United States Environmental Protection Agency

Washington, D.C. 20460

Water Compliance Inspection Report

Section A: National Data System Coding (i.e. PCS)

Transaction Code	NPDES	yr/mo/day	Inspection Type	Inspector	Fac Type
1 N 2	3 DC0000019 11	12 15/05/13 17	18 C	19 S	20 4

Remarks

21 _____ 66

Inspection Work Days	Facility Self-Monitoring Evaluation Rating	B1	QA	Reserved
67 ____ 69 ____	70 4	71 N	72 N	73 ____ 74 75 ____ 80

Section B: Facility Data

Name and Location of Facility Inspected *(For industrial users discharging to POTW, also include POTW name and NPDES permit number)*	Entry Time/Date	Permit Effective Date
Department of the Army, Baltimore District, Corps of Engineers Washington Aqueduct Division, 5900 MacArthur Boulevard, NW Washington, DC 20016-2514	9:00 AM /31/2013	11/20/2008
	Exit Time/Date	**Permit Expiration Date**
	5:00 PM 7/31/2013	11/20/2013

Name(s) of On-Site Representative(s)/Title(s)/Phone and Fax Number(s)	Other Facility Data (e.g., ISC NAICS, and other descriptive information)
1. John Peterson, Superintendent, (202) 764-0009 2. Arthur White, Water Treatment Plant Supervisor; (202) 764-0018 3. Tenkasi Viswanathan, Laboratory Quality Assurance Officer, (202) 764-0732	
Name, Address of Responsible Official/Title/Phone and Fax Number	**Contacted**
Thomas P. Jacobus, General Manager Baltimore District, Corps of Engineers, Washington Aqueduct Division 5900 MacArthur Boulevard, NW, Washington, DC 20016-2514 Tel. (202) 764-0031; Fax (202) 764-2401	x Yes ____ No

Section C: Areas Evaluated During Inspection (Check only those areas evaluated)

X Permit	X Self-Monitoring Program	____ Pretreatment	____ MS4
X Records/Reports	X Compliance Schedules	X Pollution Prevention	
X Facility Site Review	X Laboratory	____ Storm Water	
X Effluent/Receiving Waters	X Operations & Maintenance	____ Combined Sewer Overflow	
____ Flow Measurement	X Sludge Handling/Disposal	____ Sanitary Sewer Overflow	

Section D: Summary of Findings/Comments

(Attach additional sheets of narrative and checklists, including Single Event Violation codes, as necessary)

SEV Codes	SEV Description
A0018: Approved Bypass	November 10, 2014 EPA approved a bypass of the treatment of sedimentation basin residual solids. The discharge resulted in 12 numeric effluent violations for discharges to outfalls 003A and 004A.
C0011: Failure To Monitor	The facility did not collect monitoring samples for the January 2014 discharge to outfall 004A. For non-Toxicity Requirements

Name(s) and Signature(s) of Inspector(s)	Agency/Office/Phone and Fax Numbers	Date
David Pilat	DDOE; Tel.: (202) 281-3963; Fax: (202) 535-1363	05/13/15
Isaac Kelley	DDOE; Tel.: (202) 535-2691; Fax: (202) 535-1363	05/13/15
Signature of Management Q A Reviewer	**Agency/Office/Phone and Fax Numbers**	**Date**

Comments

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SECTIONS F THRU L: COMPLETE ON ALL INSPECTIONS, AS APPROPRIATE. N/A = NOT APPLICABLE

SECTION F - FACILITY AND PERMIT BACKGROUND

ADDRESS OF PERMITTEE IF DIFFERENT FROM FACILITY (Including City, County and ZIP code)	**DATE OF LAST PREVIOUS INVESTIGATION BY EPA/STATE** 07/31/2013
Same	**FINDINGS** None.

SECTION G - RECORDS AND REPORTS

RECORDS AND REPORTS MAINTAINED AS REQUIRED BY PERMIT. DETAILS:	X YES	NO	N/A
(a) ADEQUATE RECORDS MAINTAINED OF:			
(i) SAMPLING DATE, TIME, EXACT LOCATION	X YES	NO	N/A
(ii) ANALYSES DATES, TIMES	X YES	NO	N/A
(iii) INDIVIDUAL PERFORMING ANALYSIS	X YES	NO	N/A
(iv) ANALYTICAL METHODS/TECHNIQUES USED	X YES	NO	N/A
(v) ANALYTICAL RESULTS (e.g., consistent with self-monitoring report data)	X YES	NO	N/A
(b) MONITORING RECORDS (e.g., flow, pH, D.O., etc.) MAINTAINED FOR A MINIMUM OF THREE YEARS INCLUDING ALL ORIGINAL STRIP CHART RECORDINGS (e.g., continuous monitoring instrumentation, calibration and maintenance records).	X YES	NO	N/A
(c) LAB EQUIPMENT CALIBRATION AND MAINTENANCE RECORDS KEPT.	X YES	NO	N/A
(d) FACILITY OPERATING RECORDS KEPT INCLUDING LOGS FOR EACH TREATMENT UNIT.	X YES	NO	N/A
(e) QUALITY ASSURANCE RECORDS KEPT.	X YES	NO	N/A
(f) RECORDS MAINTAINED OF MAJOR CONTRIBUTING INDUSTRIES (and their compliance status) USING PUBLICLY OWNED TREATMENT WORKS.	YES	NO	X N/A

SECTION H - PERMIT VERIFICATION

INSPECTION OBSERVATIONS VERIFY THE PERMIT. DETAILS:	X YES	NO	N/A (Further explanation attached **See Notes**)
(a) CORRECT NAME AND MAILING ADDRESS OF PERMITTEE.	X YES	NO	N/A
(b) FACILITY IS AS DESCRIBED IN PERMIT.	X YES	NO	N/A
(c) PRINCIPAL PRODUCT(S) AND PRODUCTION RATES CONFORM WITH THOSE SET FORTH IN PERMIT APPLICATION.	X YES	NO	N/A
(d) TREATMENT PROCESSES ARE AS DESCRIBED IN PERMIT APPLICATION. (**See comments**)	X YES	NO	N/A
(e) NOTIFICATION GIVEN TO EPA/STATE OF NEW, DIFFERENT OR INCREASED DISCHARGES	X YES	NO	N/A
(f) ACCURATE RECORDS OF RAW WATER VOLUME MAINTAINED.	X YES	NO	N/A
(g) NUMBER AND LOCATION OF DISCHARGE POINTS ARE AS DESCRIBED IN PERMIT.	X YES	NO	N/A
(h) CORRECT NAME AND LOCATION OF RECEIVING WATERS.	X YES	NO	N/A
(i) ALL DISCHARGES ARE PERMITTED.	X YES	NO	N/A

Comments:

Only Outfall 002Q discharges to Potomac River. Other outfalls stopped discharging because the facility started treating the residues/sediments in the Residuals Processing Facility.

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SECTION I - OPERATION AND MAINTENANCE

TREATMENT FACILITY PROPERLY OPERATED AND MAINTAINED. ___X__ YES ____ NO ____ N/A (Further explanation attached __**See Notes**)
DETAILS:

(a) STANDBY POWER OR OTHER EQUIVALENT PROVISIONS PROVIDED.	X YES	__ NO	__ N/A
(b) ADEQUATE ALARM SYSTEM FOR POWER OR EQUIPMENT FAILURES AVAILABLE.	X YES	__ NO	__ N/A
(c) REPORTS ON ALTERNATE SOURCE OF POWER SENT TO EPA/STATE AS REQUIRED BY PERMIT.	__ YES	__ NO	X N/A
(d) SLUDGES AND SOLIDS ADEQUATELY DISPOSED. **See Note**	__ YES	X NO	__ N/A
(e) ALL TREATMENT UNITS IN SERVICE. **See Note**	__ YES	X NO	__ N/A
(f) CONSULTING ENGINEER RETAINED OR AVAILABLE FOR CONSULTATION ON OPERATION AND MAINTENANCE PROBLEMS.	X YES	__ NO	__ N/A
(g) QUALIFIED OPERATING STAFF PROVIDED.	X YES	__ NO	__ N/A
(h) ESTABLISHED PROCEDURES AVAILABLE FOR TRAINING NEW OPERATORS.	X YES	__ NO	__ N/A
(i) FILES MAINTAINED ON SPARE PARTS INVENTORY, MAJOR EQUIPMENT SPECIFICATIONS, AND PARTS AND EQUIPMENT SUPPLIERS.	X YES	__ NO	__ N/A
(j) INSTRUCTIONS FILES KEPT FOR OPERATION AND MAINTENANCE OF EACH ITEM OF MAJOR EQUIPMENT.	X YES	__ NO	__ N/A
(k) OPERATION AND MAINTENANCE MANUAL MAINTAINED.	X YES	__ NO	__ N/A
(l) SPCC PLAN AVAILABLE.	X YES	__ NO	__ N/A
(m) REGULATORY AGENCY NOTIFIED OF BY-PASSING. (Dates __11/10/2014__)	X YES	__ NO	__ N/A
(n) ANY BY-PASSING SINCE LAST INSPECTION.	X YES	__ NO	__ N/A
(o) ANY HYDRAULIC AND/OR ORGANIC OVERLOADS EXPERIENCED.	__ YES	__ NO	X N/A

SECTION J - COMPLIANCE SCHEDULES

PERMITTEE IS MEETING COMPLIANCE SCHEDULE. __X__ YES ____ NO ____ N/A (**Further explanation attached**)

CHECK APPROPRIATE PHASE(S):

__ (a) THE PERMITTEE HAS OBTAINED THE NECESSARY APPROVALS FROM THE APPROPRIATE AUTHORITIES TO BEGIN CONSTRUCTION.

__ (b) PROPER ARRANGEMENT HAS BEEN MADE FOR FINANCING (mortgage commitments, grants, etc.).

__ (c) CONTRACTS FOR ENGINEERING SERVICES HAVE BEEN EXECUTED.

__ (d) DESIGN PLANS AND SPECIFICATIONS HAVE BEEN COMPLETED.

__ (e) CONSTRUCTION HAS COMMENCED.

__ (f) CONSTRUCTION AND/OR EQUIPMENT ACQUISITION IS ON SCHEDULE.

X (g) CONSTRUCTION HAS BEEN COMPLETED.

X (h) START-UP HAS COMMENCED.

__ (i) THE PERMITTEE HAS REQUESTED AN EXTENSION OF TIME.

Comments:
1. The solids collection system for the Georgetown Basins is not adequate to handle solids accumulation in the basins. At the time of the inspection one of the two sediment collection barges was deployed, but not observed to be operational. Facility personal stated that to ensure the solids collection system begins functioning properly the design engineers, who initially installed the system have been put back on contract.

SECTION K - SELF-MONITORING PROGRAM

PART 1 - FLOW MEASUREMENT (Further explanation attached _____) PERMITTEE FLOW MEASUREMENT MEETS THE REQUIREMENTS AND INTENT OF THE PERMIT. DETAILS:	_X_ YES __ NO __ N/A
(a) PRIMARY MEASURING DEVICE PROPERLY INSTALLED.	_X_ YES __ NO __ N/A
TYPE OF DEVICE __ WEIR _X_ PARSHALL FLUME ___ MAGMETER ___ VENTURI METER ___ OTHER (Specify:)	
(b) CALIBRATION FREQUENCY ADEQUATE. (Date of last calibration _	___ YES ___ NO _X_ N/A
(c) PRIMARY FLOW MEASURING DEVICE PROPERLY OPERATED AND MAINTAINED.	_X_ YES __ NO __ N/A
(d) SECONDARY INSTRUMENTS (totalizers, recorders, etc.) PROPERLY OPERATED AND MAINTAINED.	__ YES __ NO _X_ N/A
(e) FLOW MEASUREMENT EQUIPMENT ADEQUATE TO HANDLE EXPECTED RANGES OF FLOW RATES.	_X_ YES __ NO __ N/A
PART 2 - SAMPLING (Further explanation attached ____**See Notes**_____) PERMITTEE SAMPLING MEETS THE REQUIREMENTS AND INTENT OF THE PERMIT. DETAILS: **See Notes.**	_X_ YES __ NO __ N/A
(a) LOCATIONS ADEQUATE FOR REPRESENTATIVE SAMPLES.	_X_ YES __ NO __ N/A
(b) PARAMETERS AND SAMPLING FREQUENCY AGREE WITH PERMIT	_X_ YES __ NO __ N/A
(c) PERMITTEE IS USING METHOD OF SAMPLE COLLECTION REQUIRED BY PERMIT. IF NO, _X_ GRAB ___ MANUAL COMPOSITE __ AUTOMATIC COMPOSITE ___ FREQUENCY	_X_ YES __ NO __ N/A
(d) SAMPLE COLLECTION PROCEDURES ARE ADEQUATE.	_X_ YES __ NO __ N/A
(i) SAMPLES REFRIGERATED DURING COMPOSITING	__ YES __ NO _X_ N/A
(ii) PROPER PRESERVATION TECHNIQUES USED	_X_ YES __ NO __ N/A
(iii) FLOW PROPORTIONED SAMPLES OBTAINED WHERE REQUIRED BY PERMIT	__ YES __ NO _X_ N/A
(iv) SAMPLE HOLDING TIMES PRIOR TO ANALYSES IN CONFORMANCE WITH 40 CFR 136.3	_X_ YES __ NO __ N/A
(e) MONITORING AND ANALYSES BEING PERFORMED MORE FREQUENTLY THAN REQUIRED BY PERMIT.	_X_ YES __ NO __ N/A
(f) IF (e) IS YES, RESULTS ARE REPORTED IN PERMITTEE'S SELF-MONITORING REPORT. (see notes)	_X_ YES __ NO __ N/A
PART 3 - LABORATORY (Further explanation attached _**See Notes**_____) PERMITTEE LABORATORY PROCEDURES MEET THE REQUIREMENTS AND INTENT OF THE PERMIT. DETAILS:	_X_ YES __ NO __ N/A
(a) EPA APPROVED ANALYTICAL TESTING PROCEDURES USED. (40 CFR 136.3)	_X_ YES __ NO __ N/A
(b) IF ALTERNATE ANALYTICAL PROCEDURES ARE USED, PROPER APPROVAL HAS BEEN OBTAINED.	__ YES __ NO _X_ N/A
(c) PARAMETERS OTHER THAN THOSE REQUIRED BY THE PERMIT ARE ANALYZED.	__ YES _X_ NO __ N/A
(d) SATISFACTORY CALIBRATION AND MAINTENANCE OF INSTRUMENTS AND EQUIPMENT.	_X_ YES __ NO __ N/A
(e) QUALITY CONTROL PROCEDURES USED. (**Lab participates in DMR – QA Studies**)	_X_ YES __ NO __ N/A
(f) DUPLICATE SAMPLES ARE ANALYZED ___5 % OF TIME.	_X_ YES __ NO __ N/A
(g) SPIKED SAMPLES ARE USED _____10 % OF TIME.	_X_ YES __ NO __ N/A
(h) COMMERCIAL LABORATORY USED.	__ YES _X_ NO __ N/A
(i) COMMERCIAL LABORATORY STATE CERTIFIED.	__ YES __ NO _X_ N/A
LAB NAME _____ LAB ADDRESS _____	

Comments:
(1) Due to the continuous discharge of Outfall 002Q, the outfall is sampled monthly, instead of quarterly. (2) Perchlorate is sampled and analyzed on a weekly basis in addition to monthly analysis of all analytes. Only monthly data is reported.
(4) The lab participates in the U.S. EPA DMR-QA Studies.

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SECTION L - EFFLUENT/RECEIVING WATER OBSERVATIONS (Further explanation attached _____)

OUTFALL NO.	OIL SHEEN	GREASE	TURBIDITY	VISIBLE FOAM	VISIBLE FLOAT SOLIDS	COLOR	OTHER
Outfall 003	No Discharge						
Outfall 004	No Discharge						

(Sections M and N: Complete as appropriate for sampling inspections)

SECTION M - SAMPLING INSPECTION PROCEDURES AND OBSERVATIONS (Further explanation attached **No samples were taken during the inspection**)

__ GRAB SAMPLES OBTAINED

__ COMPOSITE OBTAINED

__ FLOW PROPORTIONED SAMPLE

__ AUTOMATIC SAMPLER USED

__ SAMPLE SPLIT WITH PERMITTEE

__ CHAIN OF CUSTODY EMPLOYED

__ SAMPLE OBTAINED FROM FACILITY=S SAMPLING DEVICE

COMPOSITING FREQUENCY _____ PRESERVATION _____

SAMPLE REFRIGERATED DURING COMPOSITING: __ YES __ NO

SAMPLE REPRESENTATIVE OF VOLUME AND NATURE OF DISCHARGE

SECTION N - ANALYTICAL RESULTS (Attach report if necessary) **N/A**

Water/NPDES Compliance Inspection Report

NPDES Permit No. DC0000019
Department of the Army, Baltimore District, Corps of Engineers, Washington Aqueduct Division Washington, DC.

Inspectors: David Pilat, Environmental Protection Specialist, District Department of the Environment

Isaac Kelley, Environmental Protection Specialist, District Department of the Environment

Inspection Date: May 13, 2015

1. Introduction

On May 13, 2015, District Department of the Environment (DDOE) Water Quality Division inspectors David Pilat and Isaac Kelley, conducted a National Pollutant Discharge Elimination System (NPDES) Compliance Inspection at the Washington Aqueduct Station/facility in Washington, D.C, which is managed by the United States Army Corps of Engineers, Baltimore District. The inspectors reviewed records, interviewed personnel, conducted an inspection tour of the facility, and completed an EPA Form 3560-3 Water Compliance Inspection Report. The primary facility representatives were John Peterson, Superintendent; and Mel Tesema, Chief of Plant Operations. The purpose of the inspection was to determine the accuracy and reliability of the facility's self-monitoring and reporting program as stipulated in the NPDES Permit Number DC0000019.

Due to the eliminatio n of most of the discharges from the facility, which will be discussed in detail in the body of the report, the focus of the 2015 inspection was on activities associated with monitoring the remaining discharge out of Outfall 002Q and actions taken since th e EPA approved 2014 bypass to prevent future bypasses from occurring.

The weather at the time of inspection was partly cloudy with a temperature of about 65ºF.

2. Facility Description and Background

The Washington Aqueduct water treatment facility produces drinking water for approximately one million people living, working, or visiting the District of Columbia, Arlington County, and the City of Falls Church in Virginia (**Figure 1**). The facility is a Federally-owned water treatment agency and produces an average of 180 million gallons of water per day (MGD) from its two treatment plants (Dalecarlia and McMillan) located in the District of Columbia. The facility draws all its raw water from the Potomac River at two locations : Great Falls Dam and Little Fa lls Dam in Maryland. At the Great Falls Dam intake point, raw water flows under gravity to the Forebay Reservoir. At Little Falls Dam intake point, there are six pumps with a capacity of 525 MGD that pump raw water to the Dalecarlia Reservoir. The Little Falls Dam intake point is used only when needed.

3. Operation and Maintenance

(a) Water Treatment Plant Process

Under normal operating conditions, r aw water is diverted from the Potomac River at (i) Great Falls Dam intake point, located in Great Falls , Maryland and flows under gravity to the Forebay Reservoir through two 100-MGD capacity conduits and then pumped into the Dalecarlia Reservoir. During low flow or flooding conditions in the Potomac River , raw water is pumped from the Little Falls Dam to the Dalecarlia Reservoir. At both Dalecarlia and McMillan treatment plants, raw water is subjected to a full conventional water treatment process (shown in **Figure 2)** to remove suspended solids, sediments, bacteria, and microorganisms to produce drinking water.

(i) **Screening:** Raw water is passed through a series of screens designed to remove or filter debris such as twigs, leaves, and other large particles at the Great Falls Dam intake, the Little Falls Dam intake, and at the Dalecarlia Reservoir prior to pre-sedimentation and other treatment process es within the plant.

(ii) **Pre-sedimentation**: This involves settlement of sand and silt to the bottom as raw water moves slowly through the Forebay and Dalecarlia Reservoir. Settled sand and silt are removed by dredging the reservoirs periodically.

(iii) **Coagulation**: This involves adding alum (aluminum sulfate) and polymer coagulants to raw water as it flows to sedimentation basins. In solution, alum releases positively charged ions (cations) , which cause the negatively charged particles suspended in the water to lump together into denser "particles' which are then able to settle out.

(iv) **Flocculation:** Is the gentle stirring of water to distribute the coagulant. This causes the particles to combine and grow large and heavy enough to settle. This process takes approximately 25 minutes.

(v) **Sedimentation**: The quiescent flow conditions in the sedimentation basins cause the flocculated particles to settle to the bottom more efficiently. The facility representative stated that after about four hours, approximately 85 percent of the suspended material settles.

(vi) **Filtration**: Supernatant in the sedimentation basins decants into gravity filter media units consisting of layers of granular anthracite coal, sand, and gravel . Filtered water passes through to a collection system underneath.

(vi) **Disinfection**: Chlorine in the form of sodium hypochlorite is added with precision equipment to kill pathogens (bacteria, virus, etc.) . Following the addition of sodium h ypochlorite, ammonia is then added. The chlorine and ammonia combine to form chloramine compounds , which are more stable than chlorine and can be maintained throughout the distribution process . The concentration of chloramines in the water is closely mon itored from the time it is added at the treatment plant to points near the furthest reaches of the distribution systems. Fluoride, in the form of hydrofluorosilicic acid, is added to help reduce tooth decay.

Calcium hydroxide (lime) is also added to reduce corrosion in the pipes and other equipment in the distribution systems. Adding small amounts of lime introduces a slight alkalinity and thus a chemical balance, which helps prevent corrosion in the water distribution system. Lime addition also reduces the leaching of substances from plumbing. Powdered activated carbon is occasionally used for taste and odor control. All the chemicals used at the facility (e.g., sodium hypochlorite and caustic soda) are stored at the site in well protected buildings in containers with secondary containments. After the water has gone through the entire treatment process, it is referred to as finished or potable water.

The inspectors conducted a visual evaluation of the Dalecarlia Treatment Plant to assess compliance with the NPDES permit. When facility treatment plants are operating as designed finished water is no longer discharged to the Potomac. Due to the lack of discharge inspectors only briefly reviewed the plants water treatment process. Facility representatives stated that there had not been any significant process or plant operations that have changed since the 2013 inspection.

(b) Treatment Plants

(i) McMillan Water Treatment Plant

McMillan Water Treatment Plant has a total capacity of 120 MGD. Raw water from Dalecarlia Reservoir is pumped to the three Georgetown Reservoir sedimentation basins via the Georgetown Conduit. Carbon, fluoride, aluminum sulfate, and pre-chlorine are added in the Georgetown Conduit. According to the facility representatives, the residence time in the Georgetown sedimentation basins is between 1.25 and 3 days. From the Georgetown sedimentation basins, raw water is pumped to the McMillan Reservoir through the McMillan Raw Water Pump Station. Sodium hypochlorite and filter aid polymers are added upstream of the twelve McMillan rapid sand filters. The resulting filter backwash is returned to McMillan Reservoir. Sodium hypochlorite, lime, and sulfur dioxide are added to the filtered water prior to storage in the clear water basins.

(ii) Dalecarlia Water Treatment Plant

Dalecarlia Water Treatment Plant (**Photo 1**) has a total treatment capacity of 240 MGD, but has only been producing 120 MGD. Raw water is pumped from Dalecarlia Reservoir through four flow measuring hydraulic flumes, and then onto the Dalecarlia sedimentation basins. Carbon, pre-chlorine, sodium permanganate, aluminum sulfate, and polymer are added upstream at different stages of the sedimentation process. According to the facility representative, the four sedimentation basins have a hydraulic retention time of 4 to 5 hours. Sedimentation is followed by the addition of filter-aid polymer and sodium hypochlorite prior to rapid sand filtration. There are a total of 48 rapid sand filters. Filters are periodically backwashed and the backwash water is returned to the Forebay Reservoir, and then onto Dalecarlia Reservoir. Ultimately fluoride, post hypochlorite, and lime are added prior to storage in the clear water basins.

(c) Sludge Handling and Disposal

During historic operation, sedimentation basin cleaning events at Georgetown Basins #1 and #2 were accomplished by discharging all water, sediments, and sludge to outfalls 003 and 004 at the Potomac River. Typically, each basin is drained over a period of approximately 36-hours. Once the liquids and flocculated sediments have drained from the basins the facility uses front-end loaders and fire hoses to remove sediments from the basin floors and walls. The sediment from the basin floor and walls is

directed to each basins respective discharge point and flushed to outfalls 003 and 004. This practice resulted in Aqueduct exceeding DC0000019 permit limitations for total suspended solids, copper, and aluminum. To solve the problem, the Aqueduct entered into a Federal Facility Compliance Agreement (FFCA) to construct a residues processing facility (RPF). The RFP was completed and became operational in January of 2012.

The RPF collects and treats (through a combination of solids concentration and drying processes) all sediments/residues from the sedimentation basins, reservoir dredging, and filter backwash. The facility representative stated that the sediment treatment process involves scrapping the sediments from the bottom of sedimentation tanks, or dredging from the reservoirs, followed by pumping them into the Thickener Influent Splitter Chamber (TISC) (also known as influent residuals blending tank (**Figure 3)**. At this point, the percent solid is less than 0.5%; the contents of the blending TISC are transferring into four Gr avity Thickeners (GTs) where the p ercentage solid is increased . The residuals from the GTs are subsequently pumped to centrifuges where all remaining water is removed and the dried sediment (cake) is dropped into storage silos and the spent water that was removed returned to the splitter box . After drying, the residuals (cake) are sent to storage bins - ready to be weighed and trucked offsite. The treated residual is about 25 percent solids and is currently being trucked to a landfill for disposal. The Aqueduct pays contractors to transport and dispose of the residuals.

The facility representatives indicated that under normal operation the Aqueduct does not need to drain the water when cleaning the sedimentation basins . The sediment in the basins is c ontinually removed and sent to the RFP . The Dalecarlia Plant sediment tanks are equipped with scrapers (**Photo 2 and Photo 3)** that remove accumulated sediments. The Georgetown Basins are serviced by barges equipped with suction a rms that remove accumulated sediment **(Photo 4 and Photo 5)** . The entire process is centrally managed via the SCADA system located in the RPF control room.

Sediment accumulation in the Georgetown Basins has been a recurring problem and has resulted in discharges of sediments in 2012 and 2014. When the RFP facility became operational the FFCA prohibited any further discharge of residual solids from outfalls 003 and 004; however, because of several unanticipated technical difficulties the Washington Aqueduct requested several extension s which allowed the continued cleaning and discharge from the outfalls. Even after the completion of the sediment removal systems several engineering issues were encountered and necessitated the need for complete drainage of the basins for cleaning in 2012 and 2014. The initial sediment removal system operated at the Georgetown basin consisted of a barge that moves across the basin removing sediments via a suction arm intended to ride along the bottom of the basin. Facility representatives stated that a combination of factors have caused the sediment removal system to be ineffective . The suction arm of the barge does not reach the surface of the basins and the contours of the basin floor do not allow for a fixed length suction arm to be installed . Addition ally, a catastrophic failure of the guidance system now requires a complete redesign of the control system using GPS technology. Other technologies have also been explored, but these "off the shelf" systems have either failed or were not designed for this intended use and proved ineffective. Currently, the facility acknowledges there is a lack of a clear solution to address the deficiencies in the sediment removal systems and sediment accumulation will continue to be an issue until a solution is found.

Facility representatives stated that the RPF is currently operating between 30 – 40% of design capacity and that conveyance of solids to the facility and lack of storage capacity of dewatered solids prior to removal by truck (sediment can only be trucked out of the facility during early morning hours) are limiting factors that are contributing to excess sedimentation in the Georgetown Basin's.

During the inspection, one of the sediment tanks at the Dalecarlia plant (Georgetown Basin #1) was out of service for maintenance and repair **(Photo 6)**. Facility representatives stated that the sediment removal barge for Georgetown Basin #2 has been in service for the previous four weeks; inspectors noted that the barge in basin #2 was not in operation during the inspection.

4. Permit Verification

Discharges from the water treatment facility are regulated by NPDES Permit No. DC0000019 (Permit). The Permit was issued to Washington Aqueduct on November 20, 2008, and authorizes the discharge of wastewater and sediments through six NPDES outfalls. The active outfalls (002 Q, 003A, and 004 A) discharge to the Potomac River when the sedimentation basins are being cleaned. The facility's former cleaning process involved opening the basin drain valves, allowing the water column to drain and then flushing the sediment with finished source water. Chlorinated wash water was subsequently dechlorinated with sodium bisulfate prior to discharge. A final step included flushing the discharge pipe for two hours with raw water. The facility representatives indicated that the draining, washing, and flushing process used to take about 6 to 8 hours.

The last basin cleaning and discharge using the process described above occurred between December 2014 and February 2015. During the previous CEI on July 31, 2013, facility representatives indicated that because the RPF had begun operation, no discharge from the basins would be required. Discharge from basin leakage and groundwater seepage from under the Dalecarlia sedimentation tanks through Outfall 002Q is the only current regular discharge (**Photo 7**).

5. Compliance Schedule

Residuals Processing Facility (RPF)

The Aqueduct entered into FFCA with USEPA Region III. The FFCA was put into place to ensure that the Aqueduct takes any and all necessary steps within its power to achieve compliance with the numeric discharge limitations (especially for suspended solids and metals) as set forth in the NPDES permit. To meet the requirements of the FFCA and comply with the NPDES permit limitations the facility constructed an RPF (**Figure 3**). As previously stated, the RFP was completed and put into service in January 2012. The plant is operational and operating within capacity, but the sediment removal and conveyance system is not operating as intended and permit compliance has not been achieved.

6. Self-Monitoring Program

The facility is conducting its self monitoring program in accordance with Permit Part II, Section C.3, which requires that monitoring be conducted consistent with procedures approved under 40 CFR 136.

Raw and processed waters are monitored at different stages of the treatment process. Samples are collected **(Photo 8)**, stored **(Photo 9)**, and processed according to the permit requirements.

(a) Flow Measurement

Currently, the facilit y does not measure the effluent it discharges as indicated in the permit. Instead, discharges are estimated from the basin capacities and the amount of water used during the cleaning process. The facility representatives stated that since the facility st arted treating residuals/sediments, they do not measure discharge flow because they do not discharge.

(b) Sampling

The facility representatives indicated that the sampling locations are adequate and representative of the type of the discharge. Currently , only one outfall (Outfall 002Q) is discharging and being sampled. The facility representatives indicated that Outfall 002Q discharges into the Potomac River through the Outfall 002 channel. According to the plant representative, Outfall 002Q is the onl y outfall to be monitored. Sampling at Outfall 002Q is being performed monthly (with weekly internal analysis of perchlorate) instead of quarterly as indicated in the permit.

(c) Laboratory

The facility's in -house laboratory is used to monitor effluen t samples for all permit parameters according to the schedules set forth in NPDES Permit DC0000019. The laboratory equipment, calibration records, bench/log books, and lab reports appeared to be complete and in order. Chemicals and buffer solutions used in the lab were up to date (**Photos 10**).

The lab employs comprehensive quality control procedures including two source calibrations ; a seven point calibration is conducted using a standard from a distributer and the n the calibration is verified with a standard from a second source. Continuing calibration verification is conducted after every 10 th sample run. Matrix Spike (5%) / Matrix Spike Duplicates (10%) (MS/MSD), blank and field blanks samples are analyzed on a regular basis **(Photo 11)**.

Since the 20 12 inspection , the laboratory has updated their Gas Chromatograph and Mass Spectrometer GC/MS (Varian 450 -GC / 240 MS) **(Photo 12)** and Ion Chromatograph (Thermo Scientific iCAP-Q ICP-MS) **(Photo 13)** instruments and uses EnviroPro 6.2 to generate lab reports and quality control data. The lab was audited by EPA in November 2014 and also participates in the EPA DMR-QA Studies.

7. Effluent/Receiving Waters and Outfalls

(a) Outfall 002

Outfall 002 discharges to the Potomac River when cleaning the four Dalecarli a sedimentation basins. There was no discharge at the time of inspection. The facility representative stated that the last cleaning and discharge from the sedimentation basins occurred in J anuary 2012. Since the completion of the RPF, there has never been any discharge through Outfall 002.

(b) Outfall 002Q

Outfall 002Q discharges seepage from the Dalecarlia sedimentation basins and discharge from a spring located beneath the sedimentation basin s. NPDES Permit Number DC0000019 identifies this discharge as the "Other Dalecarlia Discharge" , which continuously discharges. The facility representatives indicated that Outfall 002Q discharges into the Potomac River through the Outfall 002 channel.

(c) Outfalls 003A and 004A

Both Outfalls 003A and 004A discharge effluent and solids from the Georgetown sedimentation basins to the Potomac River. When Sedimentation Basin No. 1 is being cleaned, it discharges through Outfall 004A. When Sedimentation Basin No. 2 is being cleaned, it discharges to both Outfalls 003A and 004A. Due to the approved 2014 bypass these outfalls were inspected during this inspection. During the inspection, inspectors observed sediment accumulations associated with the 2014 bypass within the outfall channels leading to the Potomac River.

(d) Outfall 006

Outfall 006 discharges treated water blow-off from City Tunnel to Rock Creek. The outfall has not discharged for more than six years. The outfall was not inspected during this inspection.

(e) Outfall 007

Outfall 007 discharges treate d water blow-off from the Georgetown Conduit to the Potomac River. The outfall has not discharged for more than six years and was not inspected during this inspection.

8. Records and Reports

(a) Discharge Monitoring Reports

Discharge Monitoring Reports (DMRs) and laboratory reports for the period of June 201 3 to April 2015 were reviewed as a component of this inspection. The review included a comparison of reported monitoring results versus requirements and limitations contained in the permit and a che ck of raw data from laboratory reports and what was reported on the DMR's.

The facility stopped discharging to the Potomac River through their outfalls, with the exception of Outfall 002Q , when it started ope rating the RPF in January 2012 . As previously stated, during the monitoring period an approved bypass was granted and the facility discharged from o utfall 003A in December 2014 and from outfall 004A in December 2014, January 2105, and February 2015.

The Aqueduct's DMRs indicate exceedences of DC0000019 permit limits for Total Suspended Solids (TSS) and total metals (Fe, Cu, and Al) at Outfalls 003A in December and Outfall 004A in December and February. No other exceedences were reported for the reviewed monitoring period and there were no results rep orted for the January discharge from Outfall 004. The failure to collect and analyze samples for the January bypass from outfall 004A is a violation of their NPDES permit. Additionally,

the bypass, though approved, from outfall 003A and 004A from sedimen t basins No. 1 and 2 during December 2014, and January and February 2015 are violations of NPDES permit No. DC0000019.

(b) Best Management Plan

The facility uses large quantities of different chemicals to treat the water. Such chemicals include lime, me thanol, ferric, ferrous, polymer, caustic soda, sodium hypochlorite, and bisulfate. The inspectors observed the chemicals properly stored inside buildings in primary storage containers with secondary containment to prevent spills and release . One of the storage buildings is the sodium hypochlorite building.

Part II, Section E of the NPDES permit (Best Management Practices) requires the permittee to have a Best Management Practices (BMP) plan. In addition to the BMP plan, the Aqueduct has a Spill Prevention, Control and Countermeasure Plan (SPCC). The SPCC Plan addresses: (a) procedures the facility implements to prevent oil spills; (b) control measures installed to prevent oil from entering navigable waters (i.e. secondary containment); (c) countermeasur es to contain, clean up and mitigate the effects of oil spills. The inspectors reviewed both the BMP and SPCC plans as part of this inspection. The most recent plans were dated October 2010. The plans contain the requirements and BMPs as specified in the permit and were found to be satisfactory.

9. Inspection Findings

As previously stated, d ue to the reduced number of dis charges from the facility the 2015 CEI inspection concentrate d on monitoring associated (laboratory procedures) with the current disc harge out of Outfall 002Q and improvements made since the 2014 bypass to prevent future occurrences. The following is a summary of the inspection findings:

- The Aqueduct's in-house lab is maintained at a high level. Sample collection, processing , and quality control procedures are well established and the analytical and general laboratory equipment is up to date and well maintained. The interviewed staff was knowledgeable about all aspects of the lab and quickly provided all requested information and documentation.
- The laboratory participates in EPA DMR -QA study, has a current Laboratory Safe Drinking Water Act Certificate, and participates in regular third party proficiency testing (ERA).
- The 2014 bypass discharges exceeded effluent limits for TSS, Total Cop per, Total Iron and Total Aluminum.
    - Bypass discharges occurred out of Outfall 003A during December 2014.
    - Bypass discharges occurred out of Outfall 004A during December 2014, January 2015 and February 2015.
    - The TSS result reported on the December 2014 DMR was 8,100 mg/l for both Outfalls 003A and 004A. The results of TSS monitoring conducted by the Aqueduct during the discharge, report concentrations ranging between 17,917 mg/l and 66,500 mg/l. TSS discharge monitoring samples were collected from several ar eas along the discharge flow path ranging from the manhole just downstream of the basin to the point where the outfall discharges to the river.
    - The discharge that occurred out of Outfall 004 A on January 13th and 14th 2015 was not reported on the faciliti es DMR's. Observations by DDOE inspectors on January 13th

and 14th confirmed the discharge occurred and a sample collected by DDOE on January 14th along with visual evidence indicates that the discharge exceeded effluent limits for TSS. The result of the TSS samples collected by DDOE personnel was 25,279 mg/l.

- Sediment accumulation from the discharges in December 2014 and January and February 2015 are still present in the 003A and 004A discharge channels that lead to the Potomac River. The sediment deposits are light brown on the surface where oxidation has occurred, dark grey to black just below the surface and made up of very fine grains; these physical characteristics are indicative of the sediments within the Georgetown Sedimentation Basins and are consistent with the observed discharge **(Photo 14)**.
- The deficiencies with the sediment removal in the Georgetown Basins have not been resolved and sediment has begun accumulating in Georgetown Sedimentation Basin #2 **(Photo 15)**.
- A clear plan to prevent future bypasses could not be provided; however, senior facility representatives stated that only under the circumstances of a "catastrophic failure" would a discharge from the Georgetown Sedimentation Basin occur. Other methods of sediment removal would be utilized and a discharge would only be considered as a last option. Currently, the engineering firm that designed and installed the sediment removal barges have been placed on contract and are currently troubleshooting the system.

Water/NPDES Compliance Inspection Report

NPDES No. DC0000019

Department of the Army, Baltimore District, Corps of Engineers
Washington Aqueduct Water Treatment Plant
Washington, DC.

Inspectors: David Pilat, DDOE
Isaac Kelley, DDOE

Inspection Date: May 13, 2015

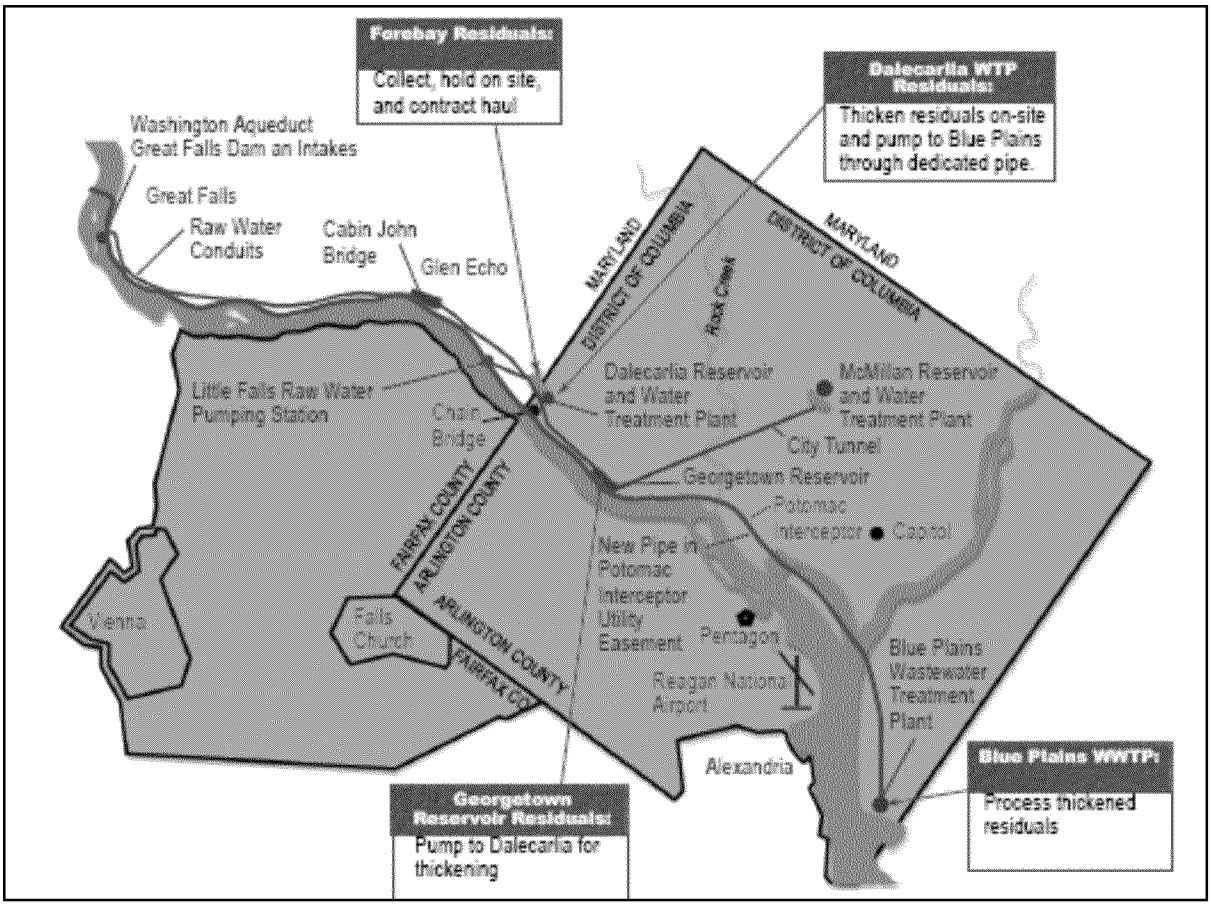

Figure 1: An overview of the service area of the Washington Aqueduct Facility.

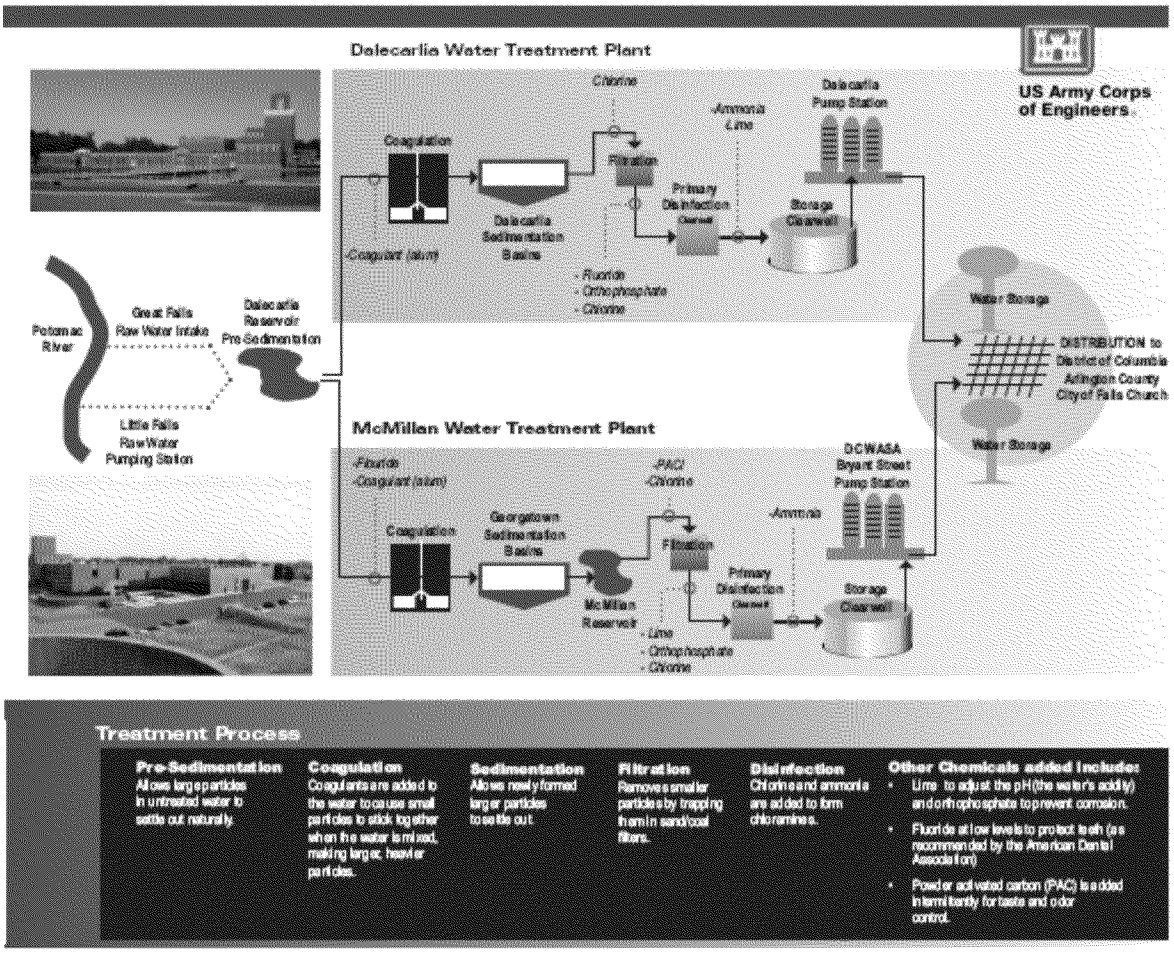

Figure 2: Washington Aqueduct water treatment process.

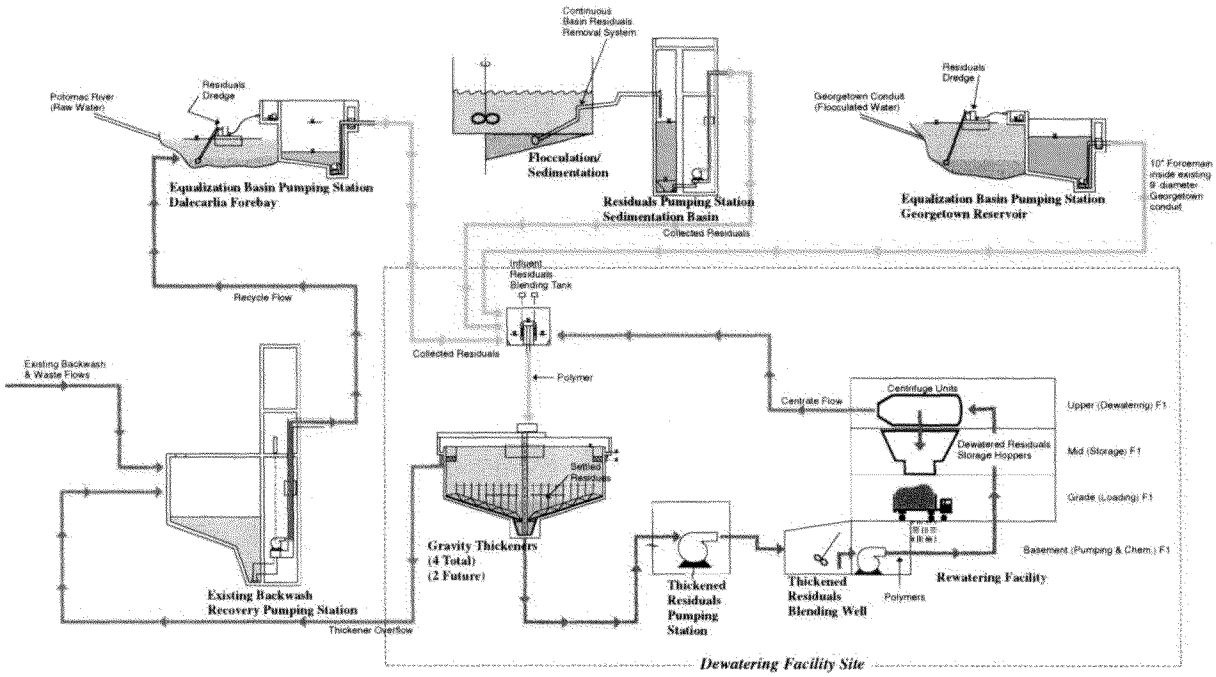

Figure 3: Washington Aqueduct residual management/treatment system.

Photo 1: Dalecarlia Water Treatment Plan.

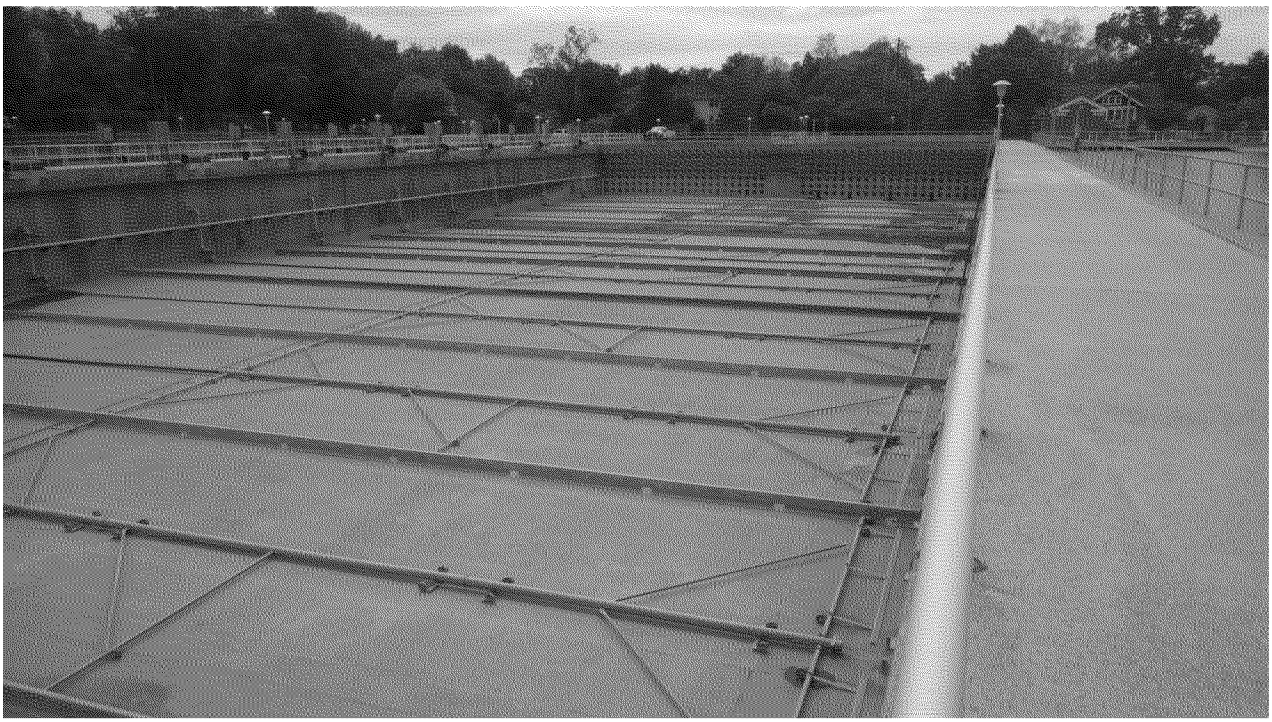

Photo 2: Sediment scrappers in Delcarlia sedimentation tank that is out of service for repair.

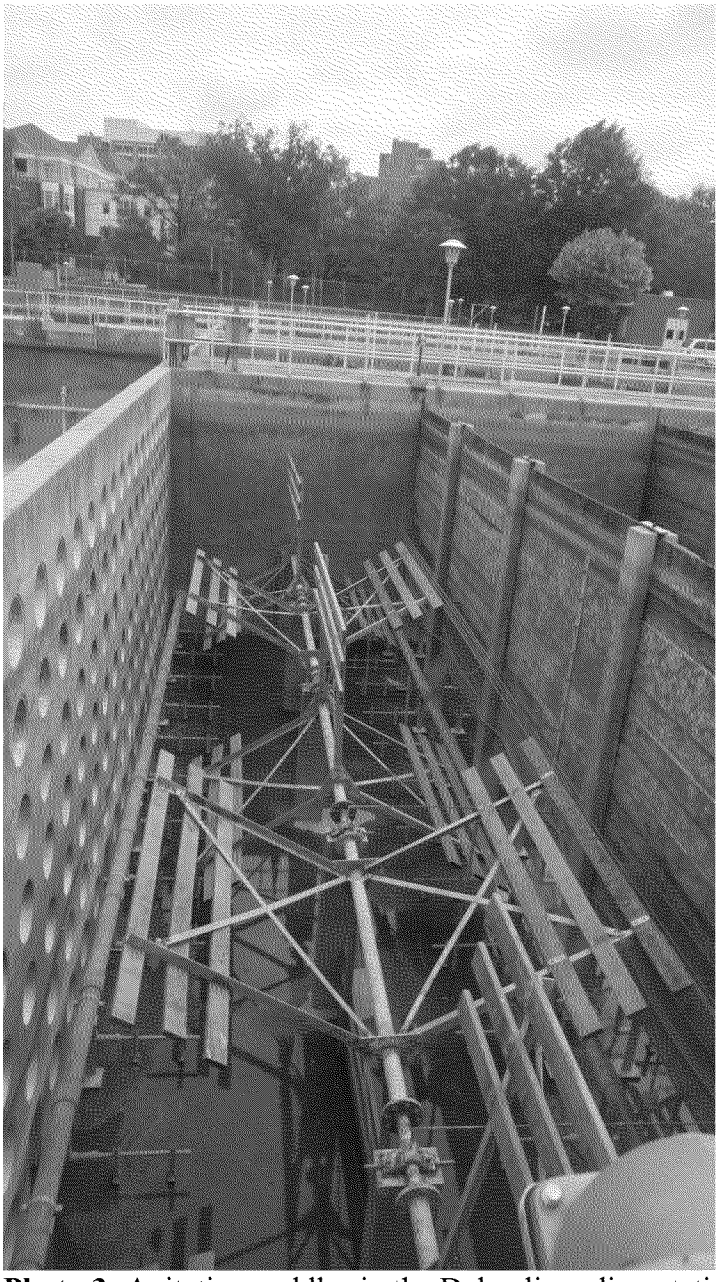

Photo 3: Agitation paddles in the Delcarlia sedimentation tanks used to re-suspend sediments so they can be pumped to the residual processing facility.

Photo 4: Sediment removal barge at the Georgetown Reservoir basin #2. The barge was not active at the time of the inspection.

Photo 5: Sediment removal barge for basin #1. Sediment basin #1 was drained and being repaired at the time of the inspection.

Photo 6: Georgetown Sedimentation Basin #1 is out of service for repair.

Photo 7: Outfall 002Q access point.

Photo 8: Sampling technician preparing field blanks and the cooler use for preservation during sample transportation.

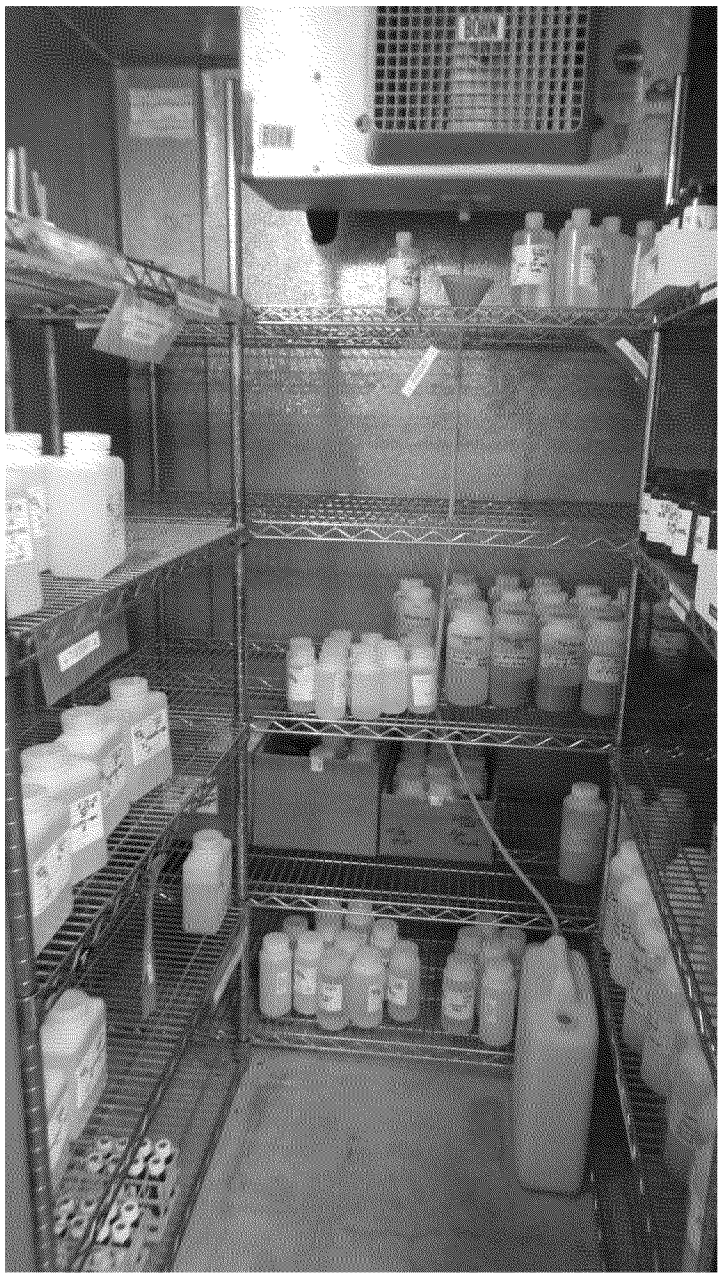

Photo 9: Sample storage cooler where samples are kept prior to processing.

Photo 10: All calibration buffers observed were within their expiration date.

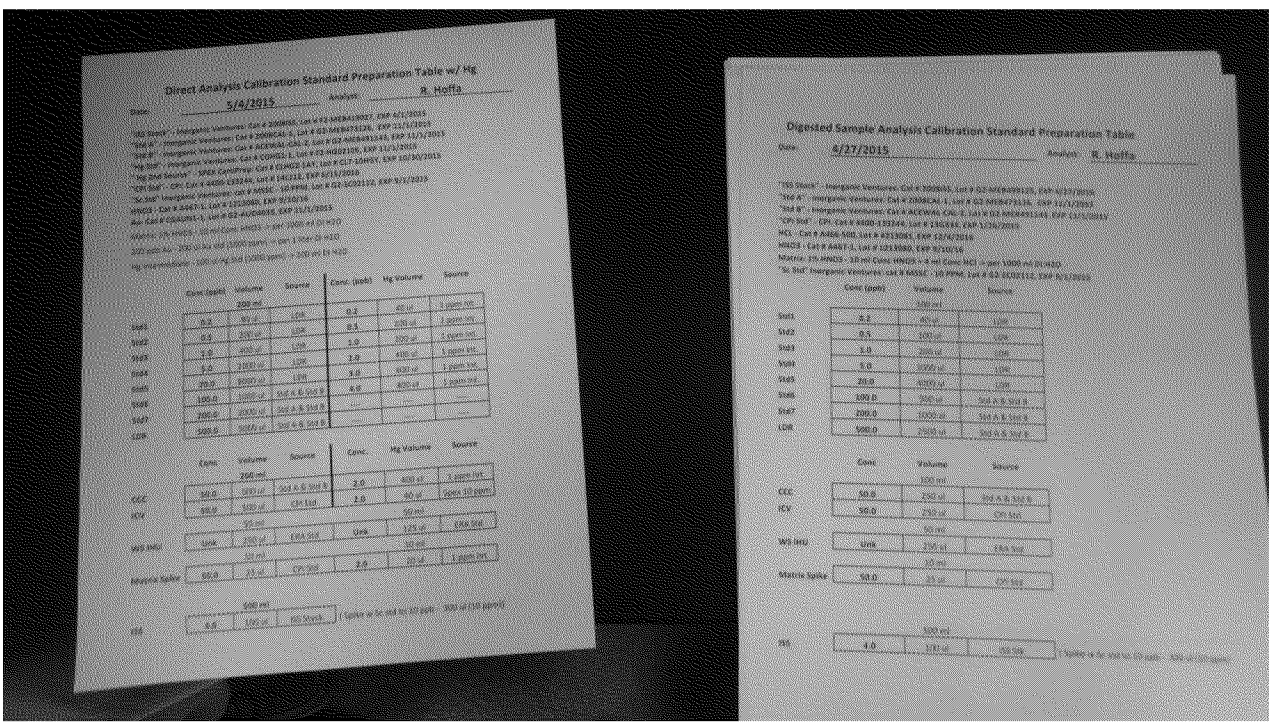

Photo 11: Laboratory calibration sheets.

Photo 12: Gas Chorography and Mass Spectrometer GC/MS (Varian 450-GC / 240 MS.)

Photo 13: Ion Chromatograph (Thermo Scientific iCAP-Q ICP-MS)

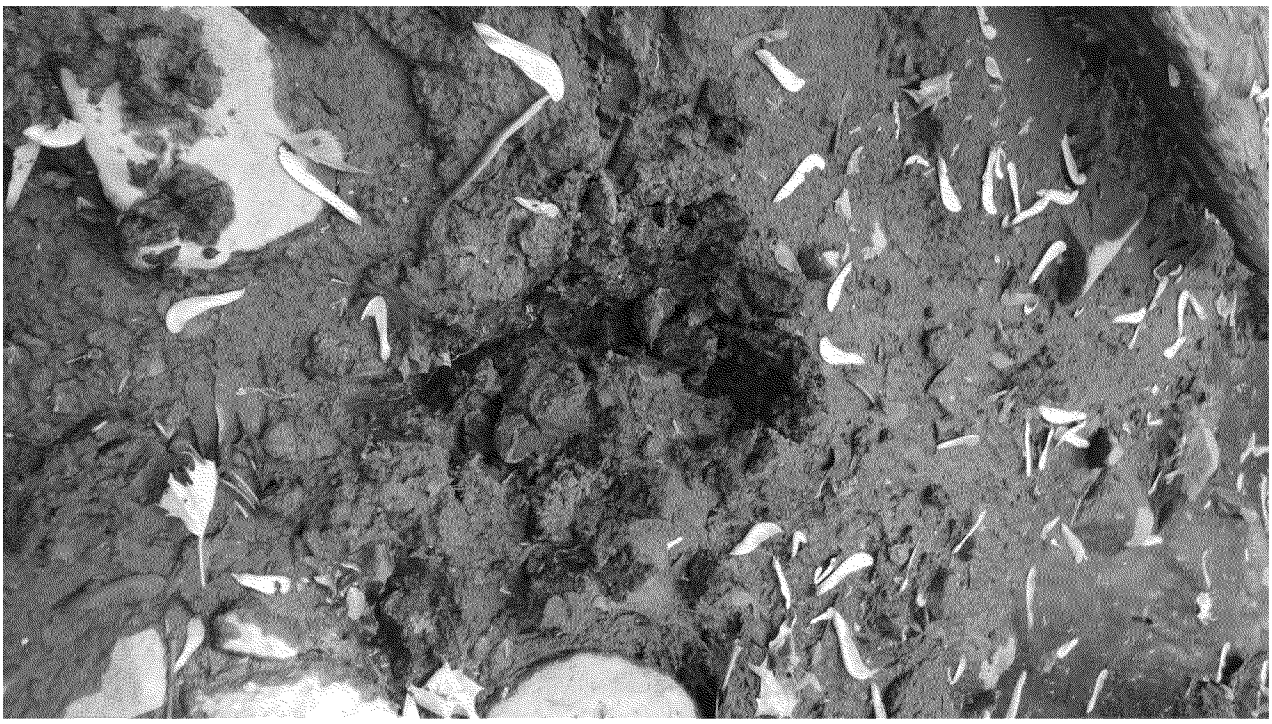

Photo 14: Sediments accumulated in Outfall 004A channel that leads to the Potomac River. The sediment has the same physical appearance as sludge that was discharged during the 2014 bypass.

Photo 15: Six months after the 2014 bypass and basin cleaning sediments have begun to accumulate on the floor of Georgetown Sedimentation Basin #2.