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Barceloneta Regional Wastewater Treatment Plant
Technically Based Local Limits

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Puerto Rico Aqueduct and Sewer Authority

Executive Summary

The Barceloneta Regional Wastewater Treatment Plant (RWWTP) is a publicly owned treatment works (POTW) whose operations are authorized under a Water Quality Certificate issued by the Puerto Rico Environmental Quality Board[1] that is incorporated in a National Pollutant Discharge Elimination System (NPDES) permit (PR0021237) issued by the U.S. Environmental Protection Agency, Region 2 (EPA).

Section 125.65 in Title 40 of the Code of Federal Regulations Part 125 (40 CFR 125), published in the *Federal Register* on August 9, 1994, sets forth the urban area pretreatment program requirements of Section 303(c) of the Clean Water Act; Section 125.65 specifies compliance with 40 CFR 403–471. Requirements to develop technically based local limits (TBLLs) are specified in 40 CFR 403.5(c).

This TBLL evaluation has been prepared to meet NPDES requirements for the Barceloneta RWWTP. The limits have been developed in accordance with EPA's Technical Support Document, *Local Limits Development Guidance* (EPA 2004), and in accordance with NPDES Permit No. PR0021237 Part IV (B)(6)(b)(1&2) Pretreatment Evaluation. In response to these standards, conditions, and requirements, the local limits in Table ES-1 have been developed for the Barceloneta RWWTP.

Table ES-1. Local Limits Summary: Industry-Wide Concentration-Based Limits

Parameter	Local Limit	Section
Arsenic	0.17 mg/L	Refer to Note a
Cadmium	0.15 mg/L	Refer to Note a
Chromium	1.0 mg/L	Refer to Note b
Copper	0.93 mg/L	Refer to Note a
Cyanide (Free)	0.1 mg/L[c]	Refer to Note a
Lead	0.31 mg/L	Refer to Note a
Mercury	0.061 mg/L	Refer to Note a
Molybdenum	0.16 mg/L	Refer to Note a
Nickel	0.68 mg/L	Refer to Note a
Selenium	0.165 mg/L	Refer to Note a
Silver	1.67 mg/L	Refer to Note a
Zinc	3.54 mg/L	Refer to Note a
Surfactants (MBAS)	23.4 mg/L	Refer to Note a
Flow	No Limit	6.1
BOD_5	250 mg/L surcharge level	6.2
TSS	250 mg/L surcharge level	6.2

[1] On August 2, 2018, Law #171 was promulgated and approved by the governor of Puerto Rico to reorganize several agencies. As a result, the Puerto Rico Environmental Quality Board was eliminated, and its responsibilities now fall under the Puerto Rico Department of Natural and Environmental Resources.

Table ES-1. Local Limits Summary: Industry-Wide Concentration-Based Limits

Parameter	Local Limit	Section
Total Nitrogen (NH_3, NO_3, and TKN)	Monitor Only	6.3
pH	6.5–9.0 SU	6.4
Phenols[b] (phenolic substances)	1.0 mg/L	6.5
Oil & Grease (O&G)	50 mg/L total O&G	6.6
Temperature	40°C (104°F) at POTW; 60°C (140°F) from SIU	6.7
Flammability	Closed-cup flashpoint <140°F (60°C), No two consecutive readings at ≥5% LEL, and no reading of ≥10% LEL allowed	6.8
Toxicity	Industry permit-specific technically based limits	6.9

[a] Table 5-6, pages 5–11, and on line 68 of "TBLL Calc-Barceloneta.xlsm" attached as Appendix C

[b] Limits were not technically derived but have been adopted from the General Limit in the Puerto Rico Aqueduct and Sewer Authority (PRASA) Rules and Regulations for the Supply of Water and Sewer Services, Section 2.05.

[c] PRASA General Limit is retained.

Notes:

°C = degrees Celsius

°F = degrees Fahrenheit

BOD_5 = 5-day biochemical oxygen demand

LEL = lower explosive unit

MBAS = methylene blue active substances

mg/L = milligrams per liter

NH_3 = ammonia

NO_3 = nitrate

SIU = significant industrial user

SU = standard unit(s)

TKN = total Kjeldahl nitrogen

The concentration-based limits presented in Table ES-1 are not based on total permitted industrial flow because more flow has been allocated to industry in Barceloneta than is currently received at the treatment plant. Such an allocation leads to errors in the EPA-approved local limits calculations because it tries to allocate mass to non-existent flow. To overcome this issue, the actual maximum monthly flow for each industry is summed to derive a universal concentration-based limit. Each industry, however, is allowed to discharge more than the maximum month observed. Consequently, the concentration-based limits for each industry are not fully effective to protect the treatment plant. This is because if all industries discharged above the flow used to calculate these limits, the combined mass would exceed the maximum allowable headworks loading. To protect the plant, a mass-based limit must also be established for each

industry. Consequently, in addition to not exceeding the above concentration-based limits, each industry may not exceed the industry-specific mass-based limits established in Table ES-2.[2]

Table ES-2. Local Limits Summary: Industry-Specific Mass-Based Limits

	Industry Specific Mass Based Limit (lb/d)							
	Industry	Pollutant of Concern						
		As	Cd	Cr	Cu	CN	Pb	Hg
	Uniform Concentration Based Limit	0.170	0.150	1.000	0.130	0.100	0.310	0.060
1	AIR MASTER AWNING, LLC.	0.052	0.046	0.306	0.040	0.031	0.095	0.018
2	BRISTOL-MYERS SQUIBB HOLDINGS PHARMA, LLC.	0.273	0.241	1.609	0.209	0.161	0.499	0.097
3	ROMARK GLOBAL PHARMA, LLC.	0.096	0.085	0.564	0.073	0.056	0.175	0.034
4	FMC AGRICULTURAL CARIBE INDUSTRIES, LTD.	0.248	0.219	1.461	0.190	0.146	0.453	0.088
5	JANSEN ORTHO, LLC (MANATI OPERATIONS)	0.083	0.073	0.486	0.063	0.049	0.151	0.029
6	PEPSICO CARIBBEAN, INC. (FRITO LAY)	0.079	0.070	0.465	0.060	0.046	0.144	0.028
7	PFIZER PHARMACEUTICALS , LLC	0.172	0.152	1.010	0.131	0.101	0.313	0.061
8	BOEHRINGER INGELHEIM ANIMAL HEALTH PUERTO RICO, LLC	0.193	0.170	1.136	0.148	0.114	0.352	0.068
9	ABBVIE LTD	0.868	0.766	5.106	0.664	0.511	1.583	0.306
10	AIAC INTERNATIONAL PHARMA, LLC	0.088	0.078	0.519	0.068	0.052	0.161	0.031
11	BASF AGRICULTURAL PRODUCTS DE PUERTO RICO	0.044	0.039	0.260	0.034	0.026	0.081	0.016
12	PATHEON PUERTO RICO, INC.	0.141	0.125	0.832	0.108	0.083	0.258	0.050
13	LA VEGA LANDFILL & RESOURCES, INC.							
14	LANDFILL TECHNOLOGIES OF ARECIBO, CORP.							
15	PFIZER PHARMACEUTICALS, LLC. (VEGA BAJA)Barceloneta	0.021	0.019	0.126	0.016	0.013	0.039	0.008

	Industry Specific Mass Based Limit (lb/d)					
	Industry	Pollutant of Concern				
		Ni	Se	Ag	Zn	MBAS
	Uniform Concentration Based Limit	0.680	0.165	1.670	3.540	23.400
1	AIR MASTER AWNING, LLC.	0.208	0.050	0.511	1.083	7.156
2	BRISTOL-MYERS SQUIBB HOLDINGS PHARMA, LLC.	1.094	0.265	2.686	5.695	37.643
3	ROMARK GLOBAL PHARMA, LLC.	0.383	0.093	0.942	1.996	13.193
4	FMC AGRICULTURAL CARIBE INDUSTRIES, LTD.	0.993	0.241	2.440	5.172	34.185
5	JANSEN ORTHO, LLC (MANATI OPERATIONS)	0.330	0.080	0.811	1.719	11.362
6	PEPSICO CARIBBEAN, INC. (FRITO LAY)	0.316	0.077	0.776	1.645	10.872
7	PFIZER PHARMACEUTICALS , LLC	0.687	0.167	1.687	3.576	23.639
8	BOEHRINGER INGELHEIM ANIMAL HEALTH PUERTO RICO, LLC	0.772	0.187	1.897	4.022	26.583
9	ABBVIE LTD	3.472	0.843	8.528	18.076	119.488
10	AIAC INTERNATIONAL PHARMA, LLC	0.353	0.086	0.868	1.839	12.155
11	BASF AGRICULTURAL PRODUCTS DE PUERTO RICO	0.177	0.043	0.435	0.922	6.094
12	PATHEON PUERTO RICO, INC.	0.565	0.137	1.389	2.944	19.458
13	LA VEGA LANDFILL & RESOURCES, INC.					
14	LANDFILL TECHNOLOGIES OF ARECIBO, CORP.					
15	PFIZER PHARMACEUTICALS, LLC. (VEGA BAJA)Barceloneta	0.086	0.021	0.210	0.445	2.944

[2] Because of small batch discharges, the La Vega and Arecibo landfills are subject only to the concentration-based limits.

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Acronyms and Abbreviations

°C	degrees Celsius
°F	degrees Fahrenheit
µg/L	microgram(s) per liter
ACGIH	American Conference of Government Industrial Hygienists
AHL	allowable headworks loading
BMP	best management practice
BOD_5	5-day biochemical oxygen demand
CFR	Code of Federal Regulations
EOMZ	edge of mixing zone
EPA	United States Environmental Protection Agency
ft	foot (feet)
LAS	linear alkylbenzene sulfonate
lb/d	pound(s) per day
LEL	lower explosive limit
m	meter(s)
MAHL	maximum allowable headworks loading
MAIL	maximum allowable industrial loading
MBAS	methylene blue active substances
mg/L	milligram(s) per liter
mgd	million gallon(s) per day
ML	minimum level
mm	millimeter(s)
NPDES	National Pollutant Discharge Elimination System
O&G	oil and grease
POC	pollutant of concern
POTW	publicly owned treatment works
PRASA	Puerto Rico Aqueduct and Sewer Authority
PRWQSR	Puerto Rico Water Quality Standards Regulation
QA/QC	quality assurance/quality control
RWWTP	regional wastewater treatment plant
SIU	significant industrial user
SU	standard units
TBLL	technically based local limit
TCLP	Toxicity Characteristic Leaching Procedure
TKN	total Kjeldahl nitrogen
TN	total nitrogen
TSS	total suspended solids
WWTP	wastewater treatment plant

1. Introduction

The Barceloneta Regional Wastewater Treatment Plant (RWWTP) is located at the State Road 684 Km 3.8, Palmas Altas Ward, Barceloneta, Puerto Rico. The plant operates under National Pollutant Discharge Elimination System (NPDES) permit number PR0021237. The Industrial Pretreatment Program regulates 15 industries that discharge wastes to the Barceloneta RWWTP collection system as significant industrial users (SIUs).

Industrial permits issued to SIUs include the Puerto Rico General Limits. The local limits in this document are intended to replace those limits with site-specific limits for the Barceloneta RWWTP

This document uses recent test data to develop revised technically based local limits (TBLLs) that are specific to current conditions in the Barceloneta RWWTP collection system. These TBLLs have been revised in response to NPDES permit PR0021237 Part IV (B)(6)(b)(1&2).

The following appendices are provided:

- Appendix A Priority Pollutants Detected at or Above MDL
- Appendix B Guidance on the Selection of Pollutants of Concern
- Appendix C Data Sheets Used in "TBLL Calc-Barceloneta.xlsm"
- Appendix D Industrial Flow Tabulation and Mass Limits Calculations
- Appendix E Puerto Rico Water Quality Standards Worksheet
- Appendix F Average TCLP for Sludge
- Appendix G Phenolic Compounds Regulated by Puerto Rico Water Quality Standards
- Appendix H Long Hand Calculation of Copper Local Limits
- Appendix I BOD_5 and TSS Estimates
- Appendix J Definitions

2. Local Limits Development Methodology

The following guidance was used to develop the TBLLs presented in this document:

- *Local Limits Development Guidance* (EPA 2004)
- *Guidance Manual on the Development and Implementation of Local Discharge Limitations under the Pretreatment Program*, EPA 833-B-87-202 (EPA 1987)

This document provides the rationale and legal support for local limits developed in relation to technically based environmental criteria using EPA-approved methodology. The methodology is intended to facilitate full compliance at the treatment facility for all identified criteria. The following steps were taken to develop the Barceloneta RWWTP TBLLs:

1) Characterize the Barceloneta RWWTP treatment system in terms of regulatory requirements, plant capacity, treatment trains, unit processes, industrial users, and receiving stream characteristics.
2) Using the site characterization from Step 1, select regulatory/operational criteria that apply to the specific treatment systems.
3) Select parameters that should be considered for local limit development, referred to as pollutants of concern (POCs).[3] Selection is based on review of historic data and also includes a minimum list of EPA-required pollutants. Pollutants selected may be individual elements or compounds, such as metals or halogenated organic compounds that are discussed in Sections 4 through 6. Additionally, local limits may be aimed at controlling groups of substances that collectively exhibit negative characteristics, such as flammability or toxicity. This second category is discussed in Section 6, Other Limits and Concerns.
4) Upon selection of the POCs, collect historic test data or generate new data from sampling and analysis to develop the rationale for the maximum ability of the plant to treat these pollutants and still remain compliant with all applicable criteria.
5) Compile test data and model the fate of the pollutants within the system using partitioning coefficients within the plant and physical properties, such as Henry's constants, in the collection system.
6) Conduct standard EPA-accepted calculations for individual elements and compounds discussed in Sections 4 through 6 to determine the maximum pollutant loading that can be allowed at the headworks (allowable headworks loading [AHL]) and still maintain compliance with all applicable criteria.
7) After applying all calculations for all criteria, use the smallest mass that facilitates meeting environmental and regulatory criteria. This is referred to as the maximum allowable headworks loading (MAHL).
8) Subtract the domestic loading and a safety and growth factor from the MAHL; the remaining allowable pollutant loading is the maximum allowable industrial loading (MAIL) available to industry.
9) Once the MAIL has been calculated, allocate the mass to the industries based on one of the prescribed methods found in the EPA *Local Limits Development Guidance* (EPA 2004). These allocations then form the basis of the local limits for these pollutants.
10) Develop criteria based on limitations that restrict the magnitude of the negative characteristics exhibited by each type of group for collective groups of pollutants in Section 6.

[3] The EPA *Local Limits Development Guidance Manual* (2004) defines and uses the technical term "Pollutants of Concern (POC)" throughout the document. Consequently, to avoid confusion during the regulatory review process of the TBLL, the terms "Pollutants," "Pollutants of Concern," and POC are used throughout this document when referring to parameters considered for local limits development.

3. System Characterization, Industrial Users, Receiving Stream, and Applicable Criteria

3.1 Treatment System

The Barceloneta RWWTP serves the municipalities of Barceloneta, Manatí, Florida, and a section of Arecibo (Garrochales). The RWWTP is permitted to treat a daily maximum flow of 8.33 million gallons per day (mgd). Currently, the average daily flow to the RWWTP is approximately 5.63 mgd based on review of data from November 11, 2018, to December 31, 2019. Table 3-1 lists the plant's design treatment capabilities for flow, 5-day biochemical oxygen demand (BOD_5), and total suspended solids (TSS). The BOD_5 and TSS capacities were estimated

Table 3-1. Barceloneta RWWTP Design Influent Loading Capacities

Item	Daily Permitted Maximum	Daily Average
Flow	8.33 mgd	5.63 mgd
BOD_5	17,368 lb/d	
TSS	13,894 lb/d	

Note:

lb/d = pound(s) per day

Treatment processes at the plant include screening, grit removal, sedimentation, biological treatment with aeration, secondary clarification, and aerobic digestion of biosolids before discharging the treated effluent to the Atlantic Ocean through an ocean outfall system that incorporates a high-rate diffuser. Sludge from the Barceloneta RWWTP is dewatered on belt thickeners and sent to the Arecibo Compost Facility.
Figure 3-1 shows the treatment train and a schematic of the plant (including an aerial view of the facility). After review of the treatment processes, two partitioning coefficients (after primary clarification and overall plant removal) were found to be present in the system.

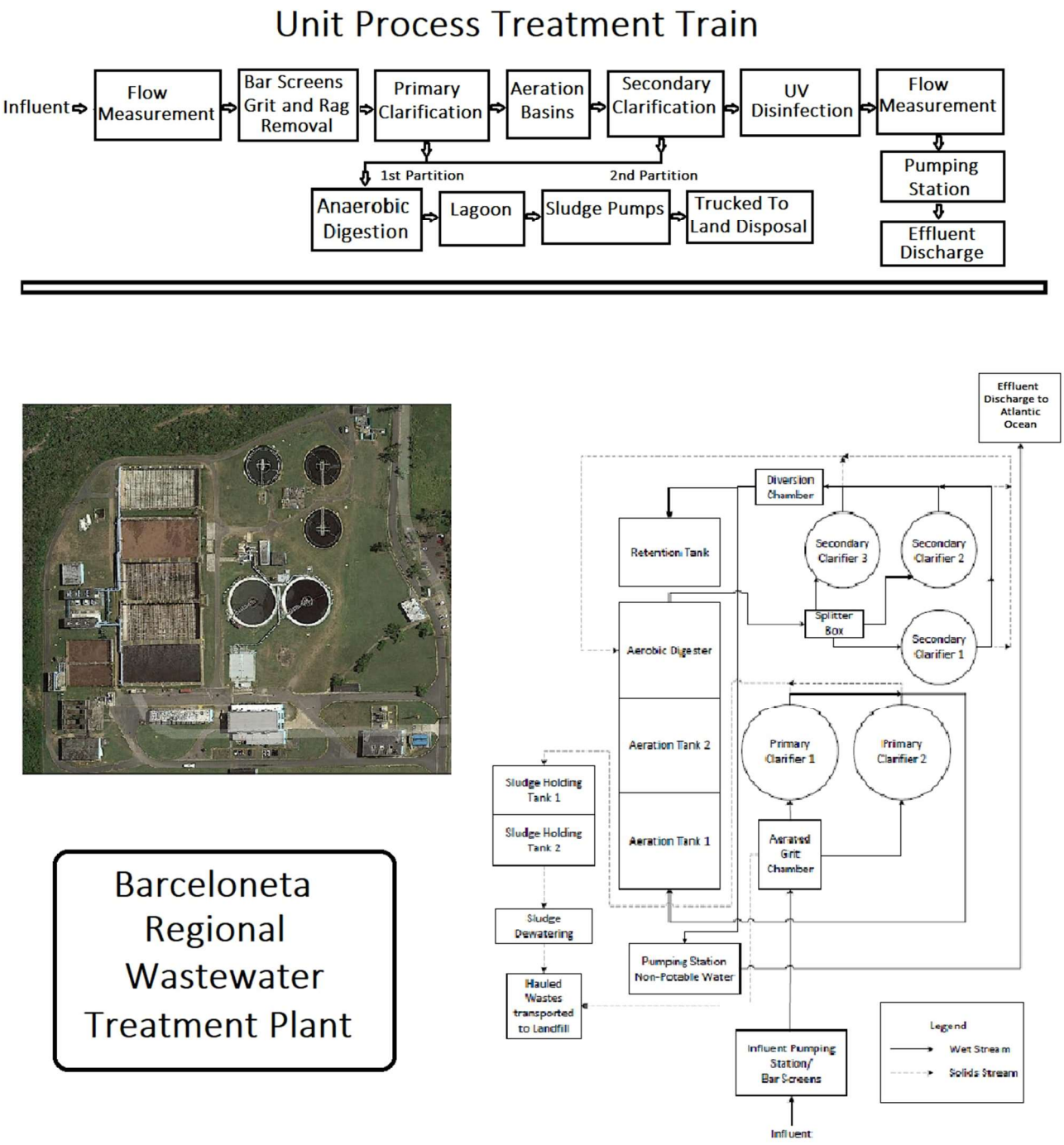


Figure 3-1. Barceloneta RWWTP, Treatment Unit Processes, and Aerial Site View

3.2 Industrial Users

The Puerto Rico Aqueduct and Sewer Authority (PRASA) has issued permits to fifteen SIUs that contribute flow to the Barceloneta RWWTP. Table 3-2 lists these SIUs and their permitted flow limits. Total permitted combined SIU flow is 6,118,433 gallons per day (6.12 mgd), which is approximately 73 percent of the plant's NPDES-permitted maximum daily flow and exceeds the actual flow received at the RWWTP. Using this flow removes the ability to use the standard local limits methodology.

Review of records, however, shows that actual industrial flows are much less than permitted flow, and the Industrial Pretreatment Program permits have allocated more flow than needed. As a consequence, the total daily flow for all 15 industries for the 21-month period from January 1, 2019, to September 30, 2020, have been analyzed for the combined maximum month to arrive at 1.61 mgd (Appendix D). Using this number allows the calculation of local limits. Using this method, however, necessitates capping the mass at each industry that can be discharged per day. This results in both a concentration-based limit that uniformly applies to each industry and a mass-based limit that is unique for each SIU. Table 3-2 lists these SIUs and their permitted flow limits. Additional test data on these industrial users are available from the PRASA Industrial Pretreatment Program.

Table 3-2. Significant Industrial Users and Respective Permitted Flows

SIU	Permit No.	Federal Category	Category	Permitted Flow (mgd)
AIR MASTER AWNING, LLC.	GDA-02-202-053	Metal Finishing Point Source	433 Subpart A	0.005
BRISTOL-MYERS SQUIBB HOLDINGS PHARMA, LLC.	GDA-07-210-004	Pharmaceutical Manufacturing Point Source	439 Subpart D	0.230
ROMARK GLOBAL PHARMA, LLC.	GDA-19-210-001	Pharmaceutical Manufacturing Point Source	439 Subpart D	0.068
FMC AGRICULTURAL CARIBE INDUSTRIES, LTD. (Antes DUPONT)	GDA-88-210-001	Pesticide Chemicals Point Source	455 Subpart C	1.6
JANSEN ORTHO, LLC (MANATI OPERATIONS)	GDA-88-210-002	Pharmaceutical Manufacturing Point Source	439 Subpart D	0.20
PEPSICO CARIBBEAN, INC. (FRITO LAY)	GDA-90-202-011	Canned and Preserved Fruits Processing Point Source	407 Subpart H	0.12
PFIZER PHARMACEUTICALS LLC	GDA-92-202-038	Pharmaceutical Manufacturing Point Source	439 Subpart C & D	0.384
BOEHRINGER INGELHEIM ANIMAL HEALTH PUERTO RICO, LLC (Antes MERIAL)	GDA-93-202-045	Pharmaceutical Manufacturing Point Source	439 Subpart C & D	0.851
ABBVIE LTD	GDA-93-202-050	Pharmaceutical Manufacturing Point Source	433 Subpart A & 439 Subpart A, C & D	1.38
AIAC INTERNATIONAL PHARMA, LLC	GDA-93-202-052	Pharmaceutical Manufacturing Point Source	439 Subpart D & E	0.252

Table 3-2. Significant Industrial Users and Respective Permitted Flows

SIU	Permit No.	Federal Category	Category	Permitted Flow (mgd)
BASF AGRICULTURAL PRODUCTS DE PUERTO RICO	GDA-93-210-047	Pesticide Chemicals Point Source	414 Subpart H &455 Subpart C	0.189
PATHEON PUERTO RICO, INC.	GDA-99-202-058	Pharmaceutical Manufacturing Point Source	439 Subpart D	0.225
LA VEGA LANDFILL & RESOURCES, INC.	GDG-11-214-009	N/A	N/A	0.010
LANDFILL TECHNOLOGIES OF ARECIBO, CORP.	GDG-12-201-004	N/A	N/A	.0003
PFIZER PHARMACEUTICALS LLC (PPLLC)	GDG-94-214-053	Pharmaceutical Manufacturing Point Source	439 Subpart D	0.560
			Total Authorized Flow	**6.12**

3.3 Discharge to Atlantic Ocean

The Barceloneta RWWTP discharges secondary-treated effluent through a single 48-inch concrete pipe outfall and high-rate diffuser system into Class SB receiving waters of the Atlantic Ocean near Punta Palmas Altas (refer to Figure 3-2). The discharge begins at a location approximately 1,800 feet offshore, where the outfall pipe joins the diffuser at a water depth of approximately 85.3 feet. Two diffuser legs, each with a diameter of 36 inches, extend in a "90-degree Y" configuration from the ocean outfall at a water depth of approximately 98.4 feet mean low water.

Each diffuser leg is approximately 328 feet long and both are identical in configuration. The diffuser legs each have twenty 12-inch-diameter vertical risers, alternately spaced at 9.32-foot and 22.68-foot intervals. The ten risers closest to shore have two 3-inch-diameter ports oriented horizontally to the bottom and perpendicular to the diffuser barrel. The next nine vertical risers, in the offshore direction, each have two 4-inch-diameter ports oriented similarly to the onshore ports. The twentieth riser terminates in a 90-degree elbow with a 12-inch-diameter port oriented seaward (parallel to the diffuser; that is, at a 90-degree angle to the other ports). The critical initial dilution factor achieved with this configuration is calculated as 281:1.

Figure 3-2. Location of Barceloneta RWWTP and Ocean Outfall

3.4 Applicable Criteria

Using the site characterization, industrial base, and regulatory/operational considerations applicable to this treatment system, the Barceloneta RWWTP is subject to the following criteria:

- Water quality standards
- NPDES permit limits
- Biosolids regulations for disposal
- Worker health and safety (toxicity, flammability, explosivity)
- Plant capacity
- Other applicable best professional judgment (BPJ)

These criteria were used to select the POCs and are further discussed in Section 4.

4. POC Screening, Selection, and Sampling

4.1 POC Selection

Toxic pollutants selected for these derivations consist of the EPA-mandated national pollutant list of 11 required metals plus cyanide. Additionally, EPA lists BOD_5, TSS, and ammonia as pollutants that should be discussed. Ammonia in this document is discussed as total nitrogen (TN; total Kjeldahl nitrogen [TKN] + nitrate + nitrite) because the limiting criteria is for total nitrogen. Flow, pH, flammability, temperature, and oil and grease (O&G) are discussed herein in relation to protecting the treatment works, the collection system, and workers. Surfactants, as methylene blue active substances (MBAS), were added because of a limit in the Barceloneta NPDES permit.

Table 4-1 provides the full list of parameters selected for evaluation.

Table 4-1. Pollutants Selected for this Local Limits Evaluation

Parameters	
Arsenic	Silver
Cadmium	Surfactants (MBAS)
Chromium	Zinc
Copper	Flow
Cyanide (Free)	BOD_5
Lead	TSS
Mercury	Phenol
Molybdenum	pH
Nickel	O&G
Nitrogen (as TKN + NO_3 + NO_2)	Temperature
Selenium	Flammability
Toxicity	

Notes:

NO_3 = nitrate

NO_2 = nitrite

4.2 Surfactants (as MBAS)

Surfactants are divided into non-ionic, cationic, and anionic categories. The MBAS test measures only anionic substances. Results of the test can vary significantly from laboratory to laboratory, depending on application of a backwash that removes interference.

The most common class of compounds found in anionic surfactants is referred to as linear alkylbenzene sulfonate (LAS). LAS is the most common ingredient in dishwashing and laundry detergent. In turn, LAS consists of a straight-chain molecule with a sulfonated benzene ring substituted at some point along the

chain (refer to Figure 4-1). The chain typically consists of 10 to 16 carbon atoms but can be shorter or longer depending on the type of surfactant designed by the manufacturer. Terzic et al. (1992) and the Organization for Economic Co-operation and Development Screening Information Dataset (OECD SIDS) (2005) show that long-chain surfactants with the ring substituted on the end of the chain are the most biodegradable, while shorter chains that have been substituted near the middle show the lowest degree of biodegradability. Because LAS adheres strongly to solid particles in the waste stream, as much as 35 percent of the LAS can be removed if primary clarification is used to remove solids from the waste stream. The LAS is further reduced by 98 to 99 percent in activated waste and further reduced in aerobic digestion. LAS is not reduced in anaerobic digestion, and some anaerobic sludges have been measured at more than 1 percent LAS as dry sludge. However, studies also indicate that once land-applied, LAS is quickly biodegraded once it enters the aerobic conditions found in soil and does not show detrimental effects to the environment when land-applied (Scott and Jones 2000).

While LAS is the chief source of anionic surfactants and easily biodegrades at treatment plants, some anionic surfactants are not easily eliminated. According to Scott and Jones (2000), "the removal of constituents in detergent formulations such as fluorescence whitening agents, or naphthalene sulfates used in chemical, pharmaceutical and textile industries is much less efficient. In the case of naphthalene sulfate, 95 percent of these pollutants are still present in WWTP effluents." This information may be useful in the case of Barceloneta because one of the dischargers is a pharmaceutical manufacturer and should be reviewed in connection with pharmaceutical manufacturers found in this system.

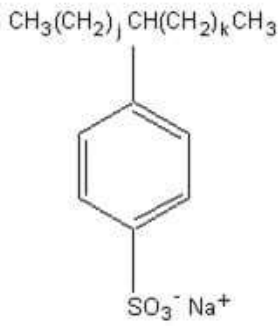


Figure 4-1. Linear Alkylbenzene Sulfonate (LAS) Molecule

Many compounds contribute to MBAS, including non-surfactants. Because each reactive compound (both surfactant and non-surfactant) exhibits a different level of biodegradability, determining a single limit for all industry may be ineffective. For the Barceloneta RWWTP, a headworks analysis was conducted, and the results indicate removal is not complete. The test data collected during this TBLL evaluation (provided in Appendix C) show a 3.43 percent LAS removal through primary treatment and a total 76.74 percent removal across the treatment plant, which has been used to calculate a TBLL of 23.35 milligrams per liter (mg/L) for industry.

4.3 Sampling and Analysis

Concurrent sampling of influent and effluent locations is necessary to develop partition coefficients (removal factors) for conservative pollutants (metals). Sampling must be conducted concurrently at specific sites in the treatment system (including collection system prior to the plant) to understand and determine how the pollutants will be either removed into the sludge or discharged to the receiving waters. This ratio of removal is known as *removal rate*, *removal coefficient*, or *partitioning coefficient*.

Concurrent sampling in the Barceloneta RWWTP treatment system was conducted from May 24 to June 7, 2020. Tables 4-2 and 4-3 list the testing schedule for weeks 1 and 2, respectively. Per EPA's guidance document (EPA 2004), composite sampling was conducted for 14 consecutive days for all tests except cyanide, which was taken as a series of grab samples. Table 4-4 lists pollutants included in the testing regimen. Laboratory analytical methods incorporated the appropriate sensitivity and quality assurance and quality control (QA/QC)[4] procedures necessary to provide useable data. The laboratory analytical

[4] Original laboratory reports (more than 4,000 pages) have not been included herein but are available upon request.

reports met or exceeded QA/QC reporting requirements. Where the best testing methods available were insufficient to generate removal factors, the EPA local limits guidance document (EPA 2004), which provides default values (book values), was used as an alternative. Instances where book values were used are noted and discussed. Laboratories that performed the analyses are listed in Table 4-5.

Cyanide testing was not conducted in the sludge samples because of the non-conservative nature of cyanide and the lack of a disposal criterion.[5] Appendix C provides influent and effluent priority pollutant test data. Using guidance found in the *Guidance Manual on the Development and Implementation of Local Discharge Limitations under the Pretreatment Program* (EPA 1987) (summarized in Appendix B), no organic pollutant qualified as a POC.

Table 4-2. Week 1 Sample Schedule

Location	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Influent	1	1	1	1	1	1	1
Effluent	--	1	1	1	1	1	1
Sludge	--	--	1	--	1	--	--
Domestic	--	1	--	--	--	1	--
Total	1	3	3	2	3	3	2

Table 4-3. Week 2 Sample Schedule

Location	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Influent	1	1	1	1	1	1	1	--
Effluent	1	1	1	1	1	1	1	1
Sludge	--	--	1	--	1	--	--	--
Domestic	--	1	--	--	--	1	--	--
Total	2	3	3	2	3	3	2	1

[5] Cyanide does not collect in the sludge. Instead, cyanide reduction occurs in the wastewater treatment process because some microbiota can use it as a food source. When cyanide predominates over time, these organisms proliferate and the plant acclimatizes to the presence of cyanide, allowing for treatment of this toxic material. For this reason, 40 CFR 503 does not list a cyanide limit in its disposal criteria.

Table 4-4. Parameters Selected for Laboratory Analysis on Each Sample

Pollutant	Sample Location			
	Influent	Effluent	Sludge	Domestic
Arsenic	X	X	X	X
Cadmium	X	X	X	X
Chromium Total	X	X	X	X
Copper	X	X	X	X
Cyanide (Free)	X	X		X
Lead	X	X	X	X
Mercury	X	X	X	X
Molybdenum	X	X	X	X
Nickel	X	X	X	X
Selenium	X	X	X	X
Silver	X	X	X	X
Zinc	X	X	X	X
Surfactants (MBAS)	X	X		X
% Solids			X	
Priority Pollutants	X	X		

Table 4-5. Laboratories Used for Testing

Parameter	Lab
Metals	Eurofins-Frontier Global Services
Surfactants (MBAS)	Environmental Quality Laboratories, Inc.
Cyanide (free), Organic Pesticides, PAHs, PCBs, Dioxins, and % Solids	ALS Environmental

Notes:

PAHs = polycyclic aromatic hydrocarbons

PCBs = polychlorinated biphenyls

5. Data Compilation and Analysis

5.1 Data Compilation

Test data generated from each laboratory were reviewed and verified using data qualifiers and laboratory data QA/QC documentation. All data above the minimum level (ML), as defined in the *Local Limits Development Guidance* (EPA 2004), were used to develop estimated removal efficiencies. If any data point for either the influent or the effluent was below the ML, per EPA guidance, one-half the ML was used. Each laboratory reports a reporting limit (RL; may also be stated as method reporting limit [MRL]) for each parameter. Jacobs staff confirmed that the reported RLs followed the methodology to produce valid MLs using standards at the levels specified.

Domestic wastewater sampling typically is obtained from low-flow areas, which are not representative of the flow entering the plant. As an alternative, the influent test data are used to represent domestic contributions. In this method, referred to as "domestic approximation," the data used for domestic flow consist of all dischargers, including domestic, commercial, and industrial. Use of the influent data, therefore, is a conservative assumption. The data for cyanide (four grab samples per day per site) were entered into a spreadsheet to calculate average values for the sample day. These data, along with data on other pollutants, were then entered into a spreadsheet titled "TBLL Calc-Barceloneta.xlsm"[6] that automates the calculation of limits as described below. Appendix C provides all pages used from the "TBLL Calc-Barceloneta.xlsm."

5.2 Removal Efficiency

The Barceloneta RWWTP requires the calculation of two removal factors: one for the sludge removal during primary clarification and one for overall plant removal. Removal factors for each pollutant are automatically calculated in the "TBLL Calc-Barceloneta.xlsm" file on the Sample Data tab. Each data point for influent, effluent, and sludge (for days available) is entered as a separate sample. The spreadsheet then calculates the removal efficiency on a pollutant-by-pollutant basis across the primary clarifiers and across the full treatment plant. Average removal efficiencies are shown in lines 4 and 5 of the Sample Data tab of the spreadsheet, which is provided in Appendix C. Some data entered in the portion of the "TBLL Calc-Barceloneta.xlsm" section that calculates removal efficiencies are near the ML, which reduces the accuracy of the values. The reasonableness of each removal factor must be considered; therefore, the resulting values were compared to the *Local Limits Development Guidance* (EPA 2004) book values shown in Table 5-1 and Table 5-2 as a cross check.

Table 5-1. Pollutant Percent Removal Efficiencies (%) Through Primary Clarification

Pollutant	Reference Removal Rate[a]	Generated by "TBLL Calc-Barceloneta.xlsm"	Adopted Removal Factor
Arsenic	NP	33.06	33.06
Cadmium	15	71.1	71.1
Chromium	27	68.29	68.29
Copper	22	55.65	55.65
Cyanide	27	Cannot Calculate	27

[6] The spreadsheet file is available on CD upon request.

Table 5-1. Pollutant Percent Removal Efficiencies (%) Through Primary Clarification

Pollutant	Reference Removal Rate[a]	Generated by "TBLL Calc-Barceloneta.xlsm"	Adopted Removal Factor
Lead	57	48.99	48.99
MBAS	NP	3.42	3.42
Mercury	10	73.99	73.99
Molybdenum	NP	52.87	52.87
Nickel	14	60.03	60.03
Selenium	NP	71.11	71.11
Silver	20	52.74	52.74
Zinc	27	76.40	76.40

[a] Book value from Local Limits Development Guidance (EPA 2004)

Notes:

NP = Book value not published or available

Table 5-2. Pollutant Percent Removal Efficiencies (%) Through Activated Sludge Treatment

Pollutant	Second Decile[a]	Median[a]	Eighth Decile[a]	Generated by "TBLL Calc-Barceloneta.xlsm"	Adopted Removal Factor
Arsenic	31	45	53	38.34	38.34
Cadmium	33	67	91	75.22	75.22
Chromium, Total	68	82	91	81.04	81.04
Copper	67	86	95	75.70	75.70
Cyanide	41	69	84	5.94	69
MBAS	NP	NP	NP	76.74	76.74
Lead	39	61	76	82.09	82.09
Mercury	50	60	79	85.04	85.04
Molybdenum	NP	NP	NP	45.08	45.08
Nickel	25	42	62	54.94	54.94
Selenium	33	50	67	53.65	53.65
Silver	50	75	88	76.93	76.93
Zinc	64	79	88	82.34	82.34

[a] Book value from *Local Limits Development Guidance* (EPA 2004)

Notes:

NP = Book value not published or available

Because of the low value obtained from testing for cyanide and a very large removal factor calculated for the primary clarifier removal, the median reference value for removal was adopted.

The QA/QC documentation was reviewed in calculating removal factors. The data pairs were then input into the "TBLL Calc-Barceloneta.xlsm" file, which calculates a removal factor for each data pair. When a

data pair contains at least one non-detect, or when the effluent is higher than the influent, the spreadsheet indicates that a removal factor cannot be calculated. The data pairs for which a removal factor can be calculated are then averaged for the final removal factor used in later calculations.

The average values of the individual data pair removal factors are shown in line 5 of the Sample Data tab page 1 of Appendix C. After review of the data, all site-specific removal factors were adopted, except for cyanide.

Many cyanide results for both influent and effluent were near non-detect. For most data pairs, the results for the effluent were higher than for the influent; in some cases, both values were non-detect. This is common when cyanide is nearly absent in the waste stream. The cause of the apparent increase in cyanide within the facility was unknown but has been observed for many years in most wastewater treatment plants (WWTPs). The apparent increase was originally thought to result from positive interfering materials in the cyanide test method. Now, based on research conducted by Jacobs, as well as others, results of experimentation show that sodium hydroxide, the EPA-required preservative for cyanide samples, synthesizes cyanide during sample storage. Influent samples with a higher organic content buffer this action more than effluent so that the net result is an increase in cyanide across the plant.[7] The median book value for cyanide removal was therefore adopted.

5.3 Calculation of Allowable Headworks Loadings

Using the adopted removal factors, the standard methodology from EPA *Local Limits Development Guidance* (EPA 2004) was used to calculate the highest quantity of each pollutant that can be received at the headworks to the treatment plant and still comply with the applicable criteria. Each criterion is explained in the following in relation to water quality and sludge quality requirements.

Each of the calculations described in this section requires the use of an industrial flow to complete the calculation. The sum of the permit-allowed flows is greater than the full flow to the plant and is not a reasonable assumption. As an alternative, the flow used in this TBLL development consists of the sum of the average maximum monthly flow for each industry observed during the period from January 2019 to October 1, 2020. For most industries this is calculated from daily flow data and is very representative of the maximum industrial flow that is received from at the RWWTP. The maximum monthly flow data are found in Appendix C. The sum for these flows is 1.6 mgd, which is conservative given that it is unlikely that all industries would discharge at their maximum rate at the same time.

To protect receiving water quality, Rule 1303.1.J.1 of the Puerto Rico Water Quality Standards Regulation (PRWQSR) sets metal limits for coastal marine waters (refer to Appendix E). Where the PRWQSR criteria are more stringent, the federal chronic water quality standards have been replaced with the PRWQSR criteria so that the limits are protective of both criteria. The Barceloneta RWWTP point of discharge is classified as a Puerto Rico Class SB segment of coastal and estuarine waters. Water quality standards are subject to a critical initial dilution (lowest projected dilution), which has been accepted by the Puerto Rico Department of Natural and Environmental Resources (DNER) at a value of 281:1. Once water quality criteria are calculated, the water-quality-based AHLs are calculated as follows:

$$L_{wq} = \frac{(8.34)\left(C_{wq}\right)\left(Q_{potw}\right)}{\left(1 - R_{potw}\right)}$$

[7] A summary of these effects (Heinemann 2018) along with references is available upon request.

Where:

L_{wq} = MAHL (lb/d) based on water quality criteria
C_{wq} = Acute or chronic water quality criteria (in mg/L)
Q_{potw} = Publicly owned treatment works (POTW) average flow (mgd)
R_{potw} = POTW removal efficiency (as a decimal)

5.4 NPDES Criteria

NPDES permit limits for metals are typically developed based on water quality criteria and follow the same equation as given under the water quality section, except that the C_{wq} is replaced by the NPDES permit limit. Table 5-2 lists the metals and other parameters with NPDES limits for the Barceloneta RWWTP.

Table 5-2. Barceloneta RWWTP NPDES Limits

Pollutant	Limit in µg/L
Copper	100.2
Lead	18.0
Mercury	0.091
Silver	2.73
Zinc	144.1
Surfactants (MBAS)	2,105
TN[a]	5,000

[a] After November 1, 2023

Note:

µg/L = microgram(s) per liter

NPDES limits must be met at the point of discharge from the RWWTP, not at the edge of the mixing zone. The limits in Table 5-2, therefore, were manually entered on line 16 of the Local Limits tab in Appendix C. The dilution factor applied to the NPDES limits is 1:1 (in line 17 of Basic Data tab in Appendix C).

In addition to the NPDES limits applicable to the point of discharge, the permit contains limits at the edge of the mixing zone. These limits are found in Table 5-3 and are identical to PRWQSR water quality criteria entered into line 15 of the Local Limits tab in Appendix C.

Table 5-3. Barceloneta RWWTP Mixing Zone Limits

Pollutant	Limit in µg/L
Copper	3.73
Lead	8.52
Mercury	0.051
Silver	2.24
Zinc	85.62
Surfactants (MBAS)	500

Once the NPDES limits are entered, the AHLs are calculated as follows:

$$L_{wq} = \frac{(8.34)(C_{npdes})(Q_{potw})}{(1 - R_{potw})}$$

Where:

L_{wq} = MAHL (lb/d) based on NPDES limit
C_{npdes} = NPDES limit (in mg/L)
Q_{potw} = POTW average flow (mgd)
R_{potw} = POTW removal efficiency (as a decimal)

5.5 Sludge Quality

Treatment plants are required to prohibit nondomestic discharges in amounts that cause violation of applicable sludge disposal or use regulations or restrict the plant from using its chosen sludge disposal option. Currently, the sludge from the Barceloneta RWWTP is sent to a landfill and, therefore, must pass Toxicity Characteristic Leaching Procedure (TCLP) requirements. The TCLP test is subject to adhesion and absorption in the solids. TCLP results, therefore, may be low even when significant metal concentrations are present. The result is that TCLP results may be a poor indicator of sludge quality. If TCLP testing shows that the metals in the sludge are subject to leaching, which could prevent using the preferred landfill option, the local limits approach should focus on TCLP.[8] However, Barceloneta RWWTP sludge quality compliance monitoring shows that the metals are compliant and do not show a tendency to leach. All TCLP data were low compared to TCLP limits and were mostly non-detect for the period January 2015 to October 2019 for all pollutants (individual parameter results are provided in Appendix F). There were detections for several metals (summarized in Appendix F along with the TCLP limits) at concentrations well below their TCLP limits.

An alternative approach focuses on total metals in the sludge. This approach compares sludge quality to Table 3 of Title 40 of the Code of Federal Regulations Part 503 (40 CFR 503), which specifies pollutant concentrations as total metals. When the sludge is qualified as acceptable in this manner, a higher probability exists that the sludge may be disposed of by any method chosen by the treatment plant. The equation below is used to calculate AHLs based on Table 3 of 40 CFR 503 criteria. Table 3 of 40 CFR 503 is replicated in line 19 of the Local Limits tab in Appendix C and is used to calculate local limits based on sludge disposal.

$$L_{in} = \frac{(8.34)(C_{slcrit})(PS/100)(Q_{sldg})}{R_{potw}}$$

Where:

L_{in} = Allowable headworks loading based on sludge quality (lb/d)
PS = Percent solids in the sludge to disposal (%)
Q_{sldg} = Sludge flow to disposal (mgd)
C_{slcrit} = Limiting sludge criteria (milligrams per kilogram)
R_{potw} = POTW removal efficiency (as a decimal)

[8] The approach according to *Local Limits Development Guidance* (EPA 2004) is explained as, "The POTW can collect site-specific data for both total pollutant concentrations in the sludge and TCLP concentrations (10–12 data pairs) and use these data to correlate TCLP concentrations with total concentrations in the sludge. Pg 5–18 2004 manual." The developed correlations can then be used to convert total metals to leachable metals.

Sludge testing provides one of the most reliable data sources when considering local limits for conservative pollutants such as metals. Sludge accumulation and treatment concentrates incoming pollutants and averages the pollutants received by the plant over time. Consequently, these data often provide the best estimate of the long-term average pollutant levels from the collection system. The Barceloneta RWWTP sludge sampled during the period of local limits testing demonstrated results that are a small fraction of the Biosolids Class A limits (Table 3 of 40 CFR 503), which is another indicator that these pollutants are present in low levels throughout the waste collection system.

5.6 MAHL Selection and MAIL Calculations for Metals and Cyanide

The "TBLL Calc-Barceloneta.xlsm" spreadsheet (Appendix C) automates the calculation of limits so that a limit is generated for each criterion. Table 5-4 displays the MAHL[9] selection process followed by calculation of the MAIL as mass loadings. This format facilitates verification that the smallest AHL has been selected. Table 5-4 presents the AHLs calculated in pounds for each limiting criterion considered. The smallest of the AHLs is referred to as the MAHL because it is the highest loading that may be seen at the headworks for which all criteria will be met. Table 5-4 also presents the current domestic loading, which is subtracted from the MAHL along with a safety factor (10 percent of the MAHL) to calculate the MAIL. The mass remaining is used along with known industrial discharge to calculate the maximum concentrations that can be discharged.

[9] The MAHL is shown in line 63 of the local limits calc page 2 Appendix C, but the spreadsheet calculates a concentration limit for each AHL and selects the smallest value.

Table 5-4. Applicable AHLs, MAHLs and MAIL

Pollutant lb/d	AHL Federal Water Quality Criteria Acute [WQC-A] (lb/d)	AHL PRWQSR Water Quality Criteria Chronic [WQC-C] (lb/d)	AHL NPDES Water Quality Limits [NPDES] (lb/d)	Activated Sludge Inhibition (lb/d)	AHL Sludge Based on Table 3 40 CFR 50 [SD] (lb/d)	Domestic Loading (lb/d)	MAIL[a] (lb/d)	Basis
Arsenic	1,476.5	770.3	NA	7.0	2.6	0.06	2.3	SD
Cadmium	2,142.7	423.3	NA	162.4	1.6	0.01	1.4	SD
Chromium	716,784.9	423.3	NA	1,480.7	NA	0.21	1,332.4	PRWQSR
Copper	314.0	202.8	19.4	105.9	73.4	4.98	19.4	NPDES
Cyanide	0.121	42.6	0.15	17.4		NA	0.12	NPDES
Lead	16,266.9	627.4	4.7	92.1	14.2	0.10	4.1	SD
Mercury	186.8	97.53	28.6	18.1	0.9	0.01	0.82	SD
Molybdenum	NA	NA	NA	NA	2.0	0.12	1.7	SD
Nickel	2,188.9	242.6	NA	117.5	10.2	0.16	9.0	SD
Selenium	NA	NA	NA	NA	2.5	0.01	2.2	SD
Silver	127.8	NA	555.658	24.8	NA	0.03	22.3	WQC-A
Zinc	7,109.4	6,398.5	NA	59.7	117.3	6.49	47.2	NPDES
MBAS	NA	28,362,275	424.9	NA	NA	0.06	2.4	NPDES

[a] The MAIL in this column has had 10% of the MAHL subtracted.

Notes:

NA = Not Applicable

SD = Sludge Disposal

WQC-A = Federal Acute Water Quality Standard

5.7 Uniform Allocation to Permitted Industrial Users

Local limits developed for this document are based on uniform allocation of available pollutant loading applied to permitted industrial users. In this method, the mass of a regulated pollutant is distributed equally to industrial flow, and each industry receives the same concentration-based limits. Derivation of uniform limits is driven by inputs for industrial flow in line 13 of the Basic Data Page 1 of Appendix C and the MAIL in line 65 of the Local Limits Page of Appendix C. Table 5-5 presents the selected limits found in line 69 of the Local Limits Calc Page in Appendix C. The resulting limits in Table 5-5 are compared to the previously applicable limits.

Table 5-5. Local Limits Summary: Industry-Wide Concentration-Based Limits

Parameter	Puerto Rico General Limits[a]	Adopted Local Limit
Arsenic	No Limit	0.17 mg/L
Cadmium	0.1 mg/L	0.15 mg/L
Chromium	1.0 mg/L	1.0 mg/L[b]
Copper	1.0 mg/L	0.93 mg/L
Cyanide (free)	0.1 mg/L	0.1 mg/L[c]
Lead	0.2 mg/L	0.31 mg/L
Mercury	0.05 mg/L	0.06 mg/L
Molybdenum	No Limit	0.16 mg/L
Nickel	0.5 mg/L	0.68 mg/L
Selenium	0.2 mg/L	0.165 mg/L
Silver	0.05 mg/L	1.67 mg/L
Zinc	0.5 mg/L	3.54 mg/L
Surfactants (MBAS)	No Limit	23.4 mg/L
Flow	SIU-specific	SIU-specific[d]
BOD_5	No Limit	250 mg/L[e]
TSS	No Limit	250 mg/L[e]
Total Nitrogen NO_2+NO_3+TKN	No Limit	Monitor Only[f]
pH	5.0–10.0 SU	6.5-9.0
Phenolics (phenolic substances)	1.0 mg/L	1.0 mg/L[g]
O&G	50 mg/L Total O&G	50 mg/L Total O&G
Temperature	60°C (140°F)	40°C (104°F) at the POTW 60°C (140°F) at discharge point[h]
Flammability	No Limit	Closed-cup flashpoint <140°F (60°C), No two consecutive readings at ≥5% LEL, and no reading of ≥10% LEL allowed[i]

Table 5-5. Local Limits Summary: Industry-Wide Concentration-Based Limits

Parameter	Puerto Rico General Limits[a]	Adopted Local Limit
Toxicity	Parameter-specific	Industry permit-specific technically based limits

[a] PRASA Rules and Regulations for the Supply of Water and Sewer Services Section 2.05

[b] The General Limit was retained because the calculated limit was significantly larger than the industrial discharge concentration that would be achieved by the industry implementing Best Management Practices (BMPs).

[c] PRASA General Limit is retained due to a calculated limit that is below the detection limit of current approved methods.

[d] Each industry has its own site-specific flow limit.

[e] A limit of 250 mg/L BOD_5 and TSS is adopted as a surcharge level to recoup additional cost for treatment above domestic-strength waste.

[f] The existing requirement to monitor is .

[g] The existing General Limit was retained because it was found to be sufficiently protective of the WWTP.

[h] cf. 40 CFR 403.5(b).

[i] As per guidance in EPA Model Pretreatment Ordinance.

Notes:

°C = degrees Celsius

°F = degrees Fahrenheit

SU = standard unit(s)

The concentration-based limits presented in Table 5-5 are not based on total permitted industrial flow because more flow has been allocated to industry in Barceloneta than is currently received at the treatment plant. Such an allocation leads to errors in the EPA-approved local limits calculations because it tries to allocate mass to non-existent flow. To overcome this issue, the actual maximum monthly flow for each industry is summed to derive a universal concentration-based limit. Each industry, however, is allowed to discharge more than the maximum month observed. Consequently, the concentration-based limits for each industry are not fully effective to protect the treatment plant. This is because if all industries discharged above the flow used to calculate these limits, the combined mass would exceed the maximum allowable headworks loading. To protect the plant, a mass-based limit must also be established for each industry. Consequently, in addition to not exceeding the above concentration-based limits, each industry may not exceed the industry-specific mass-based limits established in Table 5-6.[10] Appendix D provides the derivation of these limits. Additionally, the spreadsheet used to perform these calculations is provided as part of this submittal..

[10] Because of small batch discharges, the La Vega and Arecibo landfills are subject only to concentration-based limits.

Table 5-6. Local Limits Summary: Industry-Specific Mass-Based Limits

	Industry Specific Mass Based Limit (lb/d)							
	Industry	Pollutant of Concern						
		As	Cd	Cr	Cu	CN	Pb	Hg
	Uniform Concentration Based Limit	0.170	0.150	1.000	0.130	0.100	0.310	0.060
1	AIR MASTER AWNING, LLC.	0.052	0.046	0.306	0.040	0.031	0.095	0.018
2	BRISTOL-MYERS SQUIBB HOLDINGS PHARMA, LLC.	0.273	0.241	1.609	0.209	0.161	0.499	0.097
3	ROMARK GLOBAL PHARMA, LLC.	0.096	0.085	0.564	0.073	0.056	0.175	0.034
4	FMC AGRICULTURAL CARIBE INDUSTRIES, LTD.	0.248	0.219	1.461	0.190	0.146	0.453	0.088
5	JANSEN ORTHO, LLC (MANATI OPERATIONS)	0.083	0.073	0.486	0.063	0.049	0.151	0.029
6	PEPSICO CARIBBEAN, INC. (FRITO LAY)	0.079	0.070	0.465	0.060	0.046	0.144	0.028
7	PFIZER PHARMACEUTICALS , LLC	0.172	0.152	1.010	0.131	0.101	0.313	0.061
8	BOEHRINGER INGELHEIM ANIMAL HEALTH PUERTO RICO, LLC	0.193	0.170	1.136	0.148	0.114	0.352	0.068
9	ABBVIE LTD	0.868	0.766	5.106	0.664	0.511	1.583	0.306
10	AIAC INTERNATIONAL PHARMA, LLC	0.088	0.078	0.519	0.068	0.052	0.161	0.031
11	BASF AGRICULTURAL PRODUCTS DE PUERTO RICO	0.044	0.039	0.260	0.034	0.026	0.081	0.016
12	PATHEON PUERTO RICO, INC.	0.141	0.125	0.832	0.108	0.083	0.258	0.050
13	LA VEGA LANDFILL & RESOURCES, INC.							
14	LANDFILL TECHNOLOGIES OF ARECIBO, CORP.							
15	PFIZER PHARMACEUTICALS, LLC. (VEGA BAJA)Barceloneta	0.021	0.019	0.126	0.016	0.013	0.039	0.008

	Industry Specific Mass Based Limit (lb/d)					
	Industry	Pollutant of Concern				
		Ni	Se	Ag	Zn	MBAS
	Uniform Concentration Based Limit	0.680	0.165	1.670	3.540	23.400
1	AIR MASTER AWNING, LLC.	0.208	0.050	0.511	1.083	7.156
2	BRISTOL-MYERS SQUIBB HOLDINGS PHARMA, LLC.	1.094	0.265	2.686	5.695	37.643
3	ROMARK GLOBAL PHARMA, LLC.	0.383	0.093	0.942	1.996	13.193
4	FMC AGRICULTURAL CARIBE INDUSTRIES, LTD.	0.993	0.241	2.440	5.172	34.185
5	JANSEN ORTHO, LLC (MANATI OPERATIONS)	0.330	0.080	0.811	1.719	11.362
6	PEPSICO CARIBBEAN, INC. (FRITO LAY)	0.316	0.077	0.776	1.645	10.872
7	PFIZER PHARMACEUTICALS , LLC	0.687	0.167	1.687	3.576	23.639
8	BOEHRINGER INGELHEIM ANIMAL HEALTH PUERTO RICO, LLC	0.772	0.187	1.897	4.022	26.583
9	ABBVIE LTD	3.472	0.843	8.528	18.076	119.488
10	AIAC INTERNATIONAL PHARMA, LLC	0.353	0.086	0.868	1.839	12.155
11	BASF AGRICULTURAL PRODUCTS DE PUERTO RICO	0.177	0.043	0.435	0.922	6.094
12	PATHEON PUERTO RICO, INC.	0.565	0.137	1.389	2.944	19.458
13	LA VEGA LANDFILL & RESOURCES, INC.					
14	LANDFILL TECHNOLOGIES OF ARECIBO, CORP.					
15	PFIZER PHARMACEUTICALS, LLC. (VEGA BAJA)Barceloneta	0.086	0.021	0.210	0.445	2.944

6. Other Limits and Concerns

The need for local limits for flow, BOD_5, TSS, pH, O&G, and nitrogen is discussed in this section. Worker health and safety limits for temperature, flammability, and toxicity are also considered. Table 6-1 summarizes resultant local limits for this second group of parameters.

Table 6-1. Local Limits for Other Parameters

Pollutant	Minimum Limit	Maximum Limit
Temperature	NA	40°C (104°F) at the POTW 60°C (140°F) at discharge point[a]
Flammability	NA	Closed-cup flashpoint <140°F (60°C) No two consecutive readings at ≥5% LEL No reading of ≥10% LEL [b]
pH	6.5 SU	9.0 SU
Total Nitrogen		Monitor Only Industry-specific Limits may be set.
Phenols (phenolic substances)		1.0 mg/L
O&G	NA	50 mg/L Total O&G
Toxicity	NA	Industry-specific Limits

[a] cf. 40 CFR 403.5(b)(5)

[b] As per guidance in EPA Model Sewer Use Ordinance

Note:

NA = not applicable

6.1 Flow

The Barceloneta RWWTP has established site-specific flow limits for each industry. These limits are retained due to agreements with the industrial base.

6.2 BOD_5 and TSS

Based on estimated design capacity, the Barceloneta RWWTP is rated to treat up to a monthly average of 17,368 lb/d for BOD_5 and up to a monthly average of 13,894 lb/d of TSS. The plant currently has significant excess capacity for both pollutants. Average influent BOD_5 from November 1, 2018, to December 31, 2019, was calculated at 8,772 lb/d; the average influent for TSS during the same period was 7,452 lb/d. Appendix I provides monthly records and summary calculations.

Local limits for BOD_5 and TSS are not adopted because establishing such limits using the uniform allocation method implies that discharges may not be accepted above such a limit, even if capacity is available. Instead, a surcharge limit is set for all discharges greater than 250 mg/L for BOD_5 and greater than 250 mg/L for TSS, which is a level above which the effluent strength is considered equivalent to domestic-strength effluent. These surcharge limits are used to determine cost of sewer service. PRASA also uses industry-permit-specific technically based limits whenever an industry is found to have significant potential to discharge waste with BOD_5 or TSS in quantities that might cause treatment interference or pass-through (including use of excess plant design capacity) at unacceptable levels. Industry-specific limits help to reduce unnecessary loadings to the WWTP and extend the time between

costly facility upgrades needed to meet NPDES permit limits and requirements. Industry-specific limits for BOD_5 and TSS will be established based on available capacity at the WWTP, technically achievable limits using industry-supplied pretreatment, and industrial BMPs.

6.3 Total Nitrogen

In April 2019, the PRWQSR was amended to change the definition of TN from the sum of NO_2+NO_3+NH_3 to NO_2+NO_3+TKN. The Barceloneta RWWTP received a renewed NPDES permit issued on September 30, 2020, with a TN limit of 5,000 µg/L that will not be applied until November 1, 2023. The TN limit does not account for the dilution noted in 2017 Mixing Zone Application (CH2M 2017). Because the exact criteria is not set, a local limit will not be established in this document. In keeping with the NPDES, this document will require monitoring only.

6.4 pH

The PRWQSR states a range for pH in Class SB waters of 7.3 to 8.5 SU. The Barceloneta RWWTP NPDES permit places these limits at the point of discharge from the treatment plant and not at the edge of the mixing zone, as shown on Figure 6-1. Review of discharge monitoring report data shows compliance with this limit. Therefore, PRASA will adopt the limits used in other localities with site-specific limits. Consequently, limits are set at 6.5 to 9.0.

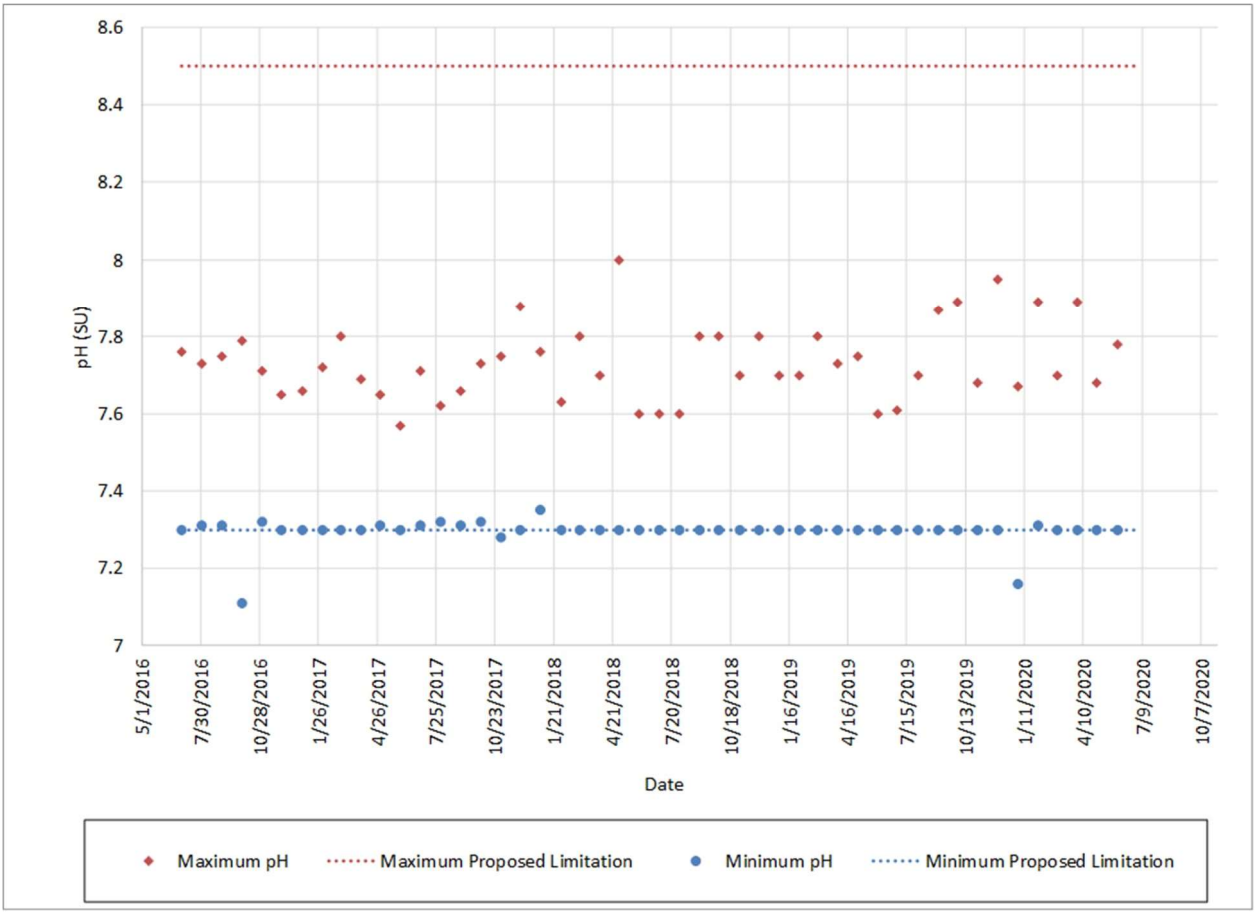


Figure 6-1. Barceloneta Daily pH Minimum and Maximum Daily Readings

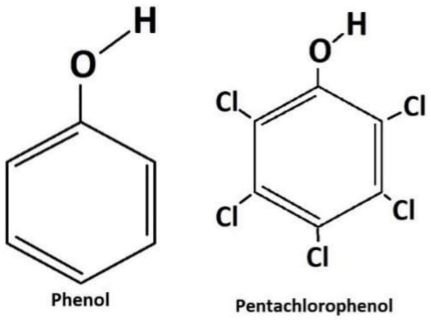
6.5 Phenolics

The PRWQSR regulates phenol and a subset of toxic phenolic derivatives. Appendix G lists these compounds and their limits. The phenol molecule consists of a 6-carbon ring, with a hydroxide group bonded (substituted) at one of the carbons. This substance is significantly less toxic than the other regulated phenolic compounds (and is even the active ingredient in some throat sprays). The PRWQSR limits phenol at 10 mg/L for freshwater and 860 mg/L for marine discharges. Derivatives of phenol occur when another substance (such as a halogen) is bonded (substituted) at one of the carbons in the ring. As more chlorine (or other halogen) substitution occurs, the toxicity of the resulting compounds increases.

As an example, pentachlorophenol is formed when each of the open points in the ring is attached to a chlorine. Pentachlorophenol has all available points substituted and is limited by the PRWQSR to 1 µg/L.

A reference value for unsubstituted phenol is available for both domestic concentration (0.025 µg/L) and for a removal factor (median value 90 percent) across activated sludge treatment, which is not used at the Barceloneta RWWTP. Based on these references, a local limit could significantly exceed 90 mg/L.

Reference data for the more toxic forms of substituted phenols, however, are not available. Consequently, it is not possible to develop a local limit for each compound in Appendix G based on reference data.



Currently, the general limit in the PRASA Rules and Regulations for the Supply of Water and Sewer Services, Section 2.05, contains a limit of 1.0 mg/L for phenolic compounds. This limit is applied to the sum of the individual concentrations of toxic phenolic substances on the list of priority pollutants analyzed using procedures in accordance with 40 CFR 136, Table 1C. This limit will be retained, with the modification that the limit applies to phenolic compounds, excluding unsubstituted phenol.

6.6 Oil and Grease

A local limit of 50 mg/L for O&G was established in the prior Barceloneta RWWTP local limits without reference to the nature of the O&G. Based on previous requests by EPA regarding local limits for O&G, this limit will be retained.

6.7 Temperature

Prior to this TBLL evaluation, local limits for temperature were established in the Puerto Rico General Limits[11] at 60 °C (140 °F). However, a 104°F (40°C) limit at sewage treatment plant headworks is a specific requirement of the federal pretreatment regulations (cf. 40 CFR 403.5(b)(5)).

The 60°C (140°F) limit at the point of discharge into the Barceloneta RWWTP sanitary sewer system is both in keeping with the Puerto Rico general limit and with a BPJ limit (which has been observed in other TBLLs to be set as high as 65°C [150°F]). The rationale is based on worker health and safety concerns and helps to achieve the other temperature limit. Therefore, a local limit including a 60°C (140°F) value at the industry's discharge point and a 40°C (104°F) value at the influent to the POTW is established.

[11] *Ibid.*

6.8 Flammability

Local limits for flammability are adopted at any discharge with a closed-cup flashpoint greater than 140°F (60°C). An additional lower explosive limit (LEL) local limit requirement is that no two successive readings of an LEL meter in the headspace of the collection system below an industry's discharge into the sanitary sewer may exceed 5 percent, and no single LEL meter reading may be 10 percent or higher.

These limits, which are based on federal pretreatment regulations (cf., 40 CFR 403.5 (b)(1)), prohibit any discharge with a closed-cup flashpoint greater than 140°F (60°C). The LEL limits are established based on worker/community health and safety. Therefore, a local limit requiring that no two consecutive readings at 5 percent or more of the LEL and that no reading of 10 percent or more of the LEL is registered.

6.9 Toxic Organic Pollutants

No toxic organic POCs were identified in this system. Therefore, system-wide local limits were not developed for toxic organic pollutants. Instead, PRASA will address toxic organic pollutants using industry, permit-specific, technically based limits whenever a toxic compound is identified in an industrial discharge. The process for developing such a limit is similar to development of TBLLs as applied to waste discharge from an industry to the effluent discharge from the Barceloneta RWWTP. If required, industry-specific limits will be based on permissible exposure limits, time-weighted averages, any additional information from toxicological references (such as the American Conference of Governmental Industrial Hygienists [ACGIH]), and (as appropriate) Henry's constant.

7. Local Limits Implementation

The new local limits will apply to all non-domestic users. It is the intent of this document that only users that have been issued industrial wastewater discharge permits by PRASA, such as SIUs and other users with a potential to discharge pollutants for which local limits have been developed, will be required to routinely monitor for compliance with local limits.

8. References

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Appendix A
Priority Pollutants Detected at or Above MDL

List of Priority Pollutants found at or above MDL

One Scan Each Arecibo Influent and Effluent

For All reports organic compounds are not listed if results were at or below MDL

	Sample ID	Sample Date	Method	Number of Results Above MDL		Result Influent µg/l		Result Effluent µg/l		MDL	RL
Influent	**BAR_TP1001**	5/24/2020									
Effuent	**BAR_TP1003**	5/25/2020									
		624.1	Volatile Organic Compounds (GC/MS)	1	1,4-Dichlorobenzene	1.29				0.5	1
				1	Chloroform	1.78				0.5	1
				1	Ethylbenzene	3.29				0.5	1
				1	Methylene Chloride	0.750 J				0.5	1
				1	Toluene	1.54				0.5	1
		625	Semivolatile Organic Compounds	1	Acenaphthene	0.033 X				0.01	0.02
				1	Anthracene	.015 J				0.01	0.02
				1	Benzo(g,h,i)perylene	0.017 J				0.01	0.02
				1	Bis(2-ethylhexyl) phthalate	3.9 J				2.5	5
				1	Fluorene	.016 J				0.01	0.02
				1	Indeno(1,2,3-cd)pyrene	0.1				0.01	0.02
				1	Naphthalene	0.082				0.01	0.02
				1	Phenanthrene	0.04				0.01	0.02
		608.3	Organochlorine Pesticides	1	Endosulfan II			0.013		0..005	0.01
		612	Organochlorine Pesticides	0							
		632	olvent Extractable Nonvolatile Compounds by HPLC-MS/M	0							
		622	Organophosphorous Pesticides	1	Malathion	0.036 J				0.025	0.05
		1668C	PCB Homologue Group Totals		Total MonoCB	16.1	pg/L	1.5	pg/L		
					Total DiCB	302	pg/L	347	pg/L		
					Total TriCB	118	pg/L	28.8	pg/L		
					Total TetraCB	163	pg/L	59.3	pg/L		
					Total PentaCB	229	pg/L	78.8	pg/L		
					Total HexaCB	227	pg/L	56.7	pg/L		
					Total HeptaCB	112	pg/L	20.3	pg/L		
					Total OctaCB	25.1	pg/L	6	pg/L		
					Total NonaCB	7.3	pg/L	<1.3	pg/L		
					DecaCB	12.2	pg/L	2.4	pg/L		
			PCBs Total of all 209 Congeners Including EMPC values		Total	1210	pg/L	601	pg/L		

J-The result is an estimated value.

X-The standard Laboratory Control Sample (LCS) KQ2007212-03 was lost during extraction.

Appendix B
Guidance on the Selection of Pollutants of Concern

Guidance on the Selection of Pollutants of Concern

Guidance Manual on the Development and Implementation of Local Discharge Limitations

Under the Pretreatment Program, EPA 833-B-87-202, December 1987

Also, EPA guidance directs that a toxic pollutant may be classified as a POC if it meets the following screening criteria:

- *The maximum concentration of the pollutant in a grab sample from the POTWs influent is more than half the inhibition threshold for the biological process; or the maximum concentration of the pollutant in a 24-hour composite sample from the POTWs influent is more than one-fourth of the inhibition threshold for the biological process.*
- *The maximum concentration of the pollutant in the POTW's influent is more than 1/500 of the applicable sludge criteria.*
- *The maximum concentration of the pollutant in the POTWs influent is more than the maximum allowable effluent concentration.*
- *The maximum concentration of the pollutant in the POTW's effluent is more than one half the allowable effluent concentration.*
- *The maximum concentration of the pollutant in the POTW's sludge is more than one half of the allowable sludge concentration.*
- *The maximum measured concentration of the pollutant was greater than the ACGIH screening level for fume toxicity.*

Appendix C
Data Sheets Used in “TBLL Calc-Barceloneta.xlsm”

Line Number

Basic Data

1	Name of Facility:	Barceloneta RWWTP	
2	Point of Contact:	Wayne Heinemann (Jacobs)	
3	Person Entering Data:	Rob Darby (Jacobs)	
4	Reviewer:	Wayne Heinemann (Jacobs)	
5	**GENERAL INFORMATION:**	(Data in colored cells below required)	
6	Receiving Water Hardness (if fresh)		<----- Number must be between 25 and 400
7	(M)arine, (F)resh, or (B)oth Discharges	**M**	<----- Enter only letters "M", "F", or "B"
8	Sludge: Class A (A) or (C)eiling level	**C**	<----- Enter only letters "A" or "C"
9	Plant: (A)ctivated sludge or (O)ther	**A**	<----- Enter only letters "A" or "O"
10			
11	Total Plant Flow (in MGD)	**5.63 MGD**	<----- For flows typically the most critical situation (one that
12	Domestic Flow (in MGD)	**4.03 MGD**	yields the lowest local limits) is the lowest flow month, but run
13	Industrial Flow (in MGD)	**1.6 MGD**	several scenarios if there is any doubt. Adopt the lowest limits.
14	Infiltration/Inflow (by subtraction)		
15	Acute Dilution Factor	**281. : 1**	<----- Based on 1Q10+avg plnt flow
16	Chronic Dilution Factor	**281. : 1**	<----- Based on 7Q10 + avg plnt flow
17	Dilution Factor for _NPDES___	1. : 1	<----- Enter Chronic DF if not otherwise determined
18	Digester Flow (in MGD)	**0.08 MGD**	<----- recommend: 0.08445 MGD @ 2% solids
19	Dry Sludge Production Rate (US Tons/day)	**7.043 T/D**	<----- recommend: 7.04313 T/D
20			
21	**Default Method for Calculating Limits**	**Customize as needed for specific pollutants at "LOCLIMIT.XLS" Rows 45-49**	
22	Sampling Data Available (inf, eff, sludge) (Y/N)	**Y**	<--- "Y" if sampling data available, otherwise defaults presumed
23	Credit present loading of existing sources (Y/N)	**N**	<-- reduce influent to domestic using "loclimit.xls" row 28
24	Adjust for receiving water pollution (Y/N)	**N**	<-- requires receiving water data in "loclimit.xls" row 29
25	Use Observed Overall Removal Rate (Y/N)	**N**	<-- Always say "Y" if good data available from the POTW
26	Use Observed Primary Removal Rate (Y/N)	**N**	<-- If primary effluent sample data is obtained say "Y"
27	Fraction of Loading Capacity held in reserve	**10.00%**	<-- Enter .1 for 10%, etc.

Line Number

Sample Data

Enter ADRE or MRE: ADRE

Use Domestic Approximation Y or N: Y

1	**SUMMARY DATA**		Arsenic (T)	Cadmium	Chrome (T)	Copper	Cyanide	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Zinc	MBAS
2	Ave. Influent Conc.		1.844 ug/L	0.205 ug/L	6.221 ug/L	148.171 ug/L	3.644 ug/L	2.983 ug/L	0.354 ug/L	3.548 ug/L	4.696 ug/L	0.443 ug/L	0.879 ug/L	193.036 ug/L	2107.750 ug/L
3	Ave. Effluent Conc.		1.131 ug/L	0.056 ug/L	1.532 ug/L	42.129 ug/L	9.321 ug/L	0.721 ug/L	0.051 ug/L	2.407 ug/L	2.289 ug/L	0.262 ug/L	0.230 ug/L	45.400 ug/L	496.167 ug/L
4	Ave. Primary Removal (ADRE)		33.06%	71.09%	68.29%	55.65%	73.02%	48.99%	73.99%	52.87%	60.03%	71.11%	52.74%	76.40%	3.42%
5	Ave. Overall Removal (ADRE)		38.34%	75.22%	81.04%	75.70%	69.00%	82.09%	85.04%	45.08%	54.94%	53.65%	76.93%	82.34%	76.74%
6	Effluent Variation (COV)		0.35	1.35	1.52	1.18	0.47	2.04	2.10	0.37	0.50	20.00	2.19	1.92	2.93
7	Average Sludge Conc.		6.56 mg/kg	1.9 mg/kg	64.68 mg/kg	621.5 mg/kg	#DIV/0!	19.18 mg/kg	2.2 mg/kg	8.1 mg/kg	27.1 mg/kg	6.52 mg/kg	6.36 mg/kg	1,024. mg/kg	#DIV/0!
8	Ambient Receiving Water Conc.		0.000 ug/L	0.000 ug/L	0.000 ug/L	0.000 ug/L	0.000 ug/L	0.000 ug/L	0.000 ug/L	0.000 ug/L	0.000 ug/L	0.000 ug/L	0.000 ug/L	0.000 ug/L	
9	AVE Industrial Conc.		0.0 ug/L	0.0 ug/L	0.0 ug/L	0.0 ug/L	0.0 ug/L	0.0 ug/L	0.0 ug/L	0.0 ug/L	0.0 ug/L	0.0 ug/L	0.0 ug/L	0.0 ug/L	
10	**SUMMARY (ABOVE)**														
11	**SAMPLE 1**														
12	Date:	LOCATION	Arsenic (T)	Cadmium	Chrome (T)	Copper	Cyanide	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Zinc	MBAS
13	5/24/2020	Influent	0.82 ug/l	0.167 ug/l	4.05 ug/l	120. ug/l	1.5 ug/l	1.88 ug/l	0.112 ug/l	2.31 ug/l	3.4 ug/l	0.2 ug/l	0.742 ug/l	134. ug/l	3,320. ug/l
14	5/25/2020	Effluent	0.73 ug/l	0.05 ug/l	1.16 ug/l	28.8 ug/l	7.26 ug/l	0.4 ug/l	0.0203 ug/l	1.63 ug/l	1.32 ug/l	0.16 ug/l	0.058 ug/l	26.1 ug/l	0.809 ug/l
15		Prim._Clar.													
16		Sludge	6.83 mg/kg	1.49 mg/kg	66.7 mg/kg	534. mg/kg		19.7 mg/kg	1.25 mg/kg	7.96 mg/kg	27.1 mg/kg	6.56 mg/kg	6.17 mg/kg	966. mg/kg	
17	5/25/2020	Sludge Wet	6.83 mg/kg	1.49 mg/kg	66.7 mg/kg	534. mg/kg		19.7 mg/kg	1.25 mg/kg	7.96 mg/kg	27.1 mg/kg	6.56 mg/kg	6.17 mg/kg	966. mg/kg	
18	Aqueous	ML/RL													
19	Sludge	ML/RL													
20	Primary Removal Rate:		Can't Do	Can't Do	Can't Do	Can't Do	**Can't Do**	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do
21	Overall Removal Rate		10.98%	70.06%	71.36%	76.00%	Can't Do	78.72%	81.88%	29.44%	61.18%	20.00%	92.18%	80.52%	99.98%
22															
23	**SAMPLE 2**														
24	Date:	LOCATION	Arsenic (T)	Cadmium	Chrome (T)	Copper	Cyanide	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Zinc	MBAS
25	5/25/2020	Influent	1.29 ug/l	0.151 ug/l	12.7 ug/l	255. ug/l	5.56 ug/l	4.09 ug/l	0.0623 ug/l	5.08 ug/l	3.33 ug/l	0.22 ug/l	0.863 ug/l	169. ug/l	2,920. ug/l
26	5/26/2020	Effluent	0.63 ug/l	0.033 ug/l	0.39 ug/l	24.2 ug/l	5.23 ug/l	0.347 ug/l	0.0205 ug/l	1.69 ug/l	0.95 ug/l	0.15 ug/l	0.132 ug/l	25.1 ug/l	0.2 ug/l
27	5/25/2020	Prim._Clar.	1.26 ug/l	0.213 ug/l	5.2 ug/l	154. ug/l	1.5 ug/l	3.23 ug/l	0.242 ug/l	2.62 ug/l	4.26 ug/l	0.3 ug/l	0.914 ug/l	195. ug/l	2,820. ug/l
28		Sludge													
29		Sludge Wet													
30	Aqueous	ML/RL	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l
31	Sludge	ML/RL	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	
32	Primary Removal Rate:		2.33%	Can't Do	59.06%	39.61%	73.02%	21.03%	Can't Do	48.43%	Can't Do	Can't Do	Can't Do	Can't Do	3.42%
33	Overall Removal Rate		51.16%	78.15%	96.93%	90.51%	5.94%	91.52%	67.09%	66.73%	71.47%	31.82%	84.70%	85.15%	99.99%
34															
35	**SAMPLE 3**														
36	Date:	LOCATION	Arsenic (T)	Cadmium	Chrome (T)	Copper	Cyanide	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Zinc	MBAS
37	5/26/2020	Influent	1.36 ug/l	0.291 ug/l	6.57 ug/l	164. ug/l	3.51 ug/l	3.76 ug/l	0.234 ug/l	2.52 ug/l	4.24 ug/l	0.62 ug/l	0.992 ug/l	267. ug/l	3,290. ug/l
38	5/27/2020	Effluent	0.82 ug/l	0.038 ug/l		27.1 ug/l	5.87 ug/l	0.42 ug/l	0.0244 ug/l	1.82 ug/l	2.06 ug/l	0.19 ug/l	0.095 ug/l	21.4 ug/l	166. ug/l
39		Prim._Clar.													
40		Sludge													
41		Sludge Wet													
42	Aqueous	ML/RL	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l
43	Sludge	ML/RL	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l
44	Primary Removal Rate:		Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do
45	Overall Removal Rate		39.71%	86.94%	100.00%	83.48%	Can't Do	88.83%	89.57%	27.78%	51.42%	69.35%	90.42%	91.99%	94.95%
46															
47	**SAMPLE 4**														
48	Date:	LOCATION	Arsenic (T)	Cadmium	Chrome (T)	Copper	Cyanide	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Zinc	MBAS
49	5/27/2020	Influent	1.9 ug/l	0.294 ug/l	5.98 ug/l	186. ug/l	2.64 ug/l	4.1 ug/l	0.37 ug/l	2.95 ug/l	5.01 ug/l	0.85 ug/l	0.882 ug/l	265. ug/l	1,580. ug/l
50	5/28/2020	Effluent	1.06 ug/l	0.033 ug/l	0.94 ug/l	31.5 ug/l	8.78 ug/l	0.374 ug/l	0.0162 ug/l	3.1 ug/l	2.5 ug/l	0.24 ug/l	0.096 ug/l	17.6 ug/l	233. ug/l
51															
52		Sludge	7.13 mg/kg	2.35 mg/kg	69.1 mg/kg	564. mg/kg		20.4 mg/kg	2.65 mg/kg	8.43 mg/kg	28.7 mg/kg	6.63 mg/kg	5.49 mg/kg	1,030. mg/kg	
53	5/29/2020	Sludge Wet	7.13 mg/kg	2.35 mg/kg	69.1 mg/kg	564. mg/kg		20.4 mg/kg	2.65 mg/kg	8.43 mg/kg	28.7 mg/kg	6.63 mg/kg	5.49 mg/kg	1,030. mg/kg	
54	Aqueous	ML/RL	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l
55	Sludge	ML/RL	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	
56	Primary Removal Rate:		Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do
57	Overall Removal Rate		44.21%	88.78%	84.28%	83.06%	Can't Do	90.88%	95.62%	Can't Do	50.10%	71.76%	89.12%	93.36%	85.25%

SAMPLE 5															
Date:	LOCATION	Arsenic (T)	Cadmium	Chrome (T)	Copper	Cyanide	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Zinc	MBAS	
5/28/2020	Influent	2.51 ug/l	0.221 ug/l	6.79 ug/l	135. ug/l	1.5 ug/l	3.33 ug/l	0.702 ug/l	1.91 ug/l	5.96 ug/l	0.44 ug/l	0.52 ug/l	156. ug/l	1,280. ug/l	
5/29/2020	Effluent	1.2 ug/l	0.01 ug/l	0.6 ug/l	30.9 ug/l	8.99 ug/l	0.277 ug/l	0.0238 ug/l	2.28 ug/l	1.76 ug/l	0.21 ug/l	0.11 ug/l	19.2 ug/l	450. ug/l	
5/28/2020	Prim._Clar.	3.49 ug/l	0.285 ug/l	9.13 ug/l	178. ug/l	2.26 ug/l	3.37 ug/l	0.228 ug/l	1.85 ug/l	9.25 ug/l	0.55 ug/l	0.889 ug/l	170. ug/l	1,770. ug/l	
	Sludge														
	Sludge Wet														
Aqueous	ML/RL	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	
Sludge	ML/RL	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l		
Primary Removal Rate:		Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	67.52%	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	
Overall Removal Rate		52.19%	95.48%	91.16%	77.11%	Can't Do	91.68%	96.61%	Can't Do	70.47%	52.27%	78.85%	87.69%	64.84%	
SAMPLE 6															
Date:	LOCATION	Arsenic (T)	Cadmium	Chrome (T)	Copper	Cyanide	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Zinc	MBAS	
5/29/2020	Influent	1.94 ug/l	0.217 ug/l	7.03 ug/l	138. ug/l	5.92 ug/l	3.58 ug/l	1.35 ug/l	3.99 ug/l	7.22 ug/l	0.32 ug/l	1.09 ug/l	226. ug/l	1,830. ug/l	
5/30/2020	Effluent	2.09 ug/l	0.15 ug/l	3.7 ug/l	106. ug/l	19.2 ug/l	2.26 ug/l	0.263 ug/l		3.6 ug/l	0.38 ug/l	0.637 ug/l	140. ug/l	450. ug/l	
	Prim._Clar.														
	Sludge														
	Sludge Wet														
Aqueous	ML/RL	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	
Sludge	ML/RL	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l		
Primary Removal Rate:		Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	
Overall Removal Rate		Can't Do	30.88%	47.37%	23.19%	Can't Do	36.87%	80.52%	100.00%	50.14%	Can't Do	41.56%	38.05%	75.41%	
SAMPLE 7															
Date:	LOCATION	Arsenic (T)	Cadmium	Chrome (T)	Copper	Cyanide	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Zinc	MBAS	
5/30/2020	Influent	3.79 ug/l	0.158 ug/l	7.85 ug/l	121. ug/l	2.26 ug/l	3.1 ug/l	0.444 ug/l	4.87 ug/l	5.01 ug/l	0.25 ug/l	0.605 ug/l	205. ug/l	1,830. ug/l	
5/31/2020	Effluent	1.2 ug/l	0.03 ug/l	0.79 ug/l	27.3 ug/l	5.5 ug/l	0.383 ug/l	0.0347 ug/l	3.34 ug/l	1.84 ug/l	0.25 ug/l	0.106 ug/l	35.1 ug/l	747. ug/l	
	Prim._Clar.														
	Sludge														
	Sludge Wet														
Aqueous	ML/RL	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l		
Sludge	ML/RL	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l		
Primary Removal Rate:		Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	
Overall Removal Rate		68.34%	81.01%	89.94%	77.44%	Can't Do	87.65%	92.18%	31.42%	63.27%	Can't Do	82.48%	82.88%	59.18%	
SAMPLE 8															
Date:	LOCATION	Arsenic (T)	Cadmium	Chrome (T)	Copper	Cyanide	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Zinc	MBAS	
5/31/2020	Influent	0.96 ug/l	0.066 ug/l	2.76 ug/l	77.6 ug/l	3.93 ug/l	1.14 ug/l	0.0788 ug/l	3.95 ug/l	2.73 ug/l	0.28 ug/l	0.193 ug/l	96.5 ug/l		
6/1/2020	Effluent	0.92 ug/l	0.036 ug/l	0.42 ug/l	21.4 ug/l	7.05 ug/l	0.264 ug/l	0.0214 ug/l	3.12 ug/l	1.54 ug/l	0.1 ug/l	0.131 ug/l	28.9 ug/l		
	Sludge	6.17 mg/kg	2.29 mg/kg	60.6 mg/kg	691. mg/kg		18.5 mg/kg	2.73 mg/kg	8.21 mg/kg	26.1 mg/kg	6.31 mg/kg	6.82 mg/kg	1,060. mg/kg		
6/2/2020	Sludge Wet	6.17 mg/kg	2.29 mg/kg	60.6 mg/kg	691. mg/kg		18.5 mg/kg	2.73 mg/kg	8.21 mg/kg	26.1 mg/kg	6.31 mg/kg	6.82 mg/kg	1,060. mg/kg		
Aqueous	ML/RL	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	
Sludge	ML/RL	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l		
Primary Removal Rate:		Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	
Overall Removal Rate		4.17%	45.45%	84.78%	72.42%	Can't Do	76.84%	72.84%	21.01%	43.59%	64.29%	32.12%	70.05%	Can't Do	
SAMPLE 9															
Date:	LOCATION	Arsenic (T)	Cadmium	Chrome (T)	Copper	Cyanide	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Zinc	MBAS	
6/1/2020	Influent	1.12 ug/l	0.135 ug/l	3.24 ug/l	111. ug/l	3.92 ug/l	2.41 ug/l	0.114 ug/l		2.31 ug/l	0.21 ug/l	0.285 ug/l	137. ug/l		
6/2/2020	Effluent	1.7 ug/l	0.217 ug/l	6.34 ug/l	157. ug/l	16.5 ug/l	3.52 ug/l	0.128 ug/l	4.33 ug/l	5.15 ug/l	0.94 ug/l	1.21 ug/l	213. ug/l		
6/1/2020	Prim._Clar.	1.48 ug/l	0.239 ug/l	9.07 ug/l	153. ug/l	3.18 ug/l	3.71 ug/l	0.365 ug/l	2.93 ug/l	6.48 ug/l	0.43 ug/l	0.76 ug/l	226. ug/l		
	Sludge														
	Sludge Wet														
Aqueous	ML/RL	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	
Sludge	ML/RL	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l		
Primary Removal Rate:		Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	
Overall Removal Rate		Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	

SAMPLE 10

Date:	LOCATION	Arsenic (T)	Cadmium	Chrome (T)	Copper	Cyanide	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Zinc	MBAS
6/2/2020	Influent	1.3 ug/l	0.159 ug/l	3.78 ug/l	138. ug/l	3.43 ug/l	2.13 ug/l	0.284 ug/l	4.03 ug/l	3.9 ug/l	0.38 ug/l	1.65 ug/l	150. ug/l	2,020. ug/l
6/3/2020	Effluent	1.01 ug/l	0.048 ug/l	1.11 ug/l	38.9 ug/l	8.46 ug/l	0.534 ug/l	0.0395 ug/l	2.58 ug/l	2.42 ug/l	0.25 ug/l	0.205 ug/l	33.5 ug/l	94. ug/l
	Prim._Clar.													
	Sludge													
	Sludge Wet													
Aqueous	ML/RL	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l
Sludge	ML/RL	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	
Primary Removal Rate:		Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do
Overall Removal Rate		22.31%	69.81%	70.63%	71.81%	Can't Do	74.93%	86.09%	35.98%	37.95%	34.21%	87.58%	77.67%	95.35%

SAMPLE 11

Date:	LOCATION	Arsenic (T)	Cadmium	Chrome (T)	Copper	Cyanide	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Zinc	MBAS
6/3/2020	Influent	1.87 ug/l	0.339 ug/l	8.25 ug/l	237. ug/l	5.95 ug/l	4.62 ug/l	0.383 ug/l	3.85 ug/l	9.05 ug/l	0.74 ug/l	2.57 ug/l	315. ug/l	2,390. ug/l
6/4/2020	Effluent	1.18 ug/l	0.038 ug/l	1.25 ug/l	29.6 ug/l	9.31 ug/l	0.38 ug/l	0.0253 ug/l	2.1 ug/l	2.71 ug/l	0.19 ug/l	0.136 ug/l	23.8 ug/l	670. ug/l
	Sludge	6.12 mg/kg	1.45 mg/kg	62.3 mg/kg	697. mg/kg		18.1 mg/kg	2.16 mg/kg	7.78 mg/kg	26.5 mg/kg	6.59 mg/kg	6.94 mg/kg	1,040. mg/kg	
6/5/2020	Sludge Wet	6.12 mg/kg	1.45 mg/kg	62.3 mg/kg	697. mg/kg		18.1 mg/kg	2.16 mg/kg	7.78 mg/kg	26.5 mg/kg	6.59 mg/kg	6.94 mg/kg	1,040. mg/kg	
Aqueous	ML/RL	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l
Sludge	ML/RL	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	
Primary Removal Rate:		Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do
Overall Removal Rate		36.90%	88.79%	84.85%	87.51%	Can't Do	91.77%	93.39%	45.45%	70.06%	74.32%	94.71%	92.44%	71.97%

SAMPLE 12

Date:	LOCATION	Arsenic (T)	Cadmium	Chrome (T)	Copper	Cyanide	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Zinc	MBAS
6/4/2020	Influent TP 1025	2.79 ug/l	0.256 ug/l	8.72 ug/l	189. ug/l	3.16 ug/l	3.78 ug/l	0.439 ug/l	4.92 ug/l	6.18 ug/l	0.9 ug/l	1.24 ug/l	278. ug/l	1,450. ug/l
6/5/2020	Effluent TP 1026	1.04 ug/l	0.028 ug/l	1. ug/l	23.7 ug/l	10.9 ug/l	0.291 ug/l	0.0226 ug/l	2.01 ug/l	2.08 ug/l	0.2 ug/l	0.122 ug/l	18.3 ug/l	863. ug/l
6/4/2020	Prim._Clar. TP 1035	1.01 ug/l	0.074 ug/l	1.96 ug/l	53.5 ug/l	3.31 ug/l	0.871 ug/l	0.0858 ug/l	2.1 ug/l	2.47 ug/l	0.26 ug/l	0.586 ug/l	65.6 ug/l	2,420. ug/l
	Sludge													
	Sludge Wet													
Aqueous	ML/RL	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l
Sludge	ML/RL	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	
Primary Removal Rate:		63.80%	71.09%	77.52%	71.69%	Can't Do	76.96%	80.46%	57.32%	60.03%	71.11%	52.74%	76.40%	Can't Do
Overall Removal Rate		62.72%	89.06%	88.53%	87.46%	Can't Do	92.30%	94.85%	59.15%	66.34%	77.78%	90.16%	93.42%	40.48%

SAMPLE 13

Date:	LOCATION	Arsenic (T)	Cadmium	Chrome (T)	Copper	Cyanide	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Zinc	MBAS
6/5/2020	Influent	1.28 ug/l	0.127 ug/l	3.25 ug/l	83.8 ug/l	4.14 ug/l	1.79 ug/l	0.154 ug/l	2.08 ug/l	2.79 ug/l	0.37 ug/l	0.255 ug/l	142. ug/l	863. ug/l
6/6/2020	Effluent	1.25 ug/l	0.047 ug/l	1.39 ug/l	26.7 ug/l	6.65 ug/l	0.455 ug/l	0.0631 ug/l	1.51 ug/l	2.3 ug/l	0.25 ug/l	0.133 ug/l	23.1 ug/l	1,190. ug/l
	Prim._Clar.													
	Sludge													
	Sludge Wet													
Aqueous	ML/RL	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l
Sludge	ML/RL	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	
Primary Removal Rate:		Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do
Overall Removal Rate		2.34%	62.99%	57.23%	68.14%	Can't Do	74.58%	59.03%	27.40%	17.56%	32.43%	47.84%	83.73%	Can't Do

SAMPLE 14

Date:	LOCATION	Arsenic (T)	Cadmium	Chrome (T)	Copper	Cyanide	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Zinc	MBAS
6/6/2020	Influent	2.89 ug/l	0.294 ug/l	6.13 ug/l	119. ug/l	3.59 ug/l	2.05 ug/l	0.235 ug/l	3.67 ug/l	4.61 ug/l	0.42 ug/l	0.413 ug/l	162. ug/l	2,520. ug/l
6/7/2020	Effluent	1.01 ug/l	0.028 ug/l	0.83 ug/l	16.7 ug/l	10.8 ug/l	0.193 ug/l	0.0098 ug/l	1.78 ug/l	1.81 ug/l	0.16 ug/l	0.048 ug/l	10.5 ug/l	1,090. ug/l
	Prim._Clar.													
	Sludge													
	Sludge Wet													
Aqueous	ML/RL	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l
Sludge	ML/RL	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	0. ug/l	
Primary Removal Rate:		Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do	Can't Do
Overall Removal Rate		65.05%	90.48%	86.46%	85.97%	Can't Do	90.59%	95.83%	51.50%	60.74%	61.90%	88.38%	93.52%	56.75%

Local Limits Calculation Page

Line Number	Pollutant:	Arsenic(T)	Cadmium	Chrome (T)	Copper	Cyanide	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Zinc	MBAS
2	**Part II: PLANT DATA - OPEN AND CHANGE "BASICDATA.XLS" VALUES IF FLOWS CONTRIBUTING FOR A PARTICULAR POLLUTANT VARY**													
3	Total Plant Flow (in MGD)	5.63 MGD	5.63 MGD	5.63 MGD	5.63 MGD	5.63 MGD	5.63 MGD	5.63 MGD	5.63 MGD	5.63 MGD	5.63 MGD	5.63 MGD	5.63 MGD	5.63 MGD
4	Domestic Flow (in MGD)	4.03 MGD	4.03 MGD	4.03 MGD	4.03 MGD	4.03 MGD	4.03 MGD	4.03 MGD	4.03 MGD	4.03 MGD	4.03 MGD	4.03 MGD	4.03 MGD	4.03 MGD
5	Industrial Flow (in MGD)	1.6 MGD	1.6 MGD	1.6 MGD	1.6 MGD	1.6 MGD	1.6 MGD	1.6 MGD	1.6 MGD	1.6 MGD	1.6 MGD	1.6 MGD	1.6 MGD	1.6 MGD
6	Infiltration/Inflow (by subtraction)	0. MGD	0. MGD	0. MGD	0. MGD	0. MGD	0. MGD	0. MGD	0. MGD	0. MGD	0. MGD	0. MGD	0. MGD	0. MGD
7	Acute Dilution Factor	281. : 1	281. : 1	281. : 1	281. : 1	281. : 1	281. : 1	281. : 1	281. : 1	281. : 1	281. : 1	281. : 1	281. : 1	281. : 1
8	Chronic Dilution Factor	281. : 1	281. : 1	281. : 1	281. : 1	281. : 1	281. : 1	281. : 1	281. : 1	281. : 1	281. : 1	281. : 1	281. : 1	281. : 1
9	Dilution Factor for HH Limits	1. : 1	1. : 1	1. : 1	1. : 1	1. : 1	1. : 1	1. : 1	1. : 1	1. : 1	1. : 1	1. : 1	1. : 1	1. : 1
10	Digester Flow (in MGD)	0.08 MGD	0.08 MGD	0.08 MGD	0.08 MGD	0.08 MGD	0.08 MGD	0.08 MGD	0.08 MGD	0.08 MGD	0.08 MGD	0.08 MGD	0.08 MGD	0.08 MGD
11	Dry Sludge Production Rate (US Tons/day)	7.043 T/D	7.043 T/D	7.043 T/D	7.043 T/D	7.043 T/D	7.043 T/D	7.043 T/D	7.043 T/D	7.043 T/D	7.043 T/D	7.043 T/D	7.043 T/D	7.043 T/D
12	Nitrification	1.5	5.2	.25-1.9,1-100	.05-.48	.34-.5	0.5			.25-.5, 5			.08-.5	
13	**Part III: CONCENTRATIONS LIMITING THE POTW DUE TO PASS THROUGH OR INTERFERENCE**													
14	WQ Acute criteria, aquatic life (mg/L)	0.069 mg/l	0.0402 mg/l	10.3 mg/l	0.0058 mg/l	0.001 mg/l	0.2208 mg/l	0.00212 mg/l	NA	0.07 mg/l	NA	0.0022 mg/l	0.0951 mg/l	NA
15	WQ Chronic criteria, aquatic life (mg/L)	0.036 mg/l	0.008 mg/l	50.4 mg/l	0.0037 mg/l	0.001 mg/l	0.00852 mg/l	0.00111 mg/l	NA	0.0083 mg/l	0.071 mg/l	NA	0.0856 mg/l	500. mg/l
16	Other Water Criteria-Color Code at Input	NA	NA	NA	0.100 mg/L	0.001 mg/l	0.018 mg/l	0.091 mg/l	NA	NA	NA	2.73 mg/l	0.144 mg/l	2.105 mg/l
17	Activated Sludge Inhibition Level	0.1 mg/l	1. mg/l	10. mg/l	1. mg/l	0.1 mg/l	1. mg/l	0.1 mg/l	NA	1. mg/l	NA	0.25 mg/l	0.3 mg/l	NA
18	Anaerobic Digestor Inhibition Level	1.6 mg/l	20. mg/l	NA	40. mg/l	4. mg/l	340. mg/l	NA	NA	10. mg/l	NA	13. mg/l	400. mg/l	NA
19	Class A Sludge standards (40 CFR 503)	41. mg/l	39. mg/l	NA	1,500. mg/l	NA	300. mg/l	17. mg/l	75. mg/l	420. mg/l	100. mg/l	NA	2,800. mg/l	NA
20	Sludge ceiling concentration for beneficial use	75. mg/l	85. mg/l	NA	4,300. mg/l	NA	840. mg/l	57. mg/l	75. mg/l	420. mg/l	100. mg/l	NA	7,500. mg/l	NA
21		Other Water Criteria	Values in gray are NPDES Limits		Values in Blue are WQ Chronic criteria, human Health									
22	**Part IV: POLLUTANT CONCENTRATION ------ SUMMARY**													
23	Estimated Average Industrial Conc.	0. mg/l	0. mg/l	0. mg/l	0. mg/l	0. mg/l	0. mg/l	0. mg/l	0. mg/l	0. mg/l	0. mg/l	0. mg/l	0. mg/l	0. mg/l
24	Ambient Concentration (receiving water)	0.0000 mg/L	0.0000 mg/L	0.0000 mg/L	0.0000 mg/L	0.0000 mg/L	0.0000 mg/L	0.0000 mg/L	0.0000 mg/L	0.0000 mg/L	0.0000 mg/L	0.0000 mg/L	0.0000 mg/L	0.0000 mg/L
25	Adjusted Domestic concentration	0.00184 mg/l	0.00021 mg/l	0.00622 mg/l	0.14817 mg/l	0.00364 mg/l	0.00298 mg/l	0.00035 mg/l	0.00355 mg/l	0.0047 mg/l	0.00044 mg/l	0.00088 mg/l	0.19304 mg/l	2.10775 mg/l
26	Typical Domestic Concentrations	0.003 mg/l	0.003 mg/l	0.05 mg/l	0.061 mg/l	0.041 mg/l	0.049 mg/l	0.0003 mg/l	0.01 mg/l	0.021 mg/l	0.001 mg/l	0.005 mg/l	0.175 mg/l	0. mg/l
27	Average Sludge Level (mg/Kg - Dry)	6.563 mg/kg	1.895 mg/kg	64.675 mg/kg	621.5 mg/kg	NA	19.175 mg/kg	2.198 mg/kg	8.095 mg/kg	27.1 mg/kg	6.523 mg/kg	6.355 mg/kg	1,024. mg/kg	#DIV/0!
28	Average Influent Level (mg/l)	0.0018 mg/l	0.0002 mg/l	0.0062 mg/l	0.1482 mg/l	0.0036 mg/l	0.003 mg/l	0.0004 mg/l	0.0035 mg/l	0.0047 mg/l	0.0004 mg/l	0.0009 mg/l	0.193 mg/l	2.1078 mg/l
29	Average Effluent Level (mg/l)	0.0011 mg/l	0.0001 mg/l	0.0015 mg/l	0.0421 mg/l	0.0093 mg/l	0.0007 mg/l	0.0001 mg/l	0.0024 mg/l	0.0023 mg/l	0.0003 mg/l	0.0002 mg/l	0.0454 mg/l	0.4962 mg/l
30														
31	**Part V: REMOVAL RATES**													
32	Average Primary Removal Rate	33.06%	71.09%	68.29%	55.65%	73.02%	48.99%	73.99%	52.87%	60.03%	71.11%	52.74%	76.40%	3.42%
33	Average Overall Removal Rate	38.34%	75.22%	81.04%	75.70%	69.00%	82.09%	85.04%	45.08%	54.94%	53.65%	76.93%	82.34%	76.74%
34	Reference Primary Removal Rate	33.06%	71.09%	68.29%	55.65%	73.02%	48.99%	73.99%	52.87%	60.03%	71.11%	52.74%	76.40%	3.42%
35	Reference 2d Decile Plant Removal	31.00%	33.00%	68.00%	67.00%	69.00%	39.00%	50.00%		25.00%	33.00%	50.00%	64.00%	
36	Reference Ave Plant Removal	38.34%	75.22%	81.04%	75.70%	69.00%	82.09%	85.04%	45.08%	54.94%	53.65%	76.93%	82.34%	76.74%
37	Reference 8th Decile Removal	53.00%	91.00%	91.00%	95.00%	84.00%	76.00%	79.00%		62.00%	67.00%	88.00%	88.00%	
38														
39	**Part VI: HOW TO CALCULATE LIMITS:**													
40	Sampling Data Available (inf, eff, sludge) (Y/N)	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y
41	Credit present loading of existing sources (Y/N)	N	N	N	N	N	N	N	N	N	N	N	N	N
42	Adjust for receiving water pollution	N	N	N	N	N	N	N	N	N	N	N	N	N
43	Use Observed Overall Removal Rate (Y/N)	N	N	N	N	N	N	N	N	N	N	N	N	N
44	Use Observed Primary Removal Rate (Y/N)	N	N	N	N	N	N	N	N	N	N	N	N	N

Local Limits Calculation Page

Line Number													
45													
46	**Part VII: LOCAL LIMITS CORRESPONDING TO THE CRITERIA ABOVE BASED ON COMPLIANCE WITH:**												
47	Acute WQ Standards (in mg/l)	110.642 mg/l	160.577 mg/l	53,715.88 mg/l	23.158 mg/l	3.18 mg/l	1,219.036 mg/l	13.995 mg/l	NA	164.027 mg/l	NA	9.579 mg/l	532.29 mg/l	NA
48	Chronic WQ Standards (in mg/l)	57.724 mg/l	31.723 mg/l	262,842.817 mg/l	14.824 mg/l	3.18 mg/l	47.01275 mg/l	7.30808 mg/l	NA	18.165 mg/l	NA	NA	479.01 mg/l	############
49	Other Water Criteria-Color Code at Input	NA	NA	NA	1.078 mg/l	0.002 mg/l	0.346 mg/l	2.139 mg/l	NA	NA	NA	41.639 mg/l	NA	26.535 mg/l
50	Sludge Application Limits (in mg/l)	0.188 mg/l	0.117 mg/l	NA	5.13 mg/l	NA	1.056 mg/l	0.068 mg/l	0.14 mg/l	0.755 mg/l	0.184 mg/l	NA	8.302 mg/l	NA
51	Activated Sludge Inhibition (in mg/l)	0.521 mg/l	12.172 mg/l	110.95 mg/l	7.561 mg/l	1.295 mg/l	6.891 mg/l	1.352 mg/l	NA	8.792 mg/l	NA	1.859 mg/l	3.987 mg/l	NA
52	Anaerobic Digestor Inhibition (in mg/l)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
53														
54	**Part VIII: SAMPLE QUALITY: COMPARISON OF LOADINGS AND REMOVAL RATES IMPLIED BY SAMPLE DATA**													
55	Pollutants in Influent (per sampling)	0.087 lbs	0.01 lbs	0.292 lbs	6.957 lbs	0.171 lbs	0.14 lbs	0.017 lbs	0.167 lbs	0.22 lbs	0.021 lbs	0.041 lbs	9.064 lbs	98.968 lbs
56	Pollutants in biosolids (per sampling)	0.092 lbs	0.027 lbs	0.911 lbs	8.754 lbs	#VALUE!	0.27 lbs	0.031 lbs	0.114 lbs	0.382 lbs	0.092 lbs	0.09 lbs	14.424 lbs	#DIV/0!
57	Pollutants in effluent (per sampling)	0.052 lbs	0.003 lbs	0.071 lbs	1.95 lbs	0.431 lbs	0.033 lbs	0.002 lbs	0.111 lbs	0.106 lbs	0.012 lbs	0.011 lbs	2.101 lbs	#DIV/0!
58	% Influent load accounted for: (eff/inf)	167.22%	303.78%	336.14%	153.86%	#VALUE!	216.69%	200.15%	135.30%	221.18%	500.19%	242.79%	182.32%	#DIV/0!
59	Current HW Load Implied by Sludge Data:	9.36%	2.27%	0.08%	59.73%	#VALUE!	6.97%	3.96%	12.69%	6.79%	6.94%	0.47%	29.34%	#DIV/0!
60	Local Limit implied by %max Biosolids level	0.034 mg/L	0.014 mg/L	NA	0.737 mg/L	NA	0.154 mg/L	0.008 mg/L	0.103 mg/L	0.240 mg/L	0.022 mg/L	NA	1.178 mg/L	NA
61														
62	**PART IX: MASS BASED ANALYSIS**													
63	Limiting MAHL (Dom Load + LL*IUflow)	2.5764 lb/d	1.56 lb/d	1,480.69 lb/d	19.36 lb/d	0.15 lb/d	4.72 lb/d	0.92 lb/d	1.99 lb/d	10.23 lb/d	2.47 lb/d	24.84 lb/d	59.69 lb/d	424.93 lb/d
64	Domestic and 10.% reserve for safety and growth	0.3196 lb/d	0.1632 lb/d	148.2784 lb/d	6.9162 lb/d	0.1376 lb/d	0.5721 lb/d	0.1039 lb/d	0.3186 lb/d	1.1809 lb/d	0.2618 lb/d	2.5135 lb/d	12.4575 lb/d	113.3348 lb/d
65	Max. Allowable Industrial Loading (MAIL)	2.2568 lb/d	1.3999 lb/d	1,332.4141 lb/d	12.445 lb/d	0.0139 lb/d	4.1467 lb/d	0.8158 lb/d	1.6747 lb/d	9.0496 lb/d	2.2074 lb/d	22.3258 lb/d	47.2374 lb/d	311.5946 lb/d
66														
67	**Part X: LOCAL LIMIT RECAP:**	**Arsenic(T)**	**Cadmium**	**Chrome (T)**	**Copper**	**Cyanide**	**Lead**	**Mercury**	**Molybdenum**	**Nickel**	**Selenium**	**Silver**	**Zinc**	**MBAS**
68	Industrial Flow (in MGD)	1.60 MGD	1.60 MGD	1.60 MGD	1.60 MGD	1.60 MGD	1.60 MGD	1.60 MGD	1.60 MGD	1.60 MGD	1.60 MGD	1.60 MGD	1.60 MGD	1.60 MGD
69	Local Limit = MAIL/(8.34*Industrial Flow)	0.169 mg/l	0.105 mg/l	99.851 mg/l	0.933 mg/l	0.001 mg/l	0.311 mg/l	0.061 mg/l	0.126 mg/l	0.678 mg/l	0.165 mg/l	1.673 mg/l	3.540 mg/l	23.351 mg/l

Barceloneta

Line Number

WATER QUALITY CRITERIA CALCULATIONS (in ug/L unless otherwise noted)

1	Receiving Water: (F)resh, (M)arine, (B)oth	M
2	Hardness for Use in Calculations:	0.00

		PRIOR	CAR	WATER QUALITY STANDARD							TOTAL	TOTAL	Total	Conv. Fact.		
		ITY	CIN	FRESH			MARINE				LIMITING	LIMITING	LIMITING	Marine	Fresh	Fresh
5	*POLLUTANT*	PLTNT?	GEN?	ACUTE	CHRONIC	Hhealth	ACUTE	CHRONIC	Hhealth	COMMENTS	ACUTE	CHRONIC	HH	dis/tot	Acute	Chronic
6	Antimony (i)			9000.00	1600.00	14.00			4300.00		0. ug/l	0. ug/l	4,300. ug/l	1.00	1.00	1.00
7	ARSENIC (T)	Y	Y	360. ug/l	190. ug/l		69. ug/l	36. ug/l		federal	69. ug/l	36. ug/l	NA	1.00	1.00	1.00
8	ARSENIC(PENT)	Y	Y	850. ug/l	48. ug/l		2,319. ug/l	13. ug/l		Gold Book	2,319. ug/l	13. ug/l	NA	1.00	1.00	1.00
9	Beryllium			130. ug/l	5.3 ug/l					Gold Book	0. ug/l	0. ug/l	NA	1.00	1.00	1.00
10	CADMIUM - Dependent on Hardness in $B	Y	N	#NUM!	#NUM!		40. ug/l	8.8 ug/l		federal	40.2414 ug/l	8.8531 ug/l	NA	0.99	#NUM!	#NUM!
11	CHROMIUM(HEX)	Y	N	15. ug/l	10. ug/l		1,100. ug/l	50. ug/l		federal	1,107.7543 ug/l	50.3525 ug/l	NA	0.99	0.98	0.96
12	CHROMIUM(T) - Dependent on hardness ir	N	N	#NUM!	#NUM!		10,300. ug/l	NA		federal	10,300. ug/l	NA	NA	1.00	0.32	0.86
13	COPPER - Dependent on Hardness in B6	Y	N	#NUM!	#NUM!		4.8 ug/l	3.1 ug/l		federal	5.7831 ug/l	3.7349 ug/l	NA	0.83	0.96	0.96
14	CYANIDE	Y	N	22. ug/l	5.2 ug/l	700. ug/l	1.0 ug/l	1. ug/l	220,000. ug/l	federal	1. ug/l	1. ug/l	220,000. ug/l	1.00	1.00	1.00
15	LEAD - Dependent on hardness in B6	Y	N	#NUM!	#NUM!		210. ug/l	8.1 ug/l		federal	220.8202 ug/l	8.5174 ug/l	NA	0.95	#NUM!	#NUM!
16	MERCURY	Y	N	2.1 ug/l	0.012 ug/l	0.14 ug/l	1.8 ug/l	0.94 ug/l	0.15 ug/l	federal	2.1176 ug/l	1.1059 ug/l	0.15 ug/l	0.85	0.85	1.00
17	Molybdenum	N	N										NA			
18	NICKEL - Dependent on hardness in B6	Y	N	#NUM!	#NUM!	610. ug/l	74. ug/l	8.2 ug/l	4,600. ug/l	federal	74.7475 ug/l	8.2828 ug/l	4,600. ug/l	0.99	1.00	1.00
19	SELENIUM	Y	N	20. ug/l	5. ug/l	170. ug/l	290. ug/l	71. ug/l	11,000. ug/l	federal	290.5812 ug/l	71.1423 ug/l	11,000. ug/l	1.00	1.00	1.00
20	SILVER - Dependent on hardness in B6.	Y	N	#NUM!	NA		1.9 ug/l	NA		federal	2.2353 ug/l	NA	NA	0.85	0.85	1.00
21	Thallium			1,400. ug/l	40. ug/l	1.7 ug/l	2,130. ug/l	NA	6.3 ug/l		2,130. ug/l	0. ug/l	6.3 ug/l	1.00	1.00	1.00
22	Tributyl Tin (TBT)			0.460	0.063		0.370	0.010			0.37 ug/l	0.01 ug/l	NA	1.00	1.00	1.00
23	ZINC- Dependent on hardness in B6	Y	N	#NUM!	#NUM!		90. ug/l	81. ug/l		federal	95.1374 ug/l	85.6237 ug/l	NA	0.95	0.98	0.99
24	Arsenic (inorganic)	Y	N			0.018 ug/l			0.14 ug/l	National Toxics Rule	0. ug/l	0. ug/l	0.14 ug/l	1.00	1.00	1.00
25	Aluminum										0. ug/l	0. ug/l	0. ug/l	1.00	1.00	1.00
26	MBAS										0. ug/l	0. ug/l	0. ug/l	1.00	1.00	1.00
27	sulfide										0. ug/l	0. ug/l	0. ug/l	1.00	1.00	1.00
28	free Cyanide										0. ug/l	0. ug/l	0. ug/l	1.00	1.00	1.00
											0. ug/l	0. ug/l	0. ug/l	1.00	1.00	1.00
											0. ug/l	0. ug/l	0. ug/l	1.00	1.00	1.00

Confirmed Federal

CAUTION: The values calculated in this color box are derived from the Water Quality Standards boxes below. Changing the location or order of any of the pollutants in rows 10 to 23 may corrupt the entire workbook. Boxes B5 and B6 are taken from the LOCLIMIT.XLS spreadsheet. This spreadsheet cannot function without data being entered there first. Additional pollutants, if needed may be entered after line 23.

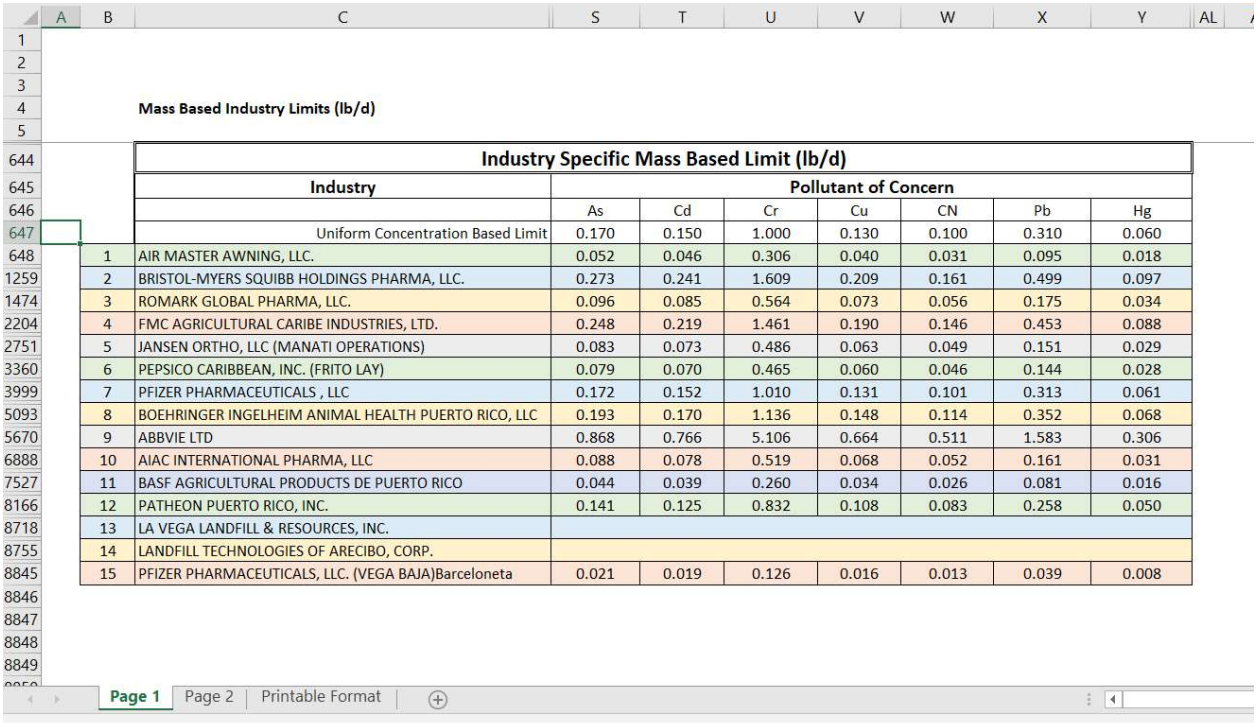
Appendix D
Industrial Flow Tabulation and Mass Limits Calculations

Appendix D. Industrial Flow and Mass Limits Calculations

Introduction

The industrial base for Barceloneta consist of 15 significant industrial dischargers. The flow limits for each industry are higher than actual flows to the plant. Because the sum of these limits exceeds the actual total flow to the treatment facility, the flow data for the period from January 1, 2019, to October 1, 2020, was analyzed to determine the maximum monthly for each industry. These maximum months were then summed to obtain a flow to calculate a concentration based uniform limits for all users. The maximum month was also used to calculate an industry-specific, mass-based limit for each industry. The analysis consists of the entry of daily flow measurements for each industry into an Excel spreadsheet, calculation of monthly average flows, and selection of the maximum month. This flow value was then used to multiply the adopted uniform concentration times the conversion factor of 8.34 to obtain a pounds-per-day limit. The resultant spreadsheet is 37 columns wide by 8,845 rows or 327,265 cells, which is too large to present in an appendix. Consequently, the spreadsheet is attached to this local limit document and the following provides guidance in how to find data within the spreadsheet.

The spreadsheet consists of three pages. Page 1 and 2 (Figures 1 and 2) are identical except that they cover different pollutants. Breaking the table into two parts provides a format that can fit to a single page. The third page provides a picture format to be used in the local limit's development document. Descriptions of the spreadsheets follow Figures 1 and 2.

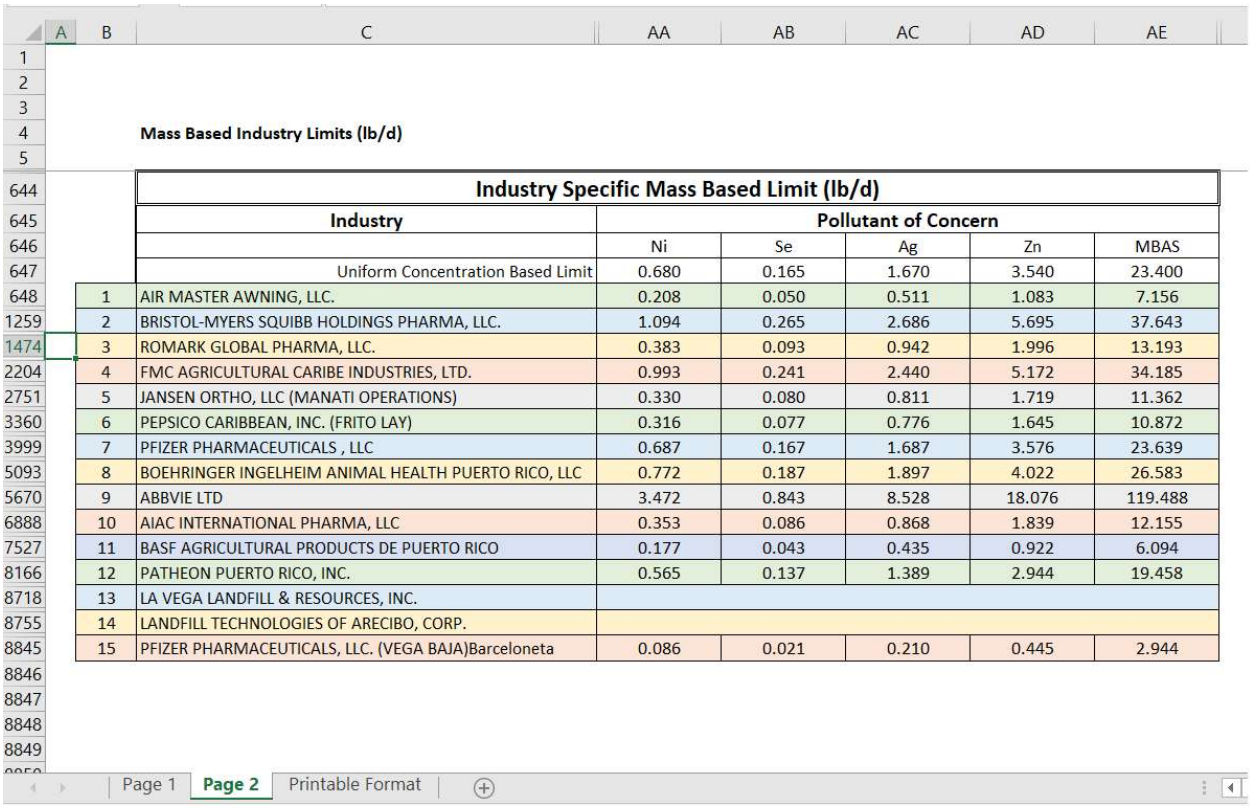


Mass Based Industry Limits (lb/d)

		Industry Specific Mass Based Limit (lb/d)							
		Industry	Pollutant of Concern						
			As	Cd	Cr	Cu	CN	Pb	Hg
647		Uniform Concentration Based Limit	0.170	0.150	1.000	0.130	0.100	0.310	0.060
648	1	AIR MASTER AWNING, LLC.	0.052	0.046	0.306	0.040	0.031	0.095	0.018
1259	2	BRISTOL-MYERS SQUIBB HOLDINGS PHARMA, LLC.	0.273	0.241	1.609	0.209	0.161	0.499	0.097
1474	3	ROMARK GLOBAL PHARMA, LLC.	0.096	0.085	0.564	0.073	0.056	0.175	0.034
2204	4	FMC AGRICULTURAL CARIBE INDUSTRIES, LTD.	0.248	0.219	1.461	0.190	0.146	0.453	0.088
2751	5	JANSEN ORTHO, LLC (MANATI OPERATIONS)	0.083	0.073	0.486	0.063	0.049	0.151	0.029
3360	6	PEPSICO CARIBBEAN, INC. (FRITO LAY)	0.079	0.070	0.465	0.060	0.046	0.144	0.028
3999	7	PFIZER PHARMACEUTICALS , LLC	0.172	0.152	1.010	0.131	0.101	0.313	0.061
5093	8	BOEHRINGER INGELHEIM ANIMAL HEALTH PUERTO RICO, LLC	0.193	0.170	1.136	0.148	0.114	0.352	0.068
5670	9	ABBVIE LTD	0.868	0.766	5.106	0.664	0.511	1.583	0.306
6888	10	AIAC INTERNATIONAL PHARMA, LLC	0.088	0.078	0.519	0.068	0.052	0.161	0.031
7527	11	BASF AGRICULTURAL PRODUCTS DE PUERTO RICO	0.044	0.039	0.260	0.034	0.026	0.081	0.016
8166	12	PATHEON PUERTO RICO, INC.	0.141	0.125	0.832	0.108	0.083	0.258	0.050
8718	13	LA VEGA LANDFILL & RESOURCES, INC.							
8755	14	LANDFILL TECHNOLOGIES OF ARECIBO, CORP.							
8845	15	PFIZER PHARMACEUTICALS, LLC. (VEGA BAJA)Barceloneta	0.021	0.019	0.126	0.016	0.013	0.039	0.008

Page 1 | Page 2 | Printable Format

Figure 1



Mass Based Industry Limits (lb/d)

		Industry Specific Mass Based Limit (lb/d)					
		Industry	Pollutant of Concern				
			Ni	Se	Ag	Zn	MBAS
647		Uniform Concentration Based Limit	0.680	0.165	1.670	3.540	23.400
648	1	AIR MASTER AWNING, LLC.	0.208	0.050	0.511	1.083	7.156
1259	2	BRISTOL-MYERS SQUIBB HOLDINGS PHARMA, LLC.	1.094	0.265	2.686	5.695	37.643
1474	3	ROMARK GLOBAL PHARMA, LLC.	0.383	0.093	0.942	1.996	13.193
2204	4	FMC AGRICULTURAL CARIBE INDUSTRIES, LTD.	0.993	0.241	2.440	5.172	34.185
2751	5	JANSEN ORTHO, LLC (MANATI OPERATIONS)	0.330	0.080	0.811	1.719	11.362
3360	6	PEPSICO CARIBBEAN, INC. (FRITO LAY)	0.316	0.077	0.776	1.645	10.872
3999	7	PFIZER PHARMACEUTICALS , LLC	0.687	0.167	1.687	3.576	23.639
5093	8	BOEHRINGER INGELHEIM ANIMAL HEALTH PUERTO RICO, LLC	0.772	0.187	1.897	4.022	26.583
5670	9	ABBVIE LTD	3.472	0.843	8.528	18.076	119.488
6888	10	AIAC INTERNATIONAL PHARMA, LLC	0.353	0.086	0.868	1.839	12.155
7527	11	BASF AGRICULTURAL PRODUCTS DE PUERTO RICO	0.177	0.043	0.435	0.922	6.094
8166	12	PATHEON PUERTO RICO, INC.	0.565	0.137	1.389	2.944	19.458
8718	13	LA VEGA LANDFILL & RESOURCES, INC.					
8755	14	LANDFILL TECHNOLOGIES OF ARECIBO, CORP.					
8845	15	PFIZER PHARMACEUTICALS, LLC. (VEGA BAJA)Barceloneta	0.086	0.021	0.210	0.445	2.944

Page 1 | Page 2 | Printable Format

Figure 2

Columns

1. Block the columns and right-click to select “unhide”.
2. Column “B” contains the industry name. Columns “K–M” select out only numbers and removes non-numeric data. Column “O” calculates the monthly average for each month/industry. Column “R” selects the maximum value for each industry. The sum of the values in column “R” was used to calculate the uniform concentration-based limit. Each industry’s flow is available in Column R directly to the left of the mass based limit shown when the columns are not expanded.

Rows

The rows in the spreadsheet are collapsed to hide the considerable daily flow data for each industry. These have been collapsed to show only the last row at the bottom of each industrial section. In the unexpanded version, each mass-based limit is calculated in this last row by multiplying the industry’s specific maximum month flow (in Column R) times the uniform concentration found in Row 647 times the conversion factor of 8.34. By calculating a mass-based flow for actual flows, the limits prevent exceeding all criteria used in the calculations of the limits.

Appendix E
Puerto Rico Water Quality Standards Worksheet

Substance	Class SB (ug/L)
Arsenic (As)	36 (AL)
Cadmium (Cd)	7.95 (AL)
Cyanide (Free CN)	1.0 (AL)
Copper (Cu)	3.73 (AL)
Chromium III (Cr+3)	---
Chromium VI (Cr+6)	50.4 (AL)
Chromium (Cr)	---
Mercury (Hg)	0.051 (HH)
Nickel (Ni)	8.28 (AL)
Silver (Ag)	2.24 (AL)
Lead (Pb)	8.52 (AL)
Selenium (Se)	71.14 (AL)
Zinc (Zn)	85.62 (AL)
Surfactants (MBAS)	500
Total Nitrogen	5,000
Total Phosphorus	1,000

Identification codes for the applicability of standards to uses. These codes include designated and existing uses.
AL = Protection of the water body for the propagation and preservation of aquatic species or species dependent on the water body.
DW = Protection of the water body for use as source of drinking water supply.
HH = Protection of the water body or aquatic life for reasons of human health.

Appendix F
Average TCLP for Sludge

TCLP Regulatory Limits and Historical Tests Results

Barceloneta

	Unit	Date 3/23/2018	6/13/2018	9/12/2018	12/12/2018	1/9/2019	3/20/2019
Arsenic - Total	mg/L	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Barium -Total	mg/L	<0.025	0.065	0.14	0.29	0.29	0.225
Cadmium - Total	mg/L	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025	<0.0025
Chromium - Total	mg/L	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Lead - Total	mg/L	<0.025	<0.025	<0.025	<0.025	<0.025	<0.025
Mercury - Total	mg/L	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
Selenium - Total	mg/L	<0.15	<0.15	<0.15	<0.15	<0.15	<0.50
Silver - Total	mg/L	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010

1/27/2021	4/21/2021	Maximum	TCLP Limit
<0.05	<0.05	<0.05	5
<0.050	0.13	0.29	100
<0.0025	<0.0025	<0.0025	1
<0.045	<0.045	<0.045	5
<0.075	<0.075	<0.075	5
<0.0002	<0.0002	<0.0002	0.2
<0.15	<0.15	<0.15	1
<0.010	<0.010	<0.010	5

Appendix G
Phenolic Compounds Regulated by Puerto Rico Water Quality Standards

Phenol and Phenolic Compounds

Substance	Classes SB and SC (µg/l)	Class SD (µg/l)	Class SG (µg/L)[a]
Pentachlorophenol	7.9 (AL)	1.0 (DW)	1.0 (DW)
2,4,6-Trichlorophenol	24 (HH)	14 (HH)	14 (HH)
2,4-Dichlorophenol	290 (HH)	77 (HH)	77 (HH)
2,4-Dimethylphenol	850 (HH)	380 (HH)	380 (HH)
2-Chlorophenol	150 (HH)	81 (HH)	81 (HH)
2-Methyl-4,6-Dinitrophenol	280 (HH)	13 (HH)	13 (HH)
2,4-Dinitrophenol	5,300 (HH)	69 (HH)	69 (HH)
Phenol	860,000 (HH)	10,000 (HH)	10,000 (HH)

PUERTO RICO WATER QUALITY STANDARDS REGULATION

Rule 1303, as Amended on August 2014

AL = Protection of the water body for the propagation and preservation of aquatic species or species dependent on the water body.
DW = Protection of the water body for use as source of drinking water supply.
HH = Protection of the water body or aquatic life for reasons of human health.

* = Identifies a substance that may be a carcinogen. The HH Criteria is base on a carcinogenicity risk of 10.5^{-5}
+ = Identifies a priority pollutant.
a = For the protection of ground waters with the potential to be used or that are used as source of drinking water supply, the applicable water quality standard is the Drinking Water (DW) or Human Health (HH) criteria. For those ground waters that flow into other water bodies, the applicable water quality standard for ground waters is the most stringent criteria resulting from the comparison between the standard applicable to the classification of the water body into which it flows and the DW or HH criteria applicable to ground waters.

Appendix H
Long Hand Calculation of Copper Local Limits

Barceloneta RWWTP

Long Hand Calculation of Local Limit - Copper

Allowable Headwork Loading (AHL) Based on Protection of Water Quality

Acute WQS, Chronic WQS, PRWQSR, and NPDES Permit Limits

POTWs are required to prohibit nondomestic user discharges in amounts that result in violation of Water Quality Standards and/or NPDES Limits.

Federal WQ criteria are found at: http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm
Puerto Rico WQS are found at: https://www.epa.gov/sites/production/files/2014-12/documents/prwqs.pdf
NPDES Limits are found in NPDES Permit # PR0021237
Where a dilution factor has been approved, the factor applies to the Water Quality Standards but not to NPDES limits.
Dilution factors applied are derived from: Best Professional Judgment - See rationale

	Y or N
Use Federal	Y

Hardness Utilized: 0

Copper

			Dissolved to Total Conversion Factor (CF)
Federal WQS Acute =	5.78	µg/L	1.00
Federal WQS Chronic =	3.73	µg/L	1.00
Puerto Rico WQS =	3.73	µg/L	0.96
	NA	µg/L	0.96
HH = 0	NA	µg/L	1.00
NPDES = 0.1	0.1	µg/L	1.00

The Allowable Headworks Loadings in Table A are calculated using the following equation:

$$Lwqs = \frac{(8.34)(Ccrit)(Qpotw * Dilution\ Factor)}{(1\text{-}Rpotw)}$$

Where:

Lwqs = Maximum allowable headworks loading (lbs/day)
based on NPDES permit limits or Water Quality Criteria
Ccrit= (NPDES effluent limits or WQ criteria expressed as mg/L)
Qpotw= (POTW average flow in mgd)
Dilution Factor = (1 is equivalent to no dilution factor)
Rpotw = (Overall Removal Factor as a decimal)

Table A

Federal Acute	Federal Chronic	Puerto Rico WQS =		HH	NPDES
Copper	Copper	Copper	Copper	Copper	Copper
0.005783133	0.004	0.004			0.1
5.63	5.63	5.63	5.63	5.63	5.63
281.00	281.00	281.00	281.00	1.00	1.00
75.7%	75.7%	75.7%	75.7%	75.7%	75.7%
Water Quality Based AHLs		lb/d			
314.00	202.79	202.53			19.32

Copper

Calculation of most Stringent WQS AHL

$$Lwqs = \frac{(8.34\ lb/gal \times 0.10000\ mg/L \times 5.63\ mgd \times 1:1)}{1 - 0.7570} = 19.32\ lb/d$$

Barceloneta RWWTP

Long Hand Calculation of Local Limit - Copper

Allowable Headwork Loading (AHL) Based on Sludge Criteria **Copper**

Maximum headwork loadings to protect sludge quality are derived based on criteria found in 40 CFR 503 in Table 1
The Allowable Headworks Loading in Table B are calculated using the following equation:

$$Lin = \frac{(8.34)(Cslcrit)(SGsldg)(PS/100)(Qsldg)}{Rpotw}$$

Where:

Lin = Allowable Headwork Pounds per Day
Cslcrit = Limiting sludge criteria (mg/kg)(Table 3)
SGsldg = Specific Gravity of the Sludge kg/L
PS = Percent solids in the sludge to disposal (%)
Qsldg = Sludge flow to disposal (mgd)
Rpotw = POTW removal efficiency (as a decimal)

The daily sludge flow and percent solids is not available
Values used are based on standard design estimation methods.

Table B

Copper
4300
1.1
2
0.08
75.7%

Pollutant	40 CFR 503 Table 3 Clean Sludge (mg/kg)	Table 1 Ceiling Sludge (mg/kg)
Arsenic	41	75
Cadmium	39	85
Chromium	NA	NA
Copper	1500	4300
Cyanide	NA	NA
Lead	300	840
Mercury	17	57
Molybdenum	NA	75
Nickel	420	420
Selenium	100	100
Silver	NA	NA
Zinc	2800	

Sludge Quality Based AHL
83.38 lb/d

Copper

$$Lin = \frac{(8.34 \text{ lb/g X } 4300 \text{ mg/L X } 1.1 \text{ kg/L X } 2\% \text{ solids X } 0.080 \text{ mgd} =}{0.7570} = 83.38 \text{ lb/d}$$

Barceloneta RWWTP

Long Hand Calculation of Local Limit - Copper

Allowable Headwork Loading (AHL) Based On Inhibition **Copper**

Literature Values for inhibition are found in Appendix G of the EPA Local Limits Guidance 2004.
The criteria used to calculate inhibition are shown in Table C for: Activated Waste
The following equation was used to derive the allowable headwork loadings shown in Table C.

For Secondary Treatment Inhibition the equation is:

$$Linhib2 = \frac{(8.34)(Ccrit)(Qpotw)}{(1-Rprim)}$$

Where:

Linhib2 = Maximum allowable headworks loading (lbs/d) based on inhibition of secondary process
Ccrit = Inhibition level (mg/L) for Activated Sludge
Rprim = Primary removal efficiency as a decimal, (if no primary - zero)
Qpotw = POTW average flow

Note: When a range has been indicated the low range value has been selected.

Table C

Pollutant	Inhibition Secondary Activated Sludge	Nitrogen Inhibition
Arsenic	0.1	1.5
Cadmium	1-10	5.2
Chromium	1-100	.25-1.9
Copper	1	.05-.48
Cyanide	0.1-5	.34-.5
Lead	1.0-5.0	0.5
Mercury	0.1-1	
Nickel	1.0-5.0	.25-.5
Selenium		
Silver		
Zinc	.3-10	.08-.5

Copper
1
55.7%
5.63

Copper

$$Linhib2 = \frac{(8.34 \text{ lb/gal} \times 1.00 \text{ mg/L} \times 5.63 \text{ mgd})}{1 - 0.5565} = 105.9 \text{ lb/d}$$

Activated Waste Inhibition Based AHL: 105.87 lb/d

For Anaerobic Inhibition the equation is:

Literature Values for inhibition are found in the EPA Local Limits Guidance 2004 Appendix G.
The criteria used to calculate inhibition are shown in Table D for: Anaerobic Digestion
The following equation was used to derive the allowable headwork loadings shown in Table D

$$Linhibdgstr = \frac{(8.34)*(Ccrit)(Qdig)}{Rpotw}$$

Where:

Linhibdgstr = Maximum allowable headworks loading (lbs/d) based on inhibition of Anaerobic Digestion
Ccrit = Inhibition level (mg/l) for Anaerobic Digestion
Qdig = Sludge flow to disposal (mgd)
Rpotw = POTW removal efficiency (as a decimal)

Table D

Pollutant	Inhibition Anaerobic Sludge
Arsenic	1.6
Cadmium	20
Chromium	130
Copper	40
Cyanide	4
Lead	340
Mercury	NA
Nickel	10
Selenium	NA
Silver	13
Zinc	400

Copper
40
0.08
75.70%

Copper

$$Linhibdgstr = \frac{(8.34 \text{ lb/gal} \times 40 \text{ mg/L} \times 0.080 \text{ MGD})}{75.70\%} = 35.255 \text{ lb/d}$$

Anaerobic Digestion Based AHL: 35.255 lb/d

Barceloneta RWWTP
Long Hand Calculation of Local Limit - Copper
Copper

Selection of Lowest AHL Representing Maximum Allowable Headworks Loading (MAHL)

The smallest of the above calculated values is selected as the MAHL.

Selection of MAHL lb/d										
	Federal Acute	Federal Chronic	Puerto Rico WQS =		LA HH	NPDES	Sludge Quality	Secondary Inhibition	Anaerobic Inhibition	Maximum Allowable Headworks Loading (MAHL)
Copper	314.00	202.79	202.53			19.32	83.378	105.87	35.2550464	19.323

Calculation of the Maximum Allowable Industrial Loading (MAIL)

The domestic (uncontrollable) sources and a safety/growth factor are subtracted from the MAHL to calculate the MAIL as follows:

$$MAIL = (MAHL)(1-SF) - L_{unc})$$

Where:

MAIL = Maximum available industrial loading, lbs/day

	Copper
MAHL = Maximum allowable headworks loading, lbs/day	19.323
SF = Safety and Growth factor, as a decimal	10%
L_{unc} = Loadings from uncontrolled sources	4.980

Using conservative approach L_{unc} has been established using (domestic flow =average plant influent-permitted industrial flow) and average influent concentration as follows:

L_{unc} = (average Influent concentration in mg/L)(average domestic flow to POTW)(8.34)

Copper

L_{unc} = 148.17143 ug/L./1000ug/mg X 4.03 mgd X 8.34) = 4.980 lb/d

MAIL = (19.32 lb/d X (1 - 10%) - 4.980 lb/d) = 12.410 lb/d

Calculation of Industrial Local Limit mg/l using Uniform Allocation Method

The uniform allocation method divides the MAIL by the industrial flow and a factor of 8.34 to convert to a concentration based limit using the following equation:

$$\text{Local Limit} = \frac{\text{MAIL lb/d}}{(8.34 \times Q_i)}$$

Q_i = Total Industrial Flow, mgd 1.6 mgd

Copper

Copper Local Limit = 12.41 lb/d divided by (8.34 X 1.6 MGD) = **0.930 mg/L**

Appendix I
BOD_5 and TSS Estimates

Barceloneta RWWTP Monthly Flow, BOD5, and TSS Records

Month	Flow	BOD5				TSS			
	Monthly Average	% Removal	Effluent Conc.	Influent Conc.	Calculated Influent Loading	% Removal	Effluent Conc.	Influent Conc.	Calculated Influent Loading
	mgd	%	mg/L	mg/L	lb/d	%	mg/L	mg/L	lb/d
Nov-2018	5.7	97	6	200	9,508	94	11	183	8,715
Dec-2018	5.8	97	8	267	12,899	89	19	173	8,355
Jan-2019	4.7	96	6	150	5,880	91	7	78	3,049
Feb-2019	5.5	98	3	150	6,880	94	7	117	5,351
Mar-2019	5.5	98	3	150	6,880	92	14	175	8,027
Apr-2019	5.7	98	5	250	11,885	97	6	200	9,508
May-2019	5.6	97	5	167	7,784	97	8	267	12,454
Jun-2019	5.7	96	7	175	8,319	91	12	133	6,338
Jul-2019	5.7	94	6	100	4,754	88	15	125	5,942
Aug-2019	5.7	94	10	167	7,923	75	32	128	6,085
Sep-2019	5.7	92	15	188	8,913	83	24	141	6,711
Oct-2019	5.9	92	12	150	7,381	78	36	164	8,052
Nov-2019	5.7	90	26	260	12,360	82	28	156	7,395
Dec-2019	6	93	16	229	11,438	88	20	167	8,340
Minimum	4.7	90	3	100	4754	75	6	78	3049
Average	**5.64**	**95**	**9**	**186**	**8772**	**89**	**17**	**158**	**7452**
Maximum	6	98	26	267	12899	97	36	267	12454

Appendix J
Definitions

Appendix J. Definitions

Allowable Headworks Loading (AHL)	The estimated maximum loading of a pollutant that can be received at a publicly owned treatment works' (POTW) headworks that should not cause a POTW to violate a particular treatment plant or environmental criterion. AHLs are developed to prevent interference or pass through.
Applicable Criteria	A regulation or standard that must be considered in the development of a local limit.
Best Management Practice (BMP)	Schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of waters of the U.S. BMPs also include treatment requirements, operating procedures, and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. (EPA definition)
Best Professional Judgment	Use of experience and technical expertise to determine a course of action for which a clear-cut direction is not available in statutory or research literature.
Biological Treatment	A treatment process that depends on use of microbiological processes to remove pollutants or render them to a less-objectionable state.
Book Values	Numeric values that have been determined in research studies to apply to similar processes. Most information is taken from EPA's 2004 *Guidance Manual on Development of Local Limits* (EPA Publication EPA 833-R-04-002A). See also *Reference Values*.
Categorical User	Industry subject to a category listed in 40 CFR 405-471. By definition, Categorical Users are also listed as Significant Industrial Users.
Chemical Treatment	A treatment process that uses a chemical reaction to reduce pollutants, make pollutants easier to treat, or render them less objectionable. An example includes pH adjustment.
Chemically Enhanced	The addition of chemicals to the waste stream to enhance the actions of a treatment process that is already present in the system.
Cobalt (Pt/Co) Scale	The Cobalt (Pt/Co) scale is a measure of color is a scale where each unit of the scale is defined as the color induced by dissolving 1 milligram per liter (mg/L) of platinum in water using cobalt platinate as the solute.
Composting	The process of adding vegetable matter and accelerating decomposition into a humus-like substance by various micro-organisms, including bacteria, fungi, and actinomycetes, in the presence of oxygen. The resulting product is used for soil amendment.
Concurrent Sampling	Sampling conducted at the same time, or with a lag period approximately equivalent to the time that the flow is resident in any portion of the system. Concurrent sampling estimates how any given characteristic changes as flow moves through the system.
Conservative Pollutant	Pollutants that are presumed not to be destroyed, biodegraded, chemically transformed, or volatilized within the publicly owned treatment works (POTW). Conservative pollutants introduced to a POTW ultimately exit the POTW solely through the POTW's effluent and sludge. Most metals are considered conservative pollutants.
Control Efficiency	The percent capture of a pollutant that is removed by a control measure installed specifically to remove that pollutant.
Criteria	A regulation or standard that may be applicable to the development of a local limit.

Design Capacity, Design Flow	The theoretical capacity based on engineering studies. Capacity is typically engineered into the original design. Changes to the system based on the system actually built after design may differ if changes were made to the design during construction, which results in the final "As-Built Capacity."
Dispersion Factor	A factor that describes how air emissions mix with the ambient air after being emitted from the original source.
Domestic (L_{unch})	Domestic waste describes waste that is generated by residential use and light commercial. In practice, the calculations typically treat domestic waste as the flow that remains after all permitted industrial flow is removed from the waste stream, which does not apply a factor for non-permitted commercial. See *Domestic Approximation.*
Domestic Approximation	Domestic sampling typically is taken from low-flow areas as an alternative; the test data from the influent is used to represent domestic contributions. These data consist of all dischargers, including domestic, commercial, and industrial. Use of the data is a conservative assumption.
Domestic Strength	Waste generated from residential use only varies appreciably between communities (for example, average biochemical oxygen demand [BOD] ranges from <180 mg/L to >300 mg/L). Using best professional judgment, the most typical concentration used in local limits and ordinances is 250 mg/L for BOD and for TSS.
Emission Standards	Emission standards are legal requirements governing air pollutants released into the atmosphere.
General Limit(s)	Limits that are taken from the Puerto Rico Aqueduct and Sewer Authority Rules and Regulations for Supply of Water and Sewer Services.
Guidance Document	Unless otherwise denoted, indicates the use of the U.S. Environmental Protection Agency Office of Wastewater Management. 2004. *Local Limits Development Guidance*. EPA 833-R-04-002A. July.
Headworks	The point at which wastewater enters a wastewater treatment plant. The headworks may consist of bar screens, comminuter, wet wells, and/or pumps.
Implementation	Specification of how Technically Based Local Limits will be applied and which users will require routine monitoring.
Industrial Test Data	Monitoring data collected from the discharge point for each industry. For use in local limits, flow is also required to convert to the mass of pollutant contributed to the treatment system.
Industrial User	Any user who is involved in commercial business practice that discharges wastewater that was generated as part of the commercial process at a rate that sufficiently exceeds domestic strength or volume so as to require regulation to protect the treatment process.
Industry-specific Limit	A limit established in individual industrial permits to limit discharge of pollutants that could interfere with or use excessive capacity of the treatment plant. Industry-specific limits are placed directly into the industrial permit as specified in the Guidance Manual Table 6-2 row three and are based on a non-uniform allocation of the capacity or MAIL available to industry. Limits may be based on a range of rationale between implementation of best management practices to requirements to install treatment equipment sufficient to protect the wastewater plant. Ultimately, the POTW will want to allocate pollutant loadings in a fair and sensible way that does not favor any one industry or group of industries, considers the economic impacts, maintains compliance with the NPDES permit, and otherwise achieves the environmental goals of the program.

Inhibition	Inhibition occurs when pollutant levels in a POTW's wastewater or sludge cause operational problems for biological treatment processes involving secondary or tertiary wastewater treatment and alter the POTW's ability to adequately remove BOD, TSS, and other pollutants.
Interference (positive/negative)	Laboratory test methods are based on attribute(s) of the parameter being tested. Other materials or sample attributes can interfere with achieving an accurate assessment of the parameter being tested. When the result that is obtained is higher than the actual value, this is referred to positive interference. When the results are lower than the actual value, the interference is referred to as negative.
Land Application	Land application is the process of spreading treated wastewater sludge onto land for agricultural purposes, improving the lands nutrient and organic matter content. Land application is subject to regulatory requirements under 40 CFR 503.
Landfill Option	Disposal of sludge in an approved landfill. The landfilling of sludge is subject to regulations in 40 CFR 257.
Lower Explosive Limits (LEL)	The minimum concentration in air at which a gas or vapor will explode or burn in the presence of an ignition source.
Maximum Allowable Headworks Loading (MAHL)	The estimated maximum loading of a pollutant that can be received at a POTW's headworks without causing pass-through or interference. The most protective (lowest) of the AHLs (see definition) estimated for a pollutant.
Maximum Allowable Industrial Loading (MAIL)	The estimated maximum loading of a pollutant that can be received at a POTW's headworks from all permitted industrial users and other controlled sources without causing pass-through or interference. The MAIL is usually calculated by applying a safety factor to the MAHL and discounting for uncontrolled sources, hauled waste, and growth allowance.
Method Detection Limit (MDL)	The minimum concentration of an analyte that can be measured and reported with 99 percent confidence that the analyte concentration is present as determined by a specific laboratory method in 40 CFR Part 136, Appendix B.
Minimum Level	The term used by EPA instead of limit of quantitation (LOQ); it is defined as the concentration at which the entire analytical system must give a recognizable signal and acceptable calibration point. The ML is the concentration in a sample that is equivalent to the concentration of the lowest calibration standard analyzed by a specific analytical procedure, assuming that all of the method-specified sample weights, volumes, and processing steps have been followed.
Non-conservative Pollutant	Pollutants that are presumed to be destroyed, biodegraded, chemically transformed, or volatilized within the POTW to some degree.
Non-domestic Discharge	Any discharge to the collection system from a permitted source.
Other Permitted User	A source of discharge which has been given a discharge permit but does not fit the definition of categorical or significant industrial user.
Overall Removal Rate	The percent removal of a specific pollutant that occurs from the point of industrial waste discharge to the NPDES-specified wastewater treatment plant discharge point.
Partition Coefficient	The percent of a specific pollutant removed across a process or the system, synonymous with "Removal Factor" and "Removal Coefficient".
Physical Treatment	A treatment process that uses a physical process to reduce pollutants, make pollutants easier to treat, or render them less objectionable. Examples include settling of particles and shredding of rags and debris.

Plug Flow	Plug flow is the flow of materials through a pipe or processes that do not appreciably mix contents with flow that occurred earlier or later in time.
Pollutant of Concern (POC)	Any pollutant that might reasonably be expected to be discharged to the POTW in sufficient amounts to pass through or interfere with the works, contaminate its sludge, cause problems in its collection system, or jeopardize its workers.
Positive Interfering Material	A substance that causes a higher than accurate result in a laboratory tests.
Primary Removal Rate	The percent removal of a specific pollutant that occurs from the point of entry to the point of exit from a primary clarifier(s). For a system with multiple treatment processes, the primary removal rate is used in the calculation of inhibition of biological treatment.
Reference Values (Removal Rate)	Numeric values that have been determined in research studies to apply to similar processes. Most information is taken from EPA's 2004 *Guidance Manual on Development of Local Limits* (EPA 833-R-04-002A). See also, *Book Values*.
Removal Coefficient	The percent of a specific pollutant removed across a process or system; synonymous with "Removal Factor" and "Partition Coefficient."
Removal Factor	The percent of a specific pollutant removed across a process or system; synonymous with "Removal Coefficient" and "Partition Coefficient."
Scrubber Equipment	Equipment installed specifically to remove a pollutant from the waste stream; in the context of local limits, scrubber equipment is used to remove metals from emissions from incinerated waste.
Significant Industrial User (SIU)	As defined in 40 CFR 403.3, all users subject to Categorical Pretreatment Standards under 40 CFR 403.6 and 40 CFR chapter I, subchapter N; and any other industrial user that discharges an average of 25,000 gallons per day or more of process wastewater to a POTW (excluding sanitary, non-contact cooling, and boiler blowdown wastewater); contributes a process waste stream that makes up 5 percent or more of the average dry weather hydraulic or organic capacity of the POTW treatment plant; or is designated as such by the Control Authority defined in 40 CFR 403.12(a) on the basis that the industrial user has a reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement [in accordance with 40 CFR 403.8(f)(6)].
Site (system) Characterization	A description of the wastewater system including size, capacity, unit processes used, and industries that discharge to the system and receiving stream. The purpose of the site characterization is to create a record of what was present at the time of the limits development for future comparison when determining if new limits are needed.
Sludge Disposal Option	The method selected to dispose of the solid materials removed from wastewater. The most frequently used options include but are not limited to burial in a landfill site, application to land for agricultural purposes, incineration, or conversion to commercial fertilizer.
Sludge Removal Step	Any step in a wastewater treatment plant that removes solid or semi-solid materials from the waste stream.
Standard Calculations	Calculations that follow exact equations specified in the EPA's 2004 *Local Limits Development Guidance* (EPA Publication EPA 833-R-04-002A) for each of the treatment processes found within a wastewater plant.

Surfactant	Surfactants are compounds that lower the surface tension between two liquids or between a liquid and a solid. Surfactants may act as detergents, wetting agents, emulsifiers, foaming agents, and dispersants. Surfactants may be anionic or cationic, with the vast majority being cationic. Surfactant limits are based on methylene blue active substances, which are anionic and are chiefly in the wastewater stream from detergents.
Surrogate	A value adopted to complete a calculation when a true value is not available because the test data are below the minimum limit (ML). EPA guidance indicates that the ML, one-half of the ML, or zero may be used. Unlike book values, surrogates are not based on previous studies or data and can cause very high differences in the removal rates calculated and, consequently, the final local limit. Surrogates are not used in this local limits derivation except when the effluent is below the ML, and the influent is high enough to indicate that a removal rate is present.
Time-Weighted Average Threshold Limit Value (TWA-TLV)	The concentration to which a worker can be exposed for 8 hours per day, 40 hours per week and not have any acute or chronic adverse health effects (commonly accepted exposure limits identified by the American Conference of Government Industrial Hygienists).
Total Metals	Total metals is a descriptor of metal content of a sample after all organic material has been digested using a vigorous acid digestion; it does not include metals that are tightly bound inside inorganic particles, such as grit and sand.
Toxicity Leaching Procedure	A laboratory procedure designed to predict whether a particular waste is likely to leach chemicals into groundwater at dangerous levels. Details are provided in 40 CFR Part 261.
True Color	Color is the preferential reflection or transmittance of a specific light frequency within the visible light range. True color is the color of water after filtration to remove any colored solid or colloidal materials.
Uniform Allocation	A method of developing local limits in which the mass of a pollutant that is available to industry is first determined and then allocated as the same concentration limit to all industries.