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Washington, DC 20002

*Subject: Cooling Tower Basins Soil Removal Action Plan;  
Benning Road Facility, 3400 Benning Road, NE, Washington, DC*

Dear Ms. Patil:

AECOM has prepared this Cooling Tower Basins Soil Removal Action Plan to document soil sampling results and describe procedures for the removal of Polychlorinated Biphenyls (PCBs)-impacted soils adjacent to and beneath the two cooling tower basins at the Benning Road facility (the Site). In accordance with the Remedial Investigation and Feasibility Study (RI/FS) Work Plan Addendum #2, the Potomac Electric Power Company (Pepco) and its affiliate, Pepco Energy Services, Inc. (PES), retained AECOM to develop this Plan. The former Benning Power Plant was located in the western portion of the Site at 3400 Benning Road NE, Washington, DC.

The two cooling towers were constructed in 1969 and 1970. The cooling tower superstructures were demolished and removed in late 2013; only the concrete basins now remain in place. A Self Implementing Plan (SIP) for the removal of the cooling tower basins was prepared in accordance with the US Environmental Protection Agency (EPA) Toxic Substance and Control Act (TSCA) Regulations at 40 CFR 761.61(a). The SIP document was submitted to EPA and approved on May 2, 2014. The SIP presents the remediation plan for the concrete basins. The remediation will entail the complete removal and disposal of the concrete basins.

PCBs in soils at the cooling tower basins are believed to have migrated from PCB-containing caulking used for the basin expansion joints. Limited soil sampling conducted at the cooling tower basins in 2012 and 2013 indicated low levels of PCB contamination ( $\leq 10$  ppm). To further delineate PCB contamination in soils, a soil sampling program for the basins was proposed in the RI/FS Work Plan Addendum #2. Addendum #2 was approved by the District Department of the Environment (DDOE) on July 23, 2014. The sampling program proposed in Addendum #2 was conducted in August and September, 2014. Subsequent sampling activities were conducted in February and March, 2015. The resulting data largely supported earlier sampling results, but also identified several areas with higher PCB levels (all  $< 50$  ppm).

The purpose of this document is to present the results of the Addendum #2 soil sampling and describe the proposed soil removal action plan for the cooling tower basin soils. This Action Plan will be implemented concurrently with the concrete basin removal described in the SIP, and is designed to remediate (via removal) all soils containing greater than 1 ppm PCBs, which represents the high occupancy/no further restrictions cleanup level for PCBs under the TSCA regulations at 40 CFR 761.61(a)(4)(i)(A).

## **Project Background and Historical Sampling Events**

The two cooling tower basins (basins 15 and 16) are each approximately 307 ft by 57 ft. Each of the basins has four horizontal expansion joints running north to south along the basin floors (57 ft long) and eight vertical expansion joints in the basin walls (approximately 7 ft tall with their bases approximately 2 ft below grade). Basin 16 has an additional 24 vertical expansion joints in the basin walls, for a total of 32 vertical expansion joints. **Figure 1** and **Figure 2** depict the distribution of floor and wall expansion joints in basins 15 and 16, respectively. Within an area approximately 26 feet wide by 32 feet long situated along the southern edge of each cooling tower basin, the basin floor is sloped to a depth of approximately 10 feet below grade to form a sump from which accumulated water was pumped to the generating plant. There are no seams or expansion joints within these depressions, and therefore no soil remediation is necessary under or adjacent to these areas.

In 1995, Pepco conducted an environmental cleanup when the PCB-containing caulk and joint filler were found to be impacting the concrete basins, sludge and water in the cooling tower basins, and soil adjacent to the basin wall expansion joints. According to the cleanup report submitted to EPA, Pepco sampled, excavated, and replaced soil adjacent to the wall expansion joints around both cooling tower basins. Surface soil samples were also collected at distances of 1 to 2 ft from the basin walls at a depth of 0.5-1 inch below grade. PCBs in these non-excavated surface soils ranged from <1 ppm to 3 ppm.

In January 2012, PES retained AECOM to perform an existing conditions/hazardous materials assessment for the two cooling tower basins. A total of ten soil samples (SS-1 through SS-10) were collected by hand auger from a depth of less than 1 ft below grade at various locations around the perimeters of the cooling towers. PCB levels in the samples ranged from <0.1 ppm to 3.3 ppm. The locations and PCB concentrations of the 2012 soil samples are presented in **Figure 1** and **Figure 2**.

In July 2013, AECOM collected additional soil samples as part of the SIP development. Two locations adjacent to the vertical expansion joints were sampled at two depths (0-3" and 3-6" below grade) at each basin, for a total of eight samples. PCB results for these samples ranged from <0.1 ppm to 10.0 ppm. The locations and PCB concentrations of the 2013 soil samples are presented in **Figure 1** and **Figure 2**.

## **RI/FS Addendum #2 Soil Sampling**

Prior to initiation of the RI/FS Addendum #2 sampling, a utility clearance was performed by Enviroscan, Inc. of Lancaster, PA to identify and mark utilities located beneath and adjacent to the cooling tower basins. In addition, utility drawings for the area were provided by the Pepco Engineering department. The presence of subsurface utilities, including electric, water, and sewer lines, required that a number of samples be offset from their proposed locations, or eliminated where they could not be safely collected.

The sub-slab samples were collected by hand auger or direct push methods through 3-inch diameter core holes in the 18-inch thick concrete basin slabs. The exterior soil samples were collected by hand auger in combination with air knife/vacuum methods to reach the terminal boring depths. All sampling equipment was decontaminated before sampling, in between samples, and after sampling as described in the RI/FS Addendum #2. Dust monitoring was conducted in all work areas and no exceedances of the project dust action level were recorded.

A total of 432 samples at 94 locations were collected over the course of three sampling events in summer 2014 and early 2015, of which 208 were analyzed. QC samples, including duplicates, MS/MSDs, and field blanks were collected as described in the RI/FS Addendum #2. The samples were packaged and shipped under chain-of-custody to TestAmerica Laboratories of Pittsburgh, PA. Samples were analyzed for PCBs by EPA Method 8082A.

The sampling targeted the basin horizontal and vertical expansion joints that contained PCB-impacted caulking material, from which PCBs migrated into the adjacent soils. As described in the RI/FS Addendum #2, all samples were identified as either primary or contingency samples, with the contingency samples to be put on hold by the laboratory pending the results of the primary samples. The primary samples were those nearest the basins or at the ground surface, where PCB contamination was most likely to be present. If a primary sample result was greater than or equal to 1 ppm PCBs, the adjacent contingency sample was taken off of hold and analyzed. The same decision process was then applied to the contingency samples until the result was <1 ppm PCBs or there were no further contingency samples.

After applying the contingency sample selection process, a total of 188 field samples were analyzed. The results of the soil sampling at the basins are presented in **Table 1** and **Table 2**, and in **Figure 1** and **Figure 2**. In **Figure 1** and **Figure 2**, where a duplicate sample was collected with a field sample, the higher result of the two is shown.

Twelve laboratory data packages (Attachment 1) were reviewed and found to meet acceptance criteria for completeness with respect to the chain-of-custody, samples designated for analysis, and tests performed. PCB results for a total of 188 normal field samples, plus QC samples, were reported. Sample preservation and preparation/analysis holding times were reviewed for conformance with the work plan criteria and all criteria were met for all samples.

Laboratory method blanks and equipment rinseate blanks were evaluated and no PCBs were detected above the reporting limits. A total of ten equipment blanks were collected during the sampling event, representing 5.1% of the field samples analyzed, meeting the work plan frequency requirement of one per twenty samples.

Surrogate spike recoveries for the PCB analyses were all within QC acceptance criteria unless diluted out due to high PCB concentrations or elevated due to matrix interferences. Matrix spike recoveries for the PCB analyses were all within QC acceptance criteria unless diluted out due to high native samples PCB concentrations or the native PCBs interfered with the spike producing apparent high recoveries, with the exception of sample CT15SO5C-12 where the Aroclor 1260 spike recovery was 30%. The Aroclor 1016 spike recovery in this same sample was within criteria. All associated Laboratory Control Sample spike recoveries were within acceptance criteria. A total of eighteen MS/MSD pair spike samples were analyzed, representing 9.5% of the field samples, meeting and exceeding the work plan frequency requirement of one per twenty samples.

Field duplicate sample precision results were all within QC criteria except for sample CT16SO6A-0 where Aroclor 1260 was nondetect in the native sample, but detected at 0.15 mg/kg in the duplicate. Precision for the Aroclor 1254 results in the same samples was acceptable (3.1%RSD). A laboratory replicate analysis for sample CT15SO6A-36 was requested and the replicate result was slightly less than half the original value, indicating possible sample inhomogeneity with respect to PCB distribution in this sample. A total of ten field duplicate samples were analyzed, representing 5.1 % of the native field samples, and meeting the work plan frequency requirement of one per twenty samples.

## Summary of Results

The sampling data indicate low-level (<50 ppm) PCB impacts in surface soils in the immediate vicinity of the basins. The majority of contamination was confined to the surficial 12 inches of soil and was <10 ppm PCBs. Only twelve of the 188 analyzed field samples had PCB levels >10 ppm. The highest concentration detected was 42 ppm PCBs at 12 inches below grade and 5 feet from a vertical expansion joint at basin 16. There were also localized areas of deeper contamination beneath the slabs and around the basin perimeters. Beneath the basins, impacted soils appear to be limited to a small area beneath basin 15, and a broader area below the eastern end of basin 16, which showed higher PCB concentrations at deeper depths on average than the rest of the basin soils. Outside the basins, soils around the eastern end of basin 16, and at three other discrete exterior locations, showed >1 ppm PCBs at greater than 12 inches below grade.

PCB Aroclor analysis showed that the impacts at basin 15 were due almost entirely to Aroclor-1254 alone, while basin 16 soils showed contamination from both Aroclor-1254 and Aroclor-1260. The only Aroclor previously detected in the expansion joint caulking material from both basins was Aroclor-1254. However, only four caulk samples from each basin were submitted for Aroclor analysis, and the presence of Aroclor-1260 in some basin caulking material cannot be ruled out.

The distribution of PCB-contaminated soils beneath and adjacent to the basins is considered to be a consequence of the basin construction process, during which PCB-containing caulking was emplaced in the expansion joints. It is suspected that the origin of PCBs in the basin soils is a combination of PCB migration from basin expansion joint caulking and distribution of contaminated material in basin soils during construction.

## **Remediation Work Plan**

### **Rationale and Remediation Goals**

Soil remediation is proposed for the basins in order to (a) protect human health and the environment from exposure to potentially harmful PCB-contaminated soils, and (b) meet the requirements of the TSCA regulations. The TSCA regulations specify a cleanup level for bulk PCB remediation waste in high occupancy areas of  $\leq 1$  ppm without further conditions. High occupancy areas where PCBs concentrations remain at  $>1$  and  $\leq 10$  ppm shall be covered with a cap to prevent exposure. A deed restriction would also be required to identify this area and ensure maintenance of the cap in perpetuity.

The purpose of the soil removal is to eliminate potential exposure to contaminated surface soils, support the concrete basin remediation, and remove deeper areas of known contamination above the PCB remediation goal that may be impacting groundwater to the extent practicable. The PCB remediation goal for the soil removal proposed in this Action Plan is  $\leq 1$  ppm. This conservative remediation goal has been selected based on the fact that the cooling tower basins, unlike the remaining areas of the Site, are regulated under TSCA. The remediation goal selected for the cooling tower basin soil remediation is not intended to be applied to any other potentially contaminated area of Site. For these areas, any remedial actions and associated remedial goals will be developed in accordance with the RI/FS Work Plan based on the findings of site-specific risk assessments.

The proposed remediation areas are shown in **Figure 1** and **Figure 2**. At a minimum, a strip of soil 15 ft wide and 3 ft deep is proposed to be excavated from the perimeters of the basins to remove contaminated surface soils. This strip will be widened and deepened to 20 ft and 6 ft, respectively, around the eastern end of basin 16, where contamination appears to be deeper and more widespread. The sub-slab soils will be excavated to a depth of at least 0.5 ft below basin bottom. Twenty-foot wide strips centered on the horizontal expansion joints will be excavated to 1 ft below basin bottom, and soils below the two easternmost bays of basin 16 will be excavated to 3 ft below basin bottom. Localized areas of deeper contamination will be addressed with more extensive excavations as depicted on the figures. A total of 5,269 cubic yards or approximately 7,904 tons of soil is proposed to be excavated from the basins. Specific excavation volumes and masses are given in the inset tables in **Figure 1** and **Figure 2**.

A limited program of confirmatory sampling will be conducted during the soil removal at locations where contamination remained vertically or horizontally unbounded at the close of pre-excavation sampling activities. Confirmatory samples will be collected at the following locations and depths:

	Location	Distance from Basin	Depth
Cooling Tower 15	SO1E	15 ft	0 in
	SO1E	15 ft	12 in
	SO5E	15 ft	0 in
	SO7F	20 ft	0 in
Cooling Tower 16	SO7B	5 ft	72 in
	SO8F	20 ft	12 in
	SO9F	20 ft	12 in
	SO10F	20 ft	36 in
	SO11F	20 ft	0 in

Notes:

B = 5 ft from basin

E = 15 ft from basin

F = 20 ft from basin

The samples will be analyzed on an expedited 24-48 hour turnaround time, and the results will be shared with DDOE as soon as they are available. If confirmatory surface samples (collected from zero inches below grade) exhibit PCB concentrations >1.0 ppm, Pepco will further excavate and characterize the soils until the remediation goal is reached. Additional characterization of subsurface soils (collected from 12 inches or deeper) will not be conducted, irrespective of the results from the confirmatory subsurface soil samples. Any contaminated subsurface soils remaining at Target Area #5 (Cooling Tower Basins) following soil removal will be addressed in an additional subsurface soil sampling effort to characterize the extent of elevated PCB concentrations. This sampling will be conducted to support the evaluation of remedial actions developed as part of the ongoing Remedial Investigation/Feasibility Study for the Site.

**Pre-Mobilization Activities**

Pepco proposes to engage the same contractor (the Contractor) selected by Pepco and PES for the concrete basin removal documented in the SIP to implement this Soil Removal Action Plan concurrently with the basin removal. The combined soil and concrete basin removal activities will be carried out in accordance with the procedures documented in the SIP and this Action Plan, and shall comply with all applicable regulatory requirements.

Prior to initiation of excavation activities, the Contractor shall:

- Amend and extend the existing demolition permit from the Department of Consumer and Regulatory Affairs (DCRA) for the basin concrete removal to include the soil removal;
- Amend and extend existing Soil Erosion and Sediment Control (SESC) Plan for the basin concrete removal to include the soil removal, and install the controls outlined therein;
- Amend the existing demolition site-specific Health and Safety Plan for the basin concrete removal to include the soil removal;
- Submit a detailed schedule to implement the action plan for DDOE’s review, upon receiving the amended permit;
- Obtain waste profile approval from the selected disposal facility for off-site disposal of the excavated soils;
- Mark the locations of the existing basin walls and expansion joints, and stake the limits of the excavation areas;

- Acquire utility drawings and previous utility designation reports for the cooling tower area, and engage a private utility locator to locate and mark out all subsurface utilities in the excavation areas; and
- Provide DDOE with a minimum of one week notification in advance of the planned date and time that excavation will begin.

Additional preconstruction activities include the notification of DC Miss Utility/One Call and the establishment of work area limits.

### Work Elements

The first phase of the soil and concrete basin remediation will be the excavation of the exterior basin soils as shown in **Figure 1** and **Figure 2**. It is proposed that all soils removed from the Site will be live-loaded into trucks and transported directly to the approved disposal facility, or stockpiled onsite before transportation, according to the contractors approved means and methods in a manner that is protective of human health and the environment. The trucks shall be covered during transport and filled so that material is no less than 6 inches below the top of the trailer bed. The excavations will be backfilled as necessary with certified clean backfill material to support construction equipment for the basin demolition. The backfill materials shall be free from contamination. Prior to the placement of any backfill materials, Pepco will submit a plan for characterizing representative concentrations of Priority Pollutant List metals, SVOCs, PAHs, and PCBs in the backfill material and, following DDOE concurrence, will submit documentation demonstrating that concentration levels are below applicable screening levels defined for the RI.

Protection will be provided to prevent any debris from entering into the 54" site storm drain pipe from the existing cooling tower basin overflow structures.

Following exterior soils removal, the concrete basins will be demolished and removed as documented in the SIP. After the concrete basin materials have been removed in accordance with the SIP, sub-slab soils will be excavated from the areas shown in **Figure 1** and **Figure 2**. To the extent practical, excavation will be conducted in a phased manner, sequentially backfilling the excavated areas so that the area open to the atmosphere at any given time is minimized. The excavated soils will be disposed of at a Subtitle D landfill.

The excavations will be dewatered as necessary in accordance with the Contractor's work plan. Rainwater or other water that is removed from the excavation will be pumped into a temporary storage tank and transported to an appropriate disposal facility.

Several active or abandoned subsurface utilities are known to exist within and beneath the immediate vicinity of the cooling tower basins, including but not limited to electric, water, and sewer lines. Extreme caution shall be taken when working around the utilities. The Contractor shall identify any utilities within the excavation areas as necessary to avoid damaging utilities.

All construction equipment that contacts the soils within the exclusion zone shall be decontaminated in accordance with the procedures in 40 CFR 761.79(c)(2)(ii) as described in the SIP. Specifically, the nonporous surfaces of equipment that has contacted PCB wastes (e.g., buckets, shovels) will be swabbed with a d-limonene (terpene hydrocarbon) containing solution. A truck washing station will be established to clean tires of vehicles exiting the site in accordance with the SESC. All wastes generated during equipment decontamination shall be containerized and analyzed to determine appropriate disposal methods.

Upon completion of the soil and concrete basin removal, the excavations will be backfilled with certified clean backfill material. The backfill will be compacted and the surface will be stabilized in accordance with the approved SESC Plan. Demobilization activities will include equipment decontamination and removal, storage tank cleaning and removal, removal of soil erosion controls, and removal of temporary



fencing, trash, and other construction debris. The site construction manager and the Contractor will conduct a final site walk to confirm that all items have been removed and the site is in an acceptable condition.

**Documentation and Closure Report**

Documentation of the soil and basin remediation will be performed as outlined in the SIP. This documentation includes a daily log of on-site activities, photographs, and transport and treatment/disposal certifications. A Remedial Action Report will be prepared upon completion of all remedial activities as described in the SIP.

The soil and basin remediation will be implemented upon DDOE's approval of this Soil Removal Action Plan. Pepco will submit a detailed remediation schedule to DDOE prior to initiation of field activities.

If you have any questions or comments concerning this Action Plan, please contact Fariba Mahvi of Pepco at (202) 331-6641 or Ravi Damera of AECOM at (301) 289-3809.


Sincerely,



Ben Daniels  
Staff Geologist



Ravi Damera, P.E., BCEE  
Senior Project Manager



Gary Grinstead, P.G.  
Operations Manager

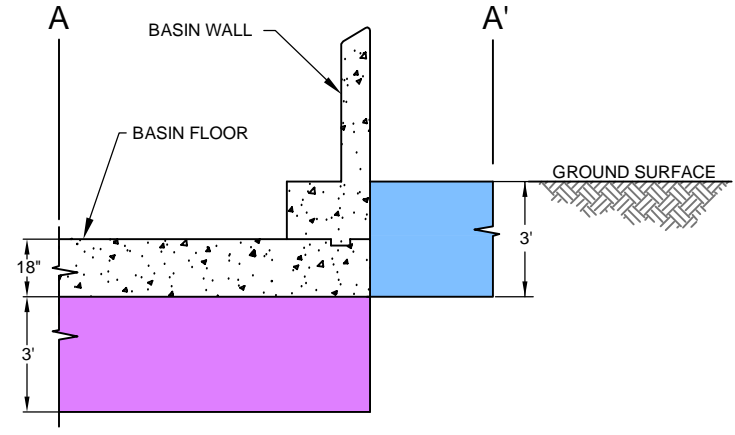
cc: Ms. Fariba Mahvi, Pepco

Attachments:

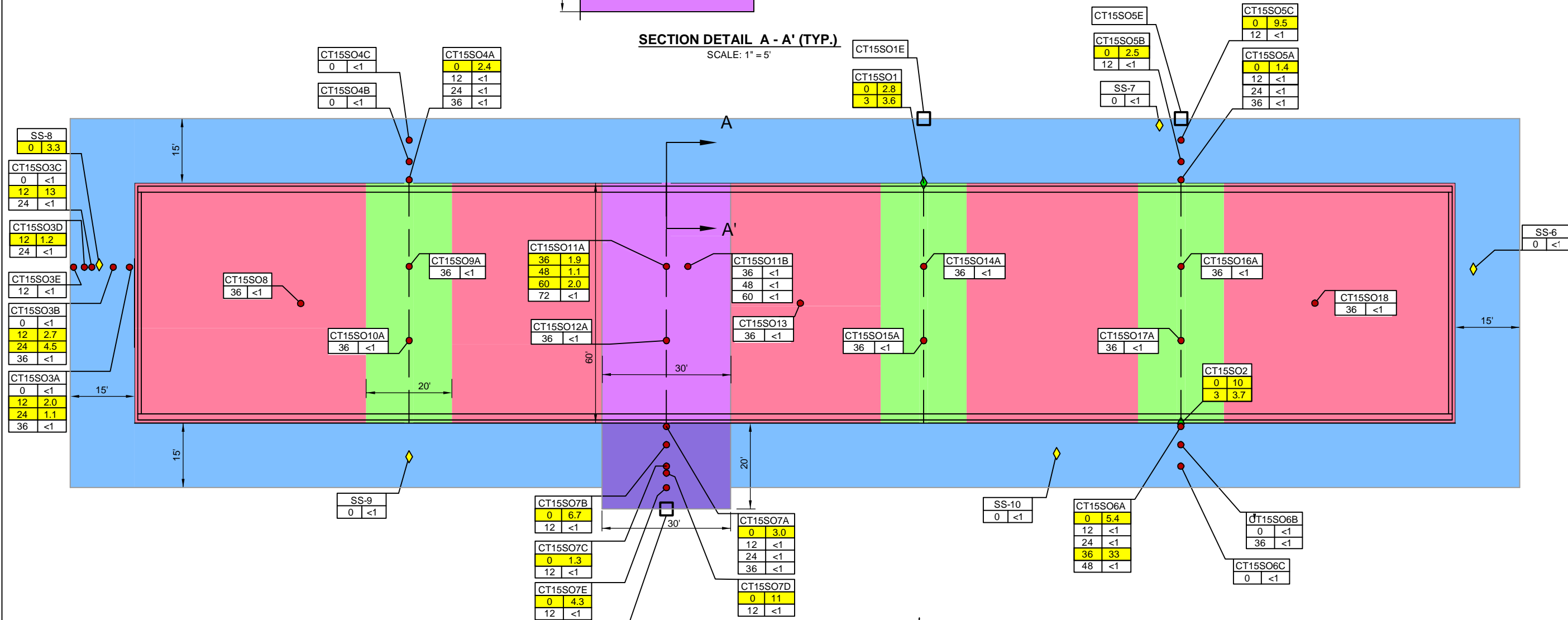
Tables 1 and 2

Figures 1 and 2

Attachment 1: Laboratory Data Packages



**SECTION DETAIL A - A' (TYP.)**  
SCALE: 1" = 5'



**COOLING TOWER 15 - PLAN VIEW**  
SCALE: 1" = 25'

**LEGEND:**

- 2014-2015 SAMPLING LOCATION
- ◆ 2013 SAMPLING LOCATION
- ◇ 2012 SAMPLING LOCATION
- PROPOSED CONFIRMATORY SAMPLE
- EXPANSION JOINT
- PCBs POLYCHLORINATED BIPHENYLS
- mg/kg MILLIGRAMS PER KILOGRAM


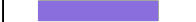
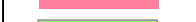


NOTE: FOR EXTERIOR SAMPLES, LETTERS AT THE END OF THE SAMPLE ID INDICATE DISTANCE FROM THE BASIN AS FOLLOWS: A=0', B=5', C=10', D=12', E=15', F=20'.

**DATA BOX KEY:**

Sample ID (SO = Soil)	
Depth below grade (in)	Total PCBs (mg/kg)
0	1.1
12	<1

NOTE: RESULTS HIGHLIGHTED IN **YELLOW** INDICATE A TOTAL PCBs CONCENTRATION GREATER THAN OR EQUAL TO 1 mg/kg.

**PROPOSED REMEDIATION AREAS:**

REMEDIATION AREA	AREA (ft <sup>2</sup> )	DEPTH (ft)	VOLUME (cy)	MASS (tons)
	11,490	3.0	1,277	1,915
	600	3.0	67	100
	13,080	0.5	242	363
	3,600	1.0	133	200
	1,800	3.0	200	300
<b>TOTALS</b>	<b>30,570</b>		<b>1,919</b>	<b>2,878</b>

NOTE: ALL REMEDIATION AREAS ARE BELOW GRADE.  AREA IS BELOW BASE OF BOTTOM SLAB AND INSIDE THE BASIN.

**DATE**  
2015.04.02

**PROJECT NUMBER**  
60287343

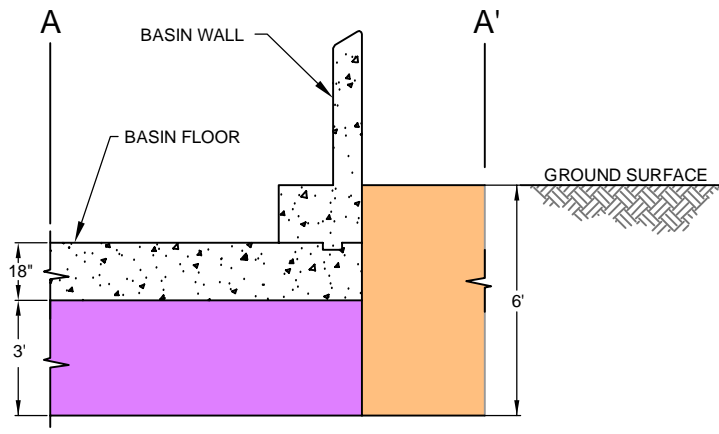
**FIGURE TITLE**  
Cooling Tower 15  
Sampling Results and  
Excavation Plan

**FIGURE NUMBER**  
1

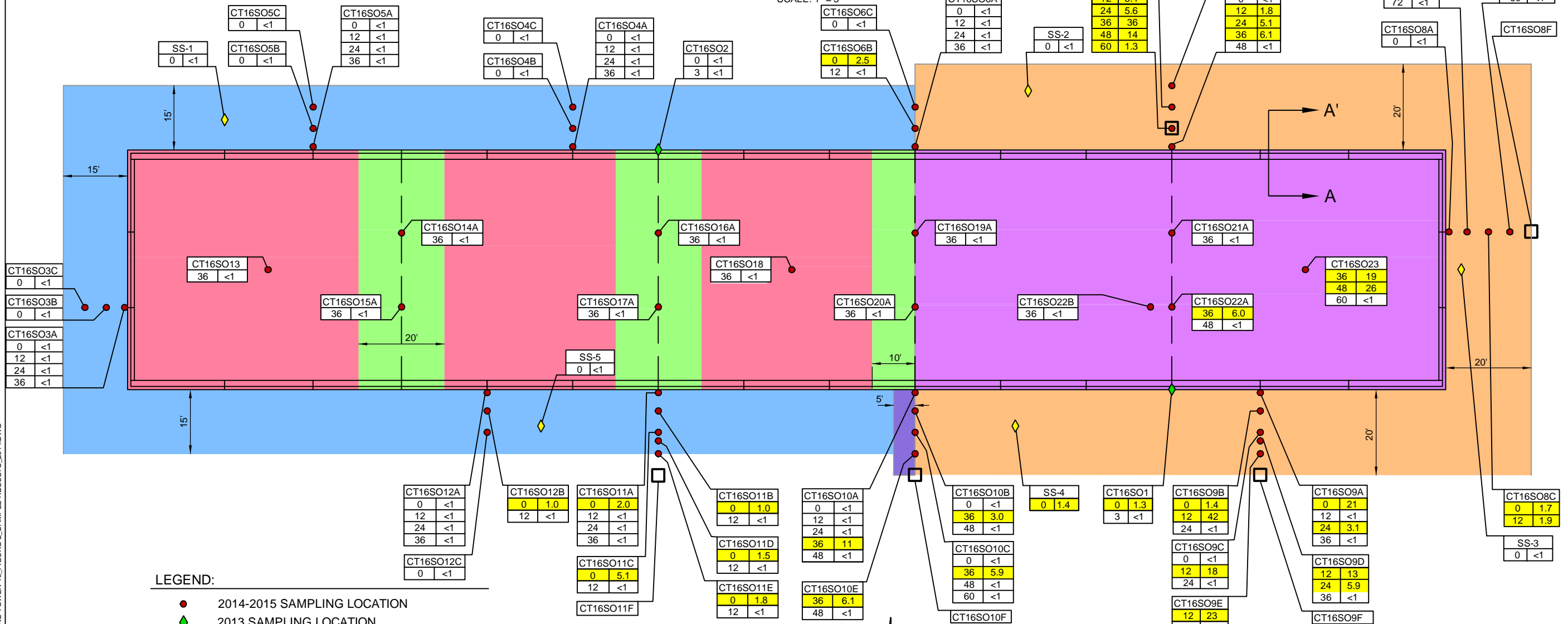
Project Management Initials: \_\_\_\_\_ Designer: \_\_\_\_\_ Checked: \_\_\_\_\_ Approved: \_\_\_\_\_  
 Last saved by: FURMANSKIC (2015-07-13) Last Plotted: 2015-07-29  
 Filename: L:\GROUPE\PCAR\THEPECO - 60287343\COOLING TOWER 15 - FIGURE 1 - SAMPLE RESULTS\_2014.DWG



Project Management Initials: Designer: Checked: Approved:



**SECTION DETAIL A - A' (TYP.)**  
SCALE: 1" = 5'



**LEGEND:**

- 2014-2015 SAMPLING LOCATION
- ◆ 2013 SAMPLING LOCATION
- ◇ 2012 SAMPLING LOCATION
- PROPOSED CONFIRMATORY SAMPLE
- EXPANSION JOINT
- PCBs POLYCHLORINATED BIPHENYLS
- mg/kg MILLIGRAMS PER KILOGRAM

NOTE: FOR EXTERIOR SAMPLES, LETTERS AT THE END OF THE SAMPLE ID INDICATE DISTANCE FROM THE BASIN AS FOLLOWS: A=0', B=5', C=10', D=12', E=15', F=20'.

**COOLING TOWER 16 - PLAN VIEW**  
SCALE: 1" = 25'

**DATA BOX KEY:**

Sample ID (SO = Soil)	
Depth below grade (in)	Total PCBs (mg/kg)
0	1.1
12	<1

NOTE: RESULTS HIGHLIGHTED IN **YELLOW** INDICATE A TOTAL PCBs CONCENTRATION GREATER THAN OR EQUAL TO 1 mg/kg.

**PROPOSED REMEDIATION AREAS:**

REMEDATION AREA	AREA (ft <sup>2</sup> )	DEPTH (ft)	VOLUME (cy)	MASS (tons)
Blue	6,819	3.0	758	1,137
Orange	6,728	6.0	1,495	2,243
Purple	7,392	3.0	821	1,232
Green	8,088	0.5	150	225
Light Green	3,000	1.0	111	167
Light Purple	100	4.0	15	22
<b>TOTALS</b>	<b>31,127</b>		<b>3,350</b>	<b>5,026</b>

NOTE: ALL REMEDIATION AREAS ARE BELOW GRADE. ■ AREA IS BELOW BASE OF BOTTOM SLAB AND INSIDE THE BASIN.

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Filename: L:\GROUPE\CARTRIDGE\PEPCO - 60287343\COOLING TOWER 16 - FIGURE 2 - SAMPLE RESULTS\_2014.DWG

**DATE**  
2015.04.02

**PROJECT NUMBER**  
60287343

**FIGURE TITLE**  
Cooling Tower 16  
Sampling Results and  
Excavation Plan

**FIGURE NUMBER**  
2