

City of Brawley



Local Limits Sampling Plan

July 23 2012



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To develop a sampling plan for local limits, various types of pollutant information were reviewed. Most of the data provided by the City for review were readily available from monitoring data collected by the City for regulatory compliance. The following data were compiled and reviewed to identify the pollutants that should be evaluated to determine the need for local limits:

- Monthly influent and effluent concentration data for 2010 and 2011
- Quarterly sludge monitoring data for 2010 and 2011
- Yearly priority pollutants analysis data (effluent and receiving water) for 2011 and 2012
- Priority pollutants analysis data from Lift Station

The sampling plan will address: (1) the pollutants to be evaluated, (2) the sampling locations, (3) the sampling frequency and procedures, and (4) the analytical methods. All sampling for local limits will be conducted by City of Brawley (David Arvizu, Water Distribution/Sewage Collections Operations Supervisor, (760) 351 -7183, darvizu@brawley-ca.gov).

1. Pollutants to Be Evaluated

The US Environmental Protection Agency (USEPA) guidance document for local limits development (2004) has identified 15 national pollutants of concern (POCs); arsenic, cadmium, chromium, copper, cyanide, lead, mercury, molybdenum, nickel, selenium, silver, zinc, biochemical oxygen demand (BOD), total suspended solids (TSS), and ammonia. 2004 USEPA Guidance also recommends sampling for organic priority pollutants.

The data were reviewed to ensure that the influent and/or effluent priority pollutant scan contained the following pollutants:

- Toxic pollutants designated in NPDES permits and/or State Water Quality Standards that apply to WWTP effluent or stream segment (i.e. New River)
- Organic toxic pollutants and toxic metals listed in 40 CFR Part 122, Appendix D, Table II and Table III
- Any toxic pollutants and hazardous substances required to be identified by existing dischargers if expected to be present listed in 40 CFR Part 122, Appendix D, Table V
- Any pollutants that are present and may cause a potential impact to the collection system, treatment works, worker health and safety or air quality
- Any pollutants that impact the treatment performance (i.e. process inhibition criteria)
- Any pollutants in biosolids listed in 40 CFR 503 Standards for the Use or Disposal of Sewage Sludge.
- Any pollutants that are recommended by Regional Water Quality Control Board (RWQCB)

Preliminary evaluation of the influent, effluent, and sludge data identified the 15 national POCs as site-specific POCs. Chemical Oxygen Demand (COD), Bis(2-ethylhexyl)phthalate and Oil and Grease (O&G) were also identified as a site-specific POCs. **Table 1** summarizes the list of POCs along with the listing criteria.

Table 1 Pollutants of Concern (Pollutants to be sampled and evaluated)

Parameters	Selection Criteria
National POCs	
Arsenic	B, I, IU, W
Cadmium	B, I, IU, W
Chromium	B, I, IU, W
Copper	B, I, IU, W
Cyanide (Total & Free Cyanide)	B, I, W
Lead	B, I, IU, W
Mercury	B, I, W
Molybdenum	B
Nickel	B, I, IU, W
Selenium	B, IU, W
Silver	I, W
Zinc	B, I, IU, W
Biochemical Oxygen Demand (BOD)	N
Total Suspended Solids (TSS)	N, IU
Ammonia, TKN, Nitrate, and Nitrate (as N)	I, N
Other Site Specific Pollutants	
Chemical Oxygen Demand (COD)	IU
Oil and Grease	N, IU
Bis(2-ethylhexyl)phthalate	N, W

Abbreviations - B: Biosolid Criteria, I: Process Inhibition, IU: Potential Industrial User Discharge, N: NPDES Permit, T: Fume Toxicity W: Water Quality Standard

2. Sampling Locations

Sampling locations include:

- **Influent Sample (INF-001):** Wastewater influent to the treatment facility. The sampling will be conducted upstream of any in-plant return flows (e.g. sludge digester decant and waste activated sludge).
- **Final Effluent Sample (EFF-001):** Final effluent discharge from facility (same location as specified in NPDES permit).
- **Biosolids Sample (SLD-001):** Sampling location must be after all biosolids treatment, chemical addition, and dewatering processes. The sampling location for compliance determination is at the end of the treatment or last sludge handling process just prior to final use or disposal, which will be after the dewatered sludge is dried in the drying beds.
- **Secondary Clarifier Sludge Sample (SLD-002):** Waste activated sludge (WAS) sample before thickening process.
- **Commercial Sample (CSC-001, North 8th Street between E Street & Main):** Sampling the commercial wastewater contribution may be accomplished by isolating and sampling an area of the collection system that receives primarily commercial wastewater (Non-SIU).
- **Residential Sample (CSR-001, Richard Street between Ronald Street & Steven Street – Lift Station #2):** Sampling the residential wastewater contribution may be accomplished by isolating and sampling an area of the collection system which only receives residential wastewater (Non-Commercial and Non-SIU).
- **Industrial Sample (CSI-001, National Beef):** National Beef discharge to the collection system.

The existing WWTP of Brawley has approximately 1.82 days of hydraulic retention time for 3.8 mgd of average effluent flow rate. Therefore, the sampling of each sampling location should take into account detention time. The effluent sample should be collected 48 hours after the influent sample.

3. Sampling Frequencies and Procedures

Sampling Frequencies

2004 EPA Guidance recommends 1 to 2 days of sampling for organic priority pollutants to determine potential POCs; and 1 to 2 days of sampling for sludge/biosolids, and 7 to 14 days of National POCs and POTW-specific POCs for POTW influent, primary effluent and final effluent, and the collection system to calculate local limits. Sampling days should be consecutive days for National POCs and POTW-specific POCs and should be 24-hour composite samples unless sampling methods only allow for grab samples (e.g. pH, cyanide, and temperature).

The minimum recommended sampling days for initial local limits development for POTWs of up to 5 MGD (Brawley) capacity is at least 7 consecutive sampling days. For a local limits study, wastewater samples should be collected during dry, normal operating conditions in the collection system, influent, effluent, and biosolids. **Table 2** presents a summary of sampling days for initial local limits development.

Table 2 Sampling Location and Sampling Frequency

Location	Consecutive Sampling Days		
	National POCs	Other Priority Pollutants - Metal	Other Priority Pollutants - Organic
Influent (INF-001)	7	7	7
Final Effluent (EFF-001) ¹	7	7	7
Biosolid (SLD-001)	2	2	2
Secondary Clarifier Sludge (SLD-002)	2	2	2
Commercial (CSC-001)	7	7	7
Residential (CSR-001)	7	7	7
Industrial (CSI-001)	7	7	7

¹ Due to hydraulic retention time, second day of effluent sample will be collected 48 hours after first day of influent sample.

Sampling Procedures

Where appropriate, 24-hour composite sampling will be conducted in accordance with standard procedures for flow-proportional sampling, with discrete samples (aliquots) collected over time based on the flow of the discharge being sampled, and then combined to form a single sample for analysis.

Grab sampling will be conducted for cyanide as specified by 40 CFR Part 136, Guidelines Establishing Test Procedures for the Analysis of Pollutants. Where grab samples are necessary, a series of grab samples over the course of a 24-hour period is recommended. Four grab samples are recommended at a minimum. The interval waste stream flow will be measured between each grab sample for a flow-proportioned grab composite sample. The grab sample will be analyzed separately and the results will be averaged according to flow weight.

At the time of grab sample collection, pH, and temperature will be measured and recorded.

Biosolid samples (SLD-001) require that a composite sample be taken of the sludge mass in drying beds. Several aliquots (minimum 4 aliquots) are taken from randomly selected locations within the sludge drying beds and the aliquots are composited to form a single sample for analysis.

Sampling Equipment

Samples can be collected with a Teflon bottle, HDPE bottle, or glass bottle (minimum 1 liter). Teflon and HDPE bottles can be interchangeable but BOD and organic priority pollutants require a glass sampling bottle. The examples of other sampling devices are provided in EPA Method 1669, Sampling Ambient Water for Determination of Metals at EPA Quality Criteria Levels. The sampling bottles must be pre-cleaned at the laboratory performing the analysis and scheduled for return shipping not later than one week prior to the sampling episode. Samples must be shipped on ice (below 4 °C and dark) by overnight courier and preservation completed on site or lab, as required. Clean, non-talc, polyethylene gloves must be worn during all operations involving handling of the sampling apparatus, samples and blanks.

Table 3 presents a summary of sampling type, size, container, and preservation for pollutants for wet stream analysis.

For biosolids sampling (SLD-001), samples will be taken by dividing drying bed into quarters. For the center of each quarter, a single core sample will be collected through the entire depth of the sludge using a coring device. Samples from each quarter will be combined and thoroughly mixed and transferred to a 1 L HDPE bottle.

Table 3 Sampling Type, Size, Container, and Preservation for Pollutants: Wet Stream Sample

Parameters	Sampling Type	Minimum Sampling Size & Container	Preservation
National POCs			
Arsenic	Composite	200 ml, HDPE	HNO ₃ – pH<2, 4 °C, Dark
Cadmium	Composite	200 ml, HDPE	HNO ₃ – pH<2, 4 °C, Dark
Chromium (Total)	Composite	200 ml, HDPE	HNO ₃ – pH<2, 4 °C, Dark

Parameters	Sampling Type	Minimum Sampling Size & Container	Preservation
Copper	Composite	200 ml, HDPE	HNO ₃ – pH<2, 4 °C, Dark
Cyanide (Total & Free Cyanide)	Grab	500 ml, HDPE	NaOH – pH>12, 4 °C, Dark
Lead	Composite	200 ml, HDPE	HNO ₃ – pH<2, 4 °C, Dark
Mercury	Composite	200 ml, HDPE	HNO ₃ – pH<2, 4 °C, Dark
Molybdenum	Composite	200 ml, HDPE	HNO ₃ – pH<2, 4 °C, Dark
Nickel	Composite	200 ml, HDPE	HNO ₃ – pH<2, 4 °C, Dark
Selenium	Composite	200 ml, HDPE	HNO ₃ – pH<2, 4 °C, Dark
Silver	Composite	200 ml, HDPE	HNO ₃ – pH<2, 4 °C, Dark
Zinc	Composite	200 ml, HDPE	HNO ₃ – pH<2, 4 °C, Dark
BOD	Composite	Glass BOD Container	4 °C, Dark
TSS ¹	Composite	100 ml, HDPE	4 °C, Dark
Ammonia (as N)	Composite	400 ml, HDPE	H ₂ SO ₄ – pH<2, 4 °C, Dark
TKN (as N)	Composite	500 ml, HDPE	H ₂ SO ₄ – pH<2, 4 °C, Dark
Nitrate (as N)	Composite	100 mL, HDPE	4 °C, Dark
Nitrite (as N)	Composite	100 mL, HDPE	4 °C, Dark
Other Site Specific Pollutants			
COD	Composite	200 ml, HDPE	H ₂ SO ₄ – pH<2, 4 °C, Dark
Bis(2-ethylhexyl)phthalate ²	Composite	200 ml, Glass	4 °C, Dark
Oil and Grease	Grab	1 L, Glass	H ₂ SO ₄ – pH<2, 4 °C, Dark

¹ %Total Solids for Sludge and Biosolids

² Prevent contamination from sampling equipment and gloves containing plastic.

All sample containers will be labeled with the following information:

- Project Name
- Sampling Date and Time
- Sampling Location
- Field Measurement (Temperature & pH)

Sampling Quality Assurance/Quality Control

The sampling program will include the following quality assurance/quality control sampling:

- One set of split samples collected at the WWTP influent for each group of analytes except VOCs.
- One set of duplicate samples collected at the WWTP influent for VOCs.
- Trip blanks for one set of VOC samples collected at the WWTP influent.
- One set of equipment blanks collected at the WWTP influent for each group of analytes collected by automatic sampler.

Flow Data

Flow data will be collected as follows:

- Total POTW flow
- Sludge flow (WAS) to Dewatering Unit
- Sludge flow to disposal

4. Analytical Methods

All sampling and analysis of wastewater will be conducted in accordance with 40 CFR Part 136. All sampling and analysis of biosolids/sludge will be conducted in accordance with 40 CFR Part 503, Standards for the Use or Disposal of Sewage Sludge. To accurately detect trace levels of pollutants, an analytical method which has the most sensitive and lowest detection limit will be selected.

Table 4 summarizes the recommended maximum reporting limits and analytical methods for pollutants.

Table 4 Maximum Reporting Limits for Analytical Methods

Parameters ¹	Maximum Reporting Limit	Units	Analytical Method
National POCs			
Arsenic	0.5	µg/L	EPA 200.8
Cadmium	0.1	µg/L	EPA 200.8
Chromium (Total)	0.5	µg/L	EPA 200.8
Copper	0.5	µg/L	EPA 200.8
Cyanide (Total & Free Cyanide) ²	3	µg/L	SM 4500-CN E
Lead	0.25	µg/L	EPA 200.8
Mercury	0.0005	µg/L	EPA 245.1

Parameters ¹	Maximum Reporting Limit	Units	Analytical Method
Molybdenum	1	µg/L	EPA 200.8
Nickel	0.5	µg/L	EPA 200.8
Selenium	1	µg/L	EPA 200.8
Silver	1	µg/L	EPA 200.8
Zinc	1	µg/L	EPA 200.8
BOD	5	mg/L	SM 5210B
TSS ³	3	mg/L	EPA 160.2
Ammonia (as N)	0.1	mg/L	SM 4500-NH ₃ C
TKN (as N)	0.25	mg/L	EPA 350.1
Nitrate (as N)	0.1	mg/L	EPA 300.0
Nitrite (as N)	0.1	mg/L	EPA 300.0
Other Site Specific Pollutants			
COD	5	mg/L	SM 5220
Bis(2-ethylhexyl)phthalate	5	µg/L	EPA 625.0
Oil and Grease ⁴	5	mg/L	EPA 1664

¹ Total recoverable metal analysis

² Non-distillation methods for available cyanide, such as UEPA OIA-1677 or ASTM D6888-04, shall be used to measure free cyanide.

³ % total solids for Sludge and Biosolids sample

⁴ Include polar and non-polar fraction of oil and grease.

The laboratory must be a USEPA-certified and licensed by the California Department of Public Health. The laboratory will perform internal quality control analyses (analytical blanks, duplicates, and matrix spikes) according to its quality assurance plans (QAPs) and as required by California Department of Public Health Laboratory Licensure.

Appendix A

Daily Sampling Activity Schedule

Appendix A: Daily Sampling Activity Schedule

Sampling Days	Sampling Locations													
	Influent (INF-001)		Final Effluent (EFF-001)		Biosolid (SLD-001)		Secondary Clarifier Sludge (SLD-002)		Commercial (CSC-001)		Residential (CSR-001)		Industrial (CSI-001)	
	CS	GS	CS	GS	CS	GS	CS	GS	CS	GS	CS	GS	CS	GS
Day 1	√	√							√	√	√	√	√	√
Day 2	√	√							√	√	√	√	√	√
Day 3	√	√	√	√					√	√	√	√	√	√
Day 4	√	√	√	√					√	√	√	√	√	√
Day 5	√	√	√	√		√		√	√	√	√	√	√	√
Day 6	√	√	√	√		√		√	√	√	√	√	√	√
Day 7	√	√	√	√					√	√	√	√	√	√
Day 8			√	√										
Day 9			√	√										

1. Abbreviations – CS: Composite Sampling, GS: Grab Sampling.
2. Due to hydraulic retention time, first day effluent sample will be collected 48 hours after first day influent sample.
3. Influent (INF-001), Final Effluent (EFF-001), Commercial (CSC-001), Residential (CSR-001), and Industrial (CSI-001) Sampling Parameters

Composite Sampling Parameters	Grab Sampling Parameters
Arsenic, Cadmium, Chromium (total), Copper, Lead, Mercury, Molybdenum, Nickel, Selenium, Silver, Zinc, BOD, TSS, Ammonia (as N), TKN (as N), Nitrate (as N), Nitrite (as N), COD, Bis(2-ethylhexyl)phthalate,	Cyanide (Total and Free), Oil and Grease (Polar and Non-polar)

4. Biosolids (SLD-001) and Secondary Clarifier Sludge (SLD-002) Sampling Parameters

Composite Sampling Parameters	Grab Sampling Parameters
Not Required.	Arsenic, Cadmium, Chromium (total), Copper, Cyanide (Total and Free), Lead, Mercury, Molybdenum, Nickel, Selenium, Silver, Zinc, % Total Solids (TS), Ammonia (as N), TKN (as N), Nitrate (as N), Nitrite (as N), Bis(2-ethylhexyl)phthalate, Oil and Grease (Polar and Non-polar)

