Caguas Regional Wastewater Treatment Plant
Technically Based Local Limits

Draft

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Puerto Rico Aqueduct and Sewer Authority

Executive Summary

The Caguas 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 (PR0025976) issued by the U.S. Environmental Protection Agency (EPA), Region 2.

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 Caguas 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. PR0025976 Part IV (B)(5)(a)(1&2) Pretreatment Evaluation. In response to these standards, conditions, and requirements, the local limits in Table ES-1 have been developed for the Caguas RWWTP.

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

Parameter	Local Limit	Section
Arsenic	0.16 mg/L	Refer to Note a
Cadmium	0.12 mg/L	Refer to Note a
Chromium	5.0 mg/L[b]	Refer to Note a
Chromium$^{(+6)}$	Monitor Only	Section 4.1
Copper	1.18 mg/L	Refer to Note a
Cyanide (Free)	0.08 mg/L	Refer to Note a
Lead	0.79 mg/L	Refer to Note a
Mercury	0.003 mg/L	Refer to Note a
Molybdenum	0.33 mg/L	Refer to Note a
Nickel	0.99 mg/L	Refer to Note a
Selenium	0.29 mg/L	Refer to Note a
Silver	0.12 mg/L	Refer to Note a
Zinc	1.91 mg/L	Refer to Note a
Surfactants (MBAS)	Monitor Only	Section 4.2
Flow	SIU-specific	6.1
BOD_5	250 mg/L surcharge level[c]	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
TSS	250 mg/L surcharge level[c]	6.2
Total Nitrogen (NH_3, NO_3, and TKN)	40 mg/L	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	No discharge with a closed-cup flashpoint less than 140°F and no two consecutive readings at ≥5% LEL; no reading of ≥10% LEL	6.8
Toxicity	Industry permit-specific technically based limits	6.9

[a] Table 5-5 and on line 69 of "TBLL Calc-Caguas.xlsm" attached as Appendix C.

[b] The calculated limit is 11.17 mg/L. The Resource Conservation and Recovery Act (RCRA) sets a statutory limit of 5.0 mg/L for total chromium. Under RCRA, chromium concentrations above 5.0 mg/L are classified as hazardous. While chromium in wastewater is not covered by RCRA because of the Domestic Sewer Exclusion, the Puerto Rico Aqueduct and Sewer Authority (PRASA) elects to not allow the discharge of waste at concentrations that would otherwise be classified as "hazardous," and therefore, a limit of 5.0 mg/L is adopted.

[c] Concentrations are set as standards for surcharges and are not local limits. PRASA reserves the right to base increased surcharges on concentrations above normal domestic waste strength, which is set at 250 mg/L BOD_5 and 250 mg/L TSS. Surcharges up to 250 mg/L may be subject to the most current calculated cost of treatment per pound of BOD_5 and TSS. High-strength waste above 250 mg/L may be subject to increased rates in accordance with accelerated need to improve or provide additional infrastructure to meet regulatory requirements for discharge.

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 = milligram(s) per liter

NH_3 = ammonia

NO_3 = nitrate

SIU = significant industrial user

SU = standard unit(s)

TKN = total Kjeldahl nitrogen

TSS = total suspended solids

Contents

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
CPSC	Consumer Product Safety Commission
EPA	U.S. Environmental Protection Agency
LAS	linear alkylbenzene sulfonate
lb/d	pound(s) per day
LEL	lower explosive limit
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
MRL	method reporting limit
ML	minimum level
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
RL	reporting limit
RWWTP	regional wastewater treatment plant
SIU	significant industrial user
SU	standard units
TBLL	technically based local limit
TCLP	Toxicity Characteristic Leaching Procedure
TDS	total dissolved solids
TKN	total Kjeldahl nitrogen
TN	total nitrogen
TSS	total suspended solids
WWTP	wastewater treatment plant

1. Introduction

The Caguas Regional Wastewater Treatment Plant (RWWTP) is located at State Road 796 Km 6.3, Caguas, Puerto Rico. The plant operates under National Pollutant Discharge Elimination System (NPDES) permit number PR0025976. The Industrial Pretreatment Program regulates nine industries that discharge wastes to the Caguas RWWTP collection system as significant industrial users (SIUs).

This document uses recent test data to develop revised technically based local limits (TBLLs) that are specific to current conditions in the Caguas RWWTP collection system. These TBLLs have been revised in response to NPDES permit PR0025976 Part IV (B)(5)(a)(1&2).

The following appendixes 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-Caguas.xlsm"
- Appendix D Removal Data from 207 Matched Pairs Using Ultralow detection for Molybdenum and Mercury
- Appendix E Puerto Rico Water Quality Standards Worksheet
- Appendix F Average TCLP for Sludge
- Appendix G Published Data – Domestic Wastewater Strengths
- Appendix H Phenolic Compounds Regulated by Puerto Rico Water Quality Standards
- Appendix I CPCS Safety Alert
- Appendix J Long Hand Calculation of Lead Local Limits
- Appendix K 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 Caguas RWWTP TBLLs:

1) Characterize the Caguas 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).[2] 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) When 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.

[2] 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 Caguas RWWTP serves the municipalities of Caguas, Gurabo, and Juncos. The RWWTP is permitted to treat a daily maximum flow of 40 million gallons per day (mgd). Currently, the average daily flow to the RWWTP is approximately 11.6 mgd based on a review of data from January 1, 2021, to February 1, 2022. 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. Caguas RWWTP Design Influent Loading Capacities

Item	Daily Permitted Maximum	Daily Average
Flow	40 mgd	11.6 mgd
BOD_5	73,392 lb/d[a]	20,964 lb/d[b]
TSS	73,392 lb/d[a]	33,779 lb/d[b]

[a] The "as-built" capacity was not available. Consequently, the values have been estimated using the permitted plant flow and reference data found in Appendix G.

[b] 3-year average from January 1, 2019, to December 31, 2021.

Note:

lb/d = pound(s) per day

Treatment processes at the plant include screening, grit removal, sedimentation, biological treatment with aeration, secondary clarification, gravity sand filtration, chlorine disinfection, dechlorination followed by aeration before discharging the treated effluent to the Bairoa River. Sludge from the Caguas RWWTP is thickened and dewatered on a belt filter press and sent to Mayagüez 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.

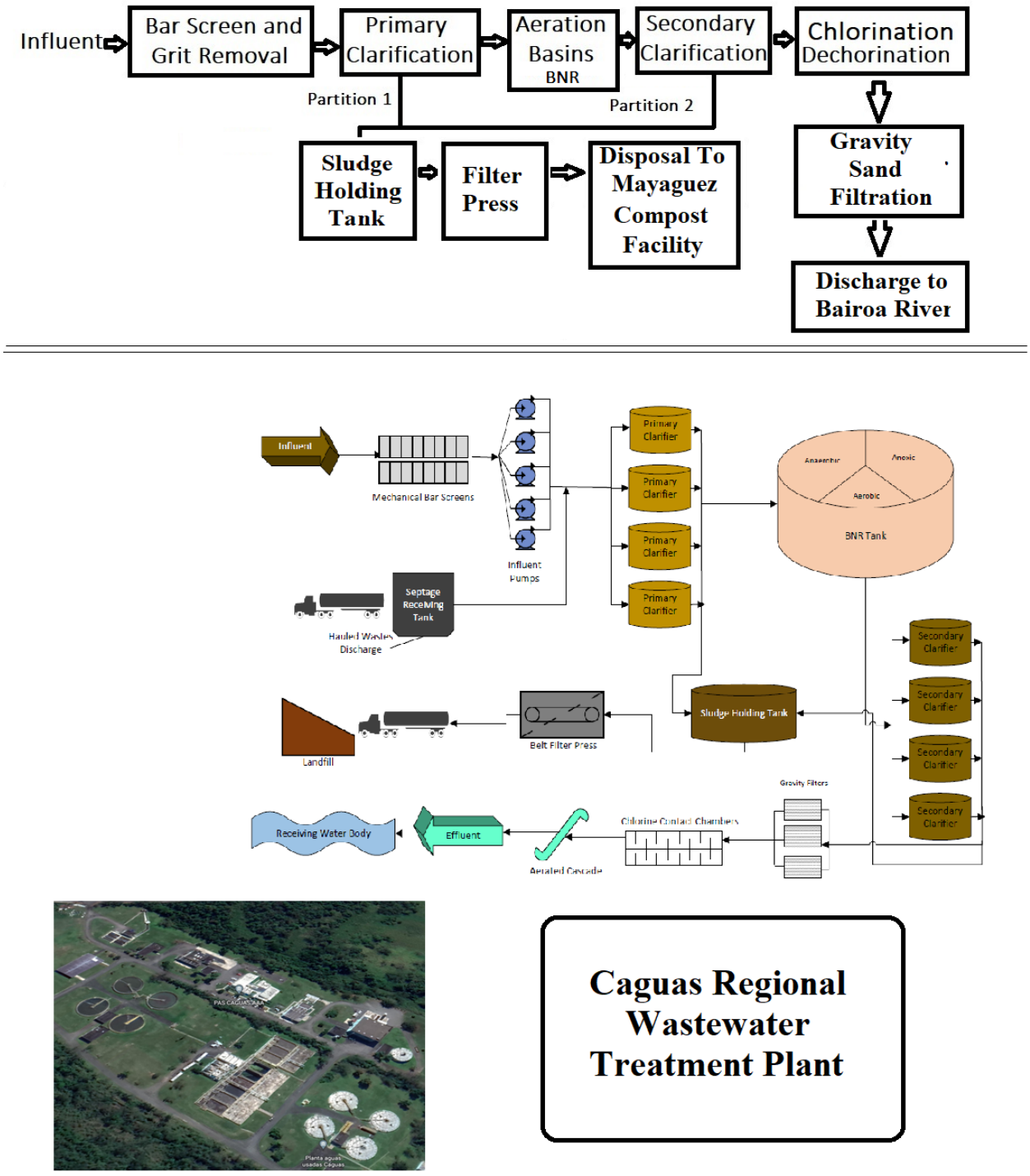


Figure 3-1. Caguas RWWTP, Treatment Unit Processes, and Aerial Site View

3.2 Industrial Users

The Puerto Rico Aqueduct and Sewer Authority (PRASA) has issued permits to nine SIUs that contribute flow to the Caguas RWWTP. Table 3-2 provides identification data for these SIUs, along with the permitted flow limits. Additional test data for these users are available from PRASA's Industrial Pretreatment Program.

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

SIU	Permit No.	Process Description (SIC/NAICS)	Federal Category	Category Description	Authorized Flow (gpd)
Amgen Manufacturing Limited	GDA-92-608-076	325412 – Pharmaceutical Preparation Manufacturing 325414 – Biological Product (except Diagnostic) Manufacturing	439, Subpart A & D	Pharmaceutical Manufacturing Point Source	500,000
Clorox Manufacturing Company of PR, Inc.	GDG-15-602-002	325612 – Polish and Other Sanitation Goods Manufacturing	N/A	N/A	6,000
EC Waste, Inc. (Caguas Transfer Station)	GDG-13-602-003	562111 – Solids Waste Collection	N/A	N/A	4,500
Janssen Ortho LLC	GDA-97-606-090	325412 – Pharmaceutical Preparation Manufacturing	439, Subpart C	Pharmaceutical Manufacturing Point Source	295,000
Medtronic Puerto Rico Operations, Co.	GDA-03-608-003	334510 - Electromedical and Electrotherapeutic Apparatus Manufacturing	N/A	N/A	75,000
Mylan, LLC	GDA-90-602-051	325412 – Pharmaceutical Preparation Manufacturing	439, Subpart D	Pharmaceutical Manufacturing Point Source	500,000
Neolpharma, Inc.	GDA-88-602-004	325412 – Pharmaceutical Preparation Manufacturing	439, Subpart D	Pharmaceutical Manufacturing Point Source	200,000

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

SIU	Permit No.	Process Description (SIC/NAICS)	Federal Category	Category Description	Authorized Flow (gpd)
Procesadora La Hacienda, Inc./Productos La Samaritana	GDA-16-613-003	311612 – Meat Processed from Carcasses 204100 – Flour Milling	432, Subpart E 406, Subpart J	Meats and Poultry Products Point Source Flour and Grain Mill Products	128,000
Quality Electroplating Corp.	GDA-88-602-005	332813 – Electroplating, Plating, Polishing, Anodizing, and Coloring	433, Subpart D	Metal Finishing Point Source	81,000
Omega Market Research[a]	TBD		N/A	N/A	7,500
Galephar Juncos[a]	TBD		439, Subpart D	Pharmaceutical Manufacturing Point Source	10,000
				Total Authorized Flow	**1,807,000**

[a] Currently being permitted.

Note:

gpd = gallon(s) per day

N/A = not applicable

SIC/NAICS = Standard Industrial Classification/North American Industrial Classification System

TBD = to be determined

3.3 Discharge to Bairoa River

The Caguas RWWTP discharges tertiary-treated effluent into Class SD receiving waters of the Bairoa River.

The critical initial dilution factor was not found. Consequently, the limits in this document have been calculated using a 1:1 dilution factor.

3.4 Applicable Criteria

Using the site characterization, industrial base, and regulatory/operational considerations applicable to this treatment system, the Caguas 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

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 criterion is for TN. 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 Caguas NPDES permit. Chromium$^{(+6)}$ ($Cr^{(+6)}$) has a limit in the NPDES permit; however, all testing at the Caguas RWWTP for this metal has resulted in nondetect results, so this document adopts the previous local limit of "Monitor Only." The previous local limits contained a limit for manganese, chloride, and for total dissolved solids (TDS). Manganese has been delisted as a pollutant of concern and no longer has a criterion. Chloride and TDS were listed as "Monitor Only" in the previous local limits. Based on lack of criteria for these POCs, new limits were not derived for these substances. Table 4-1 provides the full list of pollutants selected for evaluation.

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

Parameters	
Arsenic	Silver
Cadmium	Surfactants (as MBAS)
Chromium Total and $Cr^{(+6)}$	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 nonionic, 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 (2005) show that long-chain surfactants with the ring substituted on the end of the chain are the most biodegradable, while shorter chains on which the ring has 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% of LAS can be removed if primary clarification is used to remove solids from the waste stream. LAS is further reduced by 98% to 99% 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% LAS as dry sludge. However, studies also indicate that when land-applied, LAS is quickly biodegraded after 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% of these pollutants are still present in WWTP effluents." This information may be useful in the case of Caguas RWWTP because one of the dischargers is a pharmaceutical manufacturer and should be reviewed in connection with pharmaceutical manufacturers found in this system.

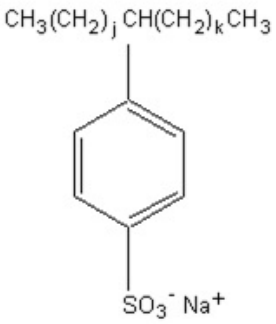


Figure 4-1. Linear Alkylbenzene Sulfonate (LAS) Molecule

Many compounds contribute to MBAS, including nonsurfactants. Because each reactive compound (both surfactant and nonsurfactant) exhibits a different level of biodegradability, determining a single limit for the whole industry may be ineffective. Such a limit focuses on LAS (detergent) that is discharged at higher levels but is easily removed by the treatment plant. For the Caguas RWWTP, an aerobic process is present in the wastewater treatment system, which removes most surfactants composed of LAS and LAS-related compounds. Consequently, a headworks analysis will predominantly measure removal of the prevalent LAS compounds at the influent, but conversely the effluent test results will principally be composed of more refractory compounds. Although these refractory compounds are likely the major concern, it is not possible to further refine the test methods to identify them and their incoming concentration.

The previous limit for MBAS was "Monitor Only" and it is retained. In addition, it is recommended that each industry be surveyed by PRASA for use of MBAS compounds. Upon completion of the survey, a set of best management practices (BMPs), including tracking and documentation of surfactant type and usage, should be included as part of the permit. For industries that routinely discharge surfactants, industry-specific limits should be adopted based on industrial needs, BMPs, type of surfactants, and (when needed)

pretreatment equipment and processes to be used prior to discharge to the Caguas RWWTP collection system. Limits for surfactants should be expressed as daily mass quantities instead of concentration, as concentrations during cleaning operations, such as clean-in-place operations, can be high at industries that may not have a large daily mass-based discharge.

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 the collection system prior to the plant) to understand and determine how the pollutants either will be 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 Caguas RWWTP treatment system was conducted from November 28 to December 11, 2021. Table 4-2 and Table 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)[3] procedures necessary to provide useable data. The laboratory analytical 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 on the sludge samples because of the nonconservative nature of cyanide and the lack of a disposal criterion.[4] Appendix A 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

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

[4] 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 4-3. 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

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		
% 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)	Specialty Analytical
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; also may be stated as method reporting limit [MRL]) for each parameter. CH2M staff confirmed that the reported RLs followed the methodology to produce valid MLs using standards at the levels specified.

Five wastewater samples were taken to determine the domestic contributions. The average of these was compared to the reference data found in the EPA *Local Limits Development Guidance*, Appendix V. The lower of the two values has been used in the local limits document. 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, then were entered into a spreadsheet titled "TBLL Calc-Caguas.xlsm"[5] that automates the calculation of limits as described in the following section. Appendix C provides all pages used from the "TBLL Calc-Caguas.xlsm."

5.2 Removal Efficiency

The Caguas RWWTP requires the calculation of two removal factors for regulated pollutants: 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-Caguas.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-Caguas.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-Caguas.xlsm"	Adopted Removal Factor
Arsenic	NP	20.46	20.46
Cadmium	15	49.69	49.69
Chromium	27	28.73	28.73
Copper	22	64.92	64.92
Cyanide	27	43.43	43.43
Lead	57	42.66	42.66

[5] 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-Caguas.xlsm"	Adopted Removal Factor
MBAS	NP	3.42	3.42
Mercury	10	61.42	61.42
Molybdenum	NP	Cannot be Calculated	25.34[b]
Nickel	14	40.83	40.83
Selenium	NP	Cannot be Calculated	38.60[c]
Silver	20	39.48	39.48
Zinc	27	41.20	41.20

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

[b] Taken from Appendix D, which provides removal rates from 207 matched data sets using ultra low detection limits conducted by CH2M HILL.

[c] Taken from a testing performed at other sites.

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-Caguas.xlsm"	Adopted Removal Factor
Arsenic	31	45	53	79.10	79.10
Cadmium	33	67	91	95.06	95.06
Chromium, Total	68	82	91	94.03	94.03
Copper	67	86	95	95.43	95.43
Cyanide	41	69	84	68.66	68.66
Lead	39	61	76	96.42	96.42
Mercury	50	60	79	98.05	98.05
Molybdenum	NP	NP	NP	Cannot be Calculated	34.69[b]
Nickel	25	42	62	56.45	56.45
Selenium	33	50	67	Cannot be Calculated	58.11[c]
Silver	50	75	88	62.85	62.85
Zinc	64	79	88	93.61	93.61

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

[b] Taken from Appendix D, which provides removal rates from 207 matched data sets using ultra low detection limits conducted by CH2M HILL.

[c] Taken from a testing performed at other sites.

Notes:

NP = Book value not published or available

The QA/QC documentation was reviewed in calculating removal factors. The data pairs then were input into the "TBLL Calc-Caguas.xlsm" file, which calculates a removal factor for each data pair. When a data pair contains at least one nondetect, or when the effluent result is higher than the influent result, the spreadsheet indicates that a removal factor cannot be calculated. The data pairs for which a removal factor can be calculated then are 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 molybdenum and selenium, which could not be calculated. For these two metals, removal factors were used from other sites with similar treatment. For molybdenum, the value used is taken as an average derived from 207 matched data pairs where detectable values were obtained. These matched pairs have been developed by CH2M since 2010. For selenium, a similar set of data is under development and the value has been taken from the data compiled to date.

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 sections 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. Each industry is allowed to discharge up to its permit limit. Consequently, the maximum compliant industrial flow has been calculated by added the limit for each industry. The sum for these flows is 1.807 mgd, which is conservative given that it is unlikely that all industries would discharge at their maximum rate at the same time.

5.3.1 Calculation of Allowable Headworks Loadings Based on Water Quality Criterion

To protect receiving water quality, Rule 1303.1.J.1 of the Puerto Rico Water Quality Standards Regulation (PRWQSR) sets metal limits for surface 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 Caguas RWWTP point of discharge is classified as a Puerto Rico Class SD segment of fresh water. Water quality standards are subject to a critical initial dilution (lowest projected dilution); however, an approved dilution ratio was not found so the dilution factor was set at 1:1. When water quality criteria are calculated, the water-quality-based AHLs are calculated as follows:

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

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)

5.3.2 Calculation of Allowable Headworks Loadings Based on NPDES Criterion

NPDES permit limits for metals typically are developed based on water quality criteria and follow the same equation as given under the previous section, except that the C_{wq} is replaced by the NPDES permit limit and a dilution factor is not allowed. Table 5-3 lists the metals and other parameters with NPDES limits for the Caguas RWWTP.

Table 5-3. Caguas RWWTP NPDES Limits

Pollutant	Limit (µg/L)
Chromium $^{(+6)}$	11
Copper	11.5
Color	15.0
Free Cyanide	5.2
Surfactants (MBAS)	100
TN	1,700

Note:

µg/L = microgram(s) per liter

NPDES limits were 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).

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

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

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)

5.4 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 Caguas RWWTP is sent to the Mayagüez Compost Facility, after which it may be disposed of at a landfill and, therefore, it 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. Therefore, 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. However, Caguas 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 nondetect results for the period from March 2015 to October 2021 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 1 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. Table 1 of 40 CFR 503 is replicated in line 20 of the Local Limits tab in Appendix C and is used to calculate local limits based on sludge disposal. The following equation calculates AHLs based on Table 1 criteria of 40 CFR 503:

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

Where:

L_{in}	=	AHL 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)

5.5 MAHL Selection and MAIL Calculations for Metals and Cyanide

The "TBLL Calc-Caguas.xlsm" spreadsheet (Appendix C) automates the calculation of limits so that a limit is generated for each criterion. Table 5-4 displays the MAHL[6] 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% 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.

[6] 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	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	166.6	88.0	4.6	12.2	2.8	0.07	2.4	SD
Cadmium	11.5	3.3	2.0	192.3	2.6	0.01	1.8	PRWQSR
Chromium	3,773.7	449.8	186.5	1,357.3	NA	0.09	167.7	PRWQSR
Copper	52.5	34.0	24.3	275.8	129.0	4.16	17.7	NPDES
Cyanide	0.121	1.6	1.6	17.1	NA	0.30	1.1	NPDES
Lead	347.5	13.5	135.4	168.7	25.3	0.09	12.1	WQC-C
Mercury	12.3	0.06	0.2	25.1	NA	0.01	0.05	WQC-A
Molybdenum	NA	NA	NA	NA	5.4	0.02	4.9	SD
Nickel	426.4	47.4	16.817	163.5	21.5	0.21	14.9	PRWQSR
Selenium	NA	NA	NA	NA	4.8	0.00	4.3	SD
Silver	2.0	NA	NA	40.0	#NA	0.00	1.8	WQC-A
Zinc	239.9	217.3	NA	49.4	232.1	15.73	28.7	Inhibition

[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

WQC-C = Federal Chronic Water Quality Standard

5.6 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 page in Appendix C. The resulting limits in Table 5-5 are compared to the previously applicable limits.

Table 5-5. Comparison of Previous Local Limits with New Limits

Parameter	Puerto Rico General Limits[a]	Previously Adopted Local Limit	Adopted Local Limit
Arsenic	No Limit	0.01 mg/L	0.16 mg/L
Cadmium	0.1 mg/L	0.05 mg/L	0.12 mg/L
Chromium	1.0 mg/L	1.0 mg/L	5.0 mg/L[b]
Chromium$^{(+6)}$	No Limit	Monitor Only	Monitor Only
Copper	1.0 mg/L	1.0 mg/L	1.18 mg/L
Cyanide (free)	0.1 mg/L	0.05 mg/L	0.08 mg/L
Lead	0.2 mg/L	0.10 mg/L	0.79 mg/L
Mercury	0.05 mg/L	0.025 mg/L	0.003 mg/L
Molybdenum	No Limit	No Limit	0.33 mg/L
Nickel	0.5 mg/L	0.50 mg/L	0.99 mg/L
Selenium	0.2 mg/L	0.20 mg/L	0.29 mg/L
Silver	0.05 mg/L	0.05 mg/L	0.12 mg/L
Zinc	0.5 mg/L	0.25 mg/L	1.91 mg/L
Surfactants (MBAS)	No Limit	Monitor Only	Monitor Only
Flow	SIU-specific	No Limit	SIU-specific[c]
BOD_5	No Limit	250 mg/L	250 mg/L[d]
TSS	No Limit	250 mg/L	250 mg/L[d]
TN (NO_2 + NO_3 + TKN)	No Limit	No Limit	40 mg/L
pH	5.0–10.0 SU	6.5-9.0 SU	6.5-9.0 SU
Phenolics (phenolic substances)	1.0 mg/L	0.25 mg/L	1.0 mg/L
O&G	50 mg/L Total O&G	50 mg/L Total O&G	50 mg/L Total O&G
Temperature	60°C (140°F)	40°C	40°C (104°F) at the POTW, 60°C (140°F) at discharge point[e]

Table 5-5. Comparison of Previous Local Limits with New Limits

Parameter	Puerto Rico General Limits[a]	Previously Adopted Local Limit	Adopted Local Limit
Flammability	No Limit	>140°F Specified as Flashpoint	No discharge with a closed-cup flashpoint less than 140°F[f] and no two consecutive readings at ≥5% LEL; no reading of ≥10% LEL[g]
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 calculated limit is 11.17 mg/L. The Resource Conservation and Recovery Act (RCRA) sets a statutory limit of 5.0 mg/L for total chromium. Under RCRA, chromium concentrations above 5.0 mg/L are classified as hazardous. While chromium in wastewater is not covered by RCRA because of the Domestic Sewer Exclusion, PRASA elects to not allow the discharge of waste at concentrations that would otherwise be classified as "hazardous," and therefore, a limit of 5.0 mg/L is adopted.

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

[d] 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.

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

[f] cf. 40 CFR 403.5(b)(1)

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

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 also are 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	No discharge with a closed-cup flashpoint less than 140°F and no two consecutive readings at ≥5% LEL; no reading of ≥10% LEL[b]
pH	6.5 SU	9.0 SU
TN		40 mg/L
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

6.1 Flow

The PRASA Industrial Pretreatment Program has established site-specific flow limits for each industry discharging to the Caguas RWWTP. After review of maximum plant capacity and annual average flow, these limits are found to be protective of the plant and are, therefore, retained.

6.2 BOD_5 and TSS

Based on estimated design capacity, the Caguas RWWTP is rated to treat up to a monthly average of 73,392 lb/d for BOD_5 and up to a monthly average of 73,392 lb/d of TSS. The "as-built" capacity was not available. Consequently, the values have been estimated using the permitted plant flow and reference data provided in Appendix G. The plant currently has significant excess capacity for both pollutants. Average influent BOD_5 from January 1, 2019, to December 31, 2021, was calculated at 20,964 lb/d; the average influent for TSS during the same period was 33,779 lb/d.

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.

Because of economic incentives, when adequate capacity is available, surcharges are a better way to control these POCs. When industrial discharges contain BOD_5 and TSS concentrations that are not greater than 250 mg/L, a surcharge system that charges the actual cost per pound of BOD_5 and TSS as the actual cost for treatment provides for each industry to pay an equitable share of the cost of treatment. When industrial waste exceeds 250 mg/L for either parameter, a higher surcharge is warranted based on

contributions that accelerate the need to increase treatment plant capacity. PRASA reserves the right to establish, and charge surcharges that account for the cost of treatment on industrial waste.

6.3 Total Nitrogen

A nitrogen (N) limit of 1.700 mg/L is found in the NPDES permit where N is equal to the sum of nitrite (NO_2) plus nitrate (NO_3) plus ammonia (NH_3). This limit is equivalent to TN except that it does not include the relatively small portion of protein nitrogen found in wastewater effluents. Because nitrogen is so prevalent in all wastewater (domestic, commercial, and industrial), it cannot be controlled through a local limitation except to a limited extent with industries that have high nitrogen loadings. Instead, nitrogen must be controlled by treatment processes at the wastewater plant that are designed to remove nitrogen. The Caguas RWWTP plant is designed to remove nitrogen, but removal depends on operational control rather than incoming nitrogen loading. It was designed to treat the TN component at normal domestic waste strength. A limit, however, is needed to assure that industry does not discharge high-strength waste. Consequently, this document uses the typical untreated domestic wastewater strength found in the reference publication *Wastewater Engineering* (Metcalf and Eddy 2003) to establish a TN limit based on domestic-waste strength. This reference contains the table found in Appendix G and rates TN in untreated waste in three categories of weak (20 mg/L), medium (40 mg/L), and strong (60 mg/L). Based on this factor, the medium (40 mg/L) category is adopted as a local limit for the Caguas RWWTP.

6.4 pH

The current local limits for pH for the Caguas RWWTP were more stringent than the Puerto Rico Pretreatment Limits, which protect the wastewater treatment system. Therefore, the limits of 6.5 to 9.0 SU are retained.

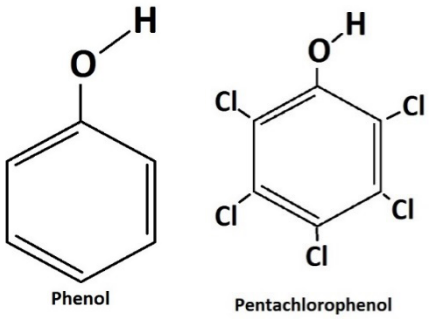
6.5 Phenolics

The PRWQSR regulates phenol and a subset of toxic phenolic derivatives. Appendix H 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 compound 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 microgram per liter (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%) across activated sludge treatment, which is not used at the Caguas 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 H based on reference data.



Phenol Pentachlorophenol

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, minus unsubstituted phenol.

6.6 Oil and Grease

A local limit of 50 mg/L for O&G was established in the prior Caguas 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[7] at 60°C (140°F) at the point of discharge from the industry to the public collections system.

A 60°C (140°F) limit at the point of discharge into the Caguas RWWTP sanitary sewer system also has been adopted as a limit to protect collections system workers and pretreatment staff. This is adopted based on the potential for inflicting burns as published by the U.S. Consumer Product Safety Commission (CPSC) Publication 5098 009611 032012 at www.cpsc.gov. This document indicates that workers exposed to 60°C for 6 seconds will experience third-degree burns. The U.S. CPSC document is attached as Appendix I.

Additionally, 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)) and is adopted.

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%, and no single LEL meter reading may be 10% 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% or more of the LEL and that no reading of 10% or more of the LEL is registered.

6.9 Toxic Organic Pollutants

Reviewing available data, 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 Caguas 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. Additionally, categorial

[7] *Ibid.*

requirements for Total Toxic Organic will be applied to industry wherever the categorial limits are applicable.

7. Local Limits Implementation

The new local limits will apply to all nondomestic 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 Caguas, Puerto Rico Effluent

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

Sample ID	Method	Number of Results Above MDL		Result Effluent 11.29.21 µg/l	MDL	RL
624	Volatile Organic Compounds (GC/MS)	1	1,4-Dichlorobenzene	0.09	0.20	
		1	Bromodichloromethane	0.91	0.07	
		1	Chloroform	2.3		
		1	Chloromethane	0.66		
		1	Dibromochloromethane	0.20		
625	Semivolatile Organic Compounds	1	Di-n-butyl Phthalate	0.039	0.13	
		1	Diethyl Phthalate	0.071	0.0210	
					0.0017	
625.1	PAH by Low Level Semi Volatile	1	Benzo(a)anthracene	0.0020	0.0020	
		1	Naphthalene	0.0074	0.0026	
		1	Pyrene	0.0029	0.0010	
622	Organophosphorous Pesticides	0				
608	Organochlorine Pesticides	0				
608.3	Organochlorine Pesticides	0			0.0034	
612	Organochlorine Pesticides	0				
617	Organochlorine Pesticides	0				
8082A	PCB	0				
8270D	PAH Semi Volatile	0				
1613B	Tetra Chlorinated Dioxins & Furans ID HRGC/HRMS	0				

J - The result is an estimated value

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 [pollutant of concern] *if it meets the following screening criteria:*

- *The maximum concentration of the pollutant in a grab sample from the POTW's* [publicly owned treatment work's] *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 POTW's 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 POTW's 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* [American Conference of Governmental Industrial Hygienists] *screening level for fume toxicity.*

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

Line Number

Basic Data

1	Name of Facility:	Caguas WWTP	
2	Point of Contact:	Luis Abreu	
3	Person Entering Data:	Dara Osborne	
4	Reviewer:	Heinemann	
5	**GENERAL INFORMATION:**	(Data in colored cells below required)	
6	Receiving Water Hardness (if fresh)	**143**	<----- Number must be between 25 and 400
7	(M)arine, (F)resh, or (B)oth Discharges	**F**	<----- 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)	**11.6 MGD**	<----- For flows typically the most critical situation (one that
12	Domestic Flow (in MGD)	**9.2 MGD**	yields the lowest local limits) is the lowest flow month, but run
13	Industrial Flow (in MGD)	**1.8 MGD**	several scenarios if there is any doubt. Adopt the lowest limits.
14	Infiltration/Inflow (by subtraction)		
15	Acute Dilution Factor	**1. : 1**	<----- Based on 1Q10+avg plnt flow
16	Chronic Dilution Factor	**1. : 1**	<----- Based on 7Q10 + avg plnt flow
17	Dilution Factor for __Health___	1. : 1	<----- Enter Chronic DF if not otherwise determined
18	Digester Flow (in MGD)	**0.174 MGD**	<----- recommend: 0.174 MGD @ 2% solids
19	Dry Sludge Production Rate (US Tons/day)	**14.5116 T/D**	<----- recommend: 14.5116 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

Basic Data

1	**Which Conservative Pollutants to Limit? (Bold = Required by EPA)**	
2	**Check (or Un-Check) for Each Pollutant**	Develop Local Limit? (check for YES)
3	Antimony	☐
4	**Arsenic (T)**	☑
5	Arsenic (penta or +5)	☐
6	Beryllium	☑
7	**Cadmium**	☑
8	**Chromium(+6)**	☐
9	Chromium (T)	☑
10	**Copper**	☑
11	**Cyanide**	☑
12	**Lead**	☑
13	**Mercury**	☑
14	**Molybdenum**	☑
15	**Nickel**	☑
16	**Selenium**	☑
17	**Silver**	☑
18	Thallium	☑
19	TributylTin	☐
20	**Zinc**	☑
21	Add #1	☐
22	Add #2	☐
23	Add #3	☐
24	Add #4	☐

Caguas WWTP

			Arsenic (T)	Cadmium	Chrome (T)	Copper	Cyanide	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Zinc
1	**SUMMARY DATA**													
2	Ave. Influent Conc.		2.351 ug/L	0.314 ug/L	19.719 ug/L	100.200 ug/L	32.868 ug/L	4.120 ug/L	0.346 ug/L	1.641 ug/L	111.200 ug/L	0.050 ug/L	0.046 ug/L	405.643 ug/L
3	Ave. Effluent Conc.		0.504 ug/L	0.014 ug/L	1.081 ug/L	3.382 ug/L	7.180 ug/L	0.139 ug/L	0.006 ug/L	9.772 ug/L	43.900 ug/L	0.050 ug/L	0.021 ug/L	22.357 ug/L
4	Ave. Primary Removal (ADRE)		20.46%	49.69%	28.73%	64.92%	43.43%	42.66%	61.42%	25.34%	40.83%	38.60%	39.48%	41.20%
5	Ave. Overall Removal (ADRE)		79.10%	95.06%	94.03%	95.43%	68.66%	96.42%	98.05%	34.69%	56.45%	58.11%	62.85%	93.61%
6	Effluent Variation (COV)		0.17	1.07	0.68	2.43	0.50	1.95	3.21	0.31	0.11	20.00	0.14	0.91
7	Average Sludge Conc.		3.26 mg/kg	1.01 mg/kg	97.53 mg/kg	414. mg/kg	#DIV/0!	10.06 mg/kg	581. mg/kg	21.93 mg/kg	257.75 mg/kg	4.45 mg/kg	23.18 mg/kg	1,182.5 mg/kg
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.		10.6 ug/L	1.4 ug/L	121.1 ug/L	368.6 ug/L	191.9 ug/L	20.8 ug/L	1.9 ug/L	9.1 ug/L	702.4 ug/L	0.1 ug/L	0.2 ug/L	1566.6 ug/L
11	**SAMPLE 1**													
12	Date:	LOCATION	Arsenic (T)	Cadmium	Chrome (T)	Copper	Cyanide	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Zinc
13	11/28/2021	Influent	1.44 ug/l	0.131 ug/l	8.86 ug/l	25.4 ug/l	5.21 ug/l	2. ug/l	0.127 ug/l	1.4 ug/l	32. ug/l	0.05 ug/l	0.02 ug/l	172. ug/l
14	11/29/2021	Effluent	0.47 ug/l	0.01 ug/l	0.57 ug/l	2.45 ug/l	1.59 ug/l	0.097 ug/l	0.0041 ug/l	6.47 ug/l	37.5 ug/l	0.05 ug/l	0.02 ug/l	20.1 ug/l
15	11/28/2021	Prim._Clar.	2.03 ug/l	0.158 ug/l	9.91 ug/l	17.1 ug/l	6.02 ug/l	2.2 ug/l	0.266 ug/l	0.71 ug/l	43. ug/l	0.05 ug/l	0.026 ug/l	215. ug/l
16		Sludge												
17		Sludge Wet												
18	Aqueous	ML/RL	0.05 ug/l	0.05 ug/l	0.25 ug/l	0.25 ug/l	1.5 ug/l	0.02 ug/l	0.0003 ug/l	0.05 ug/l	0.2 ug/l	0.05 ug/l	0.02 ug/l	0.5 ug/l
19	Sludge	ML/RL												
20	Primary Removal Rate:		Can't Do	Can't Do	Can't Do	32.68%	**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		67.36%	92.37%	93.57%	90.35%	69.48%	95.15%	96.80%	Can't Do	Can't Do	Can't Do	Can't Do	88.31%
22														
23	**SAMPLE 2**													
24	Date:	LOCATION	Arsenic (T)	Cadmium	Chrome (T)	Copper	Cyanide	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Zinc
25	11/29/2021	Influent	3.77 ug/l	0.302 ug/l	20.1 ug/l	70.3 ug/l	9.21 ug/l	4.43 ug/l	0.424 ug/l	0.64 ug/l	88.3 ug/l	0.05 ug/l	0.02 ug/l	368. ug/l
26	11/30/2021	Effluent	0.56 ug/l	0.057 ug/l	3.3 ug/l	21.5 ug/l	4.87 ug/l	0.794 ug/l	0.0463 ug/l	4.75 ug/l	55.9 ug/l	0.05 ug/l	0.02 ug/l	81.7 ug/l
27		Prim._Clar.												
28		Sludge												
29		Sludge Wet												
30	Aqueous	ML/RL	0.05 ug/l	0.05 ug/l	0.25 ug/l	0.25 ug/l	1.5 ug/l	0.02 ug/l	0.0003 ug/l	0.05 ug/l	0.2 ug/l	0.05 ug/l	0.02 ug/l	0.5 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:		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
33	Overall Removal Rate		85.15%	81.13%	83.58%	69.42%	47.12%	82.08%	89.08%	Can't Do	36.69%	Can't Do	Can't Do	77.80%
34														
35	**SAMPLE 3**													
36	Date:	LOCATION	Arsenic (T)	Cadmium	Chrome (T)	Copper	Cyanide	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Zinc
37	11/30/2021	Influent	3.24 ug/l	0.566 ug/l	35.8 ug/l	165. ug/l	20. ug/l	8.15 ug/l	0.601 ug/l	0.59 ug/l	175. ug/l	0.05 ug/l	0.02 ug/l	749. ug/l
38	12/1/2021	Effluent	0.38 ug/l	0.01 ug/l	0.92 ug/l	1.9 ug/l	5.16 ug/l	0.097 ug/l	0.003 ug/l	7.3 ug/l	41.2 ug/l	0.05 ug/l	0.02 ug/l	18.3 ug/l
39		Prim._Clar.												
40	11/30/2021	Sludge	3.26 mg/kg	0.79 mg/kg	84.9 mg/kg	368. mg/kg		9.45 mg/kg	638. mg/kg	18.6 mg/kg	233. mg/kg	4.09 mg/kg	20.9 mg/kg	1,050. mg/kg
41		Sludge Wet												
42	Aqueous	ML/RL	0.05 ug/l	0.05 ug/l	0.25 ug/l	0.25 ug/l	1.5 ug/l	0.02 ug/l	0.0003 ug/l	0.05 ug/l	0.2 ug/l	0.05 ug/l	0.02 ug/l	0.5 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
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
45	Overall Removal Rate		88.27%	98.23%	97.43%	98.85%	74.20%	98.81%	99.50%	Can't Do	76.46%	Can't Do	Can't Do	97.56%
46														

			Arsenic (T)	Cadmium	Chrome (T)	Copper	Cyanide	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Zinc
1	**SUMMARY DATA**													
2	Ave. Influent Conc.		2.351 ug/L	0.314 ug/L	19.719 ug/L	100.200 ug/L	32.868 ug/L	4.120 ug/L	0.346 ug/L	1.641 ug/L	111.200 ug/L	0.050 ug/L	0.046 ug/L	405.643 ug/L
3	Ave. Effluent Conc.		0.504 ug/L	0.014 ug/L	1.081 ug/L	3.382 ug/L	7.180 ug/L	0.139 ug/L	0.006 ug/L	9.772 ug/L	43.900 ug/L	0.050 ug/L	0.021 ug/L	22.357 ug/L
4	Ave. Primary Removal (ADRE)		20.46%	49.69%	28.73%	64.92%	43.43%	42.66%	61.42%	25.34%	40.83%	38.60%	39.48%	41.20%
5	Ave. Overall Removal (ADRE)		79.10%	95.06%	94.03%	95.43%	68.66%	96.42%	98.05%	34.69%	56.45%	58.11%	62.85%	93.61%
6	Effluent Variation (COV)		0.17	1.07	0.68	2.43	0.50	1.95	3.21	0.31	0.11	20.00	0.14	0.91
7	Average Sludge Conc.		3.26 mg/kg	1.01 mg/kg	97.53 mg/kg	414. mg/kg	#DIV/0!	10.06 mg/kg	581. mg/kg	21.93 mg/kg	257.75 mg/kg	4.45 mg/kg	23.18 mg/kg	1,182.5 mg/kg
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.		10.6 ug/L	1.4 ug/L	121.1 ug/L	368.6 ug/L	191.9 ug/L	20.8 ug/L	1.9 ug/L	9.1 ug/L	702.4 ug/L	0.1 ug/L	0.2 ug/L	1566.6 ug/L
47	**SAMPLE 4**													
48	Date:	LOCATION	Arsenic (T)	Cadmium	Chrome (T)	Copper	Cyanide	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Zinc
49	12/1/2021	Influent	2.07 ug/l	0.294 ug/l	27.7 ug/l	87.8 ug/l	13.5 ug/l	4.25 ug/l	0.368 ug/l	0.62 ug/l	90.9 ug/l	0.05 ug/l	0.02 ug/l	394. ug/l
50	12/2/2021	Effluent	0.45 ug/l	0.01 ug/l	0.88 ug/l	2.23 ug/l	6.33 ug/l	0.096 ug/l	0.003 ug/l	7.29 ug/l	39.1 ug/l	0.05 ug/l	0.02 ug/l	19.5 ug/l
51		Prim._Clar.												
52		Sludge												
53		Sludge Wet												
54	Aqueous	ML/RL	0.05 ug/l	0.05 ug/l	0.25 ug/l	0.25 ug/l	1.5 ug/l	0.02 ug/l	0.0003 ug/l	0.05 ug/l	0.2 ug/l	0.05 ug/l	0.02 ug/l	0.5 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
57	Overall Removal Rate		78.26%	96.60%	96.82%	97.46%	53.11%	97.74%	99.19%	Can't Do	56.99%	Can't Do	Can't Do	95.05%
58														
59	**SAMPLE 5**													
60	Date:	LOCATION	Arsenic (T)	Cadmium	Chrome (T)	Copper	Cyanide	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Zinc
61	12/2/2021	Influent	2.08 ug/l	0.26 ug/l	17.8 ug/l	81.9 ug/l	15.1 ug/l	3.39 ug/l	0.216 ug/l	0.86 ug/l	88.5 ug/l	0.05 ug/l	0.028 ug/l	335. ug/l
62	12/3/2021	Effluent	0.55 ug/l	0.01 ug/l	0.85 ug/l	1.35 ug/l	6.63 ug/l	0.062 ug/l	0.0038 ug/l	7.73 ug/l	38.9 ug/l	0.05 ug/l	0.027 ug/l	18.1 ug/l
63	12/2/2021	Prim._Clar.	2.05 ug/l	0.193 ug/l	14.7 ug/l	40.4 ug/l	12. ug/l	2.77 ug/l	0.243 ug/l	0.67 ug/l	64.9 ug/l	0.05 ug/l	0.025 ug/l	248. ug/l
64	12/2/2021	Sludge	3.35 mg/kg	0.93 mg/kg	96.9 mg/kg	409. mg/kg		9.67 mg/kg	545. mg/kg	19.2 mg/kg	254. mg/kg	4.16 mg/kg	23.5 mg/kg	1,180. mg/kg
65		Sludge Wet												
66	Aqueous	ML/RL	0.05 ug/l	0.05 ug/l	0.25 ug/l	0.25 ug/l	1.5 ug/l	0.02 ug/l	0.0003 ug/l	0.05 ug/l	0.2 ug/l	0.05 ug/l	0.02 ug/l	0.5 ug/l
67	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
68	Primary Removal Rate:		1.44%	25.77%	17.42%	50.67%	20.53%	18.29%	Can't Do	Can't Do	26.67%	Can't Do	10.71%	25.97%
69	Overall Removal Rate		73.56%	96.15%	95.22%	98.35%	56.09%	98.17%	98.24%	Can't Do	56.05%	Can't Do	3.57%	94.60%
70														
71	**SAMPLE 6**													
72	Date:	LOCATION	Arsenic (T)	Cadmium	Chrome (T)	Copper	Cyanide	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Zinc
73	12/3/2021	Influent	1.96 ug/l	0.259 ug/l	20.8 ug/l	87.1 ug/l	65.1 ug/l	3.38 ug/l	0.31 ug/l	1.16 ug/l	112. ug/l	0.05 ug/l	0.099 ug/l	330. ug/l
74	12/4/2021	Effluent	0.52 ug/l	0.01 ug/l	0.78 ug/l	1.29 ug/l	9.6 ug/l	0.067 ug/l	0.0021 ug/l	8.05 ug/l	42.7 ug/l	0.05 ug/l	0.02 ug/l	17.3 ug/l
75		Prim._Clar.												
76		Sludge												
77		Sludge Wet												
78	Aqueous	ML/RL	0.05 ug/l	0.05 ug/l	0.25 ug/l	0.25 ug/l	1.5 ug/l	0.02 ug/l	0.0003 ug/l	0.05 ug/l	0.2 ug/l	0.05 ug/l	0.02 ug/l	0.5 ug/l
79	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
80	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
81	Overall Removal Rate		73.47%	96.14%	96.25%	98.52%	85.25%	98.02%	99.33%	Can't Do	61.88%	Can't Do	79.80%	94.76%
82														

			Arsenic (T)	Cadmium	Chrome (T)	Copper	Cyanide	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Zinc
1	**SUMMARY DATA**													
2	Ave. Influent Conc.		2.351 ug/L	0.314 ug/L	19.719 ug/L	100.200 ug/L	32.868 ug/L	4.120 ug/L	0.346 ug/L	1.641 ug/L	111.200 ug/L	0.050 ug/L	0.046 ug/L	405.643 ug/L
3	Ave. Effluent Conc.		0.504 ug/L	0.014 ug/L	1.081 ug/L	3.382 ug/L	7.180 ug/L	0.139 ug/L	0.006 ug/L	9.772 ug/L	43.900 ug/L	0.050 ug/L	0.021 ug/L	22.357 ug/L
4	Ave. Primary Removal (ADRE)		20.46%	49.69%	28.73%	64.92%	43.43%	42.66%	61.42%	25.34%	40.83%	38.60%	39.48%	41.20%
5	Ave. Overall Removal (ADRE)		79.10%	95.06%	94.03%	95.43%	68.66%	96.42%	98.05%	34.69%	56.45%	58.11%	62.85%	93.61%
6	Effluent Variation (COV)		0.17	1.07	0.68	2.43	0.50	1.95	3.21	0.31	0.11	20.00	0.14	0.91
7	Average Sludge Conc.		3.26 mg/kg	1.01 mg/kg	97.53 mg/kg	414. mg/kg	#DIV/0!	10.06 mg/kg	581. mg/kg	21.93 mg/kg	257.75 mg/kg	4.45 mg/kg	23.18 mg/kg	1,182.5 mg/kg
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.		10.6 ug/L	1.4 ug/L	121.1 ug/L	368.6 ug/L	191.9 ug/L	20.8 ug/L	1.9 ug/L	9.1 ug/L	702.4 ug/L	0.1 ug/L	0.2 ug/L	1566.6 ug/L
83	**SAMPLE 7**													
84	Date:	LOCATION	Arsenic (T)	Cadmium	Chrome (T)	Copper	Cyanide	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Zinc
85	12/4/2021	Influent	2.33 ug/l	0.295 ug/l	16.8 ug/l	93.7 ug/l	16.5 ug/l	3.77 ug/l	0.245 ug/l	1.09 ug/l	124. ug/l	0.05 ug/l	0.099 ug/l	369. ug/l
86	12/5/2021	Effluent	0.5 ug/l	0.015 ug/l	1.18 ug/l	4.59 ug/l	14.3 ug/l	0.182 ug/l	0.0071 ug/l	8.92 ug/l	43.4 ug/l	0.05 ug/l	0.02 ug/l	29.2 ug/l
87		Prim._Clar.												
88		Sludge												
89		Sludge Wet												
90	Aqueous	ML/RL	0.05 ug/l	0.05 ug/l	0.25 ug/l	0.25 ug/l	1.5 ug/l	0.02 ug/l	0.0003 ug/l	0.05 ug/l	0.2 ug/l	0.05 ug/l	0.02 ug/l	0.5 ug/l
91	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
92	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
93	Overall Removal Rate		78.54%	94.92%	92.98%	95.10%	13.33%	95.17%	97.09%	Can't Do	65.00%	Can't Do	79.80%	92.09%
94														
95	**SAMPLE 8**													
96	Date:	LOCATION	Arsenic (T)	Cadmium	Chrome (T)	Copper	Cyanide	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Zinc
97	12/5/2021	Influent	2.09 ug/l	0.268 ug/l	11.4 ug/l	80. ug/l	4.23 ug/l	3.19 ug/l	0.225 ug/l	2.12 ug/l	56.7 ug/l	0.05 ug/l	0.02 ug/l	313. ug/l
98	12/6/2021	Effluent	0.51 ug/l	0.01 ug/l	0.66 ug/l	1.72 ug/l	6.96 ug/l	0.077 ug/l	0.0033 ug/l	11.7 ug/l	39.7 ug/l	0.05 ug/l	0.02 ug/l	19.4 ug/l
99		Prim._Clar.												
100		Sludge												
101		Sludge Wet												
102	Aqueous	ML/RL	0.05 ug/l	0.05 ug/l	0.25 ug/l	0.25 ug/l	1.5 ug/l	0.02 ug/l	0.0003 ug/l	0.05 ug/l	0.2 ug/l	0.05 ug/l	0.02 ug/l	0.5 ug/l
103	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
104	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
105	Overall Removal Rate		75.60%	96.27%	94.21%	97.85%	Can't Do	97.59%	98.54%	Can't Do	29.98%	Can't Do	Can't Do	93.80%
106														
107	**SAMPLE 9**													
108	Date:	LOCATION	Arsenic (T)	Cadmium	Chrome (T)	Copper	Cyanide	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Zinc
109	12/6/2021	Influent	2.27 ug/l	0.21 ug/l	10.6 ug/l	77.9 ug/l	121. ug/l	2.84 ug/l	0.198 ug/l	2.66 ug/l	57.6 ug/l	0.05 ug/l	0.02 ug/l	284. ug/l
110	12/7/2021	Effluent	0.75 ug/l	0.011 ug/l	1.01 ug/l	2.87 ug/l	12.1 ug/l	0.12 ug/l	0.004 ug/l	11.3 ug/l	46.4 ug/l	0.05 ug/l	0.02 ug/l	19.4 ug/l
111		Prim._Clar.												
112		Sludge												
113		Sludge Wet												
114	Aqueous	ML/RL	0.05 ug/l	0.05 ug/l	0.25 ug/l	0.25 ug/l	1.5 ug/l	0.02 ug/l	0.0003 ug/l	0.05 ug/l	0.2 ug/l	0.05 ug/l	0.02 ug/l	0.5 ug/l
115	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
116	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
117	Overall Removal Rate		66.96%	94.76%	90.47%	96.32%	90.00%	95.77%	97.97%	Can't Do	19.44%	Can't Do	Can't Do	93.17%
118														

1	**SUMMARY DATA**		Arsenic (T)	Cadmium	Chrome (T)	Copper	Cyanide	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Zinc
2	Ave. Influent Conc.		2.351 ug/L	0.314 ug/L	19.719 ug/L	100.200 ug/L	32.868 ug/L	4.120 ug/L	0.346 ug/L	1.641 ug/L	111.200 ug/L	0.050 ug/L	0.046 ug/L	405.643 ug/L
3	Ave. Effluent Conc.		0.504 ug/L	0.014 ug/L	1.081 ug/L	3.382 ug/L	7.180 ug/L	0.139 ug/L	0.006 ug/L	9.772 ug/L	43.900 ug/L	0.050 ug/L	0.021 ug/L	22.357 ug/L
4	Ave. Primary Removal (ADRE)		20.46%	49.69%	28.73%	64.92%	43.43%	42.66%	61.42%	25.34%	40.83%	38.60%	39.48%	41.20%
5	Ave. Overall Removal (ADRE)		79.10%	95.06%	94.03%	95.43%	68.66%	96.42%	98.05%	34.69%	56.45%	58.11%	62.85%	93.61%
6	Effluent Variation (COV)		0.17	1.07	0.68	2.43	0.50	1.95	3.21	0.31	0.11	20.00	0.14	0.91
7	Average Sludge Conc.		3.26 mg/kg	1.01 mg/kg	97.53 mg/kg	414. mg/kg	#DIV/0!	10.06 mg/kg	581. mg/kg	21.93 mg/kg	257.75 mg/kg	4.45 mg/kg	23.18 mg/kg	1,182.5 mg/kg
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.		10.6 ug/L	1.4 ug/L	121.1 ug/L	368.6 ug/L	191.9 ug/L	20.8 ug/L	1.9 ug/L	9.1 ug/L	702.4 ug/L	0.1 ug/L	0.2 ug/L	1566.6 ug/L
119	**SAMPLE 10**													
120	Date:	LOCATION	Arsenic (T)	Cadmium	Chrome (T)	Copper	Cyanide	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Zinc
121	12/7/2021	Influent	2.45 ug/l	0.407 ug/l	22.2 ug/l	147. ug/l	38.6 ug/l	5.18 ug/l	0.343 ug/l	1.48 ug/l	176. ug/l	0.05 ug/l	0.063 ug/l	523. ug/l
122	12/8/2021	Effluent	0.49 ug/l	0.01 ug/l	1.02 ug/l	2.36 ug/l	8.63 ug/l	0.115 ug/l	0.003 ug/l	12.6 ug/l	45.3 ug/l	0.05 ug/l	0.02 ug/l	16.3 ug/l
123	12/7/2021	Prim._Clar.	2.12 ug/l	0.181 ug/l	14.5 ug/l	30.7 ug/l	13. ug/l	2.48 ug/l	0.171 ug/l	1.24 ug/l	79.2 ug/l	0.05 ug/l	0.02 ug/l	235. ug/l
124	12/7/2021	Sludge	3.72 mg/kg	1.12 mg/kg	119. mg/kg	506. mg/kg		11.3 mg/kg	687. mg/kg	27.8 mg/kg	302. mg/kg	5.15 mg/kg	27.6 mg/kg	1,430. mg/kg
125		Sludge Wet												
126	Aqueous	ML/RL	0.05 ug/l	0.05 ug/l	0.25 ug/l	0.25 ug/l	1.5 ug/l	0.02 ug/l	0.0003 ug/l	0.05 ug/l	0.2 ug/l	0.05 ug/l	0.02 ug/l	0.5 ug/l
127	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
128	Primary Removal Rate:		13.47%	55.53%	34.68%	79.12%	66.32%	52.12%	50.15%	Can't Do	55.00%	Can't Do	68.25%	55.07%
129	Overall Removal Rate		80.00%	97.54%	95.41%	98.39%	77.64%	97.78%	99.13%	Can't Do	74.26%	Can't Do	68.25%	96.88%
130														
131	**SAMPLE 11**													
132	Date:	LOCATION	Arsenic (T)	Cadmium	Chrome (T)	Copper	Cyanide	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Zinc
133	12/8/2021	Influent	3.12 ug/l	0.571 ug/l	31.4 ug/l	181. ug/l	32.5 ug/l	6.81 ug/l	0.846 ug/l	1.4 ug/l	177. ug/l	0.05 ug/l	0.02 ug/l	719. ug/l
134	12/9/2021	Effluent	0.47 ug/l	0.01 ug/l	1.29 ug/l	1.36 ug/l	7.94 ug/l	0.067 ug/l	0.0031 ug/l	14.2 ug/l	45.2 ug/l	0.05 ug/l	0.029 ug/l	13.3 ug/l
135	12/8/2021	Prim._Clar.	1.67 ug/l	0.184 ug/l	20.7 ug/l	5.03 ug/l	42.6 ug/l	2.89 ug/l	0.231 ug/l	1.54 ug/l	197. ug/l	0.05 ug/l	0.069 ug/l	413. ug/l
136		Sludge												
137		Sludge Wet												
138	Aqueous	ML/RL	0.05 ug/l	0.05 ug/l	0.25 ug/l	0.25 ug/l	1.5 ug/l	0.02 ug/l	0.0003 ug/l	0.05 ug/l	0.2 ug/l	0.05 ug/l	0.02 ug/l	0.5 ug/l
139	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
140	Primary Removal Rate:		46.47%	67.78%	34.08%	97.22%	Can't Do	57.56%	72.70%	Can't Do	Can't Do	Can't Do	Can't Do	42.56%
141	Overall Removal Rate		84.94%	98.25%	95.89%	99.25%	75.57%	99.02%	99.64%	Can't Do	74.46%	Can't Do	Can't Do	98.15%
142														
143	**SAMPLE 12**													
144	Date:	LOCATION	Arsenic (T)	Cadmium	Chrome (T)	Copper	Cyanide	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Zinc
145	12/9/2021	Influent	2.54 ug/l	0.387 ug/l	20.2 ug/l	140. ug/l	62.5 ug/l	4.89 ug/l	0.408 ug/l	2.73 ug/l	172. ug/l	0.05 ug/l	0.044 ug/l	530. ug/l
146	12/10/2021	Effluent	0.53 ug/l	0.01 ug/l	0.95 ug/l	1.3 ug/l	4.81 ug/l	0.063 ug/l	0.002 ug/l	13.7 ug/l	48.2 ug/l	0.05 ug/l	0.02 ug/l	13.5 ug/l
147	12/9/2021	Prim._Clar.												
148	12/9/2021	Sludge	2.7 mg/kg	1.18 mg/kg	89.3 mg/kg	373. mg/kg		9.83 mg/kg	454. mg/kg	22.1 mg/kg	242. mg/kg	4.41 mg/kg	20.7 mg/kg	1,070. mg/kg
149		Sludge Wet												
150	Aqueous	ML/RL	0.05 ug/l	0.05 ug/l	0.25 ug/l	0.25 ug/l	1.5 ug/l	0.02 ug/l	0.0003 ug/l	0.05 ug/l	0.2 ug/l	0.05 ug/l	0.02 ug/l	0.5 ug/l
151	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
152	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
153	Overall Removal Rate		Can't Do	97.42%	95.30%	99.07%	92.30%	98.71%	99.51%	Can't Do	71.98%	Can't Do	54.55%	97.45%
154														

	SUMMARY DATA		Arsenic (T)	Cadmium	Chrome (T)	Copper	Cyanide	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Zinc
2	Ave. Influent Conc.		2.351 ug/L	0.314 ug/L	19.719 ug/L	100.200 ug/L	32.868 ug/L	4.120 ug/L	0.346 ug/L	1.641 ug/L	111.200 ug/L	0.050 ug/L	0.046 ug/L	405.643 ug/L
3	Ave. Effluent Conc.		0.504 ug/L	0.014 ug/L	1.081 ug/L	3.382 ug/L	7.180 ug/L	0.139 ug/L	0.006 ug/L	9.772 ug/L	43.900 ug/L	0.050 ug/L	0.021 ug/L	22.357 ug/L
4	Ave. Primary Removal (ADRE)		20.46%	49.69%	28.73%	64.92%	43.43%	42.66%	61.42%	25.34%	40.83%	38.60%	39.48%	41.20%
5	Ave. Overall Removal (ADRE)		79.10%	95.06%	94.03%	95.43%	68.66%	96.42%	98.05%	34.69%	56.45%	58.11%	62.85%	93.61%
6	Effluent Variation (COV)		0.17	1.07	0.68	2.43	0.50	1.95	3.21	0.31	0.11	20.00	0.14	0.91
7	Average Sludge Conc.		3.26 mg/kg	1.01 mg/kg	97.53 mg/kg	414. mg/kg	#DIV/0!	10.06 mg/kg	581. mg/kg	21.93 mg/kg	257.75 mg/kg	4.45 mg/kg	23.18 mg/kg	1,182.5 mg/kg
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.		10.6 ug/L	1.4 ug/L	121.1 ug/L	368.6 ug/L	191.9 ug/L	20.8 ug/L	1.9 ug/L	9.1 ug/L	702.4 ug/L	0.1 ug/L	0.2 ug/L	1566.6 ug/L
155	**SAMPLE 13**													
156	Date:	LOCATION	Arsenic (T)	Cadmium	Chrome (T)	Copper	Cyanide	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Zinc
157	12/10/2021	Influent	1.96 ug/l	0.219 ug/l	18.2 ug/l	81.4 ug/l	25.1 ug/l	2.64 ug/l	0.29 ug/l	3.31 ug/l	118. ug/l	0.05 ug/l	0.086 ug/l	303. ug/l
158	12/11/2021	Effluent	0.47 ug/l	0.01 ug/l	0.98 ug/l	1.15 ug/l	5.84 ug/l	0.054 ug/l	0.0015 ug/l	11.8 ug/l	47.6 ug/l	0.05 ug/l	0.02 ug/l	13.3 ug/l
159		Prim._Clar.												
160		Sludge												
161		Sludge Wet												
162	Aqueous	ML/RL	0.05 ug/l	0.05 ug/l	0.25 ug/l	0.25 ug/l	1.5 ug/l	0.02 ug/l	0.0003 ug/l	0.05 ug/l	0.2 ug/l	0.05 ug/l	0.02 ug/l	0.5 ug/l
163	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
164	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
165	Overall Removal Rate		76.02%	95.43%	94.62%	98.59%	76.73%	97.95%	99.49%	Can't Do	59.66%	Can't Do	76.74%	95.61%
166														
167	**SAMPLE 14**													
168	Date:	LOCATION	Arsenic (T)	Cadmium	Chrome (T)	Copper	Cyanide	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Zinc
169	12/11/2021	Influent	1.98 ug/l	0.231 ug/l	14.2 ug/l	84.3 ug/l	31.6 ug/l	2.76 ug/l	0.244 ug/l	2.92 ug/l	88.8 ug/l	0.05 ug/l	0.088 ug/l	290. ug/l
170	12/12/2021	Effluent	0.41 ug/l	0.01 ug/l	0.75 ug/l	1.28 ug/l	5.76 ug/l	0.059 ug/l	0.0019 ug/l	11. ug/l	43.5 ug/l	0.05 ug/l	0.02 ug/l	13.6 ug/l
171		Prim._Clar.												
172		Sludge												
173		Sludge Wet												
174	Aqueous	ML/RL	0.05 ug/l	0.05 ug/l	0.25 ug/l	0.25 ug/l	1.5 ug/l	0.02 ug/l	0.0003 ug/l	0.05 ug/l	0.2 ug/l	0.05 ug/l	0.02 ug/l	0.5 ug/l
175	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
176	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
177	Overall Removal Rate		79.29%	95.67%	94.72%	98.48%	81.77%	97.86%	99.20%	Can't Do	51.01%	Can't Do	77.27%	95.31%
178														

Note: Line 7 - 11 are hand entered from the lab reported data

This represents less than the RL

			Arsenic (T)	Cadmium	Chrome (T)	Copper	Cyanide	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Zinc
Report ID	Date:	LOCATION	Arsenic (T)	Cadmium	Chrome (T)	Copper	Cyanide	Lead	Mercury	Molybdenum	Nickel	Selenium	Silver	Zinc
1L00025-2504	30-Nov	Domestic	0.67	0.111	0.86	49.7	3.41	0.998	0.0432	0.22	2.6	0.05	0.02	193
1L00025-2512	30-Nov	Domestic	0.63	0.099	0.79	47.4	3.78	0.875	0.241	0.27	2.32	0.05	0.02	174
1L00041-4103	3-Dec	Domestic	1.41	0.099	2.13	57.9	4.61	1.4	0.037	0.27	3.17	0.05	0.02	194
1L00071-7104	7-Dec	Domestic	0.74	0.124	0.93	54.3	3	1.01	0.00864	0.27	2.72	0.05	0.02	186
1L00097-9703	10-Dec	Domestic	0.73	0.096	0.82	45.2	3.46	0.978	0.0131	0.32	2.27	0.05	0.02	215
		Domestic												
		Domestic												
		Domestic												
		Domestic												
		Domestic												
	Average	Domestic	0.836 ug/l	0.106 ug/l	1.106 ug/l	50.9 ug/l	3.652 ug/l	1.052 ug/l	0.069 ug/l	0.27 ug/l	2.616 ug/l	0.05 ug/l	0.02 ug/l	192.4 ug/l
		ML	0.05	0.01	0.25	0.25	1.5	0.02	2.5	0.05	0.2	0.05	0.02	0.5
		RL	0.1	0.02	0.5	0.5	3	0.04	5	0.1	0.4	0.1	0.05	1

Local Limits Calculation Page

Line Number													
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)	11.6 MGD	11.6 MGD	11.6 MGD	11.6 MGD	11.6 MGD	11.6 MGD	11.6 MGD	11.6 MGD	11.6 MGD	11.6 MGD	11.6 MGD	11.6 MGD
4	Domestic Flow (in MGD)	9.2 MGD	9.2 MGD	9.2 MGD	9.2 MGD	9.2 MGD	9.2 MGD	9.2 MGD	9.2 MGD	9.2 MGD	9.2 MGD	9.2 MGD	9.2 MGD
5	Industrial Flow (in MGD)	1.8 MGD	1.8 MGD	1.8 MGD	1.8 MGD	1.8 MGD	1.8 MGD	1.8 MGD	1.8 MGD	1.8 MGD	1.8 MGD	1.8 MGD	1.8 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
7	Acute Dilution Factor	1. : 1	1. : 1	1. : 1	1. : 1	1. : 1	1. : 1	1. : 1	1. : 1	1. : 1	1. : 1	1. : 1	1. : 1
8	Chronic Dilution Factor	1. : 1	1. : 1	1. : 1	1. : 1	1. : 1	1. : 1	1. : 1	1. : 1	1. : 1	1. : 1	1. : 1	1. : 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
10	Digester Flow (in MGD)	0.174 MGD	0.174 MGD	0.174 MGD	0.174 MGD	0.174 MGD	0.174 MGD	0.174 MGD	0.174 MGD	0.174 MGD	0.174 MGD	0.174 MGD	0.174 MGD
11	Dry Sludge Production Rate (US Tons/day)	14.5116 T/D	14.5116 T/D	14.5116 T/D	14.5116 T/D	14.5116 T/D	14.5116 T/D	14.5116 T/D	14.5116 T/D	14.5116 T/D	14.5116 T/D	14.5116 T/D	14.5116 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)	0.36 mg/l	0.0059 mg/l	2.33 mg/l	0.0248 mg/l	0.022 mg/l	0.1287 mg/l	0.00247 mg/l	NA	1.92 mg/l	NA	0.0075 mg/l	0.1584 mg/l
15	WQ Chronic criteria, aquatic life (mg/L)	0.19 mg/l	0.0017 mg/l	0.277 mg/l	0.0161 mg/l	0.005 mg/l	0.00502 mg/l	0.00001 mg/l	NA	0.2134 mg/l	NA	NA	0.1435 mg/l
16	Other Water Criteria-Color Code at Input	0.010 mg/L	0.001 mg/L	0.115 mg/L	0.012 mg/L	0.005 mg/l	0.05 mg/l	0.00005 mg/l	NA	0.076 mg/l	NA	NA	0.162 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
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
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
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
21		Other Water Criteria	Values in gray are NPDES Limits		Values in Blue are WQ Chronic criteria, human Health				PRWQS				
22	**Part IV: POLLUTANT CONCENTRATION ------ SUMMARY**												
23	Estimated Average Industrial Conc.	0.011 mg/l	0.001 mg/l	0.121 mg/l	0.369 mg/l	0.192 mg/l	0.021 mg/l	0.002 mg/l	0.009 mg/l	0.702 mg/l	0. mg/l	0. mg/l	1.567 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
25	Adjusted Domestic concentration	0.00084 mg/l	0.00011 mg/l	0.00111 mg/l	0.0509 mg/l	0.00365 mg/l	0.00105 mg/l	0.00007 mg/l	0.00027 mg/l	0.00262 mg/l	0.00005 mg/l	0.00002 mg/l	0.1924 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
27	Average Sludge Level (mg/Kg - Dry)	3.258 mg/kg	1.006 mg/kg	97.525 mg/kg	414. mg/kg	#DIV/0!	10.063 mg/kg	581. mg/kg	21.925 mg/kg	257.75 mg/kg	4.453 mg/kg	23.175 mg/kg	1,182.5 mg/kg
28	Average Influent Level (mg/l)	0.0024 mg/l	0.0003 mg/l	0.0197 mg/l	0.1002 mg/l	0.0329 mg/l	0.0041 mg/l	0.0003 mg/l	0.0016 mg/l	0.1112 mg/l	0.0001 mg/l	0. mg/l	0.4056 mg/l
29	Average Effluent Level (mg/l)	0.0005 mg/l	0. mg/l	0.0011 mg/l	0.0034 mg/l	0.0072 mg/l	0.0001 mg/l	0. mg/l	0.0098 mg/l	0.0439 mg/l	0.0001 mg/l	0. mg/l	0.0224 mg/l
30													

Local Limits Calculation Page

Line Number													
31	**Part V: REMOVAL RATES**												
32	Average Primary Removal Rate	20.46%	49.69%	28.73%	64.92%	43.43%	42.66%	61.42%	25.34%	40.83%	38.60%	39.48%	41.20%
33	Average Overall Removal Rate	79.10%	95.06%	94.03%	95.43%	68.66%	96.42%	98.05%	34.69%	56.45%	58.11%	62.85%	93.61%
34	Reference Primary Removal Rate	20.46%	49.69%	28.73%	64.92%	43.43%	42.66%	61.42%	25.34%	40.83%	38.60%	39.48%	41.20%
35	Reference 2d Decile Plant Removal	31.00%	33.00%	68.00%	67.00%	41.00%	39.00%	50.00%		25.00%	33.00%	50.00%	64.00%
36	Reference Ave Plant Removal	79.10%	95.06%	94.03%	95.43%	68.66%	96.42%	98.05%	34.69%	56.45%	58.11%	62.85%	93.61%
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
41	Credit present loading of existing sources (Y/N)	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y
42	Adjust for receiving water pollution	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
44	Use Observed Primary Removal Rate (Y/N)	N	N	N	N	N	N	N	N	N	N	N	N
45													
46	**Part VII: LOCAL LIMITS CORRESPONDING TO THE CRITERIA ABOVE BASED ON COMPLIANCE WITH:**												
47	Acute WQ Standards (in mg/l)	11.096 mg/l	0.766 mg/l	251.38 mg/l	3.223 mg/l	0.433 mg/l	23.125 mg/l	0.817 mg/l	NA	28.389 mg/l	NA	0.13 mg/l	14.93 mg/l
48	Chronic WQ Standards (in mg/l)	5.854 mg/l	0.216 mg/l	29.957 mg/l	1.986 mg/l	0.087 mg/l	0.87957 mg/l	0.0036 mg/l	NA	3.143 mg/l	NA	NA	13.43 mg/l
49	Other Water Criteria-Color Code at Input	0.304 mg/l	0.13 mg/l	12.414 mg/l	1.344 mg/l	0.087 mg/l	8.997 mg/l	0.016 mg/l	NA	1.106 mg/l	NA	NA	15.311 mg/l
50	Sludge Application Limits (in mg/l)	0.181 mg/l	0.172 mg/l	NA	8.317 mg/l	NA	1.664 mg/l	NA	0.362 mg/l	1.418 mg/l	0.32 mg/l	NA	14.411 mg/l
51	Activated Sludge Inhibition (in mg/l)	0.806 mg/l	12.809 mg/l	90.41 mg/l	18.094 mg/l	1.119 mg/l	11.216 mg/l	1.67 mg/l	NA	10.878 mg/l	NA	2.662 mg/l	2.24 mg/l
52	Anaerobic Digestor Inhibition (in mg/l)	0.191 mg/l	2.033 mg/l	NA	3.775 mg/l	0.54 mg/l	34.07 mg/l	NA	NA	1.698 mg/l	NA	1.999 mg/l	40.26 mg/l
53													
54	**Part VIII: SAMPLE QUALITY: COMPARISON OF LOADINGS AND REMOVAL RATES IMPLIED BY SAMPLE DATA**												
55	Pollutants in Influent (per sampling)	0.227 lbs	0.03 lbs	1.908 lbs	9.694 lbs	3.18 lbs	0.399 lbs	0.033 lbs	0.159 lbs	10.758 lbs	0.005 lbs	0.004 lbs	39.244 lbs
56	Pollutants in biosolids (per sampling)	0.095 lbs	0.029 lbs	2.83 lbs	12.016 lbs	#DIV/0!	0.292 lbs	16.862 lbs	0.636 lbs	7.481 lbs	0.129 lbs	0.673 lbs	34.32 lbs
57	Pollutants in effluent (per sampling)	0.048 lbs	0.001 lbs	0.103 lbs	0.322 lbs	0.684 lbs	0.013 lbs	0.001 lbs	0.931 lbs	4.183 lbs	0.005 lbs	0.002 lbs	2.13 lbs
58	% Influent load accounted for: (eff/inf)	62.70%	100.30%	153.78%	127.28%	#DIV/0!	76.60%	50367.12%	987.13%	108.42%	2770.00%	15089.11%	92.88%
59	Current HW Load Implied by Sludge Data:	4.30%	1.57%	1.61%	51.74%	#DIV/0!	2.24%	28865.28%	33.66%	78.80%	4.63%	54.72%	74.28%
60	Local Limit implied by %max Biosolids level	0.176 mg/L	0.077 mg/L	NA	1.694 mg/L	NA	0.765 mg/L	-0.002 mg/L	0.026 mg/L	0.451 mg/L	0.007 mg/L	NA	3.576 mg/L
61													
62	**PART IX: MASS BASED ANALYSIS**												
63	Limiting MAHL (Dom Load + LL*IUflow)	2.7799 lb/d	1.96 lb/d	186.45 lb/d	24.34 lb/d	1.61 lb/d	13.54 lb/d	0.06 lb/d	5.45 lb/d	16.82 lb/d	4.81 lb/d	1.96 lb/d	49.36 lb/d
64	Domestic and 10.% reserve for safety and growth	0.3463 lb/d	0.2046 lb/d	18.7358 lb/d	6.5939 lb/d	0.459 lb/d	1.6908 lb/d	0.0116 lb/d	0.567 lb/d	1.8955 lb/d	0.4847 lb/d	0.1972 lb/d	20.661 lb/d
65	Max. Allowable Industrial Loading (MAIL)	2.4336 lb/d	1.7548 lb/d	167.7178 lb/d	17.7436 lb/d	1.1463 lb/d	11.8501 lb/d	0.048 lb/d	4.8823 lb/d	14.9211 lb/d	4.3213 lb/d	1.7585 lb/d	28.6971 lb/d
66													
67	**Part X: LOCAL LIMIT RECAP:**	**Arsenic(T)**	**Cadmium**	**Chrome (T)**	**Copper**	**Cyanide**	**Lead**	**Mercury**	**Molybdenum**	**Nickel**	**Selenium**	**Silver**	**Zinc**
68	Industrial Flow (in MGD)	1.80 MGD	1.80 MGD	1.80 MGD	1.80 MGD	1.80 MGD	1.80 MGD	1.80 MGD	1.80 MGD	1.80 MGD	1.80 MGD	1.80 MGD	1.80 MGD
69	Local Limit = MAIL/(8.34*Industrial Flow)	0.162 mg/l	0.117 mg/l	11.172 mg/l	1.182 mg/l	0.076 mg/l	0.79 mg/l	0.003 mg/l	0.325 mg/l	0.994 mg/l	0.288 mg/l	0.117 mg/l	1.912 mg/l

Caguas WWTP

Line Number

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

1	Receiving Water: (F)resh, (M)arine, (B)oth	F													
2	Hardness for Use in Calculations:	143.00													
3		PRIOR	CAR	WATER QUALITY STANDARD							TOTAL	TOTAL	Total	Conv. Fact.		
4		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	National Toxics Rule	9,000. ug/l	1,600. ug/l	14. ug/l	1.00	1.00	1.00
7	ARSENIC (T)	Y	Y	360. ug/l	190. ug/l				0.00		360. ug/l	190. ug/l	0. ug/l	1.00	1.00	1.00
8	ARSENIC(PENT)	Y	Y	850. ug/l	48. ug/l		69. ug/l	36. ug/l		FED/PRQWS	850. ug/l	48. ug/l	NA	1.00	1.00	1.00
9	Beryllium			130. ug/l	5.3 ug/l		2,319. ug/l	13. ug/l		Gold Book	130. ug/l	5.3 ug/l	NA	1.00	1.00	1.00
10	CADMIUM - Dependent on Hardness in	Y	N	5.5 ug/l	1.3 ug/l					Gold Book	5.8714 ug/l	1.6598 ug/l	0. ug/l	0.99	0.93	0.81
11	CHROMIUM(HEX)	Y	N	15. ug/l	10. ug/l		33. ug/l	7.9 ug/l		Federal	15.2749 ug/l	10.395 ug/l	0. ug/l	0.99	0.98	0.96
12	CHROMIUM(T) - Dependent on hardne	N	N	735.5 ug/l	238.6 ug/l		1,100. ug/l	50. ug/l		Federal	2,327.546 ug/l	277.4303 ug/l	0. ug/l	1.00	0.32	0.86
13	COPPER - Dependent on Hardness in $E	Y	N	23.8 ug/l	15.4 ug/l		10,300. ug/l	NA			24.8285 ug/l	16.0507 ug/l	0. ug/l	0.83	0.96	0.96
14	CYANIDE	Y	N	22. ug/l	5.2 ug/l	700. ug/l	4.8 ug/l	3.1 ug/l		Federal	22. ug/l	5.2 ug/l	700. ug/l	1.00	1.00	1.00
15	LEAD - Dependent on hardness in B6	Y	N	95.1 ug/l	3.7 ug/l		1.0 ug/l	1. ug/l	220,000. ug/l	Federal	128.7279 ug/l	5.0163 ug/l	0. ug/l	0.95	0.74	0.74
16	MERCURY	Y	N	2.1 ug/l	0.012 ug/l	0.14 ug/l	210. ug/l	8.1 ug/l		Federal	2.4706 ug/l	0.012 ug/l	0.14 ug/l	0.85	0.85	1.00
17	Molybdenum	N	N				1.8 ug/l	0.94 ug/l	0.15 ug/l	Federal			NA			
18	NICKEL - Dependent on hardness in $B	Y	N	1,915.6 ug/l	212.7 ug/l	610. ug/l					1,919.3974 ug/l	213.3783 ug/l	NA	0.99	1.00	1.00
19	SELENIUM	Y	N	20. ug/l	5. ug/l	170. ug/l	74. ug/l	8.2 ug/l	4,600. ug/l	Federal	20. ug/l	5. ug/l	NA	1.00	1.00	1.00
20	SILVER - Dependent on hardness in B	Y	N	6.4 ug/l	NA		290. ug/l	71. ug/l	11,000. ug/l	Federal	7.5089 ug/l	NA	NA	0.85	0.85	1.00
21	Thallium			1,400. ug/l	40. ug/l	1.7 ug/l	1.9 ug/l	NA		Federal	1,400. ug/l	40. ug/l	1.7 ug/l	1.00	1.00	1.00
22	Tributyl Tin (TBT)			0.460	0.063		6,300. ug/l	NA	200,000. ug/l		0.46 ug/l	0.063 ug/l	NA	1.00	1.00	1.00
23	ZINC- Dependent on hardness in B6	Y	N	155. ug/l	141.5 ug/l		0.000	0.000			158.4467 ug/l	143.5119 ug/l	NA	0.95	0.98	0.99
24	Arsenic (inorganic)	Y	N	155. ug/l	141.5 ug/l		90. ug/l	81. ug/l		Federal	154.9609 ug/l	141.5028 ug/l	0. ug/l	1.00	1.00	1.00
25	Aluminum					0.018 ug/l			0.14 ug/l	National Toxics Rule	0. ug/l	0. ug/l	0.018 ug/l	1.00	1.00	1.00
26	Cobalt										0. ug/l	0. ug/l	0. ug/l	1.00	1.00	1.00
27	Formaldehyde										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.

Appendix D
Removal Data from 207 Matched Pairs Using Ultralow detection for Molybdenum and Mercury

Appendix D

The removal factors found in EPAs Local Limits Development Manual (LLDM) Appendix R were published in the manuals first addition in 1982 and relied on data gathered in the decade proceeding its publication. At the bottom of each type of treatment the footnotes indicate the following[1]:

> * Pollutant removals between POTW influent and secondary effluent (including secondary clarification). Based on a computer analysis of POTW removal efficiency data (derived from actual POTW influent and effluent sampling data) provided in U.S. EPA's Fate of Priority Pollutants in Publicly Owned Treatment Works, Volume II (EPA 440/1-82/303), September 1982.
>
> ** For the purpose of deriving removal efficiencies, effluent levels reported as below detection were set equal to the reported detection limits. All secondary activated sludge treatment plants sampled as part of the study were considered.

The methods used at the time this data collection lacked the sensitivity needed to properly measure the full removal and comparatively high detection levels in many cases yielded lowered removal factors than the true removal. This led to lower removal rates for almost all parameters because removal was limited to the detection level of these older methods. The lower the concentration of a pollutant (at both the influent and effluent) the more pronounced the effect of the use of detection levels in lieu of non-detect values. Mercury has the most pronounced truncation due to its normal low concentration throughout the system. Even today the use of method 245.1 leads to many non-detect values. Only with the use of the very sensitive method 1631 e can the true removal factors of mercury begin to be accurate measured. Jacobs over time has collected the information in this appendix to find the actual removal rates. These have been collected for systems with various treatment units ranging form 301 H exempt plants were only chemically enhance primary treatment is present to secondary, tertiary and even a quaternary plant where GAC treatment was added after membrane filtration. The data for the most part forms a fairly tight bell curve and provides an average removal.

The LLDM also does not provide a removal factor for molybdenum. Consequently, the same data base of treatment plants covered was used to derive and average removal rate for use as a reference in future local limits developed by Jacobs.

[1] Source: U.S. EPA's Guidance Manual on the Development and Implementation of Local Discharger Limitations Under the Pretreatment Program, December 1987, p. 3-56.

Mercury

Total Data Pairs (inf/eff): 216

Year Tested

Year Tested	Project	# of data pairs	% primary	% total	
2014	Cayey, PR	7	NA	98.95%	S
2014	Fajardo	8	NA	93.48%	S
2014	Jayuya	7	NA	97.48%	S
2014	Santa Isabel	7	NA	74.65%	S
2014	Vega Baja	7	NA	97.87%	S
2014	Swainsboro, GA	7	-	-	S
2018	Yauco	6	NA	96.67%	S
	Secondary Treatment Only	49	NA	93.18%	
2011	Walla Walla, Washington	16	65.60%	97.22%	P&S
2014	Guayama	7	50.38%	87.28%	P&S
2014	Stephenville	7	-	96.28%	P&S
2017	Camuy-Hatillo	7	45.53%	87.10%	P&S
2017	Abonito	7	67.54%	90.84%	P&S
2017	Baton Rouge NWWTP	17	64.41%	62.17%	P&S
2017	Baton Rouge SWWTP	17	14.83%	91.40%	P&S
2018	Mayaguez	13	35.87%	99.76%	P&S
2018	Camas	8	41.63%	96.57%	P&S
2019	Farmington	7	-	78.44%	P&S
2020	Troutdale	7	33.56%	91.05%	P&S
2021	Hood River	7	77.86%	95.97%	P&S
	Primary and Secondary Treatment	76	58.69%	86.82%	
2014	Carolina	7	72.39%	NA	301 H
2014	Bayamon	7	67.36%	NA	301 H
2014	Puerto Nuevo	7	69.62%	NA	301 H
2015	Aguadilla	7	76.47%	NA	301 H
2015	Arecibo	7	90.69%	NA	301 H
2019	Ponce	14	74.43%	NA	301 H
	301H Enhance Primary	125	75.16%	NA	
	Overall Pairs/Average Removal	216	59.26%	90.73%	

Note: The Baton Rough mercury results (all pairs) were considered to be contaminated and the final number is an outlier using the Grubb outlier tests at the 0.05 significance level. This value has been retained in the average for the sake of transparency.

Molybdenum

Total Data Pairs (inf/eff): 216

Year Tested

Year Tested	Project	# of data pairs	% primary	% total	
2014	Cayey	7	NA	37.99%	S
2014	Fajardo	8	NA	31.72%	S
2014	Jayuya	7	NA	27.67%	S
2014	Santa Isabel	7	NA	48.24%	S
2014	Vega Baja	7	NA	40.98%	S
2014	Swainsboro	7	NA	29.42%	S
2018	Yauco	6	NA	46.17%	S
	Secondary Treatment Only	49	NA	37.46%	
2011	Walla Walla, Washington	16	31.99%	52.38%	P&S
2014	Guayama	7	14.31%	27.63%	P&S
2014	Stephenville	7	-	43.64%	P&S
2017	Camuy-Hatillo	7	13.89%	16.28%	P&S
2017	Abonito	7	CNC	CNC	P&S
2017	Baton Rouge NWWTP	17	28.00%	35.83%	P&S
2017	Baton Rouge SWWTP	17	28.00%	26.64%	P&S
2018	Mayaguez	13	46.56%	82.11%	P&S
2018	Camas	8	9.12%	8.17%	P&S
2019	Farmington	7	-	17.31%	P&S
2020	Troutdale	7	30.85%	21.00%	P&S
2021	Hood River	7	-	50.57%	P&S
	Primary and Secondary Treatment	120	25.34%	34.69%	
2014	Bayamon	7	NA	NA	301 H
2014	Carolina	7	NA	NA	301 H
2014	Puerto Nuevo	7	-	NA	301 H
2015	Aguadilla	7	33.75%	NA	301 H
2015	Arecibo	7	23.60%	NA	301 H
2019	Ponce	14	23.78%	NA	301 H
	301H Enhance Primary	49	27.04%	NA	
	Overall Pairs/Average Removal	216	25.34%	35.06%	

Appendix E
Puerto Rico Water Quality Standards Worksheet

Puerto Rico Water Quality Standards (WQS) Worksheet

Caguas

Based on Puerto Rico Water Quality Standard Regulation
Rule 1303.1
Calculation of WQS Based On Hardness Hardness = 136

		Receiving Stream		Bairoa River
Arsenic		10.000	µg/l	HH
Cadmium	= (e (0.7977[ln(hardness)] - 3.909) µg/L	1.010	µg/l	AL
Chromium	= (e (0.8190[ln(hardness)] + 0.6848) µg/L	110.860	µg/l	AL
Copper	= (e (0.8545[ln(hardness)] - 1.702)) µg/L	12.132	µg/l	AL
Cyanide		5.200	µg/l	AL
Lead	= (e (1.273[ln(hardness) - 4.705) µg/L	4.706	µg/l	AL
Mercury		0.050	µg/l	HH
Nickel	= (e (0.8460[ln(hardness)] + 0.058)µg/L	67.634	µg/l	Al
Silver	= (e (1.72[ln(hardness)] - 6.59)µg/L	6.422	µg/l	AL
Selenium		5.000	µg/l	AL
Thallium		0.240	µg/l	HH
Zinc	= (e (0.8473[ln(hardness)] + 0.884))µg/L	155.476	µg/l	AL

Appendix F
Average TCLP for Sludge

Project: Caguas TBLL
all results are in mg/L
Sludge

Date	Arsenic	Barium	Cadmium	Chromium	Lead	Mercury	Selenium	Silver
03/05/2015	<0.01	<1.0	<0.002	<0.05	<0.05	<0.0002	<0.01	<0.002
05/20/2015	<0.01	**0.12**	<0.0002	<0.005	<0.005	<0.0002	<0.01	<0.002
10/13/2015	<0.10	**0.24**	<0.0005	<0.005	<0.005	<0.0002	<0.03	<0.002
12/10/2015	<0.10	**0.09**	<0.0005	<0.005	<0.005	<0.0002	<0.03	<0.002
03/09/2016	<0.10	<0.005	<0.0005	<0.005	<0.005	<0.0002	<0.03	<0.002
09/17/2016	<0.10	<0.20	<0.0010	<0.050	<0.100	<0.0005	<0.10	<0.010
12/23/2016	<0.10	<0.20	<0.0010	<0.050	<0.100	<0.0005	<0.10	<0.010
04/04/2017	<0.011	**0.027**	**0.002**	**0.007**	**0.005**	<0.0015	<0.011	<0.001
08/19/2017	<0.01	**0.031**	**0.0005**	<0.005	<0.005	<0.0002	<0.03	<0.002
03/24/2018	<0.05	<0.025	<0.0025	<0.025	<0.025	<0.0002	<0.15	<0.010
07/20/2018	<0.05	**0.065**	<0.0025	<0.025	<0.025	<0.0002	<0.15	<0.010
09/20/2018	<0.05	**0.275**	<0.0025	**0.025**	<0.025	<0.0002	<0.15	<0.010
12/30/2018	<0.05	**0.585**	<0.0025	<0.025	<0.025	<0.0002	<0.15	<0.010
03/21/2019	<0.05	**0.485**	<0.0025	<0.025	<0.025	<0.0002	<0.15	<0.010
06/13/2019	<0.05	**0.07**	<0.0025	<0.025	<0.025	<0.0002	<0.15	<0.010
09/25/2019	<0.05	**0.11**	<0.0025	<0.050	<0.050	**0.0028**	<0.15	<0.010
12/15/2019	<0.05	**0.685**	**0.0125**	<0.050	<0.050	<0.0001	<0.15	<0.010
01/22/2020	<0.05	**0.455**	<0.0025	<0.050	<0.050	<0.0001	<0.15	<0.010
04/24/2020	<0.05	**0.215**	**0.0035**	<0.050	<0.050	<0.0001	<0.15	<0.010
07/24/2020	<0.05	<0.075	<0.0025	<0.050	<0.050	<0.0001	<0.15	<0.010
10/17/2020	<0.05	**0.255**	<0.0025	<0.045	<0.075	<0.0002	**0.23**	<0.010
01/28/2021	<0.05	**0.225**	<0.0025	<0.045	<0.075	<0.0002	<0.15	<0.010
05/11/2021	<0.05	**0.135**	**0.0035**	<0.045	<0.075	<0.0002	<0.15	<0.010
08/21/2021	<0.05	**0.18**	**0.0035**	<0.045	<0.075	<0.0002	<0.15	<0.010
11/04/2021	<0.05	**0.085**	<0.0025	<0.045	<0.075	<0.0002	**0.36**	<0.025
01/25/2022	<0.05	**0.09**	<0.0025	<0.045	<0.075	<0.0002	<0.15	<0.025
02/02/2022	<0.05	**0.125**	<0.0025	<0.045	**0.075**	<0.002	<0.15	<0.025
Maximum	**<0.1**	**0.685**	**0.0125**	**0.025**	**0.075**	**0.00028**	**0.36**	**<0.025**
TCLP Limits	**0.01**	**0.005**	**0.0005**	**0.05**	**0.05**	**0.0002**	**0.03**	**0.002**

Appendix G
Published Data – Domestic Wastewater Strengths

Table 3-16
Typical Composition of Untreated Domestic Wastewater

Contaminants	Unit	Concentration		
		Weak	Medium	Strong
Solids (TS)	mg/L	350	720	1200
Dissolved, total (TDS)	mg/L	250	500	850
Fixed	mg/L	145	300	525
Volatile	mg/L	105	200	325
Suspended Solids	mg/L	100	220	350
Fixed	mg/L	20	55	75
Volatile	mg/L	80	165	275
Settleable Solids	ml/L	5	10	20
Biochemical Oxygen Demand				
5-Day 20 C, BOD5 20 C	mg/L	110	220	400
Total Organic Carbon (TOC)	mg/L	80	160	290
Chemical Oxygen Demand (COD)	mg/L	250	500	1000
Nitrogen (total as N)	mg/L	20	40	60
Organic	mg/L	8	15	35
Free ammonia	mg/L	12	25	50
Nitrites	mg/L	0	0	0
Nitrates	mg/L	0	0	0
Phosphorus (total as P)	mg/L	4	8	15
Organic	mg/L	1	3	5
Inorganic	mg/L	3	5	10
Chorides	mg/L	30	50	100
Sulfate	mg/L	20	30	50
Alkalinity (as CaCO3)	mg/L	50	100	200
Grease	mg/L	50	100	150

Values should be increased by amount present in domestic water supply.
Metcalf and Eddy's Wastewater Engineering , Ed. George Tchobanglous

Appendix H
Phenolic Compounds Regulated by Puerto Rico Water Quality Standards

Priority Pollutants

	Subtance	Classes SB and SC (ug/L)	Class SD (ug/L)	Class SG (ug/L)
+, *	Chloroform	4,700 (HH)	57 (HH)	57 (HH)
+, *	Dichlorobromomethane	170 (HH)	5.5 (HH)	5.5 (HH)
+	Toluene	15,000 (HH)	1,000 (DW)	1,000 (DW)
+, *	Chlorodibromomethane	130 (HH)	4.0 (HH)	4.0 (HH)
+	Chlorobenzene	1,600 (HH)	100 (DW)	100 (DW)
#N/A	Chloromethane	#N/A	#N/A	#N/A
#N/A	Chloroethane	#N/A	#N/A	#N/A
+, *	Bromoform	1,400 (HH)	43 (HH)	43 (HH)
+	Phenol	860,000 (HH)	10,000 (HH)	10,000 (HH)
+	1,4-Dichlorobenzene	190 (HH)	63 (HH)	63 (HH)
+	Diethyl phthalate	44,000 (HH)	17,000 (HH)	17,000 (HH)
+, *	Bis(2-ethylhexyl) Phthalate	22 (HH)	12 (HH)	12 (HH)
	Malathion	0.10 (AL)	0.10 (AL)	---
	Chloropyrifos	0.0056 (AL)	0.041 (AL)	---
	Fenthion	0.40 (AL)	0.40 (AL)	---
	Parathion	---	0.013 (AL)	---

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 I
CPCS Safety Alert

Avoiding Tap Water Scalds

The majority of injuries and deaths involving tap water scalds are to the elderly and children under the age of five. The U.S. Consumer Product Safety Commission (CPSC) urges all users to lower their water heaters to **120 degrees Fahrenheit.** In addition to preventing accidents, this decrease in temperature will conserve energy and save money.

Most adults will suffer third-degree burns if exposed to 150 degree water for two seconds. Burns will also occur with a six-second exposure to 140 degree water or with a thirty second exposure to 130 degree water. Even if the temperature is 120 degrees, a five minute exposure could result in third-degree burns.

Various procedures for lowering water temperature in the home exist, depending on the method of heating. Here are some suggestions:

Electric water heaters. Call your local electric company to adjust the thermostat. Some companies offer this service at no-charge. Hot water should not be used for at least two hours prior to setting. To make the adjustment yourself, start by shutting off current to the water heater, then turn off the circuit breaker to the heater or remove the fuse that serves the heater. Most electric water heaters have two thermostats, both of which must be set to a common temperature for proper operation. To reach these thermostats you must remove the upper and lower access panels. Adjust the thermostat following the instructions provided with the appliance. Hold a candy or meat thermometer under the faucet to check water temperature.

Gas water heaters. Because thermostats differ, call your local gas company for instructions. Where precise temperatures are not given, hold a candy or meat thermometer under faucet for most accurate reading first thing in the morning or at least two hours after water use. If reading is too high, adjust thermostat on heater, according to manufacturer's instructions, and check again with thermometer.

Furnace heater. If you do not have an electric, gas, or oil-fired water heater, you probably have an on-line hot water system. Contact your fuel supplier to have the temperature lowered. If you live in an apartment, contact the building manager to discuss possible options for lowering your tap water temperature. Reducing water temperature will not affect the heating capacity of the furnace.

CPSC notes that a thermostat setting of 120 degrees Fahrenheit (49 degrees Celsius) may be necessary for residential water heaters to reduce or eliminate the risk of most tap water scald injuries. Consumers should consider lowering the thermostat to the lowest settings that will satisfy hot water needs for all clothing and dish washing machines.

Never take hot water temperature for granted. Always hand-test before using, especially when bathing infants and young children. Leaving a child unsupervised in the bathroom, even if only for a second, could cause serious injuries. Your presence at all times is the best defense against accidents and scalding to infants and young children.

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Appendix J
Long Hand Calculation of Lead Local Limits

Caguas WWTP

Long Hand Calculation of Local Limit - Lead

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/default/files/2014-12/documents/prwqs.pdf
NPDES Limits are found in NPDES Permit # PR0025976
Where a dilution factor has been approved, the factor applies to the Water Quality Standards but not to NPDES limits.
Dilution Factor Applied are derived from: Best Professional Judgment - See rationale

	Y or N
Use Federal	Y

Hardness Utilized: 143

Lead

				Dissolved to Total Conversion Factor (CF)
Federal WQS Acute =	128.73	128.7 ug/l	µg/L	1.00
Federal WQS Chronic =	5.02	5.016	µg/L	1.00
Puerto Rico Acute =	(1.46203-((LN(Hardness))*(0.145712)))*e(1.273*(LN(Hardness))-1.46)	128.7	µg/L	0.95
Puerto RicoChronic =	(1.46203-((LN(Hardness))*(0.145712)))*e(1.273*(LN(Hardness))-4.705)	5.016	µg/L	0.74
HH =	50	50.0	µg/L	1.00
NPDES =	NA	NA	µg/L	1.00

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

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

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	PR Acute	PR Chronic	PR HH	NPDES
Lead	Lead	Lead	Lead	Lead	Lead
0.128727944	0.005	0.129	0.005	0.050	
11.6	11.6	11.6	11.6	11.6	11.6
1.00	1.00	1.00	1.00	1.00	1.00
96.4%	96.4%	96.4%	96.4%	96.4%	96.4%
Water Quality Based AHLs		lb/d			
347.48	13.54	347.48	13.54	134.97	

Lead

Calculation of most Stringent WQS AHL

$$Lwqs = \frac{(8.34\ lb/gal\ X\ 0.01003\ mg/L\ X\ 23.2\ mgd\ X\ 2:1)}{1 - 1.9283} = 13.54\ lb/d$$

Caguas WWTP

Long Hand Calculation of Local Limit - Lead

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

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

	40 CFR 503 Pollutant	Table 3 Clean Sludge (mg/kg)	Table 1 Ceiling Sludge (mg/kg)
	Arsenic	41	75
	Cadmium	39	85
Lead	**Chromium**	NA	NA
840	**Copper**	1500	4300
1	**Cyanide**	NA	NA
1.8	**Lead**	300	840
0.174	**Mercury**	17	57
96.4%	**Molybdenum**	NA	75
	Nickel	420	420
	Selenium	100	100
	Silver	NA	NA
	Zinc	2800	

Sludge Quality Based AHL
22.76 lb/d

Lead

$$Lin = \frac{(8.34 \text{ lb/g X } 840 \text{ mg/L X } 1 \text{ kg/L X } 2\% \text{ solids X } 0.2 \text{ mgd}}{0.9642} = 22.76 \text{ lb/d}$$

Caguas WWTP

Long Hand Calculation of Local Limit - Lead

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

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

Lead	Pollutant	Inhibition Secondary Activated Sludge	Nitrogen Inhibition
	Arsenic	0.1	1.5
	Cadmium	1-10	5.2
	Chromium	1-100	.25-1.9
1	**Copper**	1	.05-.48
42.7%	**Cyanide**	0.1-5	.34-.5
11.6	**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

Activated Waste Inhibition Based AHL
168.72 lb/d

Lead

$$Linhib2 = \frac{(8.34 \text{ lb/gal} \times 1.00 \text{ mg/L} \times 11.6 \text{ mgd})}{1 - 0.4266} = 168.7 \text{ lb/d}$$

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

Lead	Pollutant	Inhibition Anaerobic Sludge
	Arsenic	1.6
	Cadmium	20
	Chromium	130
	Copper	40
340	**Cyanide**	4
0.174	**Lead**	340
96.42%	**Mercury**	NA
	Nickel	10
	Selenium	NA
	Silver	13
	Zinc	400

Anaerobic Digestion Based AHL
511.735 lb/d

Lead

$$Linhibdgstr = \frac{(8.34 \text{ lb/gal} \times 340 \text{ mg/L} \times 0.174 \text{ MGD})}{96.42\%} = 511.735 \text{ lb/d}$$

Caguas WWTP
Long Hand Calculation of Local Limit - Lead
Lead

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	PR Acute	PR Chronic	PR HH	NPDES	Sludge Quality	Secondary Inhibition	Anaerobic Inhibition	Maximum Allowable Headworks Loading (MAHL)
Lead	347.48	13.54	347.48	13.54	134.97		22.757	168.72	511.734811	13.541

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:

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

Where:

MAIL = Maximum available industrial loading, lbs/day

	Lead
MAHL = Maximum allowable headworks loading, lbs/day	13.541
SF = Safety and Growth factor, as a decimal	10%
L_{unc} = Loadings from uncontrolled sources	0.316

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)

Lead

L_{unc} = 4.12 ug/L./1000ug/mg X 9.20 mgd X 8.34) = 0.316 lb/d

MAIL = (13.54 lb/d X (1 - 10%) - 0.316 lb/d) = 11.871 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 1.8 mgd

Lead

Lead Local Limit = 11.87 lb/d divided by (8.34 X 1.8 MGD) = **0.79 mg/L**

Appendix K
Definitions

Appendix K. Definitions

Term	Definition
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	Regulations or standards 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. (U.S. Environmental Protection Agency [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 the EPA 2004 *Guidance Manual on Development of Local Limits* (Publication EPA 833-R-04-002A). Refer also to *Reference Values*.
Categorical User	Industry subject to a category listed in 40 Code of Federal Regulations (CFR) 405-471. By definition, Categorical Users also are listed as Significant Industrial Users (SIUs).
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 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 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 % capture of a pollutant that is removed by a control measure installed specifically to remove that pollutant.
Criteria	Regulations or standards that may be applicable to the development of a local limit.

Term	Definition
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 is generated by residential and light commercial use. 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. Refer to *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 milligrams per liter (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 total suspended solids (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 EPA 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, comminuters, wet wells, and/or pumps.
Implementation	Specification of how Technically Based Local Limits (TBLL) 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 nonuniform allocation of the capacity or maximum allowable industrial loading (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 National Pollutant Discharge Elimination System (NPDES) permit, and otherwise achieves the environmental goals of the program.

Term	Definition
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 obtained is higher than the actual value, this is referred to as 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 land's 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 (refer to 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% 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; 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.
Nonconservative Pollutant	Pollutants that are presumed to be destroyed, biodegraded, chemically transformed, or volatilized within the POTW to some degree.
Nondomestic Discharge	Any discharge to the collection system from a permitted source.
Other Permitted User	A source of discharge that 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."

Term	Definition
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 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). Refer also to *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, noncontact cooling, and boiler blowdown wastewater); contributes a process waste stream that makes up 5% 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 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 semisolid 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.

Term	Definition
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 level (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 ACGIH).
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 Characteristic Leaching Procedure (TCLP)	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.