RMU-1, excluding L60. The leachate will be accumulated in tank (T-101) in the LTF, which stores "New" (SLF-12, RMU-1 and RMU-2) Landfill Leachate. The wastewater from this tank can be transferred by a double walled underground transfer line to the AWT. The water will be added to the filtrate tank (T-100) for organic treatment. The leachate may be processed through the biotowers, GAC, then ASG or through GAC and ASG or possibly, just GAC. The key removal step will be carbon adsorption by the GAC.

4.3.7 GWES West Drum Area and PA I and II

The contaminated groundwater from these systems is collected in tank T-8001. The wastewater from this tank can be transferred by an above ground transfer line to the AWT. The water is added to the filtrate tank (T-100) for just organic treatment. Depending on what else is in T-100, the water may be processed through the biotowers, GAC, then ASG or through GAC and ASG or possibly, just GAC. The key PCB removal step is carbon adsorption by the GAC.

4.3.8 GWES SLF 3 Area

The material is transferred by vacuum truck to a batch treatment tank (T-210, T-220 or T-230). As the groundwater has a high level of contaminants including PCBs and chlorinated pesticides, it goes through the full treatment train: acidification, lime slurry, filterpress, filtrate tank, recirculate through biotowers if needed to reduce the biodegradable organic content, then GAC, particulate filters, ASG media and into the batch qualification tank. The key PCB removal steps are filtration with the filterpress and carbon adsorption by the GAC.

4.3.9 GWES near SLF 12, PCB Warehouse, BW02S, PA III and PA IV

The material transferred by vacuum truck to a batch treatment tank (T-210, T-220 or T-230). The water is added to the filtrate tank (T-100) for just organic treatment. Depending on what else is in T-100, the water may be processed through the biotowers, GAC, then ASG or through GAC and ASG or possibly, just GAC. The key PCB removal step is carbon adsorption by the GAC.

4.3.10 Gate receipts with metals, solids, inorganics as well as organics, may include PCBs

The wastewaters are pumped to a batch treatment tank (T-210, T-220 or T-230). As the wastewater may have a high level of contaminants, it goes through the full treatment train: acidification, lime slurry, filterpress, filtrate tank, recirculate through biotowers if needed to reduce the biodegradable organic content, then GAC, particulate filters, ASG media and into the batch qualification tank. The metals are removed by lime slurry and filtration. Biodegradable organics are removed by the biotowers. The key removal steps for PCBs and other larger organic compounds are lime slurry, adsorption to precipitate solids, filtration with the filterpress and carbon adsorption by the GAC. Wastewaters with chlorinated pesticides or other BCCs are rarely submitted for approval for treatment at the AWTS.

A condition of the facility's SPDES permit issued on April 22, 2015 and effective on June 1, 2015 restricts the treatment of CWT Facility metals category wastewaters. CWM has reviewed the waste profiles approved for processing in the AWT Facility and suspended any profiles classified as metals category. This has reduced the load of metals, including mercury, into the AWT Facility.

4.3.11 Gate receipts with organics and PCBs

The wastewaters are added to the filtrate tank (T-100) for just organic treatment. Depending on what else is in T-100, the water may be processed through the biotowers, GAC, then ASG or through GAC and ASG or possibly, just GAC. If needed, the wastewater can be recirculated through the biotowers to reduce the biodegradable organics. The key PCB removal step is carbon adsorption by the GAC.

4.4 Sampling and analysis

4.4.1 Historical PCB analysis of batch qualification samples

Table 4 is a spreadsheet with the PCB analysis performed on one effluent batch per month for the past 10 years. This analysis will continue to be performed as required by the Waste Analysis Plan. The PCBs must be <100 ug/L to meet the LDR standard and qualify for release to the Fac pond (surface impoundment).

4.4.2 Quarterly analysis of influent and effluent

In accordance with the newly established PMP, additional sampling locations and the use of more sensitive analytical methods has been implemented. Quarterly samples of influent and effluent are specified in the facility's PMP. There are three general types of influent that may be treated in the AWT Facility.

One type of influent to the AWT Facility includes a treatment batch that includes old landfill leachate that will go through the whole treatment train. Each of these sources has been characterized for PCB and mercury content. A grab sample will be collected from the batch tank prior to treatment. Key locations for this type of waste includes the filtrate from the filter press and T-100 (the filtrate tank), which may include additional wastewaters. Grab samples will be collected from these locations at times when it is estimated that the selected batch has reached that stage in the process. The effluent sample will be collected after the last treatment step, either the ASG filters or the GAC if the ASG is not in use. A 24 hour composite will be collected with an ISCO sampler for PCB analysis during the time when it is estimated that the batch has been treated and is present in the effluent. A grab sample will be collected for low level mercury analysis.

Another type of influent to the AWT Facility includes gate receipts which are profiled as containing PCBs or mercury. This material will go through the whole treatment train. A grab sample will be collected from the batch tank prior to treatment. Key locations for this type of waste includes the filtrate from the filterpress and T-100 (the filtrate tank), which may include additional wastewaters. Grab samples will be collected from these locations at times when it is estimated that the selected batch has reached that stage in the process. The effluent sample will be collected after the last treatment step, either the ASG filters or the GAC, if the ASG is not in use. A 24 hour composite will be collected with an ISCO sampler for PCB analysis during the time when it is estimated that the batch has been treated and is present in the effluent. A grab sample will be collected for low level mercury analysis.

Another type of influent is wastewater that only requires organic treatment, such as new landfill leachate (RMU-1) and groundwater containing PCBs from GWES. Each of these sources has been characterized for PCB content. The influent to the treatment process is the mixture in T-100, the filtrate tank. A grab sample will be collected from T-100 after the target material has been added. There are no key locations between the filtrate tank and the end of the treatment train. The effluent sample will be collected after the last treatment step, either the ASG filters or the GAC if the ASG is not in use. A 24 hour composite will be collected with an ISCO sampler for PCB analysis during the time when it is estimated that the batch has been treated and is present in the effluent. A grab sample will be collected for low level mercury analysis.

Generally, the material being processed is a mixture of the three types of influent. During each quarter, at least one sampling event will be performed to monitor the PCB and mercury concentration in the initial batch of waste water being treated and track it through to new internal Outfall 01A. After a year of the program, the waste stream types, sampling locations and frequencies will be assessed and adjusted if necessary.

4.5 Evaluation and Implementation of Alternatives

4.5.1 Decreasing leachate from RMU-1 and SLF 1-6, adding RMU-2 leachate

Cap maintenance on the closed landfills is a key component to CWM's continuing efforts at source reduction and this will be continued. For RMU-1, the quantity of leachate has been greatly reduced by capping areas as they are brought up to grade and using intermediate cover to allow the clean rainwater to be shed off the landfill. The annual leachate generation has been reduced from approximately 15 million gallons per year to 5 million (2014). By the end of November 2015, operational areas will be covered by an intermediate or final cap. Final capping will be completed during the 2016 construction season. The leachate will drop dramatically after cap installation. RMU-2 will follow a similar "cap as you go" program to minimize the open acreage and leachate generation. The mercury and PCB loads from the RMU-1 and RMU-2 leachates was calculated using three scenarios:

Scenario #1) using the landfill leachate volumes from 2014

Scenario #2) future prediction (e.g. 2017) one year after capping of RMU-1 using the estimated leachate volume of 1,041,925 gallons and the leachate volume with the first cell of RMU-2 operational (5,000,000 gallons), and

Scenario #3) future prediction (e.g. 2022) approximately five years into the future with RMU-1 capped and five years of de-watering (257,053 gallons of leachate) and RMU-2 generating the maximum amount of leachate (4 cells open, 16,000,100 gallons).

The predictions for leachate generation for RMU-1 after capping are based on the leachate generation rates on a per acre basis after closure for SLF12. A copy of the table predicting the annual post closure leachate quantities for RMU-1 from the CWM Post Closure Cost Estimate, (reference document to the current Part 373 Permit) is included with Table B. The future predicted RMU-2 maximum leachate (now incorporated in the applicable tables 16,000,100 gallons) is based on the year of maximum leachate generation for RMU-1 (2004, 26.14 open/uncapped acres of landfill). As the landfills are similar size and cells/areas will be capped as they reach final grade to minimize leachate generation, the maximum leachate generation for RMU-2 is expected to be similar to that of RMU-1. If the first four cells of RMU-2 were constructed and operational, and no capping had been applied, there would be 23.67 open/uncapped acres of landfill. Note: the conceptual waste filling and final cover sequence shows a portion of the first three cells being capped by the time that the fourth cell is operational. A drawing from the RMU-2 Part 373 permit application and Draft RMU-2 Part 373 Permit with a conceptual cover sequence is included with Table B.

A summary of the mercury and PCB loading into AWT is provided below.

MERCURY LOADING INTO AWT ESTIMATES:

Scenario #1- using 2014 leachate volumes

SLF 1-6	103,305 gallons	464.5 mg mercury
RMU-1	5,373,759 gallons	33.0 mg mercury
Total all landfill leachate load into AWT:		605.5 mg mercury

Scenario #3 –five years into the future, RMU-1 capped, RMU-2 maximum leachate

SLF 1-6	(pre-treated leachate shipped off-site)	0 mg mercury
RMU-1	0.257 million gallons	1.6 mg mercury
RMU-2	16.0 million gallons	98.1 mg mercury
Total all landfill leachate load into AWT:		208.0 mg mercury
		(65.6% reduction)

PCB LOADING INTO AWT ESTIMATES:

Scenario #1 - using 2014 leachate volumes

SLF 1-6	103,305 gallons	1.65 lbs PCBs
RMU-1	5,373,759 gallons @ 54.65 ug/L (average)	2.44 lbs PCBs
Total all landfill leachate load into AWT:		13.32 lbs PCBs

Scenario #3 – five years into the future, RMU-1 capped, RMU-2 maximum leachate

The PCB concentration of 54.64 ug/L for RMU-1 is the average from samples taken from the lift station (T-160), the storage tank (T-101) and the calculated concentration based on standpipe data from 2006-2015. If the straight mathematical average concentration is calculated using the standpipe data for the past ten years, the value is skewed by the high PCB concentration of Cell 6 (L60) (see attached PCB data for individual standpipes). Leachate characteristics from Cell 6 are anomalous and would not be expected in RMU-2. The Cell 6 (L60) standpipe was inadvertently included in the open cell composite samples collected in June 2015 (higher flow volume), when it should have been in the closed cell composite (lower flow volume) because it is 95% capped,. The calculations have been performed by doing a weighted average using 10 years of standpipe data (see Table C) and the leachate information for fall 2015. The average PCB concentration in RMU-1 leachate standpipes excluding L60 is 2.90 ug/L. This value is used for RMU-2 projections.

SLF 1-6	(pre-treated leachate shipped off-site)	0 lbs PCBs
RMU-1	0.257 million gallons (closed, capped) @ 54.64ug/L	0.12 lbs PCBs
RMU-2	16.0 million gallons @ 2.90 ug/L	0.39 lbs PCBs
Total all leachate load into AWT:		9.73 lbs PCBs
		(27% reduction)

The details and calculations for all three scenarios are included in Table B. Scenarios # 2 & 3, show a reduction in both mercury and PCB loading into the AWT facility even when RMU-2 is at maximum leachate generation.

4.5.2 SLF 12 leachate

Two of the four leachate standpipes in SLF12 appear to have higher levels of mercury based on samples collected on August 28, 2014 (944.9, 9.2, 10, 2764 ng/L). Due to the low level of other contaminants in this leachate, it has historically been combined with RMU-1 leachate for just organic treatment. During the first semi-annual period of the MMP, CWM is tracking the volume generated by each standpipe and evaluating whether the two apparently high standpipes should be re-sampled, treatment changed to include metals precipitation or changed to pre-treatment and off-site disposal.

4.5.3 Filter press replacement

An assessment of the AWT Facility was performed by a consultant retained by CWM, O'Brien & Gere Engineers (OB&G), to identify possible AWT Facility upgrades which could be implemented to increase treatment efficiency. The cost estimates for these options, where established, have been reviewed to determine which options appear to be reasonable and cost effective.

Replacement and upgrade of the filter presses for improving removal of mercury and other contaminants that adsorb to solids in the lime slurry and are removed by filtration (e.g. PCBs) was determined to be a cost effective upgrade. CWM is therefore planning for the removal of the 30 year old filter presses and replacement with at least one more efficient filter press unit in 2016 or 2017 (at an approximate capital cost of $1 million. Mercury and PCB removal efficiency before and after filter press replacement will be assessed using the data collected from the sampling and analysis described in section 4.4.2. A sampling event performed in October 2015 found 646 ng/L mercury in a wastewater batch prior to treatment (included a gate receipt of non-hazardous oily water, GWES and the lab waste water tank) and 4.9 ng/L mercury in the filtrate from the filter press. This sampling event showed a 99.2% removal of mercury with the current filter press.

4.5.4 Other considerations

OB&G also suggested that additional enhancement of mercury removal might be achieved using co-precipitation with sulfide after biotreatment, but before GAC. As discussed in Section V of TOGS 1.3.10, co-precipitation and/or use of selective sorbents has not been demonstrated to consistently reduce mercury to levels of <12 ng/L. With a capital cost estimate of $5.7 million (and an increased annual operating cost of $510,000), this alternative was therefore determined not to be cost effective.

Removal efficiency of PCBs and other organics by the current GAC system is being monitored and assessed. OB&G has suggested that the addition of multimedia filters and replacement of the two current GAC units with new duplex GAC units might provide additional reduction for PCBs and other organics. With a capital cost estimate of $5.3 million (and an increased annual operating cost of $657,000), this alternative has been determined not to be cost effective.

OB&G has also suggested that the addition of UV-oxidation after the addition of a new GAC system could further reduce dissolved PCBs. With a capital cost estimate of $8.4 million (new multimedia, GAC and UV oxidation) and high annual operating cost of $1.5 million (primarily from increased electric usage), this alternative has also been determined not to be cost effective.

The addition of leachate from RMU-2 is not expected to impact the operation of the AWT Facility, nor reduce the quality of the effluent being produced. The pre-qualification samples from the Fac Pond are expected to be non-detect for PCBs and chlorinated pesticides. The final mercury limit specified in the SPDES permit is 50 ng/L.

Rather than spending several million dollars to add sulfide co-precipitation, add multimedia filters, replace the carbon beds and add UV oxidation to achieve small increases in treatment efficiencies, CWM has opted to reduce the input load to the AWTS by pre-treating the aqueous portion of leachate and sending all qualified aqueous material off-site to a permitted non-CWA disposal facility. See Table B for projected impact of adding RMU-2 and re-directing aqueous leachate from SLF 1-6. See also Section 7.0 below.

5.0 STORM WATER

5.1 Storm Water PCB Monitoring

CWM has performed sampling and analysis of its stormwater for PCBs over the last fifteen years. Described below are the more recent results of this sampling and then a description of the plans in place to continue to monitor and identify potential sources of PCBs and to minimize those sources.

In the past four years, outfall 002 (SMP 06) has had one PCB detection (April 11, 2013). The result of 56 ng/L as Aroclor 1242 was considered estimated as it was below the reporting limit of 65 ng/L.

In the past four years, outfall 003 (SMP 07) has had two PCB detections (February 20, 2013 and February 27, 2013). For the first detection, the results of 51 ng/L as Aroclor 1242 and 61 ng/L as Aroclor 1254 were considered estimated as they were below the reporting limit of 65 ng/L. For the second detection, the results of 42 ng/L as Aroclor 1242 and 61 ng/L as Aroclor 1254 were considered estimated as they were below the reporting limit of 65 ng/L.

In the past four years, outfall 004 (SMP 09) has had one set of samples with PCB detections (November 15, 2011). One sample had results of 307 ng/L as 1242 and 80 ng/L as 1260, the duplicate sample had results of 144 ng/L as 1242 and 35J ng/L as 1260. There was a large percent difference between the two samples. No PCBs were detected in the sample taken on November 8th, nor in subsequent samples. The carbon cloth was changed when the sample results were received. Previous studies performed in 2009 on the inlets to the SMP 09 settling basin did not identify any source of PCBs or obvious pathway.

A summary of the PCB Aroclor monitoring data for outfalls 002, 003 and 004 is included in Table 6. Table 7 includes the PCB Aroclor detections for these outfalls from 2004 to 2015, with an estimate of the PCB discharged in grams. The PCB concentration of the weekly 24 hour composite sample was used along with the flow volume for the sampling period to calculate the loading.

Outfall 004 commenced operation in 2004. There were four PCB detections at Outfall 004 in 2009 (refer to Table 7). Consequently, a source investigation was performed in the SMP09 detention basin, the culvert pipes and stormwater channels on RMU-1. No sources or areas of contamination were identified. No pathway from RMU-1 was identified. There were no PCB detections in 2010 or early 2011. PCBs were detected in one sampling event in November 2011 (11/9/11), however, there was a significant discrepancy in the PCB concentrations for the pair of field duplicate samples collected (226 ug/L and 58J ug/L, a 74% difference). No PCBs were detected in the samples collected one week prior at Outfall 004; no PCB Aroclors have been detected since 2011. The most recent sample collected at Outfall 004 on 11/3/15 for PCB congener analysis showed non-detect for all PCB congeners with a reporting limit of about 0.5 ng/L.

Table 7 includes the PCB detections and the calculated mass loading for each of the stormwater outfalls during the sampling event. Twelve out of sixteen samples include estimated results which are >MDL, but less than ML. In August 2009, a set of field duplicate samples were sent to two different labs; one lab reported PCBs not detected, the other reported 26.8 J ug/L as Aroclor 1242. This clearly demonstrates that Aroclor identification and quantitation by method 608 can be challenging at trace levels.

A load calculation for the period of 2004 to 2015 using the PCB concentrations and the flow volume for the sampling period produces the following results:

Outfall	002	003	004	(2004-2015)
including estimated values	1.300	0.769	0.576	grams PCB
w/o estimated values	0.798	0.150	0.319	grams PCB

PCB detections at the stormwater outfalls is believed to be generally due to past historical contamination. However, as there was little hazardous waste activity in the area of Outfall 004 (east of RMU-1) until the construction and operation of RMU-1, one could consider RMU-1 the possible source of the earlier PCB detections at this this outfall. As discussed above, no pathway could be identified during subsequent investigations. Even so, with the end of waste receiving and the intermediate cap in place, RMU-1 would no longer be a potential source of PCBs in stormwater. Additionally, RMU-1 will be fully capped by the time of the first cell of RMU-2 is operational. As RMU-2 is west of RMU-1, the storm water from the perimeter of RMU-2 will flow toward Outfalls 002 and 003, the PCBs from landfill activities “going to” Outfall 004 would be shifted to Outfalls 002 and 003. No increase in total load would be expected. Any future PCB Aroclor detections in storm water and source investigations will be tracked through the facility PCB Minimization Plan. The PCB MP also requires analysis using a more sensitive PCB congener test method. The first round of congener sampling in June 2015 detected eight congeners to be present above the MDL, but below the reporting limit (RL or ML) at Outfall 002. The estimated concentration of total PCBs was reported as 3.15 J ng/L PCBs. For Outfall 004, seven congeners were detected above the MDL, but below the reporting limit (RL or ML) for an estimated concentration of total PCBs of 2.69 J ng/L PCBs. These values are similar to the values for precipitation documented in the Draft TMDL Support Document for PCBs in Lake Ontario. [2]

5.2 Storm Water Program Plans in Place

5.2.1 Storm Water Sampling and Analysis Plan (SWSAP)

The Sitewide Permit (Attachment M) provides information on the site background, site description, stratigraphy, soil classification, surface water conditions, drainage system, operation of control gates, location of outfalls and sampling and analysis required by the Sitewide RCRA permit.

[2] Draft TMDL Support Document for PCBs in Lake Ontario, prepared for USEPA Region 2 by LimnoTech, Ann Arbor, MI, July 2011

5.2.2 SPDES Best Management Practices (BMP) Plan

This Plan provides general site description and history, waste handling and disposal processes, units and management methods employed to prevent release of pollutants (including PCBs) into the environment, including the storm water system.

5.2.3 Continuous Improvement in Storm Water Controls to Reduce PCBs, March 2005 (most recent update December 2014)

This document discusses historical use of CWM's property as part of the Lake Ontario Ordinance Works, clean up by the Department of Defense Contractors and operation of a TSDF since 1971. This document summarizes the RCRA Facility Investigation performed in the early 1990s and the Sitewide Corrective Measures activities performed. It discusses the locations of the surface water monitoring points (SMPs), the associated SPDES outfalls and the waste management units in the general area of the SMPs. It describes many of the efforts undertaken to initially reduce the concentration of PCBs in the storm water and in later years, to reduce the detections. This includes removal of soil with >1 mg/kg PCBs from storm water channels and associated areas, installation of clean cover/controls in areas where removal was not practical, installation of culvert pipe to minimize sediment transport, addition of geotextile and carbon cloth to the face of the perforated plate directly upstream of the control gate. For full report, see Appendix 1 of PCB MP.

5.3 SPDES Permit, PCB Monitoring and Source Identification and Minimization

5.3.1 PCB Monitoring

As part of its SPDES permit, CWM is required to monitor its stormwater outfalls for PCBs and, if necessary, move upstream of these outfalls to further evaluate potential PCB movement. These activities are described below.

5.3.1.2 Outfalls 002 (SMP 06), 003 (SMP 07) and 004 (SMP 09)

- compliance monitoring: weekly 24 hour composite sample for Aroclors by EPA Method 608
- quarterly 24 hour composite samples for PCB congeners by method 8270sim/680/NOAA if the Method 608 results are <65 ng/L. A congener sample to be collected at the same time as the EPA Method 608 sample so the results may be compared.
- The first set of samples taken in June found 3.15 ng/L PCBs at Outfall 002 and 2.69 ng/L PCBs at Outfall 004. These values are similar to the values for precipitation documented in the Draft TMDL Support Document for PCBs in Lake Ontario. [3]

[3] Draft TMDL Support Document for PCBs in Lake Ontario, prepared for USEPA Region 2 by LimnoTech, Ann Arbor, MI, July 2011

5.3.1.3 Outfalls 02A (SMP 03), 02B (SMP 04) and 02C (SMP 05)

Newly added to the SPDES permit, weekly 24 hour composite sample for Aroclors by method 608, no compliance limit for first four years of permit. As key locations in the storm water system, semi-annual 24 hour composite samples for PCB congeners by Method 8270sim/680/NOAA. Congener sample to be collected at the same time as the 608 sample so results may be compared. If result is greater than 65 ng/L by Method 608, congener analysis is not required.

5.3.1.4 Other Key Locations in storm water collection system

Toward the end of each semi-annual sampling period, the data from that time period will be reviewed and it will be determined if PCB track down should move upstream of one of the outfalls. Sampling locations could include water in storm water ditch(es) upstream of the SMP basin and/or soil suspected of contributing PCB contaminated sediment to an outfall.

5.3.2 Potential PCB Source Identification and Minimization

5.3.2.1 Wide spread, low level historical contamination in the sediment/surface soil

Numerous sampling activities and investigations have been performed over the years to identify locations where soil with potential PCB contamination may be transported in the storm water system. CWM will continue to observe storm water flows, sample areas of concern and perform corrective actions if contamination is identified. <u>See</u> PCBMP for historical details. The Sitewide Permit and the Draft RMU-2 Permit include Soil Management Plans for site excavations/soil movement activities. This includes assessment of historical contamination in the area of the activity, field monitoring for radiation and volatile organics and sampling and analysis for disposition of the soil excavated.

5.3.2.1 Process Area – PCB contamination in upper soils, contained by cap (asphalt paving, concrete, stone, grass).

The Sitewide Permit includes a condition that requires semi-annual inspection of the “cap” in the Process Area in the central portion of the facility. Areas where the “cap” has degraded are identified and repaired to minimize transport of potentially contaminated soil. GWES Process Area IV (PA IV) was installed in 2012 to extract PCB contaminated groundwater in this area and minimize upward seeps to storm water. The Process Area is not included in the footprint of RMU-2; it will not be disturbed.

5.4 Storm Water Analysis for Low Level Mercury

To confirm that mercury is not a constituent of concern in the storm water at the facility, DEC requested that CWM perform sampling and analysis for low level mercury at outfalls 002, 003 and 004. Samples were collected on 11/3/15 and the following results were obtained:

Outfall	mercury ng/L
002 (SMP 06)	3.29
003 (SMP 07)	2.25
004 (SMP 09)	3.38
Field Blank	0.257

Based on the information in the October 2015 revision of DEC's TOGS 1.3.10 Mercury – SPDES Permitting & Multiple Discharge Variance, these values are similar to the mercury concentrations found in ambient surface water bodies statewide (range 0.2 to 5.4 ng/L, average 2.0 ng/L) and are less than the average in precipitation samples collected in New York during 2013-2014 (8.4 ng/L).

6.0 STATUS REPORTS

Under CWM's SPDES permit, semi-annual status reports are required for the PCB and mercury PMPs. These reports are to include:

- all MP monitoring data for the report period
- a list of known and potential sources
- all action undertaken pursuant to the strategy during the previous report period
- all actions planned for the upcoming report period
- progress toward goal

As part of the PMP, CWM must, on an ongoing basis, evaluate control strategies for reducing PCBs and mercury at the Site via cost-effective measures. Such cost-effective measures could include the installation of new or improved treatment facilities. Therefore, even though as part of this antidegradation demonstration, CWM has shown that it has gone above and beyond what is necessary in order to satisfy the requirements for such a demonstration. The evaluation of such treatment alternatives, at least for PCBs and mercury, will be ongoing process.

7.0 BCC LOAD REDUCTION

Even though all pre-qualification facultative pond batches have been non-detect for PCBs, pesticides and other organic BCCs, reduction in loading to the AWT will be achieved by:

- Leachate (source) reduction through "cap as you go" program on the open landfill and improved storm water management features on capped landfills.
- Restriction of the CWT metals category wastewaters (mercury).
- With an investment of about $1 million, replacing the filter presses and increasing the filtration/solids removal efficiency (PCBs and mercury) as discussed in Section 4.5.

Additional reduction in loading to the AWT could be achieved by:

- In order to off-set the potential increase in the incoming load of BCCs to the AWT Facility from the RMU-2 leachate, when CWM receives the RMU-2 permit, the facility would commit to pre-treating SLF 1-6 aqueous leachate and sending all qualified treatment residues off-site to a permitted non-CWA facility for disposal. See Table B for projected impact of diverting the SLF 1-6 leachate. CWM would accept a SPDES permit condition that includes this commitment. The estimated reduction at the point when RMU-2 is at maximum leachate generations is 66% (from 605.5 mg mercury to 208 mg). Draft language that CWM would accept for this permit condition is included in Appendix 1.
- Commitment to the off-site disposal of the leachate from SLF 1-6 would also reduce the PCB load into the AWT facility by an estimated 1.65 pounds. Reduction of the leachate from RMU-1 after capping would provide further reduction of the PCB and mercury loads from this landfill. The estimated reduction at the point when RMU-2 is at maximum leachate generations is 27% (from 13.32 pounds to 9.73 pounds). See Section 4.5.1 and Table B for estimates and calculations.
- In addition, to further off-set the potential increase in the incoming load of BCCs to the AWT Facility from the RMU-2 leachate, when CWM receives the RMU-2 permit, the facility would commit to a restriction on receiving wastewaters with a B003 waste code for treatment at the AWT Facility (other than for the O/W separator). This condition would require the generators to better characterize the PCB content of their PCB containing wastewaters, instead of just using generator knowledge and assuming wastewater is B003 (>500 ppm). CWM would accept a SPDES permit condition that includes this commitment. Draft language that CWM would accept for this permit condition is included in Appendix 1.
- Based on the data generated from samples taken at internal monitoring points as part of the PMPs, other improvements as discussed above may be determined to be cost-effective methods of further reducing PCBs, mercury and other BCCs.

As shown above, therefore, CWM's actions, even with the addition of RMU-2, will result in a decrease in the BCCs being discharged to a water of the state.

8.0 IMPORTANT SOCIAL AND ECONOMIC DEVELOPMENT CONSIDERATIONS

Where a proposed activity at a facility with a SPDES permit has the reasonable probability of a new or increased discharge of a BCC, 40 CFR Part 132 Appendix E, § IV, states that the information provided in a SPDES permit modification application related to that activity should identify the social or economic benefits the area would forego if the proposed activity is not allowed. In determining such an application, DEC must assess whether a lowering of the water quality caused by the proposed activity is necessary, and, if necessary, whether that adverse impact on water quality will support important social and economic development in the area. Any decision allowing the proposed activity must not allow water quality to be lowered below the minimum level required to fully support existing and designated uses.

DEC's September 1985 TOGS 1.3.9 (Supplement to DEC's Great Lakes Basin Antidegradation Policy) and Attachment I-NY2C Antidegradation Supplement both state that the applicant's showing that the proposed discharge will support social and/or economic benefits "***should occur only after pollution prevention or alternative treatment options are evaluated and the new or increased discharge of BCC remains.***" *Id.* at 8, § 2.3 (emphasis added).

The alternate treatment options discussed above show that implementation of the identified viable treatment options will result in a decrease in the discharge of BCCs as compared to the discharge of BCCs currently authorized under CWM's 2015 SPDES permit and the currently approved operating procedures at the AWTS. Thus, as provided in TOGS 1.3.9, § 2.3, it is CWM's position that a social and/or economic development showing is not required for this application. Without prejudice to that position, reserving all of its rights, and in order to obtain a completeness determination on this application, CWM submits the following environmental, social and economic development considerations.

8.1 Socioeconomics

8.1.1 Demographics

Land use in the vicinity of the Model City Facility is primarily residential, agricultural, government services and military. Within 1 mile of the Model City Facility, the estimated population density is less than 1 person per 2 acres, as calculated from the 1980 USGS maps.

Based on the 2010 U.S. Census, the town populations for the areas surrounding the Model City Facility are as follows:

- Hamlet of Ransomville: 1,419;
- Town of Lewiston: 16,262;
- Village of Lewiston: 2,701;
- Town of Porter: 6,771;

- Village of Youngstown: 1,935; and
- Tuscarora Indian Reservation: 1,152.

8.1.2 Housing

According to the 2010 U.S. Census, there are approximately 99,120 housing units in Niagara County. Housing starts for the period of 1980 to 2010 were 14,120 units. As reported in the 2010 Census, the number of units for the Towns of Lewiston and Porter is 6,610 and 3,103 respectively.

According to the 1960 U.S. Census, the number of housing units in the Towns of Lewiston and Porter were 4,213 and 2,223, respectively. Comparing the 1960 and 2010 Census data, there has been a 56.9% increase in the number of housing units in the Town of Lewiston and a 39.6% increase in the number of housing units in the Town of Porter.

Based upon a review of aerial photography by Aero-Data Corp. for the years 1966 and 2008, the total number of residential units in Lewiston and Porter increased by 56.4%, the number of industrial sites decreased by 34.5% and the number of commercial and governmental units increased by 45.7%.

After applying the state equalization rates, total real estate assessed values for the Town of Porter increased by 38% between 2002 and 2011, and the total assessed values for the Town of Lewiston increased by 41.6% for the same period.

Present land use and zoning will act to deter residential development within 1 mile of the RMU-2 centroid. Thus, very little housing growth in the immediate vicinity of the RMU-2 site is anticipated.

8.1.3 Employment

The 2010 U.S. Census reports that educational services, health care and social assistance are the principal industries in Niagara County (26.9%). Other significant employers are retail trade (12.8%) and manufacturing (12.2%). The average unemployment rate for Niagara County in the 2010 Census was 8.1%.

The Model City Facility currently employs 66 persons. Contractor personnel at the site average 10 to 20 on a daily basis and may number as high as 140 workers per day during major construction projects.

8.1.4 Local Communities

The Model City Facility is not located in an area containing significant minority or low income communities. The NYSDEC map for Niagara County contains no potential environmental justice areas in the Town of Porter based on data from the 2010 U.S. Census. Additionally, the NYSDEC Niagara County map shows only the Tuscarora Indian Reservation as a potential environmental justice area in the Town of Lewiston. The Tuscarora Indian Reservation is approximately 3.5 miles south of the Model City Facility and is not adjacent to facility transportation routes.

8.1.5 Land Use and Zoning

The Model City Facility is located in a predominantly rural area on the border between the Towns of Lewiston and Porter. The surrounding area is undeveloped and sparsely populated, with an average of 1 person per 2 acres of land.

All existing operational areas are within the central portion of the Model City Facility which is currently zoned for heavy industrial use (i.e., M 3) in accordance with the Town of Porter Zoning Law. That zone allows waste management activities, including hazardous waste landfill operations. The proposed location of RMU 2 lies within the existing Town of Porter M 3 zoned area of the Model City Facility.

The Town of Lewiston portion of the Model City Facility is zoned I 2 Heavy Industrial. No housing is permitted, while all land surrounding the Model City Town of Lewiston property is zoned I 1 Industrial, housing permitted. Outside of the area zoned for industry in both the Towns of Lewiston and Porter, the land is zoned residential and agricultural.

8.2 Existing Facilities and Operations

8.2.1 Background

Properties in the vicinity of the Model City Facility have been, and are used for Army and National Guard maneuvers, detonation of out-of-date explosives, sanitary landfill, agricultural and light commercial operations. The Model City Facility has operated as a hazardous waste treatment, storage and disposal site (USEPA ID No. NYD049836679) since 1971. Over that period of time, it has been known by several names. In 1971, the corporate name was Chem-Trol Pollution Services, Inc. SCA Services acquired Chem-Trol Pollution Services, Inc. in 1973; the name was changed to SCA Chemical Waste Services, Inc. in 1978 and to SCA Chemical Services, Inc. in 1981. SCA Chemical Services Inc. became a wholly owned subsidiary of Chemical Waste Management, Inc. in 1986 and changed its name to CWM Chemical Services, Inc. in 1988. CWM Chemical Services, Inc. became a limited liability company in January 1998 and became CWM Chemical Services, LLC. CWM is the owner and operator of the Model City Facility. WMI is based in Houston, Texas.

The Model City Facility accepts a variety of liquid, solid and semisolid organic and inorganic hazardous and industrial non-hazardous wastes. In addition, it is the only facility located in EPA Region 2 that is approved to treat, store and dispose PCBs.

The Model City Facility generally serves a market located within an approximate 500-mile radius of the facility. A significant portion of the waste handled at the facility is generated in New York State, particularly in the western New York area. Additional wastes may be received from other states located in the northeastern United States, Canada and Puerto Rico.

There are 10 closed landfills at the Model City Facility. SLF-1 through SLF-6 pre-date 1979. After 1980, SLFs 1-6 were retrofitted with leachate removal and monitoring systems, and unit specific monitoring wells. Their operational periods were November 1971 to February 1973 for SLF-1; February 1973 to September 1973 for SLF-2; October 1973 to September 1974 for SLF-3; September 1974 to September 1975 for SLF-4; September 1975 to May 1977 for SLF-5 and March 1977 to September 1978 for SLF-6. SLF-7 and SLF-10 are similarly equipped, but of more recent origin. SLF-7 was operational between September 1978 and January 1983, and SLF-10 was operational between August 1982 and December 1984.[4]

SLF-11 was operated from 1984 to 1989. This landfill reflects mid-1980's the RCRA-mandated changes in technology with the last two sections constructed in accordance with the EPA minimum technology guidance governing the design of hazardous waste landfill double liner and double leachate collection systems. SLF-12 was also designed with a double-composite liner system and was operated between 1989 and 1995. SLF-12 is located west of SLF-7 and was closed in the spring of 1996.

The first cell of RMU-1 opened in December of 1994; additional cells were constructed as disposal capacity was required. RMU-1 was also designed with a double-composite liner system and double leachate collection systems. A majority of RMU-1 has been capped; no operational area remains. In 2003, a permit application was submitted to NYSDEC for the construction of RMU-2.

8.2.2 Potential Impact on Water Resources

8.2.2.1 Groundwater

No impacts to groundwater as a result of construction of RMU-2 or associated facilities are expected. The potential impacts to groundwater that are associated with operation of RMU-2, primarily result from production of landfill leachate and potential spills of hazardous wastes. A series of deep groundwater wells, below the natural clay layer in the uppermost aquifer and shallow groundwater wells, within the saturated zone of the upper tills, would be monitored downgradient of RMU-2 to detect potential groundwater contamination from RMU-2. Likewise, upgradient and downgradient shallow and deep groundwater monitoring wells would be monitored at new Fac Pond 5. The location and spacing of these wells are based on a computer model that assures that a potential leak would be detected by one of the wells. Results from the routine sampling of the wells for a set of site-specific indicator parameters consisting of a site specific list of volatile organics are compared with historical results. The effect of existing site contamination is considered in evaluating the results. If a statistically significant increase in the concentration of an indicator parameter is detected, specific investigative and corrective procedures would be implemented. The double-lined design in a geologically suitable location and continuation of CWM's Groundwater Monitoring Program is the basis for the "no expected impact" conclusion.

[4] There are no landfills designated as SLF 8 or SLF 9.

Leachate is produced by infiltration and percolation of water through the waste in the land disposal unit. The leachate collection system is designed to prevent release of leachate to the groundwater by directing the leachate to collection sumps from which the leachate is pumped out of the landfill. Due to the double composite liner system (primary and secondary liners, each of which have HDPE and clay/GCL layers) and perimeter cutoff wall, the possibility of leachate leaving the landfill, entering the soil and eventually migrating to the groundwater off-site without being detected is extremely remote.

8.2.2.2 Surface Water

Any leachate that is generated requires treatment by the on-site AWT Facility prior to discharge to the Niagara River. The discharge of treated effluent from the facility is governed by the provisions of Model City Facility's 2015 SPDES Permit. The permit specifies that the wastewater must be adequately treated and pre-qualified before it is discharged to the Niagara River. The pre-qualification criteria include chemical analyses and biotoxicity testing. Discharges meeting permit limitations will have no significant impacts on water quality.

To assess the capacity of the Model City Facility's leachate management systems to accommodate the leachate generated by RMU-2 during its active life, a detailed engineering analysis was performed. The evaluation demonstrates the adequacy of the capacity of the lift station, Leachate Tank Farm and AWT Facility with regard to the operation of RMU-2. This evaluation is presented in Appendix F of the *RMU-2 Engineering Report*.

8.3 CWM's Contributions to the Community Economy

The monetary contribution from CWM to the state and local economies has totaled approximately $79.2 million over the 6 years from 2007 to 2012.[5] This equates to a $13.2 million annual average monetary contribution from CWM to the state and local economies. This level of monetary contribution to state and local economies is expected to continue during the operation of RMU-2.

In total over $22 million in gross receipts taxes would be paid to the towns and school districts through the anticipated life of RMU-2. Other recurring monetary contributions from CWM to the state and local economies would include employee wages, local purchases for construction and operating expenditures, charitable contributions, Niagara County and New York State real estate, sales and other taxes and state environmental program fees.

In addition to these monetary impacts, other direct impacts to the local economy would include capital expenditures related to development and expansion of the Facility.

Capital expenditures related to facilities development and expansion includes both capping/closure of existing landfill areas, as well as the development of new landfill cells associated with RMU-2. It is anticipated that there will be an ongoing expenditure of approximately $2.4 million every 2 years for capping/closure of the filled portions of the landfill.

[5] Due to limited remaining capacity in RMU-1, gate receipts have been restricted since 2013.

In addition to regular capping expenses, it is anticipated that $55.8 million in construction costs will be incurred for the new RMU-2 landfill and will be spent over the life of the facility. It is anticipated that approximately $28 million, or 50%, will be spent within the first 6 years, with a majority of the costs anticipated to be spent on local contractors.

8.4 Taxes and Fees

Public revenues associated with permit fees, property and business taxes, employee salaries and taxes far exceed public expenses that are likely to be incurred. The Model City Facility provides its own security (by contract) and safety services.

The cost of establishing and maintaining a comprehensive regulatory program for RMU-2 will be borne by CWM. The NYSDEC regulatory program fees are established in ECL § 72-0101 *et seq.* Special assessments are established in ECL § 27-0923. ECL § 72-0201 subjects every person who holds a permit, certificate or approval under a state environmental regulatory program to the payment of fees specified in Article 72.

CWM provides public revenues associated with property and school taxes, NYS hazardous waste assessments and operating program fees, employee salaries, charitable contributions and more. Also CWM pays a 6% tax on its gross receipts annually, distributed as follows:

- 2% to the Town of Porter;
- 2% to the Town of Lewiston; and
- 2% shared by the three school districts of Lewiston-Porter, Niagara-Wheatfield and Wilson.

CWM's presence creates a business for local suppliers, contractors and trucking companies. The direct monetary contribution from CWM to the state and local economies averaged approximately $13 million per year from 2007-2012, including employee wages, local purchases for operating expenditures, charitable contributions, use of construction contractors for capital upgrades, Niagara County and New York State taxes, environmental, fees and host community fees. This direct monetary contribution to state and local economies is expected to be similar during operation of RMU-2. In addition to the direct economic impacts associated with CWM's expenditures, indirect economic impacts, including employee's spending in the local economy provides additional sustainability to local businesses and service providers. When considering both direct and indirect spending from 2007-2012, it is estimated that the total economic impact of the Model City Facility to the state and local economies has been approximately $26 million per year.

CWM and the Town of Porter entered into a Host Community Agreement on October 10, 2001. Among other things, the Host Community Agreement provides that CWM shall pay the Town of Porter the greater of $0.50 per ton of waste landfilled in RMU-1 or annual payments of $500,000 (first year of agreement). The effective date of the agreement was February 24, 2004. CWM has made the required payments since that time, including $2.1 million in 2007 to achieve the minimum required total of $3 million by May 1, 2007. If, and when, RMU-2 begins operation, payments become the greater of $3.00 per ton of waste landfilled in RMU-2, less gross receipts tax payments, or $200,000 per year.

Between 2007 and 2012, the following taxes, fees and expenditures to local and state jurisdictions were paid by CWM:

Tax, Fee, and Expenditure	2007	2008	2009	2010	2011	2012
School Tax	$479,337	$487,160	$474,745	$440,637	$477,455	$481,345
Property Tax	$253,942	$247,986	$261,670	$273,091	$279,402	$309,248
Gross receipts tax	$852,673	$993,086	$662,394	$455,256	$646,401	$894,192
Host Community Fee[6]	$2,100,000	*	*	*	*	*
NYSDEC Operating Program Fees	$315,180	$290,180	$295,055	$349,171	$349,171 estimate	$349,171 estimate
NYSDEC Monitor Reimbursement[7]	$528,000	$553,500	$558,000	$604,000	$563,000	$513,000
New York State Sales Tax[8]	$337,579	$235,048	$278,698	$215,297	$231,985	$196,508
Contributions to Local Charities	$34,915	$33,296	$33,030	$375,681[9]	$45,254	$42,351
Erie & Niagara County Suppliers, Contractors & Haulers	$3,285,492	$5,026,693	$6,115,557	$6,374,261	$6,791,860	$5,226,666
Site Payroll	$4,985,310	$5,101,951	$4,679,482	$4,618,588	$4,481,002	$4,087,492
Total Contributions to Local & State Economies	**$12,174,428**	**$12,986,810**	**$13,358,621**	**$13,705,982**	**$13,865,530**	**$12,099,973**

6 Host Community Fee will be paid upon operation of RMU-2.
7 Includes two Operations Monitors, one Construction Monitor and one Regional Engineer.
8 Self-assessment only.
9 Includes a one-time contribution ($320,000) from Waste Management Corporation Charity Golf Tournament.

8.5 Alleged Adverse Social and Economic Impacts

In their Petitions for Full Party Status, the RMU-2 Issues Conference Participants submitted a number of comments asserting that the CWM Model City Facility and proposed RMU-2 have caused or will cause a variety of adverse social, economic and/or environmental impacts. On February 27, 2015, CWM submitted its Response (the "Response") to those Petitions. That Response addressed the alleged social, economic and environmental impacts contained in the Petitions. In addition, social and economic impacts are addressed in the RMU-2 DEIS and the RMU-2 Part 361 Siting Certificate Application. CWM's Response, the RMU-2 DEIS, and the RMU-2 Siting Certificate Application are incorporated herein by reference. The following is a summary of CWM's Response to the alleged social and economic impacts identified in the Petitions regarding RMU-2.

8.5.1 The Alleged 2006 Condominium Project

Based on an unverified, hearsay statement, Residents for Responsible Government (RRG) asserted that, in 2006, a Toronto-based developer abandoned a five (5) story, 92 unit condominium project proposed for the former Club Lakewood property on the shore of Lake Ontario. Under the 1986 Porter zoning law, the property was zoned for multiple family use; it required Site Plan approval; building coverage on the lot was limited to 40%; and the maximum height for any residential structure was 35 feet. The 2004 Porter Comprehensive Plan had a goal of preserving the waterfront and ensuing access for all residents.

According to Town of Porter records, the property was purchased in 1992 for $1.25 million. The purchaser submitted two (2) proposals to develop Townhomes and a Marina. There were Town of Porter zoning issues, and DEC advised the developer that needed permits for the Marina would not likely be issued. (See Exhibit 1 attached hereto). In 2005, Jakin LP, a Toronto-based entity, purchased the property at a foreclosure sale for $225,000 plus $210,000 in back taxes. (See Exhibit 1 attached hereto).

While a five (5) story condominium project would have required a discretionary zoning variance, there are no Town of Porter records evidencing any condominium project application by Jakin for the property in question. In 2006, the parcel was sold to the current owner for $1.1 million, and a 32,000 square foot, multi-million dollar luxury residence has been constructed on the property without any apparent concern for the presence of the CWM facility in the Town of Porter,

When these facts were presented in CWM's Response, RRG offered nothing in rebuttal.

Moreover, the 2004 Porter Comprehensive Plan describes a significant increase in housing starts in the Town as follows:

(p. 122) Between 1998 and 2002, there was a steady increase in the number of permits for single family homes and the amount invested per home. In 1998, there were 9 single family homes built with an average per home of $91,000. By 2002, there were 15 permits issued at an average of $280,067; this could be due, in part, to several large homes along the

Lake that have been recently constructed. The amount of investment in home improvements increased from $1.3 million to over $4.6 million in 2002

8.5.2 The Cost-Benefit Group Report

RRG submitted a report by the New York City-based Cost-Benefit Group ("CBG") in an attempt to show that the presence of the CWM facility and/or RMU-2 had and/or would have an average 3.5% adverse impact on property values throughout all of the Towns of Lewiston and Porter, estimating that impact at $47 million. According to the Report, CBG used a combination of four valuation methods to estimate the diminution in value resulting from "water contamination." However, the Report does not explain how those four methods were used, what data was used in the analysis, or how the estimated value was determined. The Report certifies that the author has not inspected any of the properties in question. While the Report purports to address property values in the Town of Lewiston, it contains only one short sentence to describe Lewiston's demographics.

The author also asserts that PCB wastes land disposed at Model City in accordance with state and federal permits should be considered akin to GE's unregulated, end-of-pipe discharges of PCBs to the Hudson River that occurred more than 35 years ago. In addition, the author cites a 2008 cancer study conducted by the New York State Department of Health. Even though that DOH report concludes that it found no connection between the CWM facility and the reported cancers, the CBG author states that the "correlation raises serious concerns." [10]

In response, CWM submitted a report prepared by Emminger, Newton, Pigeon &Magyar, Inc. ("ENPM"), a Western New York-based real estate appraiser. (See Exhibit 2 attached hereto).

Additional shortcomings in the CBG report include the following:

1) Any groundwater contamination associated with the existing CWM facility is being effectively controlled and managed by ongoing corrective actions within the CWM property. There is no evidence cited by CBG that there are any CWM-related groundwater impacts throughout Lewiston and Porter. Moreover, any localized groundwater impacts at the CWM facility are not the result of proposed RMU-2.
2) The methods used by CBG for estimating diminution in value are potentially applicable to valuing the CWM property, but those methods are not applicable to residential, agriculture and commercial properties in Lewiston and Porter.
3) The CBG report ignores the fact that the properties adjacent to CWM are used for other waste management activities. Modern Landfill operates a solid waste landfill in the Town of Lewiston and the Federal Niagara Falls Storage Site containing radioactive waste is also located in the Town of Lewiston, nearer to the Lewiston-Porter school complex.
4) The Vision Statement in the Lewiston Comprehensive Plan 2000 Update states:

[10] While claiming no expertise in public health or environmental health issues and no bias, the CBG author gratuitously states, without any supporting data, that the Towns will face health effects and reduced tourism.

> Currently the primary industries in Lewiston are waste management and agriculture. In the future, the community will continue to nurture this activity…

(p. 2-3). The Lewiston Plan describes existing land uses as including:

> The concentration of light industry in the town is located along the Model City Road corridor. Historically, the development of Model City, the presence of the old rail right-of-way, the power line transmission corridor, and the establishment of the waste sites have made this an important development area in the Town of Lewiston. The significant industries located in this area include the Lake Ontario Ordinance Storage Area, Modern Landfill, Chemical Waste Management, and Niagara Recycling,

(p. 3-15). The Lewiston Plan Update anticipates future land use as including:

> The Special Industrial Area is designed to accommodate the current industrial activities taking place in the north-central part of Lewiston and across the Town Line in the Town of Porter. Because of former national defense related industries and the unique soil characteristics of that portion of the town below the Niagara Escarpment, a thriving waste management industry has grown. This industry provides the region and beyond with environmentally sound municipal and chemical waste disposal facilities. These facilities are expected to continue throughout the Plan.

(p. 4-18). The CBG Report ignores these public documents.

5) The CBG Report fails to acknowledge the Lewiston and Porter housing data contained in § 8.1.2 *supra* and/or the land use and zoning information contained in § 8.1.5 *supra*. The CBG report completely ignores the DEIS data demonstrating CWM’s contributions to the community economy summarized in §§ 8.3 and 8.4 *supra*.

6) The CBG Report purports to review property sale price changes between January 2012 and July 2014 comparing the Towns of Lewiston and Porter combined with the Town of Clarence, claiming that Lewiston and Porter are comparable to Clarence. CBG asserts that the quarterly average percent change in home sale price was 5.29% in Clarence and 3.12% in Lewiston and Porter, but the schedule in the Report shows a monthly average change of 2.15% in Clarence as compared to a 3.54% average monthly change in Lewiston and Porter combined. Also, on the monthly section of the schedule in the CBG Report, the cumulative percentage change for Clarence is 24.4% compared to 27.0% for Lewiston and Porter. The Report does not explain these discrepancies between the monthly and quarterly data.

Moreover, as shown in the ENPM report, the demographic and economic drivers in Clarence, as compared to Lewiston and Porter, are significantly different. Clarence is an upper end residential community in eastern Erie County served by two of the regions top-rated school districts. It has a variety of housing options, good accessibility to employment centers, and is in close proximity to many shopping and recreational opportunities. [11] The area has many up-scale residences in high demand with continued development and population growth. Using 2010 census data, the Clarence population exceeded Lewiston and Porter combined by 33%; the Clarence mean household income exceeded Lewiston and Porter by 35% to 41%; and the Clarence median housing value exceeded Lewiston and Porter by 55% to 75%. The five-year average sale price in Clarence was approximately 1.8 times the average price in Lewiston and Porter. Between 1990 and 2014, Clarence issued 4,165 residential building permits; Lewiston issued 793; and Porter issued 271. In addition, the BizJournals August 14, 2015 addition (*see* Exhibit 3 attached hereto), included a list of the Wealthiest Zip Codes in Western New York. Clarence Center is No. 2; Clarence is No. 13; Youngstown in the Porter area is No. 18; and Lewiston is No. 30. Porter is not on the list.

7) The CBG Report contains a table that lists the top thirty employers in Niagara County. Sixteen of those entities have sent wastes for land disposal at the Model City facility. CWM has also received wastes from the Lewiston-Porter School District.

8) The CBG Report does not mention the article in the Fall-2014 Buffalo Business First Edition describing $1.9 billion in construction projects completed, underway and proposed for Niagara County. (*See* Exhibit 4 attached hereto).

9) The Lewiston Comprehensive Plan 2011 Update describes eight (8) new subdivisions built since 2000, with residential building permits averaging 30 per year with a ten (10) year aggregate value of $95,715,856 for all residential permits, and non-residential permits valued at $104,230,311.

10) Finally, the 2004 Porter Plan acknowledges the positive economic impacts provided by the Model City facility:

> Another ongoing factor that has been a stabilizing factor on town [real property] taxes is the revenue received from [CWM]. In the 2003 Budget adopted by Porter, approximately $400,000 was provided by CWM. The tax rate for the Town is currently $0.88 cents per $1,000 of assessed value. According to Supervisor Wiepert, without the income received from CWM, the Town's tax rate would increase by $1.33 to $2.21 per thousand dollar of assessed value.

(p. 157). The Plan then goes on to discuss the anticipated receipt of payments due under the Host Community Agreement between Porter and CWM. The Plan describes CWM's

[11] A commute from the Lewiston-Porter area to the major employment centers in Erie County involves two bridges, tolls and a 30 mile drive.

estimate of annual economic impact to Niagara County at $21 million relating to payroll and purchase of goods and services but not including taxes and host community fees.

8.5.3 Enrollment Decline at the Lewiston-Porter School District

RRG proffered the testimony of the President of the Lewiston-Porter School Board to indicate that, between 2000 and 2014, enrollment at the Lewiston-Porter School District declined by 9%. The proffer asserts that the enrollment decline is due to the fact that the approved truck route to the CWM facility runs past the School Campus. [12]

According to data in the CBG Report, the Town of Porter's population hit its peak in 1970, at 7,429, and slowly and steadily declined through 2012 to 6,745. That represents a 9.2% drop in population. The CBG Report also indicates that, between 2000 and 2010, the average household size in Porter dropped from 2.6 to 2.43, a 6.5% decline; the average family size dropped from 3.04 to 2.93, a 3.6% decline; and the average age rose from 40.5 to 45.9, a 13.3% increase. The Porter 2004 Plan describes the Town as "typical of the Western New York region that has experienced an overall decline in population." (p. 105). The Lewiston Comprehensive Plan 2000 Update reports similar changes in the Town of Lewiston demographics.

The decline in the School's enrollment is most likely explained by the changes in demographics that have occurred over the period of time in question. Those changes include an aging and declining or stagnating population that is characteristic of many of the towns and villages in Niagara County and other parts of Western New York, resulting in fewer births and therefore fewer school age children. There are more women in the workforce and many of those have either postponed getting married, waited longer to have children, and/or have had fewer children.

The Lewiston-Porter decline in enrollment is similar to what has occurred throughout the western New York area. The headline story in the March 8, 2014 Buffalo News was entitled "Declining Enrollment is Forcing School Districts in WNY to Consider Merging in Order to Survive." (See Exhibit 5 attached hereto). That article states that Erie County public schools reported an 8.5% decline between 2007-2008 and 2012-2013, the largest among New York's counties with 100,000 or more students. Over the 10 year period from 2002-2003 to 2012-2013, the Erie County enrollment decline was 16%. All but four (4) school districts in Erie and Niagara Counties saw enrollment drop between 1994 and 2013. Since hitting its peak in 2007, the Clarence school district enrollment in 2012-2013 had declined by more than 9% and further declines are projected for the future. (See Exhibit 6 attached hereto).

Between 1994-1995 and 2012-2013, Lewiston-Porter's enrollment declined by 22%; Lockport declined by 23%; Niagara Falls declined by 24%; North Tonawanda declined by 32%; Wilson declined by 19%; and Niagara Wheatfield declined by 1%.

None of these data support the Petitioners' assertion that CWM's operations are the reason for the decline in the Lewiston-Porter School District enrollment.

[12] Truck traffic to CWM's facility has been using the same route for more than 40 years.

8.5.4 Tourism

Petitioners claim that the presence of the CWM facility has an adverse impact on local tourism. Petitioners offer no substantive evidence in support of this claim. The report entitled "The Economic Impact of Tourism in New York, 2012 Calendar Year, Greater Niagara Focus," attached to the Witryol Petition, does not show any demonstrable adverse impact on tourism related to the presence of the CWM facility. From 2011 to 2012, tourism spending in the greater

Niagara region grew by 5.2%. In Niagara County alone, the spending increase was 6.1%. In 2012, direct tourism labor was 6.1% of Niagara County's total direct labor income and 10.3% of the County's total direct and indirect labor income. In addition, 19.8% of Niagara County employment is dependent on tourism, the highest percentage share in the Greater Niagara Region. In 2010, tourism in Niagara County generated $65.2 million in state and local taxes equaling a $736 per household savings in taxes, also the highest in the Greater Niagara Region. Attached hereto as Exhibit 7 is a copy of "Niagara USA Travel Guide 2015," published by the *Niagara Tourism and Convention Corporation*. Reference is made to made to the information contained on pages 11-12, 22-24, 32-33, and 38-46 of Exhibit 7, all of which showcase Niagara County's growing tourism industry.

8.5.5 Public Expense/Public Revenue Comparative Analysis

The Wityrol Petition purported to present a public expense/public revenue comparative analysis. The Petition failed to provide any source documents to support the public expense items listed; it included inapplicable expense items; and it understated the public revenues paid by CWM.

For example, ECL Article 72 and 6 NYCRR Parts 480-485 impose various regulatory program fees that are applicable to CWM. The amount of the fees due are calculated annually by the Department of Environmental Conservation Staff based upon annual reports submitted by CWM.

Based on the Host Community Agreement, for RMU-2, the Town of Porter is guaranteed a minimum annual payment of $200,000. The Petitioners excluded all gross receipts tax payments. In doing so, the Petitioner assumed that RMU-2 would not be permitted, otherwise such taxes will be paid. Thus, a $750,667 tax offset needs to be removed from the schedule in the Witryol Petition, and there should be an additional revenue estimate for the Host Community fees that have been and will continue to be paid to the Town of Porter.

There is no basis for the estimated $500,000 in expense for the Army Corps of Engineers. To the extent that the Corps spends any amount to remediate the radioactive contamination at the site related to the Lake Ontario Ordinance Works operations, those are public liabilities not attributable to CWM. The NYPA power subsidy program was terminated, thus the $135,000 public expense item must be removed from Petitioners' schedule. Without any demonstrable basis, Petitioner simply presumes to include a $600,000/year public expense. There is no basis for this claim. Petitioner also claims a $100,000 municipal cost/loss per home per year with no explanation or evidentiary basis.

Eliminating these erroneous entries and adding in the ongoing minimum host community fees that would be due to the Town of Porter, Petitioner's claimed net public loss from CWM turns into a net public gain of more than $600,000/year without considering the "private" sector benefits resulting from CWM's payroll, purchases from local vendors and contractors, and CWM's support of various local charities identified in the RMU-2 DEIS and in § 8.3 *supra*. There is no evidence that RMU-2 will preclude any other activity that would yield comparable social and economic benefits without impacting water quality. The facts presented in the RMU-2 application documents, including the Siting Certificate Application, the DEIS, CWM's Response, and the Department Staff's response to the public comments all demonstrate that there will be positive social, economic and other impacts in Niagara County in particular and in New York State in general that will outweigh any alleged negative impacts.

8.6 Social, Economic and Environmental Considerations

In concept, an antidegradation demonstration is intended to compare an expected lowering in water quality resulting from a proposed new activity with the positive social and/or economic development aspects of that activity that would be foregone if the activity is not approved. In this demonstration, not approving the proposed activity will have a negative effect on water quality and a negative economic impact on the local economy.

Not approving the addition of RMU-2 leachate to the influent to the AWTS will result in the continued discharge of a total annual load of 605.5 mg of mercury into the AWTS. The approximate annual mercury load in the SLF 1-6 leachate into the AWTS is 464.5 mg. The proposed activity excludes the SLF 1-6 leachate from the influent to the AWTS and adds the RMU-2 leachate to the influent which will have the effect of reducing the total annual mercury load into the AWTS by 65.6%.

The 2014 PCB load into the AWTS from all leachate sources is 13.32 lbs. Removing the SLF 1-6 leachate and projecting the PCB load from the RMU-2 leachate into the AWTS, the total annual PCB load is 9.73 lbs, a reduction in the annual PCB load of 27%. Thus, not approving the SPDES permit modification with a new condition requiring the offsite disposal of SLF 1-6 leachate, will have a negative environmental impact on the quality of CWM's Outfall 001 discharge. Not approving the activity will also result in the local community foregoing the substantial majority of the economic benefits associated with the construction and operation of RMU-2.

9.0 CONCLUSION

With the submission of this document, CWM has satisfied the completeness requirements for an antidegradation demonstration under NYSDEC guidance (TOGS 1.2.1 and 1.3.9) and therefore a Notice of Complete Application for CWM's modification request should be issued.

In this antidegradation demonstration, CWM has identified the reasonable potential for BCCs to be present in any potential increased discharge from the facility as a result of the operation of RMU-2. CWM's evaluation of alternatives (including pollution prevention and treatment) and proposal to implement the cost-effective alternatives identified, demonstrates that after RMU-2 commences operation,[13] the BCC loading to the AWT facility will be reduced thereby ensuring that the water quality of the Niagara River will not be adversely impacted. Closure of RMU-1 and construction and operation of RMU-2 is not expected to produce any change to the quality of the storm water being discharged from the facility. PCB reductions in storm water may be achieved through the PCB Minimization Plan. Finally, while a social or economic development evaluation becomes unnecessary since CWM has shown that the pollution prevention and treatment alternatives it will implement will ensure that the water quality of the Niagara River will not be lowered, the economic information nevertheless shows the benefits from the continued operation of the facility (and the permitting of RMU-2) to the local area.

[13] These pollution prevention and/or treatment alternatives would not be necessary or implemented if RMU-2 is not permitted.

CWM CHEMICAL SERVICES, LLC
MODEL CITY FACILITY

ANTIDEGRADATION DEMONSTRATION SUPPLEMENT FOR
BIOACCUMULATIVE CHEMICALS OF CONCERN

TABLE 1

TABLE 1

2014 Fac Pond 3 Pre-qual (ug/L)
Alpha Analytical, Inc.

	6/16/2014	MDL	RL
AROCLOR 1016	U	0.02	0.05
AROCLOR 1232	U	0.01	0.05
AROCLOR 1221	U	0.03	0.05
AROCLOR 1242	U	0.015	0.05
AROCLOR 1248	U	0.015	0.05
AROCLOR 1254	U	0.02	0.05
AROCLOR 1260	U	0.025	0.05
ALPHA-BHC	U	0.0002	0.001
BETA-BHC	U	0.0003	0.001
4,4'-DDT	U	0.0002	0.002
METHOXYCHLOR	U	0.0003	0.01
DELTA-BHC	U	0.0002	0.001
LINDANE	U	0.0002	0.001
ENDRIN	U	0.0002	0.002
DIELDRIN	U	0.0002	0.002
4,4'-DDE	U	0.0002	0.002
ENDOSULFAN I	U	0.0002	0.001
TRANS-CHLORDANE	U	0.0003	0.001
HEPTACHLOR	U	0.0002	0.001
ENDOSULFAN SULFATE	U	0.0002	0.002
HEPTACHLOR EPOXIDE	U	0.0002	0.001
TOXAPHENE	U	0.003	0.01
CIS-CHLORDANE	U	0.0003	0.001
CHLORDANE	U	0.002	0.01
ALDRIN	U	0.0001	0.001
ENDRIN ALDEHYDE	U	0.0004	0.002
ENDRIN KETONE	U	0.0002	0.002
4,4'-DDD	U	0.0002	0.002
ENDOSULFAN II	U	0.0003	0.002
HEXACHLOROBENZENE	U	2	0.4
HEXACHLOROBUTADIENE	U	2	0.42

Note: U = Not detected at the method detection limit (MDL) for the sample.

TABLE 1

2007-2013 Fac Pond 3 Pre-qualification (ug/L)
Adirondack Environmental Services, Inc.

	5/29/2013	5/9/2012	5/3/2011	5/11/2010	5/2/2009	5/6/2008	5/8/2007
Aroclor 1016	<0.065	<0.065	<0.065	<0.065	<0.065	<0.064	<0.065
Aroclor 1221	<0.065	<0.065	<0.065	<0.065	<0.065	<0.064	<0.065
Aroclor 1232	<0.065	<0.065	<0.065	<0.065	<0.065	<0.064	<0.065
Aroclor 1242	<0.065	<0.065	<0.065	<0.065	<0.065	<0.064	<0.065
Aroclor 1248	<0.065	<0.065	<0.065	<0.065	<0.065	<0.064	<0.065
Aroclor 1254	<0.065	<0.065	<0.065	<0.065	<0.065	<0.064	<0.065
Aroclor 1260	<0.065	<0.065	<0.065	<0.065	<0.065	<0.064	<0.065

4,4´-DDD	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
4,4´-DDE	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
4,4´-DDT	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
alpha-BHC	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
alpha-Chlordane	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
beta-BHC	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
delta-BHC	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Dieldrin	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Endosulfan II	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan sulfate	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin aldehyde	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Ketone	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
gamma-Chlordane	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Heptachlor epoxide	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Methoxychlor	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Toxaphene	<1	<1	<1	<1	<1	<1	<1
Chlordane	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Hexachlorobenzene	<5	<5	<5	<5	<5	<5	<5
Hexachlorobutadiene	<5	<5	<5	<5	<5	<5	<5

Note: < is defined as not detected at the method detection limit (MDL) for the sample.

TABLE 1
Mercury Analysis, Fac Pond 3 Pre-qualification for Discharge (Outfall 001)

		Results (ng/L)									
Date	Analytical Method	Top	Middle	Bottom	Rinse Blank	Field Blank	Lab	Average Concentration TMB	Million gals discharged	pounds mercury	
Apr-00	1631E	53.6	42.1	400	6941	<0.5	STL/TA	165.2	16.88	0.0233	2 discharges in 2000
Sep-00	1631E	51.8	53.8	83.6	6382	0.2	STL/TA	63.1	19.05	0.0100	
FALL 2001	1631E	358	199	156	4400	0.44	STL/TA	237.7	14.11	0.0280	
Jun-02	1631E	164	132	116	15600	<0.5	STL/TA	137.3	16.86	0.0193	
Jun-03	1631E	120	89.4	121	3030	<0.5	STL/TA	110.1	19.6	0.0180	
May-04	1631E	138	89.3	80.3	4200	<0.5	STL/TA	102.5	19.48	0.0167	
Jun-05	1631E	134	131	227	6270	0.56	STL/TA	164.0	20.57	0.0281	
2006	1631E	102	80.6	77.5			TA	86.7	30.43	0.0220	discharge 9/13/06-11/12/06
May-07	1631E	59	50.5	49.6	2460	4.99	AES	53.0	22.6	0.0100	
Jul-08	1631E	6.69	7.75	7.23	<1	<1	AES	7.2			changed from PVC sampler to ISCO pump with teflon tubing
Sep-08	1631E	5.79	6.46	5.43	<1	<1	AES	5.9	15.07	0.0007	
5/5/2009	1631E	21.1	22.3	21.5	<0.5	<0.5	AES	21.6	14.22	0.0026	
5/11/2010	1631E	34.5	31.4	31.6	0.8	<0.5	AES	32.5	12.85	0.0035	
5/3/2011	1631E	26.9	26.6	26.5	1.8	<0.5	AES	26.7	18.46	0.0041	
5/9/2012	1631E	52	28.1	27.8	<0.5	<0.5	AES	36.0	14.78	0.0044	
5/29/2013	1631E	6.9	9.1	8.5	<0.5	<0.5	AES	8.2	13.98	0.0010	
6/16/2014	1631E*	0.2J	0.2J	<0.5	0.3J	<0.5	Alpha	0.2	13.82	0.00002	

STL/TA = Severn Trent Laboratories/Test America
AES = Adirondack Environmental Services
* Individual samples collected in 250-ml Teflon bottle (5 locations, 3 levels)
Top, Mid & Bottom composite prepared by LL Hg lab and preserved with BrCl within 48 hours
(Previous samples composited in glass bottles at CWM and poured into 40 ml glass vials with HCL preservative)
Note: < is defined as not detected at the method detection limit (MDL) for the sample.

CWM CHEMICAL SERVICES, LLC
MODEL CITY FACILITY

ANTIDEGRADATION DEMONSTRATION SUPPLEMENT FOR
BIOACCUMULATIVE CHEMICALS OF CONCERN

TABLE 2

TABLE 2

PCBs in batch qualification samples
ng/L (ppt)

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	
January	490(1242)	<3900	<65	210 (1242)	<65	<40	<65	<65	<65	57J (1242)	<65	<50	ng/L (ppt)
						<30		<65	<65				
February	290(1242)	1600(1242)	<65	100 (1242)	<65	930 (1248)	<65	<65	125(1254)	38J (1242)	<65	no batch	
								<65	85(1260)				
March	700(1242)	3600(1242)	<370	1800 (1248)	140 (1254)	<1100	268 (1260)	<65	<65	52J (1242)	<50	<50	
								<65		221 (1254)			
										70 (1260)			
April	<65	1400(1242)	<65	860 (1242)	<65	<65	201 (1248)	<65	<65	71 (1242)	170 (1242)	<50	
		250(1254)					428 (1260)	<65		81 (1254)	69 (1254)		
		1650 TOT								85(1260)			
May	2100(1242)	130 (1242)	<65	<65	<65	<65	120 (1260)	533 (1248)	<65	50J (1242)	<50	<50	
							336 (1260)	537 (1248)					
June	380(1242)	<150	<370	600 (1248)	150 (1260)	<110	220 (1260)	<65	<65	92 (1260)	<50	105 (1242)	
				590 (1260)			248 (1260)	142 (1248)					
				1190									
July	920(1242)	<65	<370	260 (1242)	160 (1242)	<290	691 (1260)	269 (1248), 421 (1260)	524(1242)	42J (1260)	<50	77(1248)	
					110 (1260)		293(1260)	227 (1248), 540 (1260)	222(1254)			36J (1254)	
					270							23J (1260)	
August	340(1248)	<65	<65	210 (1242)	30J (1260)	<590	180 (1260)	<65	<65	42J (1260)	<50	56(1242)	
	140(1254)			26J (1254)			187 (1260)	<65				36J(1254)	
	480			236								25J(1260)	
September	1100(1242)	170(1242)	150 (1248)	120 (1242)	120 (1248)	<1100	166 (1248)	468 (1248) 244 (1260)	<65	99 (1242)	<50	88(1242)	
		26(1260)			40J (1260)		158 (1260)	398 (1248) 227 (1260)				40J(1254)	
		196			160J								lab duplicate
October	280(1242)	190(1242)	1400 (1242)	<65	66 (1260)	60 J (1248)	<65	467 (1248) 110 (1260)	230(1242)	58J (1242)		100 (1242)	71 (1242)
		240(1254)				350 (1260)	<65	527 (1248) 146 (1260)	195(1254)		55 (1254)	57 (1254)	56 (1254)
		430							82(1260)		39J(1260)	26J (1260)	24J (1260)
November	<65	<740	<65	320 (1242)	240 (1242)	<570	161 (1260)	72 (1016) 802 (1242)	<65	<65	115(1242)		
					170 (1254)		258 (1260)	<65					
					410								
December	<65	<740	<180	720 (1242)	84 (1242)	360 (1260)	<65	<62	57J (1242)	54J (1242)	<50		
					77 (1260)		<65						
					161								

Notes: < is defined as not detected at the method detection limit (MDL) for the sample.
(XXXX) indicates arochlor detected
TOT = Total PCBs

CWM CHEMICAL SERVICES, LLC
MODEL CITY FACILITY

ANTIDEGRADATION DEMONSTRATION SUPPLEMENT FOR
BIOACCUMULATIVE CHEMICALS OF CONCERN

TABLE 3

TABLE 3

Low level mercury analysis on batch tank qualifiers

Date	tank	ISCO comp	grab	
10/31/2011	125		3.5	ng/L
11/17/2011	58	85.9	1.4	
11/22/2011	125	8.7	18	
11/29/2011	58	17.3	24	
12/2/2011		9.3	5.3	
12/7/2011		9.2	5	
12/19/2011	58	<0.5	<0.5	
12/22/2011	125	2.3	1.2	
1/12/2012	125	<0.5	<0.5	
1/19/2012	58	0.9	0.9	
1/27/2012	125	0.7	1.5	
1/30/2012	58	<0.5	<0.5	
2/3/2012	125	1.1	1	
2/13/2012	58		0.4	
2/28/2012	125		<25	
3/5/2012	58		<25	
3/21/2012	125	25.6		
4/5/2012	125	40.1		
4/16/2012	58	37.6		carbon change 4/26/12
5/2/2012	58		1990	
5/2/2012	58		39.8	
5/7/2012	125		2420	
5/7/2012	125		48.5	
5/14/2012	125		<25	
5/16/2012	58		<25.0	
5/23/2012	125		<25	
6/6/2012	58		39.4	
6/20/2012	125		36.2	
7/12/2012	58		8.1	
7/19/2012	125		8.8	carbon change 8/10/12
8/7/2012	58		40.6	
8/16/2012	125		38.2	
10/24/2012	125		7.3	
11/20/2012	58		<5.0	
12/5/2012	125		0.5	
12/20/2012	58		<0.5	
1/2/2013	125		8.8	
1/16/2013	58		<5.0	
2/21/2013	58		1	
2/28/2013	125		1.1	
3/5/2013	58		1.4	
4/16/2014	125		<0.5	

Note: < is defined as not detected at the method detection limit (MDL) for the sample.

OUTFALL 01A

Mercury (ng/L)

J Flag	ng/L	01A sample	batch qual	field blank	
	RL				
Date Sampled					
6/2/15 batch qual	0.5		2.41	0.90	
6/3/2015	0.5	4.98		1.01	
6/16/2015	0.5	2.3		1.10	
6/17/15 batch qual	0.5		1.95	0.79	
6/18/2015	0.5	6.49		2.15	
6/23/2015	0.5	3.78		1.66	
6/23/15 batch qual	0.5		3.61	1.50	
7/2/2015	0.5	1.88		0.68	
7/2/15 batch qual	0.5		2.39	0.79	
7/6/2015	0.5	2.62		0.50	
7/6/15 w/HCl	0.5	1.79		0.66	
7/8/2015 batch qual	1		5.9	0.30	
7/14/2015	0.5	2.92		0.31	
7/21/2015	0.5	1.5		0.30	
7/23/15 batch qual	2.5		4.07	0.37	
7/28/2015	2.5	3.6		0.30	
8/6/2015	0.5	2.1		0.40	
8/13/2015	0.5	4.3		0.70	
8/13/15 batch qual	0.5		1.3	1.80	
9/11/2015	0.5	2.2		2.40	new carbon &ASG media
9/14/2015	0.5	0.5		0.40	
9/15/15 batch qual	0.5		4.1	0.60	
9/21/2015	0.5	3.9		1.70	
9/24/15 batch qual	0.5		0.726	1.21	
10/2/2015	0.5	1.7		1.90	
duplicate	0.5	1.7			trip blank <0.5
10/12/2015	0.5	10.5		0.50	
10/15/15 batch qual	0.5		8.3	0.50	
11/2/2015	0.5	13.7		1.80	
average		3.81	3.48	0.97	
st dev		3.29	2.28		
average + 2stdev		10.39	8.04		

CWM CHEMICAL SERVICES, LLC
MODEL CITY FACILITY

ANTIDEGRADATION DEMONSTRATION SUPPLEMENT FOR BIOACCUMULATIVE CHEMICALS OF CONCERN

TABLE 4

TABLE 4

PCB Sources processed at AWT

Site generated wastestreams:			**total PCBs (ug/L)**			most recent
			maximum	**minimum**	**average**	analysis
Old LF leachate	SLF 1-6 Aq	T-130, T-103	4295	46.2	1913	8/4/2015
	SLF 7	T-107				
	SLF 10	T-110	17.85	5.99	13.05	7/23/2012
	SLF 11	T-108	32,300	300	8965	8/6/2012
New LF leachate	SLF12	T-150	550	388	469	7/23/2015
	RMU-1	T-160	142	ND <0.26		6/18/2015
	(see also RMU-1 standpipe data)					
GWES		T-8001	614	4.96	115.7	10/28/2015
	West Drum Area	AQ02	1.3	ND		9/21/2015
		AQ05	ND	ND		9/27/2013
		AQ07	0.39	ND		9/30/2014
	Process Area	AQ09	260	ND		9/21/2015
		AQ12	556000	ND		12/19/2013
		EW12	160000	ND		9/29/2014
	Lagoons Area	AQ13W	1.18	ND		10/7/2015
		AQ14E	35	ND		9/30/2014
	SLF3 Area	T-8004	5630	476		8/8/2012
		EW06	16000000	ND		9/29/2014
		EW07	2100000	ND		12/9/2013
	BW02S	T-8005	ND <0.065	<0.065		10/1/2012
	SLF 12	T-8006	1.888	ND <0.065		10/1/2012
	PCB Whse	T-8007	7.513	ND <0.065		10/1/2012
	Process Area IV	T-8009	33.24	17.24	25.24	10/19/2015
	Process Area III	T-8010	<1			10/19/2015

CWM CHEMICAL SERVICES, LLC
MODEL CITY FACILITY

ANTIDEGRADATION DEMONSTRATION SUPPLEMENT FOR BIOACCUMULATIVE CHEMICALS OF CONCERN

TABLE 5

TABLE 5

Mercury Sources processed at AWT

Site generated wastestreams:			**total mercury (ng/L)**			
			maximum	**minimum**	**average**	
Old LF leachate	SLF 1-6 Aq	T-130, T-103	2600	7.2	1188	7/13/2015
	SLF 7	T-107	17.5	0.6	9.05	7/23/2012
	SLF 10	T-110	<5	<0.5	<2.5	7/23/2012
	SLF 11	T-108	16	<0.5	<8	8/6/2012
New LF leachate	SLF12	T-150	640	27.1		7/23/2015
		L51	944.9			8/28/2014
		L52	9.2			8/28/2014
		L53	10			8/28/2014
		L54	2764	<1		9/15/2014
	RMU-1	T-160	7.84	<0.5	<2.92	6/18/2015
		closed cells comp	7.92			7/22/2015
		open cells comp	<2.5			7/22/2015
		L55	<5	<1.25		4/22/2015
		L56	<5	<1.25		4/22/2015
		L57	<5	<1.25		4/22/2015
		L58	<5	<1.25		4/22/2015
		L59	<5	<1.25		4/22/2015
		L60	<5	<1.25		4/22/2015
		L61	<5	<1.25		4/22/2015
		L62	<5	<1.25		4/22/2015
		L63	<5	<1.25		4/22/2015
		L64	<5	<1.25		4/22/2015
GWES		T-8001	13	1		4/9/2015
	West Drum Area	AQ02				
		AQ05				
		AQ07				
	Process Area	AQ09				
		AQ12				
		EW12				
	Lagoons Area	AQ13W				
		AQ14E				
	SLF3 Area	T-8004	6.9	<25		8/8/2012
		EW06				
		EW07				
	BW02S	T-8005	0.5	<25		10/1/2012
	SLF 12	T-8006	0.7	<25		10/1/2012
	PCB Whse	T-8007	2.4	<25		10/1/2012
	Process Area IV	T-8009	9.1			10/19/2015
	Process Area III	T-8010	2.0			10/19/2015
Reagents						
	Hydrogen Peroxide solution		<0.5			8/28/2014
	Ferrous sulfate solution		<0.5			8/28/2014
	Sulfuric acid		24.9			8/28/2014

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TABLE 6

TABLE 6

PCB Aroclor Detections in Storm Water

	SMP 06 (Outfall 002)			SMP 07 (Outfall 003)			SMP 09 (Outfall 004)	
Year	# of Detections	Max. Conc. (ppt)	Year	# of Detections	Max. Conc (ppt)	Year	# of Detections	Max. Conc (ppt)
2001	12	350	2001	6	310			
2002	10	760	2002	3	330			
2003	8	240	2003	1	67			
2004	2	77	2004	0		2004	0	
2005	0		2005	0		2005	0	
2006	0		2006	0		2006	0	
2007	0		2007	0		2007	0	
2008	0		2008	0		2008	0	
2009	2	116	2009	4	66	2009	4	102
2010	0		2010	0		2010	0	
2011	0		2011	0		2011	1	226
2012	0		2012	0		2012	0	
2013	1	56	2013	1	61	2013	0	
2014	0		2014	0		2014	0	
2015 Y-T-D	0		2015 Y-T-D	0		2015 Y-T-D	0	

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TABLE 7

TABLE 7
PCB detections at storm water outfalls

Date	Outfall 002			Outfall 003			Outfall 004			TOTAL (2004-2009) using 24 hr flow volume	
	PCBs (ng/L)	flow volume (24 hr)	PCB grams per 24 hr	PCBs (ng/L)	flow volume (24 hr)	PCB grams per 24 hr	PCBs (ng/L)	flow volume (24 hr)	PCB grams per 24 hr		
4/20/2004	62	407,880	0.096								
8/1/2004	77.2	407,880	0.119								
2/11/2009				38	921,800	0.133					
2/17/2009				66	248,200	0.062					
2/18/2009							51	1,055,350	0.204		
2/24/2009							36	13,490	0.002		
3/10/2009	116	1,547,520	0.679								
3/12/2009				55	1,133,800	0.236					
4/7/2009	33	402,370	0.050								
4/14/2009							102	741,990	0.286		
8/11/2009				14	1,897,600	0.101					
8/14/2009							13.4	841,790	0.043		
11/9/2011							226	38,310	0.033		
11/9/2011							58	38,310	0.008		
2/20/2013				51	352,400	0.068					
2/20/2013				66	352,400	0.088					
2/27/2013				42	208,600	0.033					
2/27/2013				61	208,600	0.048					
4/11/2013	56	1,679,000	0.356								
Total PCBs in grams(2004-2015)			1.300			0.769			0.576	2.645	with estimated values
			0.798			0.150			0.319	1.267	wtihout estimated values

Estimated results >MDL, but < ML reported and shaded pink

All detections Aroclor 1242 unless otherwise noted

SPDES permit requires PCB analysis of 24 hour composite sample, collected once a week.

Outfall 002, 2004 prior to V notch weir installation in 2005; flow volumes over reported due to backflow, used average flows from 2014.

8/14/09 - split sample to two labs, one ND, the other 26.8 ng/L 1242; average 13.4 ug/L

11/9/11 - field duplicate samples, two Aroclors detected: 307 and 144 ng/L 1242 (average 226, 53% difference), 80 and 35J ng/L (1260 (average 58J, 56% difference)

2/13 - two Aroclors detected: 1242 and 1254

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ANTIDEGRADATION DEMONSTRATION SUPPLEMENT FOR
BIOACCUMULATIVE CHEMICALS OF CONCERN

TABLE A

TABLE A
BCC Analysis, July 2015

Method		Analyte	Aq SLF 1-6 T-103 7/13/2015 J83844	RMU-1 capped* 7/22/2015 L1517070	RMU-1 open* 7/22/2015	FacPond 3 7/15/2015 L1516288
608	PCBs (ug/L)	PCBs	<110	1.022	2190	<0.050
8082A	(8/4/15 by CWM)	PCBs	46			
608	pesticides (ug/L)	chlordane	<470	<2.0	<20	<0.2
		4,4'-DDD	<47	<0.4	<4.0	<0.04
		4,4'-DDE	<47	<0.4	<4.0	<0.04
		4,4'-DDT	<47	<0.4	<4.0	<0.04
		dieldrin	<47	<0.4	<4.0	<0.04
		BHC	see isomers	see isomers	see isomers	see isomers
		alpha-BHC	19 J	<0.2	<2.0	<0.020
		beta-BHC	<47	<0.2	<2.0	<0.020
		gamma-BHC (lindane)	33 J	<0.2	<2.0	<0.020
		delta-BHC	25 J	<0.2	<2.0	<0.020
		toxaphene	<470	<4.0	<40	<0.4
		Mirex	7.5 J			
8081B	pesticides (ug/L)	Mirex		<0.0005	<0.0102	<0.0005
625	semi-volatiles (ug/L)	octachlorostyrene		ND as TIC	ND as TIC	ND as TIC
		hexachlorobenzene		<20	<40	<2.0
		hexachlorobutadiene		<20	<40	<2.0
		pentachlorobenzene		ND as TIC	ND as TIC	ND as TIC
		1,2,3,4-tetrachlorobenzene		ND as TIC	ND as TIC	ND as TIC
		1,2,4,5-tetrachlorobenzene		ND as TIC	ND as TIC	ND as TIC
8270D	semi-volatiles (ug/L)	octachlorostyrene	<770			
		hexachlorobenzene	<1500			
		hexachlorobutadiene	<1500			
		pentachlorobenzene	87 J			
		1,2,3,4-tetrachlorobenzene	<770			
		1,2,4,5-tetrachlorobenzene	88 J			
		Photomirex	ND as TIC			
1613B	dioxins/furans (ng/L)	2,3,7,8-TCDD	0.0041 J	<0.0103	<0.00982	<0.0103
1631E	LL mercury (ng/L)	mercury	7.2 B	7.92	<2.5	5.76
		field blank				<0.5
		rinse blank				<0.5
		method blank	0.184 J			

Notes: * composite sample

Note: < is defined as not detected at the method detection limit (MDL) for the sample.

TIC = Tentatively Identified Compound

ND = Not detected at the method detection limit (MDL) for the sample.

Table A
Bioaccumulative Chemicals of Concern

	Leachate characterization (aqueous from O/W sep)							RMU-1& SLF 12	2011-2012 SAMPLES:							Fac Pond 3
			T-103	T-101		T-101	T-103	T-102	SLF 1-6	SLF 7	SLF 10	SLF 11	SLF 12	RMU-1	RMU-2	2007- 2013
PCBs (average, ug/L)	12/1/1995	12/10/1997	3/12/1999	4/1/2003	5/1/2005	5/11/2009	3/21/2013	3/4/2009								
Aroclor 1016																<0.065
Aroclor 1221																<0.065
Aroclor 1232																<0.065
Aroclor 1242		1200						8.8	1266	316	10.3	127	88.6	8.04		<0.065
Aroclor 1248																<0.065
Aroclor 1254									397		1	5862	95.3			<0.065
Aroclor 1260									343		1.75	2975	74.2	18.9		<0.065
average total PCBs, ug/L	90			<92					2535	316	13.05	8956	469.4	24.8		<0.065
4,4´-DDD (ug/L)	ND	ND		ND	ND	ND	2.6 J	ND	ND	ND	ND	ND	ND	ND		<0.1
4,4´-DDE	ND	ND		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		<0.1
4,4´-DDT	ND	10		ND	ND	ND	2.5 J	ND	ND	ND	ND	ND	ND	ND		<0.1
alpha-BHC	2	ND		ND	ND	14	6.2	ND	0-70.4	ND	ND	ND	ND	ND		<0.05
alpha-Chlordane	ND	ND		ND	ND	ND			ND	ND	ND	ND	ND	ND		<0.05
beta-BHC	0.9	ND		ND	ND	ND	13	ND	ND	ND	ND	ND	ND	ND		<0.05
delta-BHC	2	39		22	ND	9.9	14	ND	0-81.6	ND	0 - 1.76	ND	ND	ND		<0.05
Dieldrin	ND	ND		ND	0.84	ND	ND	ND	ND	ND	ND	ND	ND	ND		<0.1
gamma-BHC	3	21		16	16	20	14	ND	ND	ND	ND	ND	ND	ND		<0.05
gamma-Chlordane	ND	ND		ND	ND				ND	ND	ND	ND	ND	ND		<0.05
Heptachlor	ND	ND		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		<0.05
Toxaphene	ND	ND		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		<1
Chlordane	ND	ND		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		<0.05
Hexachlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		<5
Hexachlorobutadiene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND		<5
Mirex														none profiled		NA
Octachlorostyrene														none profiled		NA
Pentachlorobenzene	ND	ND	ND	ND	720	ND	300 J	ND						none profiled		NA
Photomirex																NA
2,3,7,8-TCDD (ng/L)	ND	nd <0.3		ND	ND	nd <0.33	ND <9.5	nd <0.17						See TRI report*		NA
1,2,3,4-tetrachlrorobenzene														none profiled		NA
1,2,4,5-tetrachlorobenzene	ND	ND		ND	ND	ND	210 J	ND						2 profiles !		NA
mercury (average ng/L)	11000	540		<200	<200	231		193	1581	9.05	<1	8.2	932	$\leq$1		0.2 - 53

* average 1.28 mg 2,3,7,8-TCDD landfilled in RMU-1 per year
! CU6482 42,120 pounds of soil with 0 - 6.9 mg/kg 1,2,4,5-tetrachlorobenzene received in 2003
NY303708 1,995,620 pounds of soil from transformer spills with 22.3 mg/kg 1,2,4,5-TCB received in 2012

Note: ND = Not detected at the method detection limit (MDL) for the sample.

CWM CHEMICAL SERVICES, LLC
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ANTIDEGRADATION DEMONSTRATION SUPPLEMENT FOR BIOACCUMULATIVE CHEMICALS OF CONCERN

TABLE B

TABLE B

Mercury load from leachate into Aqueous Waste Treatment System (AWTS)

Scenario #1 - Using leachate volumes from 2014

Landfill	aqueous leachate volume (gal)	average mercury (ng/L)	mercury load (mg)	total mercury load (mg)	
1-6	103,305	1188	464.5	464.5	
7	51,750	9.05	1.8	0	pre-treated and shipped off-site due to arsenic concentration
10	90,049	<1	<0.34	0	
11	121,921	8.2	3.8	3.8	
12	29,610	932	104.5	104.5	
RMU-1	5,373,759	1.62	33.0	33.0	
				605.7	

Discharge to river < 50 ng/L

Scenario #2 - Future prediction (e.g. 2017) with RMU-1 capped and first cell of RMU-2 operational

Landfill	aqueous leachate volume (gal)	average mercury (ng/L)	mercury load (mg)	total mercury load (mg)	
1-6	103,305	1188	464.5	0	pre-treated and shipped off-site due to mercury concentration
7	51,750	9.05	1.8	0	pre-treated and shipped off-site due to arsenic concentration
10	90,049	<1	<0.34	0	
11	121,921	8.2	3.8	3.8	
12	29,610	932	104.5	104.5	
RMU-1	1,041,925	1.62	6.4	6.4	
RMU-2	5,000,000	1.62	30.7	30.7	
				145.3	

Discharge to river < 50 ng/L

Scenario #3 - Future prediction (e.g. 2022) with RMU-2 at maximum leachate generation (4 cells open) and SLF 1-6 off-site disposal

Landfill	aqueous leachate volume (gal)	average mercury (ng/L)	mercury load (mg)	total mercury load (mg)	
1-6	103,305	1188	464.5	0	pre-treated and shipped off-site due to mercury concentration
7	51,750	9.05	1.77	0	pre-treated and shipped off-site due to arsenic concentration
10	90,049	<1	<0.34	0	
11	121,921	8.2	3.8	3.8	
12	29,610	932	104.5	104.5	
RMU-1	257,053	1.62	1.6	1.6	
RMU-2	16,000,100	1.62	98.1	98.1	
				208.0	

RMU-1 leachate volume estimated based on leachate generation rate for SLF 12 after closure
RMU-2 leachate volume estimated based on open acreage and capping sequence

Discharge to river < 50 ng/L

TABLE B
PCB load from leachate into Aqueous Waste Treatment System (AWTS)

Scenario #1 - Using leachate volumes from 2014

Landfill	aqueous leachate volume (gal)	average PCB (ug/L)	PCB load (g)	total PCB load (lbs)	
1-6	103,305	1913	747.0	1.65	
7	51,750	316	61.8	0.00	pre-treated and shipped off-site due to arsenic concentration
10	90,049	13.05	4.4	0.01	
11	121,921	8965	4131.6	9.10	
12	29,610	469.4	52.5	0.12	
RMU-1	5,373,759	54.64	1109.9	2.44	
			6107.3	13.32	

Discharge to river: ND <65 ng/L

Scenario #2 - Future prediction (e.g. 2017) with RMU-1 capped and first cell of RMU-2 operational

Landfill	aqueous leachate volume (gal)	average PCB (ug/L)	PCB load (g)	PCB load (lbs)	
1-6	103,305	1913	747.0	0.00	pre-treated and shipped off-site due to PCBs and mercury concentration
7	51,750	316	61.8	0.00	pre-treated and shipped off-site due to arsenic concentration
10	90,049	13.05	4.4	0.01	
11	121,921	8965	4131.6	9.10	
12	29,610	469.4	52.5	0.12	
RMU-1	1,041,925	54.64	215.2	0.47	
RMU-2	5,000,000	2.9	54.8	0.12	
			5267.4	9.82	

Discharge to river: ND <65 ng/L

Scenario #3 - Future prediction (e.g. 2022) with RMU-2 at maximum leachate generation (4 cells open) and SLF 1-6 off-site disposal

Landfill	aqueous leachate volume (gal)	average PCB (ug/L)	PCB load (g)	total PCB load (lbs)	
1-6	103,305	1913	747.0	0.00	pre-treated and shipped off-site due to PCBs and mercury concentration
7	51,750	316	61.8	0.00	pre-treated and shipped off-site due to arsenic concentration
10	90,049	13.05	4.4	0.01	
11	121,921	8965	4131.6	9.10	
12	29,610	469.4	52.5	0.12	
RMU-1	257,053	54.64	53.1	0.12	
RMU-2	16,000,100	2.9	175.4	0.39	
			5225.9	9.73	

RMU-1 leachate volume estimated based on leachate generation rate for SLF 12 after closure
RMU-2 leachate volume estimated based on open acreage and capping sequence

Discharge to river: ND <65 ng/L

Table B
Average Concentrations

Mercury (ng/L)	**SLF 1-6 Aqueous**	9/10/2010	T-130	2600			
		10/18/2011	T-103	203			
		2/2/2012	T-103	1940			
		8/4/2015	T-103	7.2			
		average		1187.6			
	RMU-1	1/31/2012	T-160	1.6			
		2/1/2012	T-160	<1			
		2/7/2012	T-160	<1			
		2/9/2012	T-160	<1			
		2/14/2012	T-160	<0.5			
		2/15/2012	T-160	<0.5			
		8/28/2014	T-160	<0.5			
		6/18/2015	T-101	7.84			
		7/22/2015	standpipes	2.92	(assume 25% CC @7.92 and 75% OC @ ND <2.5)		
		average		1.62			
	SLF7	10/18/2011	T-107	0.6			
		7/23/2012	T-107	17.5			
		average		9.05			
	SLF 10	10/18/2011	T-110	<0.5			
		2/2/2012	T-109	<1			
		7/23/2012	T-110	<5			
		average		<1			
	SLF 11	10/18/2011	T-108	<0.5			
		2/7/2012	T-108	16.4			
		7/23/2012	T-108	<5			
		8/6/2012	T-108	<25			
		average		8.2			
	SLF12		**T-150**	**L54**	**L51**	**L52**	**L53**
		2/14/2012	27.1	<1			
		7/23/2012	640.0				
		8/28/2014		2764.0	944.9	9.2	10.0
		average	932.0				
PCBs (ug/L)	**SLF 1-6 Aqueous**	9/10/2010	T-130	4295			
		10/18/2011	T-103	850.3			
		2/2/2012	T-103	2459			
		8/4/2015	T-103	46.2			
		average		1912.6			
	SLF7	10/18/2011	T-107	152.0			
		7/23/2012	T-107	480.0			
		average		316.0			
	SLF 10	10/18/2011	T-110	15.3			
		2/2/2012	T-109	17.85			
		7/23/2012	T-110	5.99			
		average		13.05			
	SLF 11	10/18/2011	T-108	321			
		2/7/2012	T-108	32300			
		7/23/2012	T-108	300.1			
		8/6/2012	T-108	2939			
		average		8965			
	SLF12		**T-150**	**L54**			
		2/14/2012	550.6	<0.357			
		7/23/2012	388.2				
		average	469.4				
	RMU-1	2/1/2012	T-160	4.67			
		2/7/2012	T-160	141.6			
		2/9/2012	T-160	0.13			
		2/14/2012	T-160	2.04			
		2/15/2012	T-160	0.175			
		6/18/2015	T-101	25.58			
		standpipe calculation		208.3			
		average		**54.64**			

Calculated average based on PCB analysis of standpipe composite samples collected 7/22/15
Averge assuming 25% Closed Cells @1.022 and 75% Open Cells @ 2190 = 1642.5 ug/L PCBs
(deleted this value from the average as value is biased high with L60 included in open cell composite)

Calculated average based on PCB analysis of standpipe samples 2006-2015 and level trends/pump run times from fall 2015
Average assuming 45% from cell 11/13 (5.93), 45% from supplemental pumps in cells 7/8-12/14 (2.39)
and 10% from cells 1-6 (2045.82) = 208.3 ug/L
(Used this value in the average calculation as more representative than the open cell, closed cell composites above)
(Includes RMU-1 standpipe PCB data from 2006-2015)

LEACHATE GENERATION RATES
MODIFIED LINEAR REGRESSION OF RMU-1

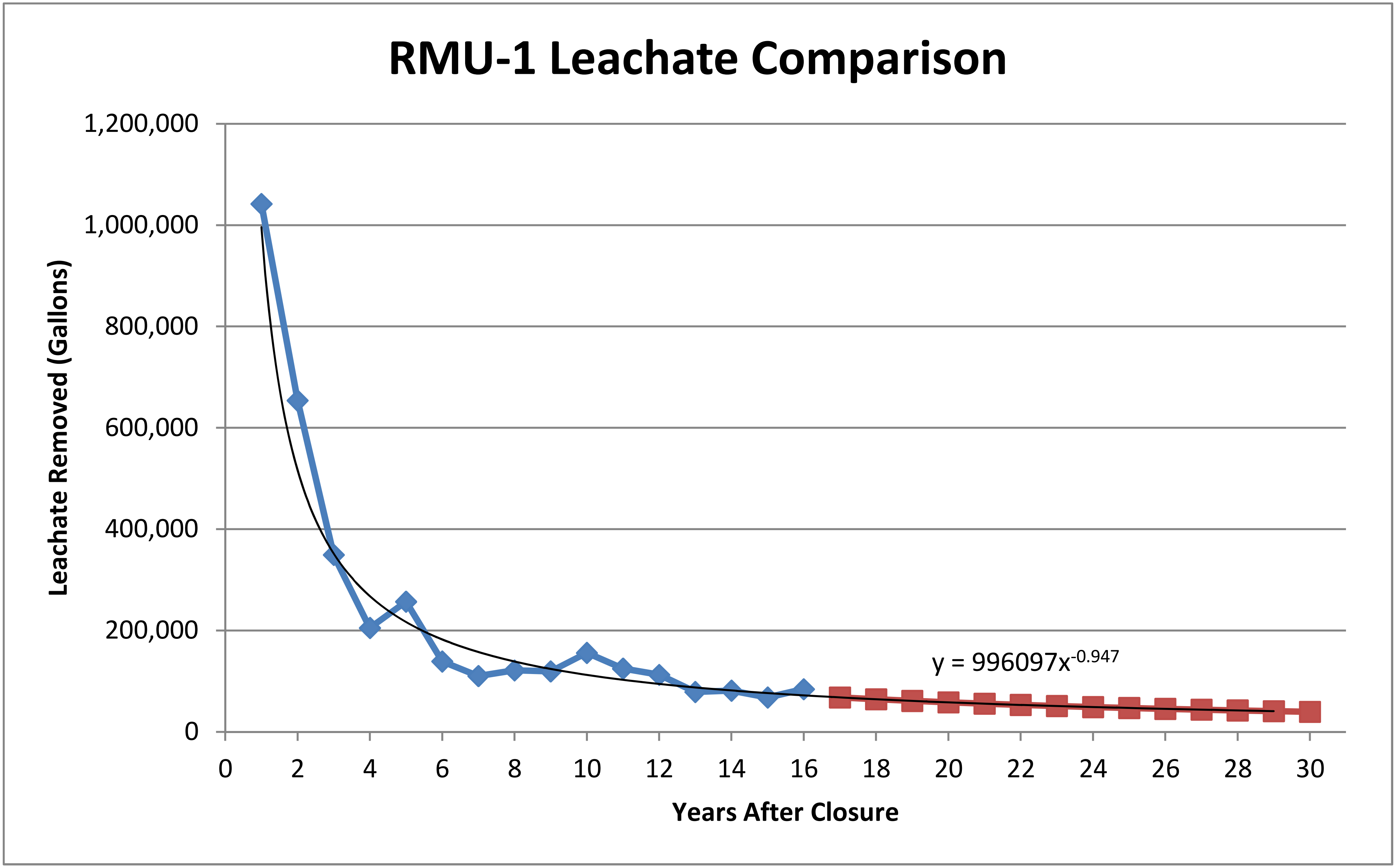
Years After Closure	Year	Leachate Removed (Actual)	Leachate Removed (Predicted)	SLF-12 leachate removed per acre
1	2015	n/a	1,041,925	26311.2
2	2016	n/a	653,832	16510.9
3	2017	n/a	349,331	8821.5
4	2018	n/a	205,227	5182.5
5	2019	n/a	257,053	6491.2
6	2020	n/a	139,091	3512.4
7	2021	n/a	110,378	2787.3
8	2022	n/a	121,403	3065.7
9	2023	n/a	119,538	3018.6
10	2024	n/a	155,984	3939.0
11	2025	n/a	124,974	3155.9
12	2026	n/a	112,736	2846.9
13	2027	n/a	78,869	1991.6
14	2028	n/a	81,572	2059.9
15	2029	n/a	67,977	1716.6
16	2030	n/a	84,362	2130.4
17	2031	n/a	68,087	
18	2032	n/a	64,500	
19	2033	n/a	61,280	
20	2034	n/a	58,375	
21	2035	n/a	55,739	
22	2036	n/a	53,337	
23	2037	n/a	51,138	
24	2038	n/a	49,118	
25	2039	n/a	47,256	
26	2040	n/a	45,533	
27	2041	n/a	43,934	
28	2042	n/a	42,447	
29	2043	n/a	41,059	
30	2044	n/a	39,762	
31	2045	n/a	38,546	
32	2046	n/a	37,405	
33	2047	n/a	36,330	
34	2048	n/a	35,318	
35	2049	n/a	34,361	
36	2050	n/a	33,457	
37	2051	n/a	32,600	
38	2052	n/a	31,787	
39	2053	n/a	31,014	
40	2054	n/a	30,280	
41	2055	n/a	29,580	
42	2056	n/a	28,912	
43	2057	n/a	28,275	
44	2058	n/a	27,666	
45	2059	n/a	27,084	
46	2060	n/a	26,526	
47	2061	n/a	25,991	
48	2062	n/a	25,478	
49	2063	n/a	24,985	
50	2064	n/a	24,512	
51	2065	n/a	24,057	
52	2066	n/a	23,618	
53	2067	n/a	23,196	

147527.2 Average of years 0 through 30

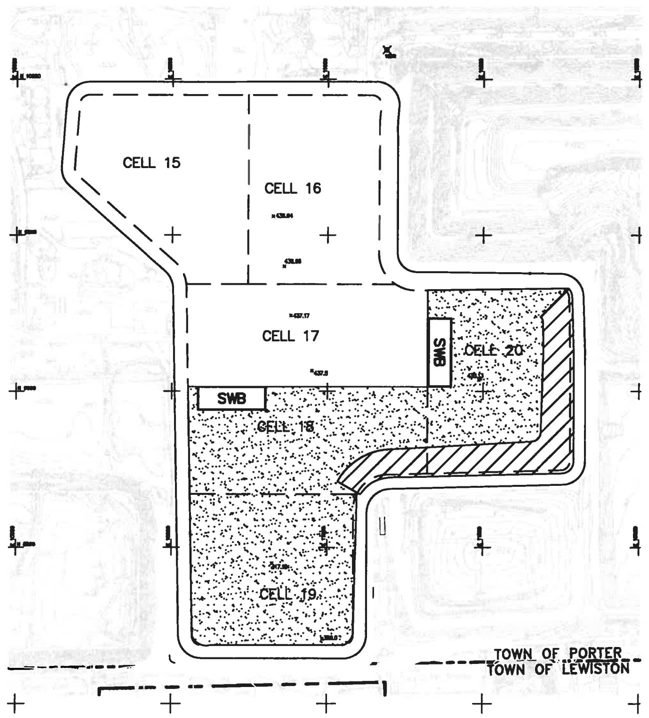
LEACHATE GENERATION RATES
MODIFIED LINEAR REGRESSION OF RMU-1

Years After Closure	Year	Leachate Removed (Actual)	Leachate Removed (Predicted)	SLF-12 leachate removed per acre
54	2068	n/a	22,789	
55	2069	n/a	22,396	
56	2070	n/a	22,017	
57	2071	n/a	21,652	
58	2072	n/a	21,298	
59	2073	n/a	20,956	
60	2074	n/a	20,625	

Note:
Model based on the per acre generation rate of SLF-12 for each year since closure. The generation rate per acre for SLF-12 was applied to RMU-1 since both landfills are of similar construction. For years after the 16 years since closure of SLF-12, Golder calculated the predicted leachate removed using a power trendline based on actual data from years 0-16.



RMU-1 Leachate Comparison
Leachate Removed (Gallons)
1,200,000
1,000,000
800,000
600,000
400,000
200,000
0
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
Years After Closure
y = 996097x^-0.947

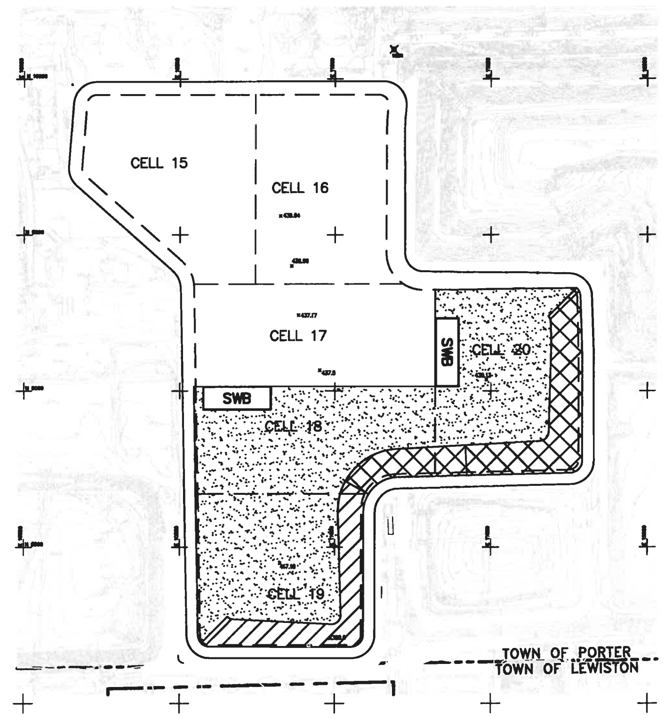


NOTE:

1. CELLS 18, 19, AND 20 ASSUMED TO BE CONSTRUCTED AND ACTIVE IN THIS PHASE.

PHASE 1

SCALE: 1" = 300'

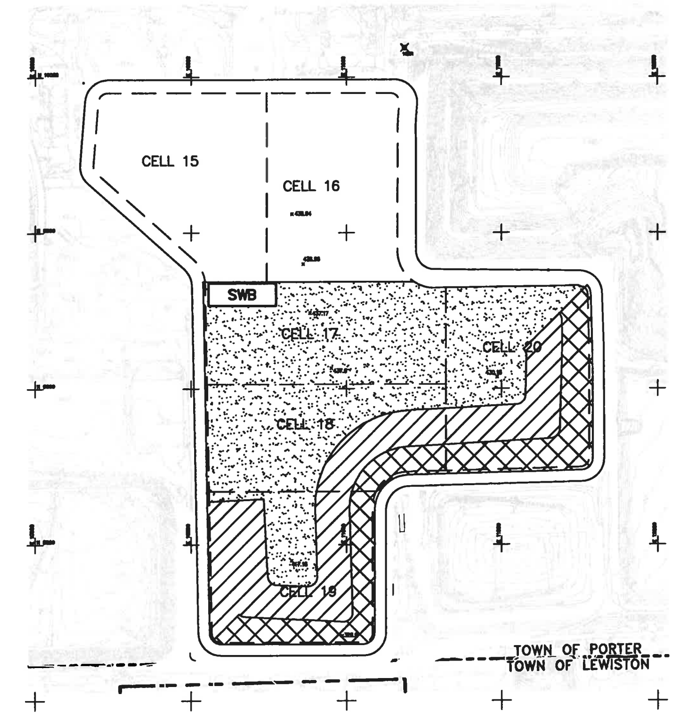


NOTE:

1. CELLS 18, 19, AND 20 ASSUMED TO BE CONSTRUCTED AND ACTIVE IN THIS PHASE.

PHASE 2

SCALE: 1" = 300'



NOTE:

1. CELLS 17, 18, 19 AND 20 ASSUMED TO BE CONSTRUCTED AND ACTIVE IN THIS PHASE.

PHASE 3

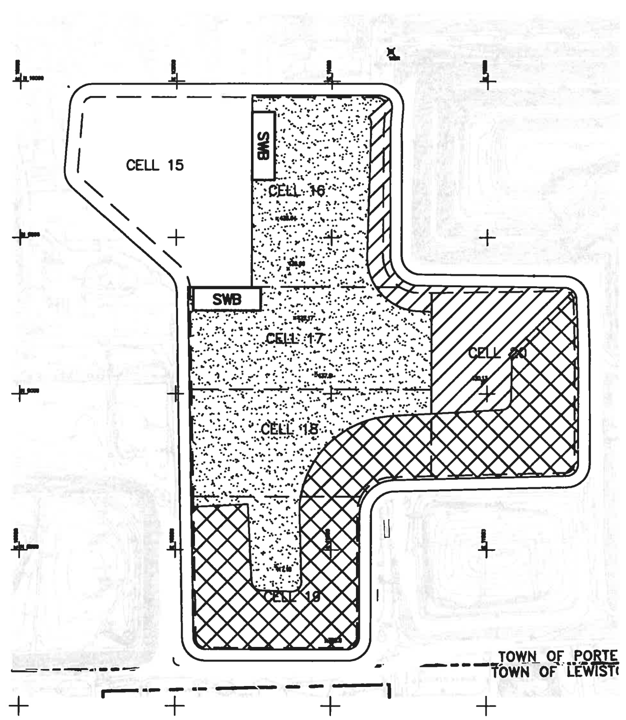
SCALE: 1" = 300'

LEGEND:

- APPROXIMATE PROPERTY LINE
- PROPOSED CELL DIVIDE
- NEWLY INSTALLED FINAL COVER
- FINAL COVER INSTALLED DURING PRIOR PHASES
- WASTE FILLING
- SWB — STORMWATER BASIN (SEE NOTE 2)
- E 12500 / N 10000 — COORDINATE GRID

GENERAL NOTES:

1. REFER TO DRAWING NO. 2 FOR ADDITIONAL BASE MAP INFORMATION.
2. STORMWATER BASINS ARE DEPICTED TO ILLUSTRATE POSSIBLE LOCATIONS AND ARE NOT INTENDED TO REPRESENT REQUIRED SIZES. LOCATIONS ARE BASED ON ALLOWANCE FOR CONSTRUCTION OF FINAL COVER IN EACH PHASE.
3. THIS DRAWING DEPICTS POSSIBLE WASTE FILLING AND FINAL COVER SEQUENCING. OTHER WASTE FILLING AND FINAL COVER SEQUENCING POSSIBILITIES EXIST AND MAY BE EMPLOYED.
4. DUE TO THE CONCEPTUAL NATURE OF THIS DRAWING, DIFFERENCES IN ACTUAL WASTE FILLING AND FINAL COVER SEQUENCING SHOULD BE EXPECTED AND WILL NOT REQUIRE PERMIT MODIFICATION IN ORDER TO IMPLEMENT.

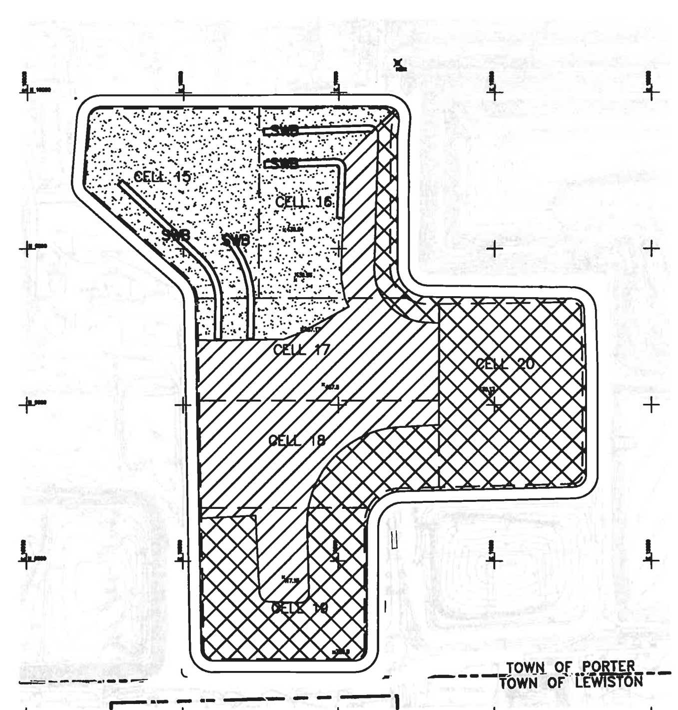


NOTE:

1. CELLS 16, 17, 18, 19 AND 20 ASSUMED TO BE CONSTRUCTED IN THIS PHASE. CELLS 16, 17, 18, AND 19 ASSUMED TO BE ACTIVE AT THE END OF THIS PHASE.

PHASE 4

SCALE: 1" = 300'

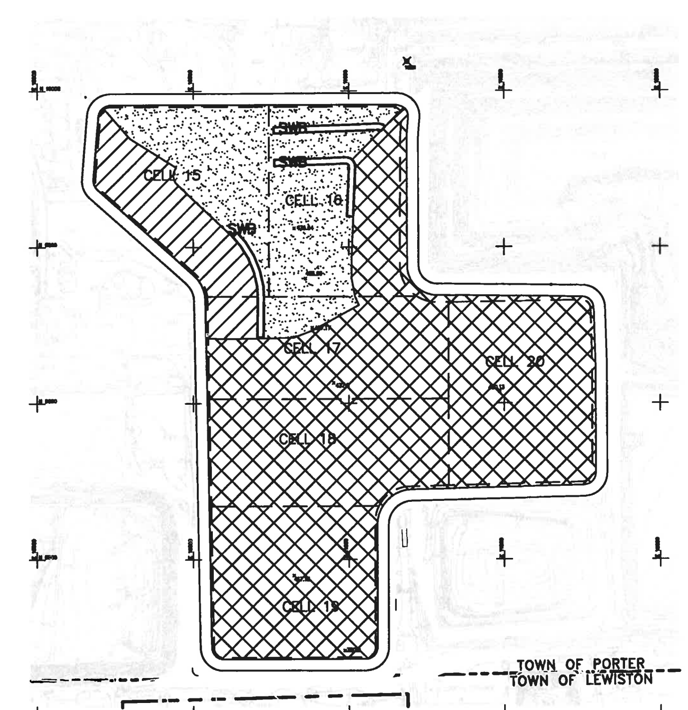


NOTE:

1. ALL CELLS ASSUMED TO BE CONSTRUCTED IN THIS PHASE. CELLS 15, 16, AND 17 ASSUMED TO BE ACTIVE AT THE END OF THIS PHASE.

PHASE 5

SCALE: 1" = 300'

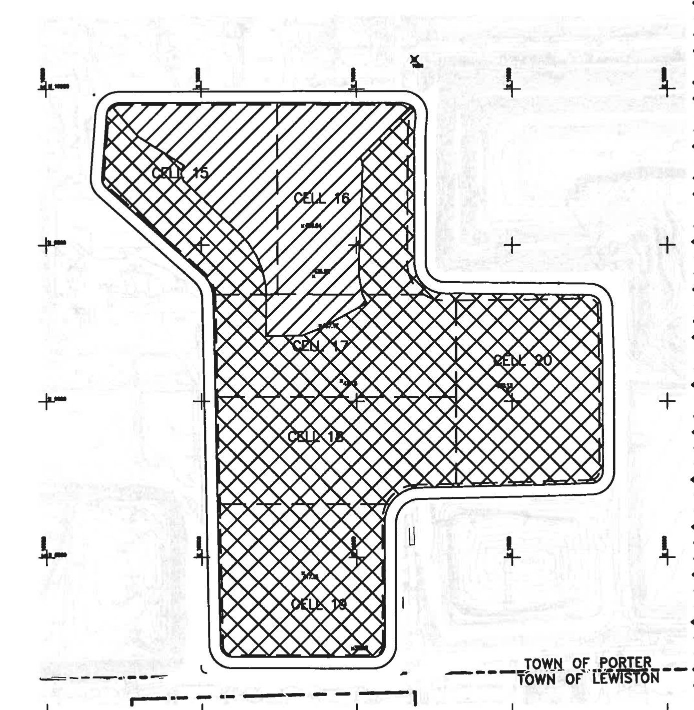


NOTE:

1. ALL CELLS ASSUMED TO BE CONSTRUCTED IN THIS PHASE. CELLS 15, 16, AND 17 ASSUMED TO BE ACTIVE AT THE END OF THIS PHASE.

PHASE 6

SCALE: 1" = 300'



NOTE:

1. ALL CELLS ASSUMED TO BE CONSTRUCTED IN THIS PHASE. LANDFILL IS COMPLETELY CAPPED AT THE END OF THIS PHASE.

PHASE 7

SCALE: 1" = 300'

XREFS: 23725X02 23725X01 23725X00 23725X11 | IMAGES: | PROJECTNAME:

CITY: SYRACUSE DIV/GROUP: ENVCAD DB: K. DAVIS G. STOWELL L. FORAKER LD: PIC: W. POPHAM PM: W. RANKIN TM: B. STONE LYR: ON=*;OFF=*REF*
G:\ENVCAD\SYRACUSE\ACT\B0023725\2011\00003\DWG\RMU_2\23725G09.dwg LAYOUT: 9 SAVED: 2/19/2013 10:19 AM ACADVER: 18.1S (LMS TECH) PAGESETUP: M-D2B-PDF PLOTSTYLETABLE: PLTCONT1.CTB PLOTTED: 2/25/2013 1:13 PM BY: SARTORI, KATHERINE

300' 0 300' 600'
1"=300'

THIS BAR REPRESENTS ONE INCH ON THE ORIGINAL DRAWING: USE TO VERIFY FIGURE REPRODUCTION SCALE

No.	Date	Revisions	By	Ckd
1	2/20/12	REVISED PHASING	PTO	BMS

THIS DRAWING IS THE PROPERTY OF THE ARCADIS ENTITY IDENTIFIED IN THE TITLE BLOCK AND MAY NOT BE REUSED OR ALTERED IN WHOLE OR IN PART WITHOUT THE EXPRESS WRITTEN PERMISSION OF SAME.

Professional Engineer's Name: JOSEPH MOLINA		
Professional Engineer's No.: 072644		
State: NY	Date Signed: 2/27/13	Project Mgr.: TJF
Designed by: BMS/PTO	Drawn by: LAF	Checked by: BMS

STATE OF NEW YORK · JOSEPH MOLINA · 072644 · LICENSED PROFESSIONAL ENGINEER

ARCADIS

ARCADIS OF NEW YORK, INC.

CWM CHEMICAL SERVICES, LLC • MODEL CITY, NEW YORK
RESIDUALS MANAGEMENT UNIT 2 PERMIT DRAWING

CONCEPTUAL WASTE FILLING AND FINAL COVER SEQUENCING

GENERAL

ARCADIS Project No. B0023725.2009.00006

Date AUGUST 2009

ARCADIS of New York, Inc.
6723 Towpath Road
P.O. Box 66
Syracuse, New York
TEL. 315.446.9120

9

CWM CHEMICAL SERVICES, LLC
MODEL CITY FACILITY

ANTIDEGRADATION DEMONSTRATION SUPPLEMENT FOR BIOACCUMULATIVE CHEMICALS OF CONCERN

TABLE C

TABLE C
PCBs in RMU-1 leachate (standpipes)

Non-detect <1ug/L averaged as half the detection limit (0.5 ug/L)

Cell	1	2	3	4	5	6	7/8	9/10	11/13	12/14	
standpipe	**L55**	**L56**	**L57**	**L58**	**L59**	**L60**	**L61**	**L62**	**L63**	**L64**	
5/2/2006						5260	0.5	0.5	0.5	0.5	ug/L
7/14/2006	19.1	4.93	0.5	0.5	12.4	763	0.5	0.5	0.5	0.5	total
12/7/2006						867	0.5	0.5	0.5	0.5	Aroclors
2/12/2007	0.5	4.57	0.5	0.5	4.84	41700	0.5	0.5	0.5	0.5	
5/12/2007						190000	0.5	0.5	0.5	0.5	
7/12/2007	0.5	0.5	0.5	0.5	11.7	1920	0.5	0.5	0.5	0.5	
12/13/2007						15100		0.5	0.5	0.5	
2/13/2008	0.5	1.88	0.5	0.5	1.73	1540	0.5	0.5	0.5	0.5	
5/8/2008						634		0.5	0.5	0.5	
7/29/2008	0.5	2.3	0.5	0.5	5.6	1260	0.5	0.5	0.5	0.5	
12/5/2008						375	0.5	0.5	0.5		
2/17/2009	0.5	3.84	0.5	2.42	2.98	429	0.5	0.5	0.5	0.5	
5/18/2009						2210	0.5	0.5	11.1	3.12	
7/21/2009	0.5	8.2	0.5	0.5	4.4	347	0.5	0.5	4	0.5	
2/18/2010	0.5	0.5	0.5	0.5	3.92	764	0.5	0.5	0.5	0.5	
5/18/2010						141	0.5	0.5	0.5	12.9	
7/13/2010	0.5	1.78	0.5	0.5	2.79	65.2	0.5	0.5	7.16	2.86	
12/15/2010						664	0.5	0.5	0.5	6.77	
2/15/2011	0.5	0.5	0.5	0.5	2.74	116	0.5	0.5	0.5	0.5	
5/23/2011							0.5	0.5	0.5	0.5	
7/19/2011	0.5	6.14	0.5	27.7	4.08		0.5	0.5	0.5	4.54	
12/22/2011						3470	0.5	0.5	0.5	0.5	
2/14/2012	0.5	4.04	0.5	0.5	2.02	1150	0.5	0.5	0.5	0.5	
8/22/2012	0.5	10.9	0.5	2.39	1.47	12400	0.5	0.5	97.2	1.17	
4/26/2013	0.5	3.41	0.5	0.5		7210	0.5	0.5	26.5		
10/17/2013	0.5	6.59	0.5	2.82	0.5	447	0.5	0.5	6.43	0.5	
4/18/2014	0.5	0.5	0.5	0.5	1.73	11100	0.5	0.5	0.5	0.5	
10/17/2014	86.8	1.49	0.5	0.5	0.5	3800	0.5	10.5	8.37	0.5	
2/20/2015						9360	0.5	6.65	9.08	19.26	
7/22/2015						42100	0.5	0.5	2.95	0.5	
10/26/2015	0.5	0.5	0.5	0.5	2.64	301	0.5	0.5	0.5	0.5	
average	6.33	3.48	0.50	2.35	3.88	12258.39	0.50	1.02	5.93	2.12	
	capped	capped	capped	capped	capped	95% capped	95% capped	partially capped	partially capped	partially capped	

(all cells intermediate capped as of November 2015)

Based on leachate level trends and pump run times from fall 2015, a weighted average PCB concentration is calculated as follows:
45% of leachate is from cell 11/13 (5.93), 45% from supplemental pumps in cells 7/8-12/14 (2.39) and 10% from cells 1-6 (2045.82) = 208.3 ug/L

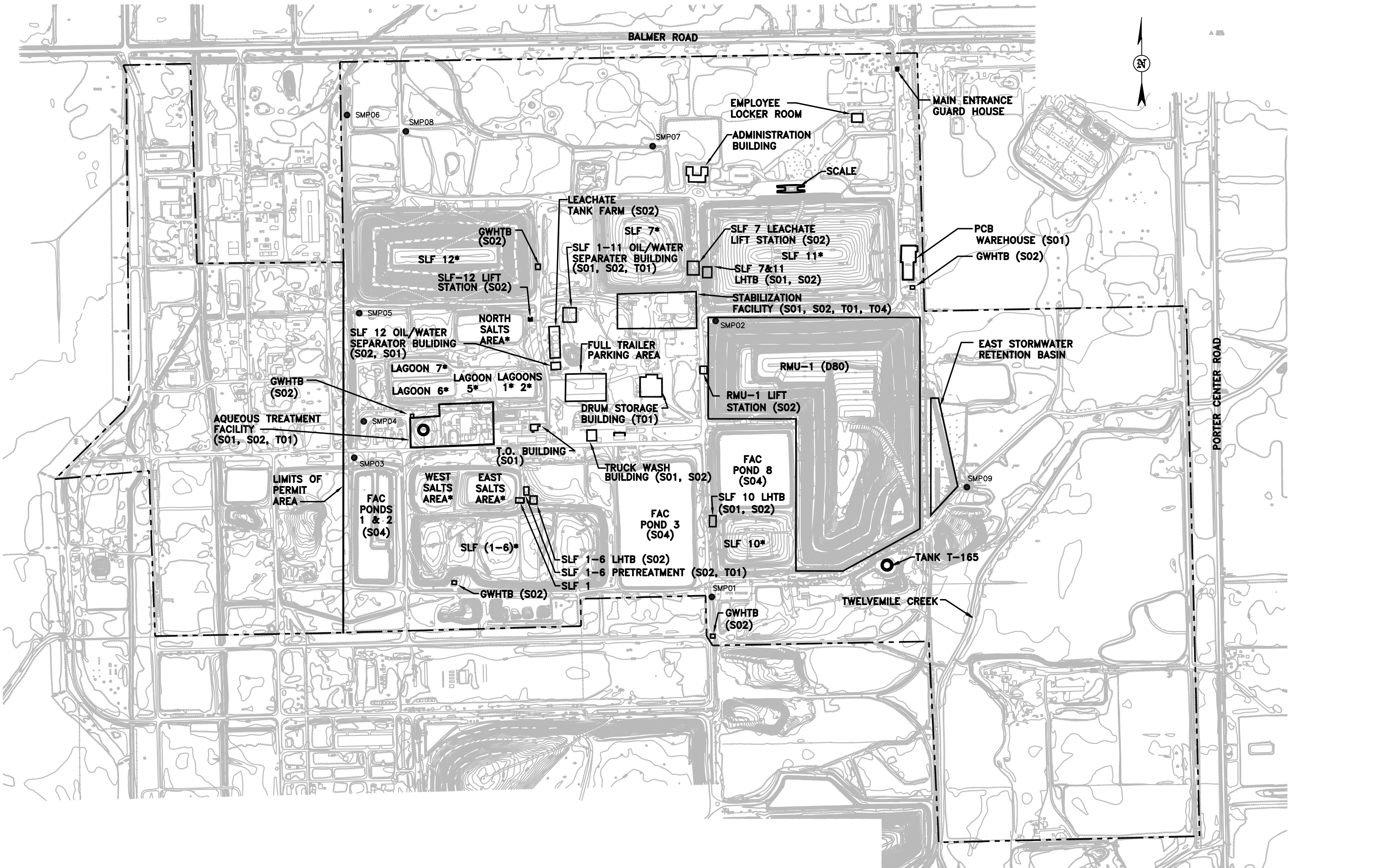
Average excluding Cell 6 (L60) = 2.90 ug/L PCBs

	Cells 1-6	Cells 7/8, 9/10, 11/13, 12/14
	6.33	
	3.48	
	0.5	0.5
	2.35	1.02
	3.88	5.93
	12258.39	2.12
average	2045.82	2.39

CWM CHEMICAL SERVICES, LLC
MODEL CITY FACILITY

ANTIDEGRADATION DEMONSTRATION SUPPLEMENT FOR BIOACCUMULATIVE CHEMICALS OF CONCERN

FIGURE 1



LEGEND

SLF = SECURE LANDFILL
FAC = FACULTATIVE
LAG = LAGOON
* = INACTIVE
LHTB = LEACHATE HOLDING TANK BUILDING
GWHTB = GROUNDWATER COLLECTION HOLDING TANK BUILDING
D80 = LANDFILL
S01 = CONTAINER STORAGE

PROPERTY LINE
LIMITS OF ACTIVE LANDFILL
S02 = TANK STORAGE
S04 = SURFACE IMPOUNDMENTS
T01 = TANK TREATMENT
T04 = OTHER TREATMENT
SMP09 ● = SURFACE MONITORING POINT (SMP)

NOTES:

1. THIS MAP COMPILED BY PHOTOGRAMMETRIC METHODS FROM AERIAL PHOTOGRAPHY DATED 5-31-01. (AIR SURVEY CORP. PROJECT NO.71010503)
2. VERTICAL DATUM BASED ON NGS MEAN SEA LEVEL.
3. GRID BASED ON LOCAL COORDINATE SYSTEM.
4. CONTOUR INTERVAL 2 FT.
5. DASHED CONTOURS INDICATE THAT GROUND IS PARTIALLY OBSCURED BY VEGETATION OR SHADOWS. THESE AREAS MAY NOT MEET STANDARD ACCURACY AND REQUIRE FIELD TESTING COMPLETION.
6. PROPERTY LINES ARE APPROXIMATE.
7. 630 PERMITTED ACRES.
8. 710 TOTAL ACRES.
9. LOCATION OF SMPs ARE APPROXIMATE.

500' 0' 500' 1000'

EnSol, Inc.
Environmental Solutions
661 MAIN STREET
NIAGARA FALLS, NY 14301
PHONE (716) 285-3920
FAX (716) 285-3928

FACILITY LAYOUT PLAN
CWM CHEMICAL SERVICES, LLC.
MODEL CITY, NY

FIGURE 1

CWM CHEMICAL SERVICES, LLC
MODEL CITY FACILITY

ANTIDEGRADATION DEMONSTRATION SUPPLEMENT FOR
BIOACCUMULATIVE CHEMICALS OF CONCERN

FIGURE 2

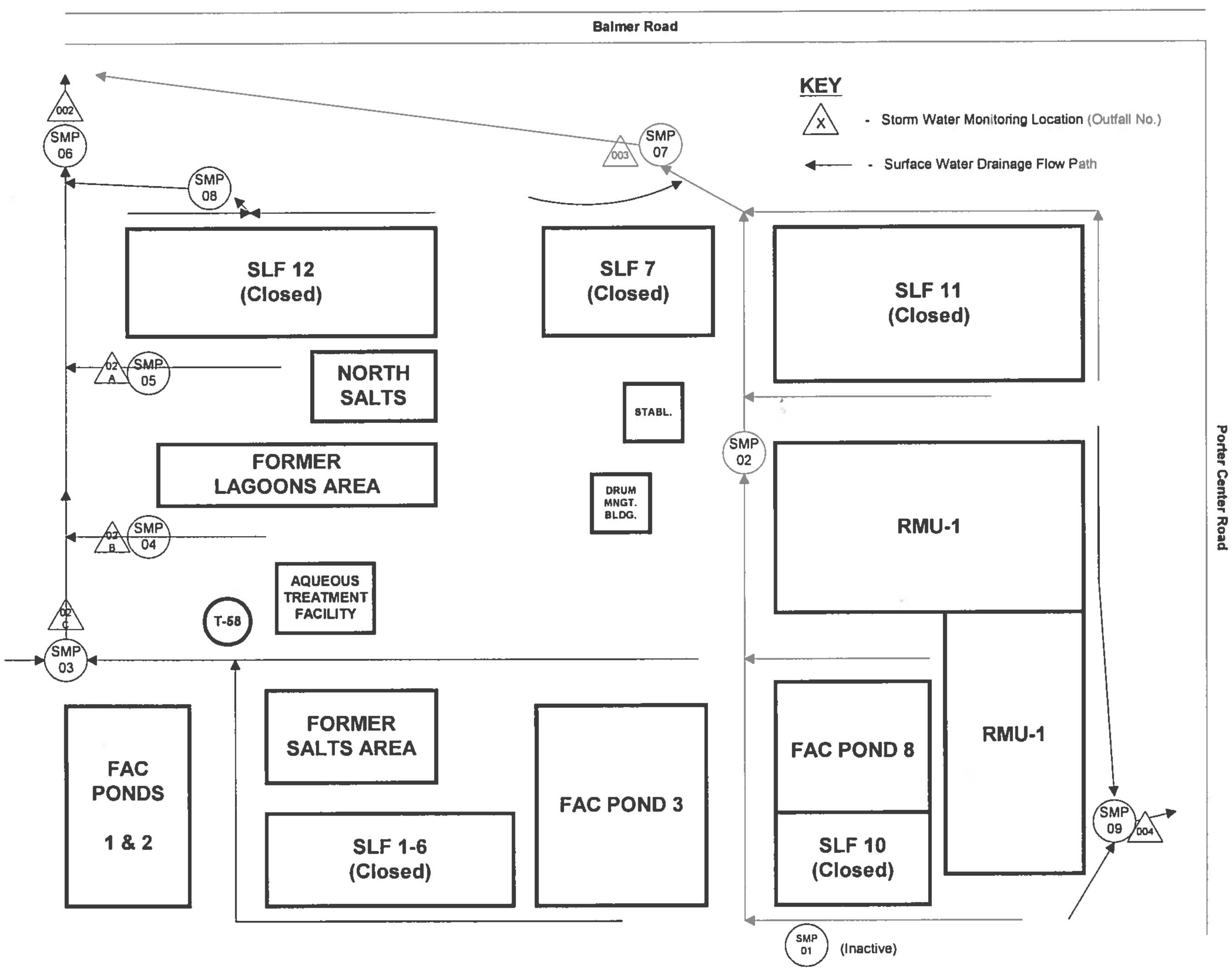
Figure 2

OUTFALLS 001 AND 01A MONITORING LOCATIONS

Outfall 001 - The permittee shall take samples and measurements in Fac Pond 3 for Prequalification Sampling, and at the Filter Outlet after Fac Pond 3for Outfall 001 for those parameters specified in the permit for "Outfall" sampling.

Outfall 01A - The permittee shall take samples and measurements after treatment in the Aqueous Wastewater Treatment System (AWTS) and prior to tanks 58 and 125. The one exception is that the monitoring location for pH shall be moved to tanks 58 and 125 for the first 48 hours following installation of a new carbon bed.

STORM WATER FLOW SCHEMATIC & MONITORING LOCATIONS



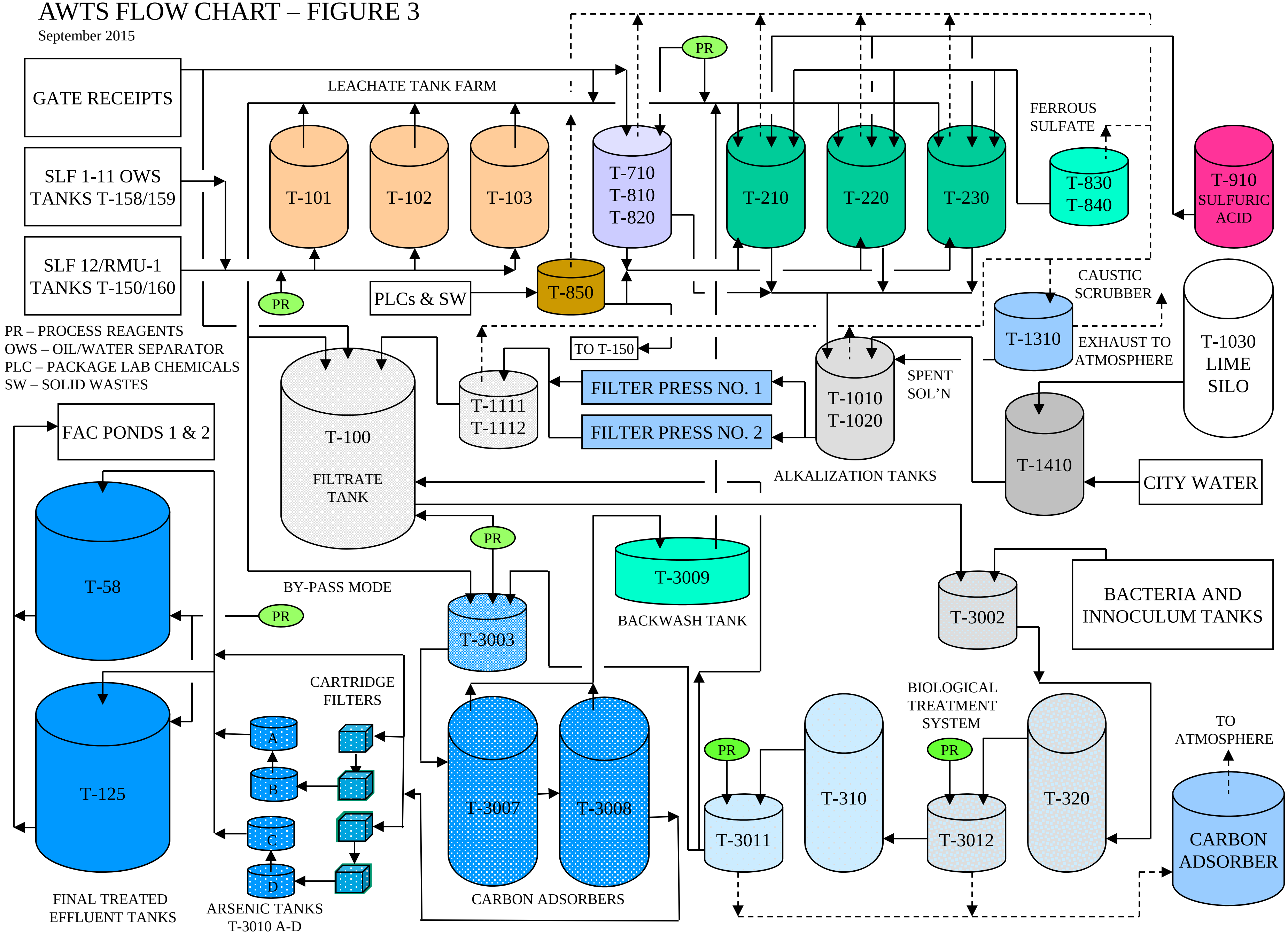
CWM CHEMICAL SERVICES, LLC
MODEL CITY FACILITY

ANTIDEGRADATION DEMONSTRATION SUPPLEMENT FOR
BIOACCUMULATIVE CHEMICALS OF CONCERN

FIGURE 3

AWTS FLOW CHART – FIGURE 3

September 2015



CWM CHEMICAL SERVICES, LLC
MODEL CITY FACILITY

ANTIDEGRADATION DEMONSTRATION SUPPLEMENT FOR
BIOACCUMULATIVE CHEMICALS OF CONCERN

APPENDIX 1

APPENDIX 1 to
CWM Chemical Services, LLC - Model City Facility

Antidegradation Demonstration Supplement for
Bioaccumulative Chemicals of Concern

CWM has demonstrated that, by taking the actions described below, treating and discharging, in accordance with the terms of this permit, the leachate generated by RMU-2 would not have the reasonable potential to increase the amount of BCC in the discharge authorized by this permit. Therefore CWM is authorized to treat and discharge the leachate from RMU-2 in accordance with this permit subject to the following conditions:

1. CWM will develop and implement a mercury minimization plan ("MMP") in accordance with the requirements in this permit.

2. Upon issuance of all necessary permits, certificates and approvals to construct and operate RMU-2, and to the extent technically and economically practicable, CWM shall pretreat all of the leachate from SLF N os.1-6 to remove PCBs so that the further management of such leachate is not subject to regulation under TSCA, as set forth in the EPA's TSCA approvals related to RMU-1, and such leachate shall be disposed of at an off-site non-Clean Water Act facility.

3. Within 365 days of the effective date of this permit modification, CWM shall upgrade or replace the existing filter presses with at least one filter press.

4. Upon issuance of all necessary permits, certificates and approvals to construct and operate RMU-2, CWM will restrict receipt of waste water with a B003 waste code into the A WT facility for treatment, unless pre-treatment by oil/water separation is performed.

5. As part of the MMP, based on the monitoring results of the influent to the AWTS and the effluent (0lA and 001), CWM will continue to assess other mercury sources and mercury treatment steps to identify cost-effective measures to further reduce mercury in the effluent.