Work Instruction (WI)

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COMPLIANCE IS MANDATORY

Responsible Office: 250 / Medical and Environmental Management Division

Title: WSSC Sampling and Analysis Plan

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PREFACE

P.1 PURPOSE

This sampling plan sets forth guidelines and procedures for sanitary sewer effluent sampling to ensure compliance with the NASA Goddard Space Flight Center's (GSFC) Washington Suburban Sanitary Commission (WSSC) Discharge Authorization Permit (DAP) No. 00449. GSFC, under the premise of this permit, is classified as both an "Industrial User" (IU) and a "Categorical Industrial User." The permit requires that effluent sampling is completed quarterly under a self-monitoring program at two separate industrial waste monitoring points (IWMPs); identified for GSFC as Monitoring Point FAC and Monitoring Point 001.

Monitoring Point FAC is established as the manhole labeled "WSSC IWMP," located on the east side of the guardhouse at GSFC's main gate. Monitoring Point FAC is authorized to discharge pretreated wastewater, laboratory wastewater, and sanitary wastewater to the WSSC sewer system.

Monitoring Point 001 is established as the red spigot, labeled "WSSC IWMP," on the effluent pipe of the pH neutralization system located in the pretreatment room of the building 5 electroplating facility. Monitoring Point 001 captures GSFC's electroplating facility pretreated wastewater, classified as a categorical waste stream subject to 40 CFR Part 433.

P.2 APPLICABILITY

a. This instruction applies to Code 250 civil servants and their authorized contractors at Greenbelt only.
b. In this directive, all document citations are assumed to be the latest version unless otherwise noted.
c. In this document, all mandatory actions (i.e., requirements) are denoted by statements containing the term "shall." The terms "may" or "can" denote discretionary privilege or permission; "should" denotes a good practice and is recommended but not required; "will" denotes expected outcome; and "are/is" denotes descriptive material.

P.3 APPLICABLE DOCUMENTS AND FORMS

a. WSSC Discharge Authorization Permit No. 00449.
b. 2018 WSSC Plumbing & Fuel Gas Code.
c. 29 Code of Federal Regulations (CFR) 1910.146, Permit-Required Confined Spaces, Appendix E, Sewer System Entry.
d. 40 CFR 136, Guidelines Establishing Test Procedures for the Analysis of Pollutants.
e. 40 CFR 433.11, Metal Finishing Point Source Category, Specialized Definitions.

P.4 CANCELLATION

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P.5 TOOLS, EQUIPMENT, AND MATERIALS

Field tools, equipment, and materials for self-monitoring at Monitoring Point FAC include:

- Sigma 900 Max Refrigerated Sampler;
- Sampler tubing with strainer attached;
- High density polyethylene composite bottle (10–20 L: 10 liters is the largest bottle that can be used with the distributer arm);
- pH probe with preamp interface;
- Submersible flow meter fixed to metal channel band attachment;
- pH 7.0 and 10.0 buffers, and deionized water (DI) spray/wash bottle;
- 27A Key;
- Disposable hand warmers (to warm hands and pH buffers during cold weather);
- Sodium chloride solution for pH probe storage (i.e., contact lens solution);
- Computer with Insight software installed and necessary cables;
- Graduated jar or cylinder for sample volume calibration;
- Chain of Custody (COC) form;
- Labels for sample containers;
- Sample containers (refer to Appendix F for complete list of required containers);
- Two plastic funnels for pouring composite samples;
- Bactericide to wash hands;
- Manhole safety gate and/or manhole crossbar (as necessary to meet safety standards);
- Pole or rebar used to secure flow meter into channel;
- Logbook;
- Indelible ink pens;
- Trash bag(s);
- Paper towels;
- Cooler to ship samples to lab;
- Ice for cooler;
- Protective gloves and eyewear;
- Tyvek protective suits (if desired); and
- Notebook or laptop personal computer (PC), government issued.

Field tools, equipment, and materials for self-monitoring at Monitoring Point 001 include:

- One composite bottle (10–20 L);
- Glass container for temperature stabilization;
- Hanna HI 98183 or HI 98191 pH/ORP meter;

- pH 7.0 and 10.0 buffers, and DI spray/wash bottle;
- Disposable hand warmers (to warm hands and pH buffers during cold weather);
- COC form;
- Checklist form;
- Labels for sample containers;
- Sample containers (refer to Appendix F for complete list of required containers);
- Bactericide to wash hands;
- Logbook;
- Indelible ink pens;
- Paper towels;
- Cooler to ship samples to lab;
- Ice for cooler;
- Protective gloves and eyewear; and
- Time keeping device (cell phone, stop watch, timer, etc.).

P.6 SAFETY PRECAUTIONS AND WARNINGS

The WSSC manhole designated as the IWMP for Monitoring Point FAC is a confined space and is regulated by the Occupational Safety and Health Administration (OSHA) in 29 CFR 1910.146, Permit-Required Confined Spaces, Appendix E, Sewer System Entry.

ENTRY INTO A WSSC MANHOLE IS PROHIBITED.

The WSSC effluent sampling poses a threat to human health through pathogens associated with sewage effluent. When sampling, it is important to wear disposable nitrile gloves and protective eyewear to prevent direct contact with the effluent. Follow sampling and equipment decontamination procedures (see section 1.2.5) and ensure that good personal hygiene is practiced. It is recommended, but not required, that sampling personnel be vaccinated for Hepatitis A and B.

Sampling at Monitoring Point FAC involves the use of the Sigma Refrigerated Sampler. The tubing on the sampler is placed into appropriate containers and the effluent is “purged” by the sampler. This results in minimal contact with the effluent and reduces human health risks.

Only those individuals proficient in water sampling practices and procedures are authorized to conduct this sampling. A person is considered proficient when he/she demonstrates the ability to perform the procedures outlined in this instruction without oversight; understands the WSSC permit requirements, and demonstrates sound professional judgment and decision making skills.

A Job Hazard Analysis (JHA) for this job task is maintained by GSFC’s Medical and Environmental Management Division (MEMD). The WSSC JHA is saved in MEMD file path EM-4.3.6 Job Hazard Analyses.

P.7 TRAINING

None.

P.8 RECORDS

Record Title	Record Custodian	Retention
WSSC Logbook	MEMD	*NRRS 8/23.5A11 Destroy after second reissuance of permit or 10 years after permit expires or is cancelled. Retention should be coordinated with related permit.
Quarterly Reports	MEMD	*NRRS 8/23.5A11 Destroy after second reissuance of permit or 10 years after permit expires or is cancelled. Retention should be coordinated with related permit.

** NRRS – NASA Records Retention Schedule (NPR 1441.1)*

P.9 MEASUREMENT/VERIFICATION

Periodic Compliance Reports shall be delivered to WSSC as required by the DAP.

Instructions

In this document, a requirement is identified by "shall," a good practice by "should," permission by "may" or "can," expectation by "will," and descriptive material by "is."

1.0 METHOD SUMMARY FOR MONITORING POINT FAC

Any variation from this plan must be approved in advance by the contractor's Water Manager and MEMD's Sanitary Wastewater Manager.

The WSSC DAP requires self-monitoring of specific parameters at Monitoring Point FAC to include: flow, pH, cyanide, metals (cadmium, chromium, copper, lead, nickel, silver, zinc, arsenic, selenium, and molybdenum), total phosphorus, biochemical oxygen demand (BOD), and ammonia. In addition to these self-monitoring parameters, WSSC will monitor at their discretion for beryllium, fats, oils, and grease (FOG, Polar), oil and grease (Nonpolar, Petroleum), polychlorinated biphenyls (PCBs), total dissolved solids (TDS), total suspended solids (TSS), mercury, tetrachloroethylene (tetrachloroethelene), trichloroethylene (trichloroethelene), and temperature. Appendix C lists the effluent permit limits for Monitoring Point FAC and Appendix E includes programming procedures for sampling equipment.

Self-monitoring is performed by an authorized MEMD contractor or civil servant.

Quarterly self-monitoring for Monitoring Point FAC shall be completed for two days each quarter at the sanitary sewer manhole labeled WSSC IWMP, located on the east side of the GSFC main gate guardhouse, building 9. The following requirements apply:

- Sampling shall be completed for all required parameters (see Appendix C) during each 24-hour period.
- Each 24-hour period shall fall within one calendar day as required by the WSSC DAP, (i.e., from 00:01 to 23:59).
- Composite and grab samples are collected using a Sigma 900 Max Refrigerated Sampler. The manual mode of the sampler will be used to gather the grab sample. The sampler will be programmed to gather a flow proportional composite sample.
- Flow rate and pH are measured and recorded using a Sigma 900 Max Refrigerated Sampler.
- The total composite shall consist of at least four liters volume.

Samples are taken and sent to a contract laboratory for analysis. Measurement results are reviewed onsite. Reports of results are tabulated and reports are submitted to WSSC quarterly.

1.1 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

1.1.1 Field QA/QC Requirements

1.1.1.1 Data shall be documented in the WSSC Field Logbook to include: sample date, time, sampling location (Monitoring Point FAC IWMP), pH checks, pH calibration, flow calibration, volume calibration, personnel sampling, and any alterations from this Work Instruction (WI). In addition, all activities taking place at the WSSC Monitoring Point FAC IWMP will be documented in the WSSC Field Logbook.

1.1.1.2 The key sampling equipment used for each sampling event shall be documented with its associated model number in the WSSC Field Logbook for reference in the event of equipment failure or questionable data. Key sampling equipment includes:

a. Sigma 900 Max Refrigerated Sampler;
b. Submersible Flow Meter attached to metal Channel Band; and
c. pH probe with preamp interface.

1.1.1.3 COC information shall be documented during each step of the event to include the container receipt from the laboratory, all custody changes, sampling events, and shipping. For grab samples, the time documented will be the actual time the sample was collected. For composite samples, the date used for the sample collection date will be the date of the 24-hr period, and the sample time will be 23:59. The full duration of the composite period (i.e., 00:01 to 23:59) must be noted on the COC and in the PCR. The sample collection time will not be the date and time personnel physically collected the sample. COC forms must include the following information:

a. Sample date;
b. Start and end times (especially for composite samples);
c. Specific sampling location;
d. Sample collection method (grab, composite, etc.);
e. Sample containers;
f. Preservation method and preservation used;
g. Analyses requested;
h. Appropriate signatures;
i. Client/project; and
j. Any other relevant information.

1.1.1.4 All instrumentation will be operated in accordance with operating instructions supplied by the manufacturer, unless otherwise specified in this WI. The pH meter calibration shall occur prior to sampling/operation and must be documented in the WSSC logbook. Flow meter calibration should be done twice a year at minimum. Calibration records in the WSSC logbook will include the time, notable results or field conditions that may affect calibration, manufacturer, as well as lot number and expiration date of the standards used for the calibration. The manufacturer recommends replacing pH probes six

months after initial use. The date of first use should be documented on the pH probe itself and/or in the WSSC Field Logbook.

1.1.1.5 The pH meter shall be calibrated at the start of each continuous sampling period. This will be accomplished using pH buffers 7 and 10 prior to each sampling event at WSSC Monitoring Point FAC, as well as when pH field checks indicate the meter is out of calibration. In the event pH readings are consistently low (i.e., less than 7.0) the calibration range may be changed from pH buffers 7 and 10, to pH buffers 4 and 7. Respective buffers should bracket the anticipated pH range of the effluent.

1.1.1.6 Fresh buffer solution will be used to calibrate the pH probes for each sampling event. This prevents contamination of buffer solution, ensures the accuracy of pH calibrations, and improves the reliability of the pH calibration check readings. The pH buffers are temperature sensitive and should be stored at room temperature. If field conditions are cool, warm buffers with disposable hand warmers prior to calibration or pH checks.

1.1.1.7 Instrumentation shall be decontaminated, after each use, to prevent cross-contamination.

1.1.1.8 All sampling procedures, when possible, shall be performed by a team of two.

1.1.2 Laboratory QA/QC Reporting Requirements

Selected analytical methods for Monitoring Point FAC parameters will be verified annually using 40 CFR 136. See section 1.3, Analytical Methods. The following information shall be provided by the laboratory and included with all analyses:

a. Laboratory sample ID;
b. Date(s) and time(s) sample(s) collected;
c. Preservation techniques;
d. Date sample received at laboratory;
e. Date sample extracted, digested, or distilled (if applicable);
f. Date(s) and time(s) sample(s) analyzed;
g. Parameter analyzed;
h. Analytical methodology;
i. Instrumentation;
j. Dilution factor (if applicable);
k. Detection limits – Numeric values must be submitted for all analyses. If values are below detection limit, indicate the numeric detection limit, (e.g., <0.01 mg/l);
l. Concentration/units;
m. Legible signature by qualified professional; and
n. Related comments.

1.1.3 Sample Identification

The samples will be identified using the sampling date and the type of sample collected (grab or composite) as follows: YYYYMMDD type (e.g., 20031215g is 12/15/2003 grab). The sample time for the composite samples is indicated as the time the sampling period ends (23:59 on the sampling date).

1.2 PROCEDURES

This section describes the sampling procedures.

1.2.1 Preparation for Sampling

a. Prepare sampling schedule. Notify partner, staff, and MEMD program manager, and post the schedule on the Outlook calendar the week prior to the scheduled sampling.
b. Obtain necessary sampling and monitoring equipment and Personal Protective Equipment (PPE).
c. Ensure all equipment is in working order.

Week Preceding Sampling:

a. Call or email the laboratory to arrange for delivery of sample bottles.
b. Check supply of PPE and order/purchase more if necessary.

Day Preceding Sampling:

Gather all equipment and sample containers required for collection of WSSC Monitoring Point FAC parameters (see Appendix F for a list of sample containers required for quarterly monitoring).

1.2.2 Field Set Up Procedures

a. Don protective gloves and eyewear, mobilize equipment, and set up for sampling event.
b. Place manhole safety gate around manhole.
c. Unlock sampler shed and remove manhole cover.
d. Note time, date, and other appropriate information in WSSC Field Logbook.
e. Follow procedures specified for the installation of the attached probes to the Sigma 900 Max Refrigerated Sampler fixed at the sampling site.
f. If the onsite Sigma 900 Max Refrigerated Sampler is inoperable, MEMD maintains backup equipment. The programming for backup equipment may vary slightly depending on equipment software. See the manual for programming instructions using the WI as guidance for programming selection. Deviations from this WI must be noted in the logbook and pre-approved in accordance with section 1.0.

1.2.3 Operation of Sampler

1.2.3.1 The apparatus will be set up as follows:

a. Connect cables to proper inputs and sample tube to sample connector (using a new tube).
b. Calibrate the flow meter by following the steps in section 1.2.3.2d. Insert channel band with attached submersible flow meter into channel at bottom of manhole. The flow meter must be installed in the direction indicated on the top of flow meter.
c. Insert strainer and tubing into the sewer pipe downstream of the flow meter so strainer is immersed and does not affect measured flow rate.
d. Calibrate pH meter and log readings according to Sections 1.2.3.2.a and 1.2.3.2.b.
e. Insert pH probe into manhole so that the pH probe is hanging and immersed in center of channel downstream of flow meter. Probe must be low enough to remain immersed if the water level drops overnight.
f. Secure sampler and shed following programming by locking padlock.

1.2.3.2 The pH meter and volume shall be calibrated before each continuous sampling event. The submersible flow meter will be calibrated prior to monitoring or at an interval recommended by the manufacturer. The pH meter will also be field checked by following the steps in 1.2.3.2.b prior to monitoring, once during each 24-hour monitoring event, and once at the conclusion of monitoring. The pH check must show pH values no greater than +/- 0.2 of the true value. If the pH readings are out of range, the pH meter must be recalibrated.

a. pH Calibration

1. Attach pH probe that will be used during monitoring event.
2. Turn unit on.
3. Select main menu; options; advanced options.
4. Select calibrate; pH/ORP; pH.
5. Place probe in first pH buffer solution and leave immersed for a few seconds.
6. Press any key to start calibration.
7. Meter will show the temperature reading; accept if correct or enter correct temperature.
8. Screen shows “select pH for first buffer solution”; if incorrect, change buffer pH.
9. Remove probe from solution and rinse with DI.
10. Repeat steps 6-10 with second buffer solution.
11. Push main menu to return to status screen.

b. pH Field Check

1. Push run/stop to pause program.
2. Remove probe from sanitary water.
3. Rinse probe with DI water.

4. Put probe in first pH buffer solution.
5. Push run; press any key to start program.
6. With probe in first pH buffer solution, log each minute for 3-4 minutes and record pH in logbook.
7. Push run/stop to halt program.
8. Rinse probe with DI water.
9. Place probe in second pH buffer solution.
10. Push run/stop twice.
11. Select resume.
12. Log 3-4 minutes for second buffer.
13. Push run/stop to halt program.
14. Rinse probe with DI water.
15. Place probe back in sanitary water.
16. Push run/stop and resume program.

***Note**: DO NOT select "start program from beginning" instead of "resume," or you will lose the logged readings.*

c. Volume Calibration

1. Main menu; options.
2. Volume calibration (place hose in bottle); manual calibration.
3. Press start (wait for purge).
4. Collect sample in graduated container.
5. Verify volume.
6. Press done.
7. Actual volume: 100 mL – Accept or enter corrected volume, if applicable.
8. Make sure to replace hose.
9. Pour sample bottle of purge water down the manhole.

d. Submersible Flow Meter Calibration

1. Flow meter should be calibrated every six months (per manufacturer recommendations) and documented in the logbook.
2. Remove meter from channel band.
3. Place meter face down on flat surface.
4. Select main menu; options; advanced options.
5. Select calibrate; submerged probe.
6. Flow meter will calibrate automatically. Calibration is complete when screen returns to menu.

1.2.3.3 See Appendix G for Sigma 900 Max Sampler programming steps.

1.2.4 Sample Collection Procedures

During peak flow hours (08:00 to 16:30), strainer should be checked every two hours to remove clogs and prevent missed samples. If sample fails to collect, due to error or programming, and/or if any sampling or monitoring is missed, all parameters for sampling and monitoring shall be repeated. Consult permit language and MEMD program manager when there is a question concerning the need to resample for all or specific parameters.

Note: In the case of noncompliance, you only need to repeat the parameter of noncompliance. Flow is always measured for flow proportionate composite samples and data must be reported.

1.2.4.1 Cyanide samples shall be collected two (2) times per 24-hour monitoring period. The cyanide grab samples should be taken during peak flow hours: one grab sample taken in the morning and the other grab sample taken during the end of day pH check. Cyanide will be collected following these steps:

a. Push "Run/Stop." Screen will display "halted."
b. Press Manual Mode.
c. Remove the plastic tube from the top of the composite bottle lid.
d. Place the tube into the appropriate sample container.
e. Cover the bottle top with gloved hand to prevent splash of effluent.
f. Push "Pump Forward" button.
g. Fill container carefully and press any key to start pumping.
h. Press any key to stop pumping before bottle is full.
i. Replace tubing connection to the lid of the composite sample bottle.
j. Push "Reverse Pump" until line is clear of effluent.
k. Press Run/Stop and select resume. Screen will display "running."
l. Label container, fill out COC, and store sample at or below 6°C in 900 Max Refrigerated Sampler.

1.2.4.2 Composite samples for metals, total phosphorus, ammonia, and BOD shall be collected at the end of the 24-hour monitoring period following these steps:

a. Unlock and unhinge Sigma 900 Max Refrigerated Sampler to access composite bottle.
b. Estimate the volume of sample collected by noting the graduated level on the composite bottle and enter the volume in WSSC Field Notebook. The permit requires that the total composite sample must be a minimum of four liters.
c. Remove composite bottle from sampler.
d. Place a lid on the container and carefully swirl composite bottle to ensure mixing of sample.
e. Pour sample from composite bottle into the appropriate sample containers. A clean, decontaminated funnel can be used if desired.
f. Label container, and fill out COC, and store sample at or below 6°C in the Sigma 900 Max Refrigerated Sampler.

g. Empty any remaining wastewater from the composite bottle into the manhole after the sample bottle has been filled and labeled.

1.2.5 Decontamination Procedures

Decontamination shall be conducted in the field upon conclusion of quarterly sampling. Before decontaminating, ensure sampling equipment is in good operating condition. Clean all equipment contacting effluent using the following decontamination procedures:

a. Don protective gloves and goggles.
b. Wash equipment with an Alconox solution with a pint of isopropanol or ethanol added per gallon of solution. Wash the composite bottle, exterior of tubing, and sensors with brush. Run sampler pump sequence several times to pump Alconox solution through tubing. Avoid getting the electronics in the control box wet.
c. Rinse equipment with DI. Flush tubing with three pumping sequences of DI.
d. Keep equipment on plastic sheeting to protect it from damage or outside contamination.
e. Air-dry and store equipment in the building 27A equipment shed or building 27B in between WSSC Monitoring Point FAC sampling events.

1.2.6 Management of Raw Data

1.2.6.1 Monitoring data may be saved from the sampling equipment directly to a PC. Hach American Sigma Insight software must be installed on the PC. This software is needed to transfer and download data to a PC. If your computer does not have this software, contact American Sigma (www.hach.com) for details on how to obtain the Insight software or download the copy of the software stored in the following file path: : \EM-7 Property\Equipment User Manuals and Info\Sigma samplers. If you do not have administrative rights on the PC, you will need to contact technical support to install the program and give you rights to the associated program folder, or apply for temporary rights to perform this task yourself. You can also change the folder storage location from the advanced setting menu or change the directory to your desktop or user files during installation. If you do not have privileges to write to the program folders where the site files are stored, you will not be able to save the site files to your computer. You will also need to ensure the appropriate driver is installed for the transfer cables used to connect the PC to the equipment.

1.2.6.2 The steps for transferring data to a PC are as follows:

a. Connect the PC to the sampling equipment using the necessary transfer cables (i.e., cannon cable to RS-232 to USB) to an empty port on the computer.
b. Open the Hach Insight program.
c. Select the “900 Max” icon, make sure the baud rate is 19,200. Ensure port is on the “COM” number that is assigned for cable in use and click “ok” to download the data from the sampler to the PC. The COM port number will change depending on which USB port you are using.

d. Once the files are downloaded, they are permanently saved on the computer's hard drive. From the hard drive, these data are "Site Files" and can be saved to another location. For more information on report procedures, see section 3.1.

1.2.7 Sample Shipment

Contact the laboratory in order to schedule courier pick up at the end of the sampling event. When shipping samples to lab, ensure that the cooler has an appropriate amount of ice.

1.3 ANALYTICAL METHODS

The laboratory shall analyze the samples using the following methods, collected in the specified containers with the listed preservatives, and analyzed within the specified holding times.

Analytical Parameter[1]	**Analytical Methods[1]**	**Preservative** (Cool all samples at ≤6°C)	**Holding Time**	**Sample Type**
BOD	Standard Method 5210B-2001	None	48 hours	Composite
Total Phosphorus	EPA 365.3	H_2SO_4 to pH <2	28 days	Composite
Ammonia[2]	Standard Method 4500-NH3-F-2011 or EPA 350.1 Rev. 2.0	H_2SO_4 to pH <2	28 days	Composite
Cyanide	Standard Method 4500-CN^- or EPA 335.4	NaOH to pH>12	14 days	Grab
Metals[3] as follows: Cadmium (T) Chromium (T) Copper (T) Lead (T) Nickel (T) Silver (T) Zinc (T) Arsenic (T) Molybdenum (T) Selenium (T)	EPA 200.8	HNO_3 to pH<2	6 months	Composite

(T) – Total
[1]See 40 CFR 136.3 for current acceptable analytical methods.
[2]Analytical for ammonia can be performed from the Total Phosphorus sample.
[3]Make sure to list all metals on the COC as individual parameters can vary by IWMP location.

1.4 MONITORING POINT FAC NONCOMPLIANCES

The MEMD Sanitary Wastewater Manager must be notified immediately of any permit noncompliance by phone and e-mail. Notification will include the following information: parameter of noncompliance, result, possible cause of noncompliance, date and time of sampling. The MEMD Sanitary Wastewater Manager will then contact WSSC and inform them of the permit noncompliance within 24 hours. This verbal notification will be followed by a letter within five calendar days. Instructions may follow per WSSC's discretion. Noncompliances will be investigated. See MEMD files for procedures used in the past and make modifications to fit the current scenario. The sampling and analysis for the parameter in violation will be repeated. Results of the repeated monitoring shall be submitted to WSSC within 30 days of becoming aware of noncompliance. See permit reporting requirements for additional details.

Note: Noncompliance for cyanide, total metals, ammonia, total phosphorus, and BOD is determined by laboratory results above the permit limits. A pH noncompliance is determined by pH out of permit limits for 15 consecutive minutes and/or 30 aggregate minutes throughout the compliance day. The first minute of pH reading out of range does not count towards the consecutive noncompliance since the goal is to measure elapsed time. In addition, a pH of less than 5.0 for any period of time shall constitute a noncompliance. Readings for pH are also truncated to the first decimal place, not rounded. The limit is only exceeded when you reach 0.1 pH units above or below the limit (e.g.,, 10.1 or 5.9). Guidelines for truncating pH are found in footnote 3, p. 19 of the DAP.

2.0 METHOD SUMMARY FOR MONITORING POINT 001

Any variation from this plan must be approved in advance by the contractor's Water Manager and MEMD's Sanitary Wastewater Manager.

The WSSC requires sampling of parameters specified in 40 CFR Part 433 and the DAP permit at Monitoring Point 001. Self-monitoring parameters at Monitoring Point 001 include pH, cyanide, and total metals. GSFC maintains a TOMP in lieu of monitoring for TTO at Monitoring Point 001. The TOMP is stored in MEMD files and should be reviewed annually.

Sampling is performed by an authorized MEMD contractor or civil servant. Quarterly sampling at Monitoring Point 001 captures electroplating wastewater that has passed through an ion exchange system and a pH neutralization system. The electroplating wastewater is discharged from the pH neutralization system as a batch discharge. Quarterly sampling at Monitoring Point 001 will be completed two days per quarter. The following requirements apply:

- Samples collected and measurements taken shall be representative of the process waste stream over the course of production for each day of monitoring.
- Sampling shall be completed for all required parameters (see Appendix D) during each day of monitoring.
- Discharge at this monitoring point occurs in small batches; therefore, all samples will be grab samples. Grab samples shall mean a minimum of one grab sample per batch during the monitoring day. When multiple batches are discharged during the monitoring day, the IU is required to collect one grab per batch. The grab samples (excluding pH) from each batch during that specific monitoring day may be composited in the laboratory or the field.
- Flow must be monitored continuously over the course of the batch discharge. pH is monitored by a grab using the Hanna HI 98191 or HI 98183 pH/ORP meter.
- Flow will be measured using the Plating Facility's Rosemont 8700 Series Magnetic Flowmeter Flowtube wall unit, which is installed into the Plating Facility's pH neutralization system discharge line.

Samples are taken and sent to a contract laboratory for analysis. Measurement results are reviewed onsite. Reports of results are tabulated and reports are submitted to WSSC quarterly.

2.1 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

2.1.1 Field QA/QC Requirements

2.1.1.1 Data will be documented in the WSSC Field Logbook to include: sample date, start and end time of batch discharge; sampling location (Monitoring Point 001 IWMP); pH calibration, pH checks; flow, pH, personnel sampling, date ion exchange columns were last rotated or replaced, and any alterations from this WI. In addition, all activities taking place at WSSC Monitoring Point 001 IWMP will be documented in the WSSC Field Logbook to include proper ion exchange valve configuration checks before sampling.

2.1.1.2 The key sampling equipment used for each sampling event shall be documented with its associated model number in the WSSC Field Logbook for reference in the event of equipment failure or questionable data. Key sampling equipment includes:

a. Hanna HI 98191 or HI 98183 pH/ORP meter; and
b. Rosemont 8700 Series Magnetic Flowmeter Flowtube wall unit.

2.1.1.3 COC information will be documented during each step of the event to include the container receipt from the laboratory, all custody changes, sampling events, and shipping. For grab samples, the time documented shall be the actual time the sample was collected. Information to be documented onto COC forms during sampling includes:

a. Client, project name, sampler's initials;
b. Sample identification;
c. Date/time collected;
d. Site location (i.e., "Monitoring Point 001 IWMP")
e. Sample matrix (i.e., wastewater);
f. Total number of sample containers per analyses;
g. Analyses requested;
h. Turnaround time, container type, preservative used; and
i. Remarks/conditions, etc.

2.1.1.4 All instrumentation shall be operated in accordance with operating instructions supplied by the manufacturer, unless otherwise specified in this WI. Equipment and calibration activities will occur prior to sampling/operation and must be documented in the WSSC logbook. Calibration records in the WSSC logbook will include the time, equipment manufacturer, lot number, and expiration date of the standards used for the calibration.

2.1.1.5 The Hanna HI 98191 or HI 98183 pH/ORP meter shall be calibrated using pH buffers 7 and 10 prior to each WSSC Monitoring Point 001 sampling event. The process wastewater from the Plating Facility pH neutralization system will have a pH greater than 6.5 and less than 10. Refer to 250-WI-8500.5.9 Water Sampling Equipment for calibration procedures.

Note: The pH buffers are temperature-sensitive and should be stored at room temperature. If field conditions or room temperatures are cool, warm buffers with disposable hand warmers prior to pH calibration or pH checks.

2.1.1.6 The Plating Facility utilizes the Rosemont 8700 Series Magnetic Flowmeter Flowtube wall unit to monitor discharge flow rates from their pH neutralization tank. The flowmeter has been installed into their pH neutralization system discharge line per the manufacturer's instructions and is not subject to routine calibration. A copy of the Rosemont 8700 Series Magnetic Flowmeter Flowtube Product and Installation Manual can be found at the following location on the MEMD network drive: T:\EM-4 GSFC\EM-4.3 Procedures and Guidelines\EM-4.3.5 Env WIs\250-WI-8500.5.6 WSSC\Reference Document.

2.1.1.7 Instrumentation shall be decontaminated after each use to prevent cross contamination.

2.1.1.8 A minimum of two authorized MEMD personnel are required to perform the quarterly sampling at Monitoring Point 001. One person is responsible for recording flow rate and pH grab at one minute for the duration of the batch discharge. The other person is responsible for collecting samples from the red spigot (WSSC IWMP) for the appropriate grab samples. A third person may be present to facilitate time keeping and preparation of sample containers with appropriate labeling.

2.1.2 Laboratory QA/QC Reporting Requirements

Refer to section 1.1.2 of this WI for a comprehensive list of all information to be provided by the laboratory and included with all analyses returned to MEMD. Selected analytical methods for Monitoring Point 001 parameters are verified annually in accordance with 40 CFR 136.3. See section 2.3, Analytical Methods.

2.1.3 Sample Identification

The samples will be identified using the sampling date and the type of sample collected (grab or composite) as follows: YYYYMMDDtype# (e.g. 20160106g1 is 01/06/2016 grab #1).

2.2 PROCEDURES

Sampling at the WSSC Monitoring Point 001 IWMP will be performed manually without the use of an automated sampler. The following procedures shall be followed:

2.2.1 Preparation for Sampling

2.2.1.1 Plan the sampling schedule for Monitoring Point 001 early in the WSSC Quarterly Reporting Period to ensure that adequate time is allotted to coordinate monitoring with Plating Facility personnel. Plating Facility personnel availability and work load may impact the monitoring schedule.

2.2.1.2 Obtain necessary sampling and monitoring equipment, and PPE.

2.2.1.3 Ensure all equipment is in working order.

2.2.1.4 Week Preceding Sampling:
MEMD will contact the Plating Facility one week prior to the planned quarterly sampling. If the Plating Facility will have a full batch ready to discharge, they are required to contact MEMD to coordinate the specific sampling day. In addition, more time may be needed to perform additional monitoring to meet permit requirements (e.g., compliance with the monthly averages permit limits or repeat monitoring). All sampling will be scheduled in Outlook (include the MEMD Wastewater Program Manager). WSSC will coordinate with MEMD and Plating Facility personnel to arrange a time to perform their biannual monitoring. Plating Facility points of contact are indicated in Appendix E.

2.2.1.5 Day Preceding Sampling:
MEMD will contact the Plating Facility the day prior to the scheduled quarterly sampling to confirm the time of sampling and to confirm that there is a full batch to discharge within the pH neutralization tank. The pH neutralization system tank should be at full capacity each day of quarterly sampling.

2.2.2 Field Set Up and Sampling Procedures

2.2.2.1 Prior to Arrival at the Plating Facility
a. Gather necessary materials and sample containers for quarterly monitoring at Monitoring Point 001 (see Appendix F for a list of sample containers required for quarterly monitoring).
b. Label sample containers with the appropriate date, parameter, and preservative. The sample time will be recorded on the label in the field once the sampling is complete.
c. Calibrate the Hanna pH meter HI 98183 or HI 98191 using at least two pH buffers that generally bracket the expected pH value of the sample: pH buffers 7 and 10. Adhere to calibration procedures as described in 250-WI-8500.5.9 Water Sampling Equipment. Note calibration results in the WSSC logbook.
d. Conduct pH checks using pH buffers 7 and 10. The pH check must show pH values no greater than +/-0.2 of the true value. If the pH readings are out of range, the pH meter must be recalibrated.

2.2.2.2 Prior to Discharge
a. Note arrival time at the Plating Facility and the names of personnel conducting the sampling in WSSC Logbook.

b. Plating Facility personnel will take an initial pH reading of the tank contents prior to opening the discharge valve to validate their instrument calibration. This allows for a two-minute time period before the pH neutralization system discharge begins. Plating Facility will recirculate the pH neutralization tank contents if their pH readings are less than 6.5.
c. Place the 10 L composite bottle with the lid removed on the stool underneath the red spigot. This composite bottle is used to collect the grab sample for pH. Place the Hanna HI 98183 or HI 98191 pH meter on the desk to the left of the red spigot to ensure that the probe will reach the bottom of the 10 L composite bottle.
d. After the Plating Facility takes an initial pH reading of the tank contents, ask them to fill up the small glass container of the same water. Insert the Hanna pH probe into the small glass container to allow the probe to acclimate to the pH and temperature of the discharge water. This will ensure that the pH reading will stabilize more efficiently during the one minute grab recording.
e. When the Plating Facility instrument calibration has been validated and the pH/temperature reading on the Hanna pH/ORP meter has stabilized, remove the pH probe from the glass container and insert into the composite bottle once the discharge has started. Once complete, Plating Facility personnel will initiate the batch discharge.
f. The person responsible for collecting the samples should have one 250 mL plastic container preserved (NaOH) for the cyanide grab sample, and one 250 mL plastic container preserved (HNO3) for the total metals grab sample, labeled and within arm's reach of the red spigot.

2.2.2.3 During Batch Discharge

The pH neutralization tank will discharge fully within approximately five to fifteen minutes. Plating Facility personnel must open the discharge valve fully in order for there to be enough water pressure to achieve a discharge at the red spigot. The authorized MEMD personnel responsible for sampling Monitoring Point 001 will perform the following tasks during the discharge:

a. Align the composite bottle under the red spigot (WSSC IWMP) at the correct angle as it sits on the stool to capture the discharge.
b. Open the valve at the red spigot when the batch discharge has been initiated.
c. Ensure that the pH probe is submersed, allow meter to stabilize, and record the pH.
d. Take grab samples for cyanide and total metals during the first few minutes of discharge. Verbally notify the person recording pH and flow when these grab samples are collected so that the correct sample times can be documented on the container label and in the WSSC logbook. The person documenting the pH and flow will record a pH reading in the WSSC logbook for one minute during the batch discharge. Record the pH reading as a grab sample; concurrently, read the Rosemont 8700 Series Magnetic Flowmeter Flowtube wall unit and record the flow rate in the WSSC logbook. The flow meter readings during the discharge will be added and used to calculate the total discharge volume, based on the number of minutes it took for the system to discharge.
e. Close the valve at the red spigot when the batch discharge is complete or after the pH grab, cyanide grab and total metals grab are taken.

2.2.2.4 After Batch Discharge (bullets d-e can be completed in the field or in the decontamination area in building 27A).

a. Take a final pH check when the batch discharge is complete and write it in the WSSC logbook. If the pH meter is found to be out of the allotted calibration range, sampling must be repeated.
b. Label each sample container with the appropriate sample time.
c. Once samples are prepared for laboratory pick-up, take the 10L composite bottle to building 27A for decontamination in accordance with the procedures in section 1.2.5 of this WI. Any excess water left in the composite bottle that was not needed for sampling will be poured down the sanitary drain located in the decontamination area.
d. The laboratory COC form will be completed using the appropriate WSSC IWMP location; "WSSC Monitoring Point 001."
e. If the grab samples are being combined at the laboratory and analyzed as one sample, please make a note of this on the COC.

2.2.3 Decontamination Procedures

Refer to section 1.2.5 of this WI for decontamination procedures. Store equipment in accordance with 250-WI-8500.5.9A Calibration, Use, and Storage of Water Sampling Equipment.

2.2.4 Sample Shipment

Contact the laboratory to schedule courier pick up at the end of the sampling event. When shipping samples to lab, ensure that the cooler has an appropriate amount of ice in order to maintain required temperature.

2.2.5 Plating Facility Requirements

Quarterly sampling at Monitoring Point 001 must be completed over two days within the quarter, in accordance with the GSFC's DAP. When multiple batches are discharged during the monitoring day, the IU is required to collect one grab per batch. The grab sample from each batch during that specific monitoring day can be composited in the laboratory or in the field. MEMD will notify the Plating Facility personnel immediately if any problems are encountered during monitoring and if repeat sampling is necessary.

2.3 ANALYTICAL METHODS

The laboratory shall analyze samples using the following methods, collected in the specified containers with the listed preservatives, and analyzed within the specified holding times.

Analytical Parameter	Analytical Methods[1]	Preservative (Cool all samples at ≤6°C)	Holding Time	Sample Type
Cyanide	SM 4500-CN^- or EPA 335.4	NaOH to pH>12	14 days	Grab
Cadmium (T) Chromium (T) Copper (T) Lead (T) Nickel (T) Silver (T) Zinc (T)	EPA 200.8	HNO_3 to pH<2	6 months	Grab

(T) – Total
[1]See 40 CFR 136.3 for current acceptable analytical methods.

2.4 MONITORING POINT 001 NONCOMPLIANCES

Cyanide and total metals noncompliances are determined by laboratory results above the permit limits. In the event that laboratory results identify an exceedance of the permit limits, coordination with Plating Facility will take place immediately to schedule repeat monitoring of the parameter in violation.

A pH violation will exist if greater than 6.25% of the grabs taken that day are less than 6.0 or greater than 10.0 or if any of the grabs taken are less than 5.0. The Plating Facility pH neutralization system is configured to shut off the discharge to the sanitary sewer system if the pH of the process wastewater is out of range (pH less than 6 or greater than 10). Readings for pH are truncated to the first decimal place, not rounded. The limit is only exceeded when pH is 0.1 pH units above or below the limit (e.g., 10.1 or 5.9).

3.0 REPORTS

A report of the sampling results for Monitoring Point FAC and Monitoring Point 001 is submitted to WSSC quarterly. The report shall include the following documentation specific to each IWMP and should be prepared as noted in the table below:

Document	Preparation Details
Cover Letter	Microsoft Word document signed by the official designated in the Delegation of Signatory Authority on file.
Period Compliance Report (PCR) Forms (Monitoring Point FAC and Monitoring Point 001)	Blank PCR forms are provided in the WSSC DAP; Microsoft Word versions of the PCR forms have been provided to GSFC by WSSC. The PCR forms must also be signed by the official designated in the Delegation of Signatory Authority on file. Refer to section 3.1 for specific requirements for preparing the PCR form for Monitoring Point FAC.

Document	Preparation Details
Daily pH Sampling Log – Grab (1) Samples	Microsoft Word versions of the 'Daily pH Sampling Log – Grab (1) Samples' form was provided to GSFC by WSSC. This form should be used to document the grab recording for pH and interval flow readings collected during Monitoring Point 001 monitoring. Provide all required data on this form as it was noted in the WSSC logbook.
Summary Reports and Graphs for Monitoring Point FAC	The summary reports and graphs for pH and flow are produced from the Hach Insight program. Refer to section 3.1 for more instructions.
Analytical Reports	The analytical report(s) are produced by the contract laboratory. Reports that are received after 4:00 p.m. shall be opened the next business day. A copy of all analytical reports for Monitoring Point FAC and Monitoring Point 001 is provided with the report. Refer to section 1.1.2 of this WI for Laboratory QA/QC Reporting Requirements.
TTO Certification for Monitoring Point 001	TTO certification is a scanned document that must be signed each quarter by the official designated in the Delegation of Signatory Authority on file.
Grease Trap and Oil/Water Separator Service Log	Service logs are obtained from the GSFC Cafeteria (B21) Manager; logs are emailed to GET on the 15th of each month. Cleanouts are conducted by Atlantic Wastewater Solutions, LLC. Invoices must contain date of cleanout, description of service, ratio of grease/water/solids and cost of services.
Pre-field Checklist for WSSC Monitoring (for MEMD only)	This checklist (found in Appendix F) is used to ensure that the proper sample containers and other necessary equipment are collected prior to any/all monitoring at each respective WSSC IWMP.

3.1 MONITORING POINT FAC PCR FORM, COVER SHEET, AND GRAPH PRODUCTION

3.1.1 The Periodic Compliance Report for Monitoring Point FAC is a Microsoft Word document that must be completed with the required data each quarter. The columns on the report equate to one calendar day. Start and stop times represent the beginning and ending times of pH and flow monitoring. However, the start and stop time for the composite sample should be specified in bold (i.e., 00:01 to 23:59). The pH values reported on this document are reported to one decimal place and the values are truncated rather than rounded.

3.1.2 These procedures shall be followed to produce the cover sheet and graph from the raw data collected by the Hach Insight program from quarterly monitoring at the Monitoring Point FAC IWMP.

Note: If you do not have privileges to access and write to the folder associated with the site files, you will run into errors trying to produce the summary reports and graphs.

3.1.2.1. Open Insight and click Site Files and click on the site file or site ID that you need for the quarterly WSSC report. Remember to make sure the Site File you want is located in the data directories specified by your Insight software. Data directories can be modified in the advanced menu in Insight.

3.1.2.2 Create cover sheet for each day from text report. Click "Report" once you have selected the correct site file. Next under the channels tab, make sure pH/ORP, level, and Flow 1 are checked. Select the data tab and have the day report checked. Next, select the header tab and check Header. Under the Misc tab, program settings and logged readings must also be checked. Make sure time is checked for 24 hours and the units is in gallons. If the flow is high, the totalizer scaling may need to be adjusted. Click on "Create." This summary report includes the Sampler and Program information, the minimum and maximum pH value of each day with the associated time, and the minimum and maximum flow value of each day with the associated time. Delete the detailed pH and flow data unless otherwise instructed by WSSC to include them.

3.1.2.3 Create graphs of pH versus time and print to Adobe PDF. Label pH checks and start/stop times (if start/stop time is unclear on graph).

3.1.2.4 Create graphs of flow versus time and print to Adobe PDF.

3.1.2.5 Save all files to appropriate network drive.

Note: Graphs and supporting data submitted to WSSC shall be printed single-sided.

Appendix A – Definitions

A.1 Categorical Industrial User – Any industrial user who is subject to national categorical pretreatment standards (40 CFR 403.6 and 40 CFR Chapter I, Sub-Chapter N).

A.2 Chain of Custody – A form, provided by the laboratory, that shows the record of custody for all samples. The Chain of Custody is filled out with the sample information (number of samples, testing to be completed, etc.) and is signed by the person packaging the cooler with the water samples. When the lab picks up the samples, the driver signs the form and gives the customer a copy. When the samples arrive at the lab, the form is signed again, indicating the samples arrived at their intended location. The Chain of Custody also serves as the work order request identifying the methodology for processing the samples once they arrive in the lab.

A.3 Composite sample – A combination of individual samples collected at regular intervals over a time period. According to WSSC the composite is not to exceed 24 hours in any given calendar day. The volume of each individual sample may be either proportional to the flow rate during the same sample period (flow composite), or constant and collected at equal time intervals during the composite period (time composite). Composite sampling shall be representative of the process wastestream for that day.

A.4 Continuous pH monitoring – A pH reading taken automatically at a frequency of at least once/minute. In the event that an IU monitors its pH continuously, a PH violation will be construed as any excursion less than 6.0 or greater than 10.0 for more than 15 minutes at any one time, or more than 30 minutes in aggregate, for any calendar day. The pH shall not be less than 5.0 for any period of time.

A.5 Daily maximum – The maximum allowable discharge concentration of a pollutant in a wastestream during a calendar day.

A.6 Estimated flow – A calculated volume or discharge rate which is based on a technical evaluation of the sources contributing to the discharge including, but not limited to, pump capabilities, water meters, and batch discharge volumes.

A.7 Grab Sample – An individual sample collected over a time period not exceeding 15 minutes, without regard for flow or time.

A.8 Grab Sample, pH – In the event that an Industrial User monitors its pH by collecting grab samples, a violation shall exist if greater than 6.25% of the grabs taken that day are less than 6.0 or greater than 10.0, or if any of the grabs taken are less than 5.0.

A.9 Industrial User – Any place of business, endeavor, arts, trade or commerce, whether public or private, commercial or charitable, that uses water in a product, process, or any manner that generates wastewater which is a source of indirect discharge.

A.10 Measured flow – Flow obtained from appropriate flow measurement devices and methods consistent with scientific practices to ensure accuracy and reliability. Such devices shall be maintained to ensure that the accuracy of the measurements is consistent with the accepted capability of that type of device. Devices selected must be capable of measuring flows with a maximum deviation of less than 10% for true discharge rates throughout the range of expected discharge volumes.

A.11 Monthly average – The arithmetic average of the values for effluent samples collected over a calendar month.

A.12 Total Toxic Organics – The summation of all toxic organic compounds with a concentration greater than 10 micrograms per liter. This list consists of those compounds appearing in the categorical standard to which the industry is subject.

A.13 Quarter - or reporting purposes, a quarter shall consist of the methods of January- March, April – June, July – September, and October – December.

Appendix B – Acronyms

BOD – Biochemical Oxygen Demand
COC – Chain of Custody
CFR – Code of Federal Regulations
DAP – Discharge Authorization Permit
DI-Deionized Water
FOG – Fats, Oil and Grease
GSFC – Goddard Space Flight Center
IU – Industrial User
IWMP – Industrial Waste Monitoring Point
JHA – Job Hazard Analysis
MEMD – Medical and Environmental Management Division
OSHA – Occupational Safety and Health Administration
PC – Personal Computer
PPE – Personal Protective Equipment
TDS – Total Dissolved Solids
TOMP – Toxic Organic Management Plan
TSS – Total Suspended Solids
TTO – Total Toxic Organic
WI – Work Instruction
WSSC – Washington Suburban Sanitary Commission

Appendix C: Effluent Limitations / Monitoring Requirements for Monitoring Point FAC

(Always verify parameters and limits with current DAP.)

Parameter	Daily Max. (mg/l)	Sampling Frequency (per quarter)	Sample Type	Limit Origin
Flow (gpd)	N/A	2 days	Estimated	N/A
pH	6.0 - 10.0	2 days	Continuous Monitoring	WSSC
Cadmium (T)	0.10	2 days	Composite	WSSC
Chromium (T)	7.0	2 days	Composite	WSSC
Copper (T)	2.0	2 days	Composite	WSSC
Lead (T)	0.35	2 days	Composite	WSSC
Nickel (T)	3.4	2 days	Composite	WSSC
Silver (T)	0.50	2 days	Composite	WSSC
Zinc (T)	4.2	2 days	Composite	WSSC
Cyanide (T)	0.40	2 days	Grab[1]	WSSC
Arsenic (T)	0.28	2 days	Composite	WSSC
Selenium (T)	0.40	2 days	Composite	WSSC
Molybdenum (T)	0.35	2 days	Composite	WSSC
Total Phosphorus	8.0	2 days	Composite	WSSC
Ammonia	190	2 days	Composite	WSSC
BOD	3000	2 days	Composite	WSSC
[2]Beryllium (T)	Monitoring Only	Periodic[3]	Composite	WSSC
[2]Fats, Oil and Grease (FOG, Polar)	200	Periodic[3]	Grab	WSSC
[2]Oil and Grease (Nonpolar, Petroleum)	250	Periodic[3]	Grab	WSSC
[2]Polychlorinated Biphenyls (PCBs)	Non-detect	Periodic[3]	Composite	WSSC
TSS	3000	2 days	Composite	WSSC
[2]TDS	5000	Periodic[3]	Composite	WSSC
[2]Mercury (T)	0.03	Periodic[3]	Composite	WSSC
[2]Tetrachloroethylene (Tetrachloroethelene)	0.0945	Periodic[3]	Grab	WSSC
[2]Trichloroethylene (Trichloroethelene)	0.026	Periodic[3]	Grab	WSSC
[2]Temperature	140 degrees F	Periodic[3]	Continuous during monitoring	WSSC

N/A – Not Applicable
T – Total

gpd – gallons per day

[1]The grab sample for cyanide shall mean a minimum of two (2) separate grab samples collected during each monitoring day. GSFC is allowed to composite the grab samples collected during each specific monitoring day in the laboratory or in the field.

[2]These parameters are monitored by WSSC and are not part of the self-monitoring protocol.

Appendix D: Effluent Limitations / Monitoring Requirements for Monitoring Point 001*

(Always verify parameters and limits with current DAP.)

Parameter	Daily Max. (mg/l)	Monthly Avg (mg/L)[2]	Sampling Frequency (per quarter)	Sample Type	Limit Origin
Flow (gpd)	N/A	N/A	2 days per quarter	Estimated	N/A
[1]pH	6.0 - 10.0	N/A	2 days per quarter	Continuous Metering	WSSC
Cadmium (T)	0.11	0.07	2 days per quarter	Grab	Categorical 40 CFR 433, PSNS
Chromium (T)	2.77	1.71	2 days per quarter	Grab	Categorical 40 CFR 433, PSNS
Copper (T)	3.38	2.07	2 days per quarter	Grab	Categorical 40 CFR 433, PSNS
Lead (T)	0.69	0.43	2 days per quarter	Grab	Categorical 40 CFR 433, PSNS
Nickel (T)	3.98	2.38	2 days per quarter	Grab	Categorical 40 CFR 433, PSNS
Silver (T)	0.43	0.24	2 days per quarter	Grab	Categorical 40 CFR 433, PSNS
Zinc (T)	2.61	1.48	2 days per quarter	Grab	Categorical 40 CFR 433, PSNS
Cyanide (T)	1.20	0.65	2 days per quarter	Grab	Categorical 40 CFR 433, PSNS

N/A– Not Applicable
T – Total
gpd – gallons per day
[1]pH grabs must be analyzed at a frequency no greater than 15 minutes, over the course of a sampling day. A pH violation exists if greater than 6.25% of the grabs taken that day are less than 6.0 or greater than 10.0, or if any grabs taken are less than 5.0. All pH meters must be calibrated at the beginning of each monitoring day with calibration checks performed at the beginning and end of each monitoring day. If beginning calibration checks indicate results in excess of +/- 0.2 standard units from the buffer standard, the facility must recalibrate the pH meter and conduct additional calibration checks. Failure to ensure that the beginning calibration checks are within +/- standard units will render any following pH data as invalid. Ending calibration checks in excess of +/- standard units of the calibration buffer will be considered out of tolerance, rendering the pH data invalid. All calibrations and calibration check records must be submitted with the PCR. In reporting all pH data, all data shall be truncated to one decimal place (the tenths digit).
[2]Monthly averages will be calculated using analytical results from both days of monitoring. In the event of monthly average exceedances, additional monitoring of the parameter in violation will be conducted in effort to bring the monthly average into the permitted range.

Appendix E: Plating Facility Points of Contact for WSSC Monitoring Point 001

Plating Facility Personnel	Role	GSFC Phone Number
Benjamine White	Certified Wastewater Operator, Primary Point of Contact	(301) 286-6464
Wellington Abhilashi	Wastewater Operator (Temporary Certificate), Alternate Point of Contact	(301) 286-2748

Appendix F – Pre-field Checklist for WSSC Monitoring

This checklist should be used to ensure that the proper sample containers and other necessary equipment are collected prior to any/all monitoring at each respective WSSC IWMP. It can also be used the week prior to monitoring, to ensure that the necessary bottles and equipment are ordered and available. Each checklist item should be checked off as it is collected prior to leaving building 27B. If performing additional monitoring for an NOV, Significant Non-Compliance, or other WSSC directive, verify with the Water Team Lead which parameters are to be monitored prior to field preparation/programming of sampler.

Sample Containers Required for Sampling at Monitoring Point FAC IWMP

	Parameter	Preservative	Size	Type	Sample Type	Quantity Per Event	Total Quantity Needed[1]
	Total metals	HNO_3	250 mL	Plastic	Composite	1	2
	Cyanide	NaOH	250 mL	Plastic	Grab	2	4
	Biochemical Oxygen Demand (BOD)	None	1 liter	Plastic	Composite	1	2
	Arsenic, Selenium, and Molybdenum	HNO_3	250 mL	Plastic	Composite	1	2
	Total Phosphorus and Ammonia	H_2SO_4	250 mL	Plastic	Composite	1	2

[1] 'Total Quantity Needed' is based on sample containers needed for two 24-hour monitoring events for quarterly sampling.

Other Equipment Required for Sampling at Monitoring Point FAC IWMP[1]

	Sampler tubing with strainer attached
	10 liter, high density, polyethylene composite bottle (1-2 bottles; if necessary)
	pH probe with preamp interface
	Submersible flow meter fixed to metal channel band attachment
	pH 7.0 and 10.0 buffers, and DI spray/wash bottle (with disposable hand warmers, if necessary)
	Graduated jar or cylinder for sample volume calibration
	Labels for sample containers (completed as best possible)
	Plastic funnel for pouring composite sample
	Logbook and indelible ink pens
	Trash bag(s)
	Sanitizing wipes
	Cooler filled with ice to ship samples to lab
	Protective gloves and eyewear; Tyvek protective suits (if desired)
	Government-issued laptop with Insight software installed and necessary cables (for data download)

[1] Any equipment not listed on this checklist that is listed in section P.5, 'Tools, Equipment, and Materials', is already stored at the WSSC FAC shed, located on the southeast side of the GSFC main gate guardhouse.

	Were all required pH checks performed and noted in the logbook? (once per monitoring day and final pH check)

Sample Containers Required for Monitoring Point 001

	Parameter	Preservative	Size	Type	Sample Type	Quantity Per Event	Total Quantity Needed[1]
	Total metals	HNO_3	250 mL	Plastic	Grab	1	2
	Cyanide	NaOH	250 mL	Plastic	Grab	1	2

[1] 'Total Quantity Needed' is based on one batch discharge per monitoring day for quarterly sampling; two monitoring days.

Other Equipment Required for Sampling at Monitoring Point 001 IWMP

	10 liter composite bottle
	Hanna HI 98183 or HI 98191 pH/ORP meter
	pH 7.0 and 10.0 buffers, and DI spray/wash bottle (with disposable hand warmers, if necessary)
	Labels for sample containers (completed as best possible)
	Logbook with indelible ink pen
	Cooler filled with ice to ship samples to lab
	Small glass container for temperature stabilization
	Protective gloves and eyewear
	Time keeping device (cell phone, stop-watch, timer, etc.)

	Were all necessary pH checks performed and noted in the logbook? (at the end of each batch discharge)
	Were all valves in the correct position before sampling started? Note in logbook.
	What was the date when the Ion Exchange column was last changed? Note in logbook.

Appendix G: Programming Procedures

The Sigma 900 Max Refrigerated Sampler should be programmed using the following steps:

1. Press main menu.
2. Set up.
3. Modify All Items.
4. Number of Bottles: 2 – Accept.
5. Bottle Volume: 10 gallons – Accept.
6. Intake tube length: X feet – Accept (tube length must be 11-14 feet).
7. Tube type: 3/8" vinyl – Accept.
8. Program Lock: Disabled – Accept.
9. Program Delay: Disabled – Accept.
10. Sample Collection: Flow – Proportional – Accept.
11. Flow pacing mode: const. vol/ vari. time – Accept.
12. Flow Meter: integral – Accept.
13. Sample every X gallons – Accept (should be 1100 gallons but may need to be adjusted as sanitary flow on Center changes).
14. Time over ride: Disabled – Accept.
15. Take first sample: immediately – Accept.
16. Deliver each sample to all bottles? No – Accept.
17. Choose method of distribution: bottles per sample – Accept.
18. Bottles per sample: 1 – Accept.
19. Liquid sensors: enabled – Accept.
20. Sample volume: 100 mL – Accept.
21. Intake rinse: 0 – Accept.
22. Sample retry: 3 – Accept.
23. Site ID: YYYYMMDD (date format) – Accept.
24. Access **advanced sampling**: Yes.
25. Arrow down to Time Bottle Sets – Select.
26. Time Bottle sets: Enabled – Accept.
27. Use clock time or duration: clock time – Accept.
28. Next bottle set: 00:00 – Accept.
29. Note: The size of each timed bottle set is 1 bottle.
30. Continuous mode: Enabled – Accept.
31. Scroll to Start/Stop times – Select.
32. Program by time: Enable – Accept.
33. Method of entering Start/Stop times: Time/Date – Accept.
34. Begin with bottle 1 on each new start: Disabled – Accept.
35. Program start #1: 00:01 AM DD-MM-YY (time/date format) – Accept.
36. Program stop #1: 23:59 PM DD-MM-YY (time/date format) – Accept.
37. Program start #2: 00:01 AM DD-MM-YY (time/date format) – Accept.
38. Program stop #2: 23:59 PM DD-MM-YY (time/date format) – Accept.

39. Additional start: press **clear entry** – Accept.
40. Main Menu; Options; Advanced Options.
41. Select Flow meter setup – Accept.
42. Flow Units: GPM – Accept.
43. Level Units: Inches – Accept.
44. Primary device: Manning Equation – Accept.
45. Shape: U-shaped channel – Accept.
46. Channel width: 11 inches – Accept.
47. Slope: 0.005 – Accept.
48. Channel roughness: 0.017 – Accept.
49. Total flow units: gallons – Accept.
50. Scroll to data log.
51. Select inputs.
52. Select pH / ORP.
53. Items to edit: pH.
54. Input Data: logged – Accept.
55. pH data logging interval: 1 min. – Accept.
56. Scroll to level flow – Accept.
57. Level Flow input data: logged – Accept.
58. Level Flow logging interval: 5 minutes – Accept.
59. Back to main screen.
60. SETUP COMPLETE.
61. Perform Field Check according to 3.3.2.2.
62. Press START PROGRAM (as late in the day as feasible since the calendar day is midnight to midnight).

*All additional data will have to be reported even if outside of the reporting/sampling day.
**Once the program has started, have sampling partner validate that dates and sampling times have been programmed correctly.

CHANGE HISTORY LOG

Revision	Effective Date	Description of Changes
Baseline	02/15/2005	Initial Release
A	05/15/2009	Revised Directive No. in header from 250-WI-8500.0.6A to 250-WI-8500.5.6A P.3 Added 2007 WSSC Plumbing & Fuel Gas Code. Updated hyperlink to new permit. P.5 Updated list to reflect current supplies and equipment. Updated instructions for pH buffer changes with respect to fluctuations in the nature of the effluent throughout document (P.5, 2.1.5, 3.3.2.1, 3.3.2.2). Changed references to "manhole" or "outfall" to IWMP throughout document (P.6, 2.1.1, 2.1.2) and added IWMP to acronyms in P.11. Changed shed location description from "outside Building 9" to "at the WSSC IWMP" in section 3.5. 1.0 Clarified method summary to reflect changes in permit and to explain TTO Exemption. Reworded Appendix C description. 2.1.4 Reworded reasoning for refreshing buffer solution with each recalibration. Clarified note about replacing pH probe. 2.3 Grab or composite to be used as part of sample identification. 3.2 Reworded 5. to reflect changes to Appendix C and programming instruction location. 3.3.3 Moved Hach Sigma 900 Max Refrigerated Sampler programming steps to Appendix C. Changed Program start/stop to 24 hour format. 3.4 Added directions concerning sampling error, non compliance, and repeat sampling events. Sample storage temperature was changed from 4°C to 6°C in section 3.4.1, 3.4.2, and 4.0. 3.6 Changed Office Procedures to Raw Data Management and added directions for direct transfer to PC. Changed EPA Method for Cyanide form 335.2 to 335.4 in section 4.0 and Appendix B. Updated report inclusions for clarification and current procedure in section 6.0. Clarified pH reporting protocol in section 6.1. Appendix A: Clarified TTO monitoring requirement and added beryllium and mercury. Appendix C: Deleted Programming for Hach American Sigma 800SL. Changed title of appendix – no longer "Alternative" programming.
B	03/26/2010	Changed Safety and Environmental Division (S&E) references to Medical and Environmental Management Division (MEMD) due to division name change.Changed S&E Water Program Manager to MEMD Sanitary Wastewater Manager. Updated signature block.
C	05/02/2011	Put WI on a new template. Relabeled appendices accordingly. P.5. Changed "program" to "software installed" in the ninth bullet. P.6 Added MEMD file path for TSA. Added "but not required" to the last sentence in the second paragraph. P.7 Added clarification to training and described what is proficient.

		P.9 Added a measurement/verification. 2.1.2 Added "or Equipment Control Number" to first bullet. 2.1.3 Added waste to water in fourth bullet. 3.3.1 Removed PVC from item number 3. 3.3.2 Added " or at interval recommended by manufacturer." 3.3.2.2 Added "to halt program" to item number 5 and 11. Added note at the bottom. 3.3.2.3 Inserted item number 4, moved item number 7 to end, and added "or enter corrected volume, if applicable" to item number 8. 3.4.2 Added step for 4, to mix sample. Added "remaining wastewater in the" to item number 6. 3.5 Added "or ethanol" to item number 2. 3.6 Added last two sentences to note. 3.6.2 Removed "COM" number and added "number that is assigned for cable in use". Updated table in section 4.0. 6.0 Added "or electronic version provided by WSSC". 6.1 Changed designated official to "official designated in the Delegation of Signatory Authority on file" in the first, second, and third bullet. Added sentence that lab reports received after 4pm shall not be opened until the next business day in the fifth bullet. 6.2 Added note. Updated Sample Order Form in appendix.
D	09/01/2011	Updated Appendix C with changes to effluent limits due to permit reissuance.
E	10/01/2012	P.8 Updated records retention and removed Task Safety Analyses from retention schedule. Appendix E.1 Added step 28.
F	04/16/2013	P.3. Updated reference to plumbing code and all hyperlinks. P.5. Added cooler, ice, and laptop to tools, equipment, and materials list. Removed DTU and portable sampler from the list, and added a note about the composite bottle size. Removed portable sampler as backup equipment since we have a spare refrigerated sampler. Made all associated changes in P.5, 1.0, 3.2, and programming procedures in appendix. 1.0, 2.1.3, 2.1.4, and 2.2. Minor typographical edits. 2.3. Modified sample identification to exclude WSSC. 3.1. Minor edits to include email in addition to calling to make arrangements week proceeding sampling. Added SharePoint Water Quality Calendar and link in lieu of notification to MEMD Sanitary Wastewater Manager. 3.4.2. Deleted note on step 1 and made minor edits to step 2. 3.5. Minor edits in first sentence. 3.6. Took out instructions for transferring data using a DTU. Added notes about the COM number changing when using a different USB port. Added information about driver installation and site file storage. 3.7. Added note and made minor edit. 5.0. Revised note concerning pH noncompliance for clarification and to add recent WSSC guidance. Added instructions to repeat sampling in case of noncompliance.

		6.0, 6.1, and 6.2. Made minor grammatical edits. Updated Appendix A definition to A.1 and A.3; minor edits to A.6. Updated Appendix B removing DTU and adding WI. Deleted sample bottle order form in Appendix D and made associated corrections to appendix reference throughout document (1.0, 3.1, 3.2, and 3.3.3). Updated programing procedures and changed it to Appendix D.
G	11/03/2016	250-WI-8500.5.6G has been updated to a reflect permit modification. New self-monitoring and WSSC parameters have been added to the DAP. A new IWMP has been added to capture electroplating wastewater from the Building 5 Plating Facility (Monitoring Point 001). Section 2 of this WI reflects new monitoring procedures for Monitoring Point 001. All formatting and section numbers have been updated. Updated WI template and added a table of contents. Updated P.1 to include a description of both WSSC IWMPs; Monitoring FAC and Monitoring Point FAC Updated P.3. to reflect new WSSC Plumbing Code Updated P.4. to reflect new document number Added equipment for Monitoring Point FAC and Monitoring Point 001 to P.5. Updated P.6. Replaced Task Safety Analysis with Job Hazard Analysis. Reference to the WSSC IWMP has been changed to specify Monitoring Point FAC in P.6 1.0 Method Summary for Monitoring Point FAC; updated to describe self-monitoring procedures for the WSSC Monitoring Point IWMP as required under the modified DAP. All references to "WSSC sampling" in this section have been changed to "WSSC Monitoring Point FAC sampling". Monitoring Point FAC parameters have been updated. 1.1.1.1 Updated IWMP reference and WSSC Field Logbook documentation. 1.1.1.2 Deleted serial number/ECN number reference. 1.1.1.3 Added language describing the duration of the composite period and documentation on the COC. 1.1.1.4 Note added to store buffers with hand warmers to aid in calibration and pH checks. 1.1.2 Reference to "quality control professional" has been changed to "quality assurance professional". 1.1.3 and 1.2.7 have been updated to include sampling for collecting two cyanide samples per monitoring day and combining the grabs for analysis. 1.2.1 SharePoint hyperlink has been updated. 1.2.3.2 Added language for volume calibration prior to Monitoring Point FAC sampling events. 1.2.3.2.4 Added language; "per manufacturer recommendations". 1.2.4.2 New monitoring parameters have been added. 1.2.5 Added Building 27B as a storage location for WSSC monitoring equipment in between monitoring events. 1.2.6 Removed language regarding directory changes as they apply to raw data downloads; those statements no longer apply to the most recent version of the Insight software. 1.3 Analytical Methods for WSSC Monitoring Point FAC have been updated to include the new monitoring parameters. 1.5 Reports is now Section 3.0. Section 2.0 and 3.0 have been added.

		Updated Appendix A to include trip blank. Updated Appendix B removing TSA and adding JHA, COD, BOD, FOG, TDS, and TSS. Appendix C has been updated to include new monitoring parameters and footnotes as noted in the DAP permit modification. Appendix D has been added to provide monitoring parameters for the new WSSC Monitoring Point 001 IWMP. Appendix E. Plating Facility Points of Contact for WSSC Monitoring Point 001 has been added. Appendix F. Pre-field Checklist for WSSC Monitoring has been added. Appendix D. Programming Procedures is now Appendix G. Added language to Appendix G footnote. Appendix H. Monitoring Point 001 pH Log has been added.
H	02/26/19	Updated WI template. 250-WI-8500.5.6H has been updated to a reflect permit modification. New self-monitoring and WSSC parameters have been added to the DAP. All formatting and section numbers have been updated. P.5 Added 27aA key, glass container for temperature stabilization, and checklist form to tools, equipment, and materials. P.6 Made minor grammatical edits. 1.0 Added parameters (Arsenic, Selenium, Molybdenum, Total Phosphorus, and Ammonia). Deleted parameters TSS and COD. 1.1.1.1 Added pH calibration. 1.1.1.2 Reworded paragraph. 1.2.1 Removed posting schedule on the Water Quality Calendar on SharePoint and added to schedule it on the Outlook Calendar. 1.2.2.2 Added a step to place manhole safety gate around manhole. 1.2.4.2 Added extra parameters from new permit to be collected (arsenic, selenium, molybdenum, total phosphorus, and ammonia. Removed COD and TSS. 1.2.5 Reworded a sentence in first paragraph. 1.3 Update Analytical Methods. Removed COD and TSS. Added Total Phosphorus, Ammonia, Arsenic, Molybdenum, and Selenium. Added a note that Ammonia can be sampled with total phosphorus.

		1.4 Added extra parameters from new permit (arsenic, selenium, molybdenum, total phosphorus, and ammonia. Removed COD and TSS. 2.0 Removed TTOs from the self-monitoring parameter. Changed wording of paragraph to state that sampling is completed over two days instead of two consecutive days. Added note to include information about grab samples that came from the new permit. Also added other pH meter (HI98191) throughout text. Removed text about composite sampling, now it is all a grab. 2.1.1.1 Added some text to document in WSSC field logbook (date when ion exchange column was changed, and to note if the configuration of the valves are facing a different way). 2.1.1.2 Added pH meter HI 98191. 2.1.1.3 Removed sentence about composite sample times, the new permit changed it all to grab samples. 2.1.1.5 Added pH meter HI 98191 and updated the WI name it refers to. 2.2.1.1 Made edits to paragraph about sampling schedule. 2.2.1.3 Removed text from week preceding sampling. Removed entering scheduling into SharePoint. Reworded Day preceding sampling. 2.2.2 Added pH meter HI98191 and updated WI title to 5.9 Water Sampling equipment. 2.2.2.2 Added a note to describe what bottles would be needed and that the samples taken are grabs and not composite samples. Deleted paragraph about TTO because it is exempt from the new permit. Added details about pH monitoring. 2.2.2.3 Deleted text about TTO and added text about total metals being a grab. Made a few grammatical edits. 2.2.2.4 Deleted composite sampling text. 2.2.5 Deleted consecutive day sampling text, sampling can now be completed during two days in the quarter. Added text if there are multiple batches in the day. 2.3 Updated Analytical Methods to change the total metal samples to a grab instead of a composite and removed TTO sampling. 2.4. Removed TTO sampling from text. Made a few grammatical edits. 3.0 Removed TTO certification from table. 3.1.2 Added detailed steps to explain how to create the summary data.

		Appendix B – Updated acronym list Appendix C Updated Parameters, Daily Max, sampling frequency and sampling type with new permit requirements. (Added Arsenic, Selenium, Molybdenum, Total Phosphorus, and Ammonia for GSFC to sample. Removed BOD and TSS for GSFC to sample) Also added WSSCs updated sampling parameters and highlighted them grey. Removed note about TTO monitoring. Appendix D Removed TTO and changed sampling type for cyanide and total metals to grab. Updated notes to reflect permit requirements. Appendix F Updated FAC parameters to include Arsenic, Selenium, Molybdenum, Total Phosphorus, and Ammonia. Removed COD and TSS. Updated 001 parameters to remove TTO sampling and to change total metal sampling to grab. Made notes for 001 Checklist. Appendix G Updated step 13 to reflect latest sampling programming to ensure enough volume is collected. Reworded multiple shall statements where more than one occurred in a single paragraph.

For Best Practices refer to:
https://gs279gdmsias.gsfc.nasa.gov/GDMSv2/downloadFile.htm?docId=28819