CALIFORNIA Water Boards

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San Francisco Bay Regional Water Quality Control Board

July 02, 2021
CW - 244705

Silicon Valley Clean Water (SVCW)
1400 Radio Road
Redwood City, CA 94065-1220

ATTN: Benjamin Padua, Jr.
Environmental Services Supervisor
Via email to BPaduaJR@svcw.org

SUBJECT: REVIEW OF 2019 LOCAL LIMITS ASSESSMENT

Dear Benjamin Padua:

Enclosed is the review of SVCW's 2019 Local Limits Analysis Report. Based on the review, the Regional Water Board conditionally approves SVCW's local limits. For the updated local limits for chromium and copper, and for the removal of the local limits for carbon disulfide, phenolic compounds, polycyclic aromatics hydrocarbons, SVCW shall publicly notice this substantial modification and provide an opportunity for comment at a public hearing pursuant to 40 CFR 403.18. If SVCW does not receive any comments, it shall provide documentation to the Regional Water Board. Subsequently, this substantial modification will be reflected and incorporated into SVCW's NPDES permit. Should you have any questions regarding this matter please email me at Michael.Chee@waterboard.ca.gov.

Sincerely,

Michael Chee
Water Resources Control Engineer
Pretreatment Program Coordinator

cc: Gurgagn Chand, State Water Board, Gurgagn.Chand@waterboards.ca.gov
Amelia Whitson, U.S. EPA Region 9, Whitson.Amelia@epa.gov

Attachment: Silicon Valley Clean Water 2019 Local Limits Verification Report

Silicon Valley Clean Water
2019 Local Limits Verification Report

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1. Summary

The San Francisco Bay Regional Water Quality Control Board (Regional Water Board) reviewed SVCW's *2019 Local Limits Analysis Report* (Local Limits Report) dated August 2019. The Regional Water Board conducted this review in accordance with the guidelines specified in U.S. EPA's *Local Limits Development Guidance* (*Guidance Manual*). This verification report presents the conclusions from the Regional Water Board's review of the Local Limits Report submitted by SVCW.

2. Background Information

SVCW owns and operates the Silicon Valley Clean Water Wastewater Treatment Plant (WWTP) and its collection system, which provides advanced secondary treatment, preliminary mechanical bar screens, primary sedimentation, secondary biological treatment through fixed film reactors or aeration basins (or both), secondary clarification, mono- or dual-media filtration, chlorine disinfection using sodium hypochlorite, and dechlorination using sodium bisulfite. The WWTP serves approximately 220,000 residents, has an average dry weather effluent flow design capacity of 29 million gallons per day (MGD), and a peak wet weather flow capacity of 71 MGD. The WWTP receives and treats wastewater generated from domestic, commercial, and industrial sources from the cities of Belmont, San Carlos, Redwood City, and Woodside; and for the service area of the West Bay Sanitary District, which collects wastewater from the cities of Menlo Park, Atherton, Portola Valley, and areas of East Palo Alto, Woodside, and unincorporated areas of San Mateo and Santa Clara counties.

The WWTP provides advanced secondary treatment and discharges to Lower San Francisco Bay. The WWTP effluent is regulated by National Pollutant Discharge Elimination System (NPDES) Permit CA0038369. The WWTP effluent is also regulated under NPDES Permits CA0038849 and CA0038873, which establish requirements on mercury and polychlorinated biphenyls and nutrients from waste discharges to San Francisco Bay. In addition, SVCW's recycled water activities are regulated under Regional Water Board Order No. 96-011.

SVCW's NPDES Permit requires it to evaluate the need to revise its local limits and submit a report within 180 days of the NPDES Permit effective date of April 1, 2018. The NPDES Permit is set to expire on March 31, 2023.

Based on its Local Limits Report, SVCW proposes updating the maximum allowable industrial loadings (MAILs) and uniform concentration-based local limits for all the pollutants of concern (POCs). According to the cover letter attached to the Local Limits Report, SVCW decided they will adopt the proposed local limits values for metals and conventional pollutants once approved by the Regional Water Board but will retain the existing local limit concentrations for organics. SVCW also plans to adopt selenium, chemical biochemical oxygen demand (cBOD), total dissolved solids (TDS), and electrical conductivity to its local limits.

SVCW's sewer use code *Regulations of Silicon Valley Clean Water* (SVCW, 2005) list three sets of local limits:

1. Wastewater Strength Limitations (metals, organics, conventional pollutants),
2. Specific Wastes Prohibited (oil and grease, pH, and temperature), and
3. Specific User Limitations (aggregate mass limits).

The values of these local limits in the SVCW code are summarized in Table 1.

Table 1. Summary of Current Local Limits

Analyte		Wastewater Strength Limitations/Waste Prohibitions [1]		Aggregate Maximum Permitted Amounts	
		Value	Units	Value	Units
Arsenic		0.1	mg/L	11.4	lb/day
Cadmium		0.04	mg/L	6.11	lb/day
Chromium (Total)		0.2	mg/L	31.3	lb/day
Copper		0.2	mg/L	19.9	lb/day
Lead		0.2	mg/L	22.7	lb/day
Mercury		0.002	mg/L	0.915	lb/day
Nickel		0.06	mg/L	6.82	lb/day
Silver		0.1	mg/L	12.5	lb/day
Zinc		1.0	mg/L	113.0	lb/day
Phenolic Compounds		2.6	mg/L	385.0	lb/day
Cyanide		0.06	mg/L	5.25	lb/day
PAHs [2]		0.2	mg/L	15.2	lb/day
Methylene Chloride		0.07	mg/L	----	----
Chloroform		0.03	mg/L		
Tetrachloroethene (Perchloroethylene) [3]		0.03	mg/L	----	----
Benzene		0.002	mg/L	----	----
Carbon Tetrachloride		0.0001	mg/L	----	----
Carbon Disulfide		0.008	mg/L	----	----
Temperature		150	°F	----	----
Oil and Grease	Animal/Vegetable	300	mg/L	----	
	Mineral/Petroleum	100	mg/L	----	
pH [4]		6.0	S.U.	----	----

Footnotes:

[1] These values are from Sections 2.3 and 2.4 of the Silicon Valley Clean Water Code (SVCW, 2005).

[2] Polycyclic Aromatic Hydrocarbons

[3] The Silicon Valley Clean Water Regulations refer to tetrachloroethene as "perchloroethylene"

[4] The Silicon Valley Clean Water Regulations limit "pH lower than 6.0 or having a corrosive property capable of causing damage or hazard to structures or equipment of the [SVCW and member agencies'} Sewerage Facilities, or any portion thereof…" (SVCW, 2005).

3. Methodology

SVCW used the following procedures for its local limits evaluation:

1. Determine POCs,
2. Collect data for each POC,
3. Calculate mean removal efficiencies (MREs) for each POC,
4. Calculate Allowable Headworks Loadings (AHLs) and Maximum Allowable Headworks Loadings (MAHLs) for each POC based on treatment plant removal efficiencies, applicable environmental criteria for the effluent discharges and biosolids and process inhibition criteria,

5. Compare MAHLs to current influent loadings. Local limits are recommended when influent loadings exceed specified percentages of the calculated MAHLs, as discussed in Section 6,
6. Calculate MAILs for POCs where the influents loadings exceed the MAHL thresholds, and
7. Calculate local limits based on the MAILs, if needed.

Note: Since SVCW already developed local limits for most of its POCs, SVCW could have reviewed its local limits in accordance with Chapter 7 – Local Limits Review and Detailed Re-Evaluations of the *Guidance Manual*. The procedures in Chapter 7 are similar to the procedures above but provides different guidance and thresholds.

4. Determining Pollutants of Concerns

4.1 National Pollutants of Concern

U.S. EPA has identified 15 pollutants often found in POTW sludge and effluent that it considers potential POCs. These 15 "National POCs" are arsenic, cadmium, chromium, copper, lead, mercury, molybdenum, nickel, selenium, silver, zinc, ammonia, cyanide, biochemical oxygen demand (BOD), and total suspended solids (TSS).

According to the Local Limits Report, SVCW included 11 out of the 15 "National POCs" in its local limits evaluation. The 11 POCs that SVCW included in its local limits evaluation were: arsenic, cadmium, chromium, copper, lead, mercury, nickel selenium, silver, zinc, and cyanide. SVCW did not include ammonia, BOD, molybdenum, and TSS in its local limits evaluation for the following reasons:

- **Ammonia:** Regulation of ammonia in industrial dischargers are not necessary, because industrial dischargers are not expected nor considered to be a significant source of ammonia.
- **BOD:** SVCW's NPDES Permit regulates cBOD, which has been evaluated instead of BOD.
- **Molybdenum:** There are no regulatory criteria for molybdenum that currently apply to SVCW.
- **TSS:** SVCW's WWTP is designed to significantly remove TSS. In addition, industrial dischargers are not expected nor considered to be a significant source of TSS.

4.2 Receiving Water Quality Criteria

The Regional Water Board conducted the Regional Potential Analysis (RPA) based on NPDES and Pretreatment Program effluent monitoring data from October 2012 through January 2017, which included all California Toxics Rule (CTR) constituents.

The pollutants identified through the RPA (Table 2) were included in SVCW's local limits evaluation as potential POCs except for ammonia and Dioxin-Total Equivalents (Dioxin-TEQ). The exclusion of ammonia from SVCW's local limits evaluation is presented in Section 4.1. Dioxin-TEQ was not included in this local limits evaluation, because (1) dioxin and dioxin-like

compounds were not above detection limits in influent or effluent samples, and (2) SVCW is currently not concerned about pass-through or interference from dioxins and dioxin-like compounds.

Table 2. Order R2-2018-0005 Reasonable Potential Triggers and Reasonable Potential Analysis Report

State Implementation Policy [1] Reasonable Potential Trigger or Basin Plan Requirement	Description	Applicable Pollutants
Trigger I	Maximum effluent concentration (MEC) exceeds applicable water quality objectives (WQOs). WQOs are the most stringent of CTR freshwater, saltwater, or human-health-based objective.	Ammonia Copper Cyanide
Trigger II	Receiving Water ambient background concentration exceeds a WQO (irrespective of MEC)	Dioxin-TEQ
Trigger III	Other information indicates that water quality-based effluent limitations (WQBELs) are needed to protect beneficial uses of the receiving water	Dioxin-TEQ
Basin Plan Requirement [2]	Technology-based limits or WQBELs are required by the Basin Plan	Copper Cyanide Mercury

Footnotes:

[1] On March 2, 2000, the State Water Board adopted the Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California (State Implementation Policy or SIP). The SIP establishes implementation provisions for priority pollutant criteria and objectives, and provisions for chronic toxicity control. The SIP became effective on April 28, 2000, with respect to the priority pollutant criteria U.S. EPA promulgated for California through the NTR and the priority pollutant objectives the Regional Water Board established through the Basin Plan. The SIP became effective on May 18, 2000, with respect to the priority pollutant criteria U.S. EPA promulgated through the CTR. The State Water Board adopted amendments to the SIP on February 24, 2005, that became effective on July 13, 2005. Requirements of this Order implement the SIP.

[2] The Regional Water Board adopted the Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan), which designates beneficial uses, establishes water quality objectives, and contains implementation programs and policies to achieve those objectives for all waters addressed through the plan. The Basin Plan was last amended on November 5, 2019.

4.3 Other Criteria

The following criteria were also reviewed in the Local Limits Report: Air Quality Environmental Criteria, Explosive/Flammable Criteria. Fume Toxicity Criteria, Site-Specific Criteria, Sludge (Biosolids) Quality Environmental Criteria, Treatment Process Inhibition Criteria, and Water Quality Criteria. Based on those criteria, the following POCs were added in SVCW's local limits evaluation: selenium, cBOD, TDS, and electrical conductivity.

4.4 Pollutant of Concerns Eliminated from Consideration

The following POCs were not considered in SVCW's local limits evaluation:

- **Carbon Disulfide:** Industrial discharges are likely not significant sources of carbon disulfide. Domestic wastewater is assumed to be a more significant source in the collection system and WWTP, being created through degradation of domestic wastewater. Therefore, limiting point sources and particularly industrial users would not be expected to reduce carbon disulfide concentrations to address concerns about fume toxicity and corrosion in the collection system and WWTP.

- **Chlordane:** No results were above detection limits in recent influent or effluent samples. Therefore, there is currently no concern about pass-through or interference.
- **Chlorine:** Chlorine is added at the WWTP for disinfection and therefore should not be regulated in industrial discharges.
- **Dieldrin:** No results were above detection limits in recent influent or effluent samples. Therefore, there is currently no concern about pass-through or interference.
- **Fecal Coliform and Enterococcus Bacteria:** Industrial discharges are unlikely to contribute substantially to bacterial concentrations in the WWTP.
- **Phenolic Compounds:** SVCW does not have effluent limits for phenolic compounds or component analytes. In addition, effluent concentrations are also generally non-detect except for the base phenols.
- **Phosphorus:** SVCW is not currently subject to effluent limits for phosphorous and has no reason to limit its discharge to the collection system and WWTP.
- **Polycyclic Aromatic Hydrocarbons:** PAHs are a category of organic compounds that includes naphthalene and anthracene, which are priority pollutants. Therefore, these have been monitored as part of SVCW's recent permit renewal. However, the component analytes do not have effluent limits and were not detected in the WWTP influent or effluent. Therefore, SVCW is currently not concern about pass-through or interference and regulation in industrial dischargers are not needed at this time.
- **Polychlorinated Biphenyls (PCBs):** PCBs were not above detection limits in recent influent or effluent samples. Therefore, there is currently no concern about pass-through or interference.
- **Turbidity:** Turbidity is not typically regulated via local limits.

5. Data and Calculations

SVCW used the following data presented in Table 3 to calculate mean removal efficiencies (MREs), AHLs, MAHLs, Percent MAHLs, MAILS, and Uniform Concentration-Based Local Limits.

Table 3. Overview of Flow and Water Quality Data Used in Local Limits Analysis

Source	Parameters	Frequency	Monitoring Data
Permitted Industrial Users	Flow	Daily	2017-2018
Domestic and Commercial Concentration for POCs (Belmont Pump Station)	Water Quality	Four Times	March-April 2019
POTW Influent	Flow, Water Quality	Varies	October 2012-December 2018
POTW Effluent	Flow, Water Quality	Varies	October 2012-December 2018
Sludge to Digester	Flow	Daily	2014-2018
Biosolids Mass to Disposal (Dry)	Mass Flow Rate	Daily	2014,2015,2017
Biosolids Mass to Disposal (Wet)	Mass Flow Rate	Daily	2014, 2015.2017
Biosolids	Quality	Varies	2014, 2015, 2017

Attachment 1 contains Regional Water Board calculations for MREs, AHLs, MAHLs, Percent MAHLs, MAILs, and Uniform Concertation-Based Local Limits. These calculations were then compared to values calculated in SVCW's Local Limits Report. The calculations conducted by the

Regional Water Board showed very slight differences. These differences are likely caused by a difference in the MREs used in the Regional Water Board's calculations compared to the MREs used in SVCW's calculations. In the end, these slight differences did not cause a substantial difference between the MAILs and Uniform Concentration-Based Local Limits calculated by the Regional Water Board compared to the calculations conducted by SVCW. In addition, the Regional Water Board did not observe any other discrepancies in SVCW's calculations.

A list of equations used for calculating MREs, AHLs, MAHLs, Percent MAHLs, MAILs, and Uniform Concertation-Based Local Limits are found in Attachment 2. A list of WWTP variables used in the calculations are found in Attachment 3.

6. Maximum Allowable Headworks Loadings

The U.S. EPA Guidance Manual recommends that local limits are needed when any of the following are true:

- Average influent loading of toxic pollutant exceeds 60 percent of the MAHL,
- Maximum daily influent loading of a toxic pollutant exceeds 80 percent of the MAHL any time in the 12-month period preceding the analysis, and
- Monthly average influent loadings reach 80 percent of the average design capacity for BOD, TSS, and ammonia during any month in the 12-month period preceding the analysis.

The following average influent loadings approached and/or exceeded the 60 percent threshold: mercury (59%) and electrical conductivity (79%). The following maximum daily influent loadings exceeded the 80 percent threshold: mercury (386%), nickel (255%), TDS (86%), and electrical conductivity (275%).

7. Proposed Maximum Allowable Industrial Loadings

SVCW proposed MAILs are presented below in Table 4.

Table 4. Proposed MAILs

Analyte	Proposed Value (lb/day)
Arsenic	2.9
Cadmium	1.4
Chromium (Total)	36
Copper	25
Lead	13
Mercury	0.011
Nickel	1.8
Selenium	1.1
Silver	4.8
Zinc	71
Phenolic Compounds	(Remove)

Analyte	Proposed Value (lb/day)
PAHs	(Remove)
Benzene	9.3
Carbon Tetrachloride	0.46
Chloroform	13
Cyanide	1.8
Methylene Chloride	254
Tetrachloroethene (Perchloroethylene)	1.6
Carbonaceous Biochemical Oxygen Demand	21,700
Total Dissolved Solids	39,000
Electrical Conductivity [1]	20

Footnotes:

[1] Units for electrical conductivity MAIL are not strictly lb/day since the electrical conductivity concentration used in the calculations is in units of micro-Siemens per centimeter (µS/cm) instead of milligram per liter (mg/L).

8. Proposed Uniform Concentration-Based Local Limits

SVCW proposed Uniform Concentration-Based Local Limits are presented below in Table 5.

Table 5. Proposed Uniform Concentration-Based Local Limits

Analyte		Proposed Value	Units
Arsenic		0.27	mg/L
Cadmium		0.13	mg/L
Chromium (Total)		3.3	mg/L
Copper		2.3	mg/L
Lead		1.2	mg/L
Mercury		0.00097	mg/L
Nickel		0.17	mg/L
Selenium		0.098	mg/L
Silver		0.44	mg/L
Zinc		6.5	mg/L
Phenolic Compounds		(Remove)	mg/L
PAHs		(Remove)	mg/L
Benzene		0.86	mg/L
Carbon Tetrachloride		0.043	mg/L
Chloroform		1.2	mg/L
Cyanide		0.17	mg/L
Methylene Chloride		23	mg/L
Tetrachloroethene (Perchloroethylene)		0.15	mg/L
Carbon Disulfide		(Remove)	mg/L
cBOD		2000	mg/L
TDS		3600	mg/L
Electrical Conductivity		1800	µS/cm
Temperature		150	°F
Oil and Grease	Animal/Vegetable	300	mg/L
	Mineral/Petroleum	100	mg/L

Analyte	Proposed Value	Units
pH	6.0-11.0 [1]	S.U.

Footnotes:

[1] The SVCW Regulations limit "pH lower than 6.0 or having a corrosive property capable of causing damage or hazard to structures or equipment of the [SVCW and member agencies] Sewerage Facilities, or any portion thereof…" (SVCW, 2005).

9. Summary of New Local Limits

As mentioned in Section 2, SVCW intends to adopt the proposed local limit values for metals and conventional pollutants once approved by the Regional Water Board, however, SVCW will retain its existing local limit concentrations for organics.

Note: The adoption of the proposed local limits for metals (except for mercury and selenium) are less stringent compared to SVCW's current local limits.

Table 6. Summary of New Local Limits

Analyte		Wastewater Strength Limitations/Waste Prohibitions		Aggregate Maximum Permitted Amounts	
		Value	Units	Value	Units
Arsenic		0.27	mg/L	2.9	lb/day
Cadmium		0.13	mg/L	1.4	lb/day
Chromium (Total)		3.3	mg/L	36	lb/day
Copper		2.3	mg/L	25	lb/day
Lead		1.2	mg/L	13	lb/day
Mercury		0.00097	mg/L	0.011	lb/day
Nickel		0.17	mg/L	1.8	lb/day
Selenium [1]		0.098	mg/L	1.1	lb/day
Silver		0.44	mg/L	4.8	lb/day
Zinc		6.5	mg/L	71	lb/day
Cyanide [2]		0.06	mg/L	5.25	lb/day
Methylene Chloride [2]		0.07	mg/L	254	lb/day
Chloroform [2]		0.03	mg/L	13	lb/day
Tetrachloroethene (Perchloroethylene) [2]		0.03	mg/L	1.6	lb/day
Benzene [2]		0.002	mg/L	9.3	lb/day
Carbon Tetrachloride [2]		0.001	mg/L	0.46	lb/day
cBOD [1]		2,000	mg/L	21,700	lb/day
TDS [1]		3,600	mg/L	39,000	lb/day
Electrical Conductivity [1] [3]		1,800	mg/L	20	----
Temperature		150	°F	----	----
Oil and Grease	Animal/Vegetable	300	mg/L	----	----
	Mineral/Petroleum	100	mg/L	----	----
pH		6.0-11.0	S.U.	----	----

Footnotes:

[1] New local limits adopted.

[2] SVCW's current local limits for this analyte will remain the same.

[3] Units for electrical conductivity MAIL are not strictly lb/day since the electrical conductivity concentration used in the calculations is in units of micro-Siemens per centimeter (µS/cm) instead of milligram per liter (mg/L).

10. Closing Remarks

The federal pretreatment regulations at 40 CFR 403.5(c) require SVCW to continually evaluate and develop local limits as necessary to ensure they are protective of the WWTP. As such, any changes to local limits are to be addressed in the Pretreatment Annual Report under Pretreatment Program Changes (Attachment H – Pretreatment Requirements).

Based on the review, the Regional Water Board conditionally approves SVCW's local limits. For the updated local limits for chromium and copper, and for the removal of the local limits for carbon disulfide, phenolic compounds, polycyclic aromatics hydrocarbons, SVCW shall publicly notice this substantial modification and provide an opportunity for comment at a public hearing pursuant to 40 CFR 403.18. If SVCW does not receive any comments, it shall provide documentation to the Regional Water Board. Subsequently, this substantial modification will be reflected and incorporated into SVCW's NPDES permit.

In addition, the Regional Water Board concluded there were no other discrepancies or items of concerns to address regarding SVCW's Local Limits Report. In addition, the Regional Water Board agrees with SVCW's conclusion that its existing and proposed local limits are sufficiently protective to prevent violation of NPDES effluent limitations, inhibition of WWTP processes, or contamination of WWTP biosolids that would limit current beneficial reuse.

Attachment 1:
Regional Water Board Calculations

Table 1. Mean Removal Efficiencies

Pollutant	Influent Average (µg/L)	Effluent Average (µg/L)	Mean Removal Efficiency (Percent)	Mean Removal Efficiency (Decimal)
Arsenic	1.6	1	38	0.38
Cadmium	0.32	0.038	88	0.88
Chromium	4.7	0.55	88	0.88
Copper	61	5.9	90	0.90
Lead	4.5	0.18	96	0.96
Mercury	0.23	0.0047	98	0.98
Nickel	8.8	4.3	51	0.51
Selenium	1	0.4	60	0.6
Silver	0.73	0.029	96	0.96
Zinc)	170	15	91	0.91
Benzene	0.39	0.25	36	0.36
Carbon Tetrachloride	0.47	0.32	32	0.32
Chloroform	4.3	2.5	42	0.42
Methylene Chloride	2.7	1.5	44	0.44
Tetrachloroethene	0.73	0.33	55	0.55
Cyanide	3 [1]	2.7 [1]	10	0.1
cBOD	200 [1]	3.8 [1]	0.98	0.98
TDS	920 [1]	893 [1]	3	0.03
Electrical Conductivity	1710 [2]	1540 [2]	-3	-0.03

Footnotes:

[1] The units are in milligram per liter (mg/L).

[2] The units are in micro-Siemens per centimeter (µS/cm).

Table 2. NPDES Permit Limits, Applicable Water Quality Objectives, and Other Criteria Values

Pollutant (Concentration)	NPDES Permit Limit Daily Max	NPDES Permit Limit Weekly Average	NPDES Permit Limit Monthly Average	Receiving WQO Based Limits Daily Max	Receiving WQO Based Limits Monthy Average	Chronic Water Qulaity Criteria
Arsenic (mg/L)	----	----	----	----	----	0.036
Cadmium (mg/L)	----	----	----	----	----	0.0094
Chromium (mg/L)	----	----	----	----	----	0.05
Copper (mg/L)	----	----	----	----	----	----
Dry	0.084	----	0.052	0.10	0.064	----
Wet	0.084	----	0.052	0.10	0.064	----
Lead (mg/L)	----	----	----	----	----	0.0085
Mercury (mg/L)	----	7.2×10^{-5}	8.0×10^{-6} [1]	----	----	----
Nickel (mg/L)	----	----	----	----	----	0.013
Selenium (mg/L)	----	----	----	----	----	0.005
Zinc (mg/L)	----	----	----	----	----	0.086
Dry	0.036	----	0.021	----	----	----
Wet	0.036	----	0.021	----	----	----
cBOD (mg/L)	----	----	----	----	----	----
Dry	----	12	8	----	----	----
Wet	----	24	16	----	----	----
TDS (mg/L)	----	----	----	----	----	----
Electrical Conductivity (mS/cm)	----	----	----	----	----	----

Footnotes:

[1] Silicon Valley Clean Water's discharge is subject to a watershed-wide permit for mercury, SF Bay Regional Water Board Order R2-2017-0041. The Mercury Watershed Permit includes an Average Monthly Effluent Limit of 0.66 ug/L but also an Average Annual Effluent Limit of 0.32 kilograms per year (kg/yr). Because there is no AHL calculation for annual effluent limits, for purposes of the monthly limit in Table 1-5, the Discharger took the minimum of the Average Monthly Effluent Limit and the Average Annual Effluent Limit converted to a monthly basis, and the converted annual value ended up being the lower value. The calculation for the converted annual limits is: 0.32 kg/yr ÷ 365 days/yr ÷ 29 million gallons per day ÷ 3.785 liters/gallon = 8.0E-6 mg/L. There are some other unit conversions not shown that cancel each other out, e.g. million gallons to gallons and kilograms to milligrams. Also, the 29 MGD design capacity of the treatment plant is used here as a conservative measure.

Table 2 (Continued). NPDES Permit Limits, Applicable Water Quality Objectives, and Other Criteria Values

Pollutant (Concentration)	Acute Water Quality Criteria	Human Health Criteria	Recycled Water Criteria
Arsenic (mg/L)	0.069	----	----
Cadmium (mg/L)	0.042	----	----
Chromium (mg/L)	1.1	----	----
Lead (mg/L)	0.22	----	----
Nickel (mg/L)	0.087	----	----
Selenium (mg/L)	0.02	----	----
Silver (mg/L)	0.0022	----	----
Zinc (mg/L)	0.095	----	----
Benzene (mg/L)	----	0.071	----
Carbon Tetrachloride (mg/L)	----	0.0044	----
Methylene Chloride (mg/L)	----	1.6	----
Tetrachloroethene (mg/L)	----	0.0089	----
TDS (mg/L)	----	----	1600
Electrical Conductivity (mS/cm)	----	----	2.5

Table 3. Allowable Headworks Loading Based on NPDES Permit Limits and Applicable Water Quality Objectives

Pollutant)	AHL NPDES Permit Limit Daily Max (lb/day)	AHL NPDES Permit Limit Weekly Average (lb/day)	AHL NPDES Permit Limit Monthly Average (lb/day)	AHL Based on Daily Maximum WQO-Based Limits (lb/day)	AHL Based on Monthly Average WQO-Based Limits (lb/day)	AHL Design Capacity Based on Weekly Average (lb/day)
Copper (mg/L)	----	----	----	----	----	----
Dry	100	----	62	120	76	----
Wet	100	----	62	120	76	----
Mercury (mg/L)	----	0.41	0.044	----	----	----
Cyanide (mg/L)	----	----	----	----	----	----
Dry	4.6	----	2.7	----	----	----
Wet	4.6	----	2.7	----	----	----
cBOD (mg/L)	----	----		----	----	----
Dry	----	----		----	----	152,000
Wet	----	----		----	----	----

Table 3 (Contiued). Allowable Headworks Loading Based on NPDES Permit Limits and Applicable Water Quality Objectives

Pollutant (Concentration)	AHL Design Capacity Based on Monthly Average (lb/day)	AHL Chronic Water Quality Criteria (lb/day)	AHL Acute Water Quality Criteria (lb/day)	AHL Human Health Criteria (lb/day)	AHL Recycled Water Criteria (lb/day)
Arsenic	----	6.6	13	----	----
Cadmium	----	9.1	41	----	----
Chromium	----	49.2	1090	----	----
Lead	----	24.5	636	----	----
Nickel	----	3.1	20	----	----
Selenium	----	1.4	5.8	----	----
Silver	----	----	6.4	----	----
Zinc	----	114	126	----	----
Benzene	----	----	----	13	----
Carbon Tetrachloride	----	----	----	0.74	----
Methylene Chloride	----	----	----	331	----
Tetrachloroethene	----	----	----	2.3	----
Dry	101,000	----	----	----	----
Wet	----	----	----	----	----
TDS	----	----	----	----	190,000 [1] [2]
Electrical Conductivity	----	----	----	----	280 [2]

Footnotes:

[1] Units for electrical conductivity AHL are not strictly lb/day since the electrical conductivity concentration used in the calculations is in units of milli-Siemens per centimeter (Ms/cm) instead of milligram per liter (mg/L).

[2] Values are rounded to two significant figures.

Table 4. Allowable Headworks Loadings Based on California Hazardous Waste Sludge Criteria and Federal Sludge Criiteria

Pollutant	Mean Removal Efficiency (Percent)	Mean Removal Efficiency (Decimal)	California Hazardous Waste Criteria (mg/kg)	40 C.F.R. 503.13 Table 1 Maximum Land Application Sludge Criteria (mg/kg)	Most Stringent (mg/kg)
Arsenic	38	0.38	500	75	75
Cadmium	88	0.88	100	85	85
Chromium	88	0.88	2500	----	2500
Copper	90	0.9	2500	4300	2500
Lead	96	0.96	1000	840	840
Mercury	98	0.98	20	57	20
Nickel	51	0.51	2000	420	420
Selenium	60	0.6	100	100	100
Silver	96	0.96	500	----	500
Zinc	91	0.91	5000	7500	5000

Table 4 (Continued). Allowable Headworks Loadings Based on California Hazardous Waste Sludge Criteria and Federal Sludge Criiteria

Pollutant	AHL California Hazardous Waste Sludge Criteria (lb/day)	AHL Federal Sludge Criteria (lb/day)	AHL SVCW's California Hazardous Waste Sludge Criteria Calculations (lb/day)	AHL SVCW's Federal Sludge Criteria Calculations (lb/day)	AHL Difference California Hazardous Waste Sludge Criteria (lb/day)	AHL Difference Federal Sludge Criteria (lb/day)
Arsenic	96	4.0	102.1	4.2	6.1	0.2
Cadmium	8.2	1.9	8.2	1.9	0	0.029
Chromium	204	----	206	----	2.1	----
Copper	199	95.2	201	95.3	1.7	0.091
Lead	75	17.5	75	17.5	0.5	0.0
Mercury	1.5	1.2	1.5	1.2	0.03	0.036
Nickel	282	16	286.3	16.6	4.7	0.17
Selenium	12	3.3	12.1	3.3	0.1	0.033
Silver	37	----	37.8	----	0.31	----
Zinc	394	164	397.2	164.3	3.0	0.059

Table 5. Allowable Headworks Loadings Based on Activated Sludge Inhibition and Anaerobic Digester Inhibition

Pollutant	Mean Removal Efficiency (Percent)	Mean Removal Efficiency (Decimal)	Precent Removal Efficiency from Headworks to Primary Treatment Effluent (Decimal)	Activated Sludge Inhibiton Threshold Levels (mg/L)	Anaerobic Digester Inhibition Threshold Level (mg/L)s
Arsenic	38	0.38	0	0.1	1.6
Cadmium	88	0.88	0	5.5	20
Chromium	88	0.88	0	51	240
Copper	90	0.90	0	1.0	40
Lead	96	0.96	0	51	340
Mercury	98	0.98	0	0.55	----
Nickel	51	0.51	0	3.0	73
Silver	96	0.96	0	----	39
Zinc	91	0.91	0	5.2	400
Benzene	36	0.36	0	300	----
Carbon Tetrachloride	32	0.32	0	----	80.7
Chloroform	42	0.2\42	0	----	8.5
Tetrachloroethene	55	0.55	0	----	20
Cyanide	10	0.10	0	2.6	50.5
EC	-3	-0.03	0	2.8	----

Table 5 (Continued). Allowable Headworks Loadings Based on Activated Sludge Inhibition and Anaerobic Digester Inhibition

Pollutant	AHL Secondary Treatment Inhibition (lb/day)	AHL Tertiary Treatment Inhibition (lb/day)	AHL SVCW's Secondary Treatment Inhibition (lb/day)	AHL SVCW's Tertiary Treatment Inhibition (lb/day)	AHL Difference Secondary Treatment Inhibition (lb/day)	AHL Difference Tertiary Treatment Inhibition (lb/day)
Arsenic	12	3.8	12	4.1	0	0.2
Cadmium	633	20.4	630	20.4	3	0
Chromium	5870	244.8	5810	245.4	60	0.6
Copper	115	39.9	120	39.9	5	0
Lead	5870	319	5810	318.5	60	0.5
Mercury	63	----	60	----	3	----
Nickel	345	128.6	350	129.6	5	1.0
Silver	----	36.6	----	36.6	----	0
Zinc	598	394.5	590	394.2	8	0.3
Benzene	34528	----	34530	----	2	----
Carbon Tetrachloride	----	227.8	----	232.4	----	4.6
Chloroform	----	18.3	----	17.6	----	0.7
Tetrachloroethene	----	32.9	----	32.7	----	0.2
Cyanide	299	454.9	290	547.8	9	92.9
EC	322	----	320	----	2	----

Table 6. Allowable Headworks Loading Based on Fume Toxicity

Pollutant	Vapor Phase Concentration (mol/m^3)	Henry's Constant $[(mg/m^3)/(mg/L)]$	Discharge Screening Level (mg/L)	AHL Fume Toxicity (lb/day)	AHL SVCW'S Fume Toxicity (lb/day)	AHL Difference (lb/day)
Benzene	130	228	0.57	66	66	0
Carbon Tetrachloride	514	1185	0.43	50	50	0
Chloroform	399	163.5	2.44	281	281	0
Methylene Chloride	17727	104.8	169.15	19468	19468	0
Tetrachloride	`1404	18.6	75.48	8688	8687	1

Table 7. Most Stringent Maximum Allowable Headworks Loadings and Driving Factors

Pollutant	Most Stringent MAHL (lb/day)	Driving Factor	SVCW's Most Stringent MAHL (lb/day)	SVCW's Driving Factor	MAHL Difference (lb/day)
Arsenic	3.8	Anaerobic Digester Inhibition	4.1	Anaerobic Digester Inhibition	0.3
Cadmium	1.9	Federal Sludge Criteria	1.9	Federal Sludge Criteria	0
Chromium	49	Chronic Water Quality Criteria	48	Chronic Water Quality Criteria	1
Copper	40	Anaerobic Digester Inhibition	40	Anaerobic Digester Inhibition	0
Lead	18	Federal Sludge Criteria	17	Federal Sludge Criteria	1
Mercury	0.04	NPDES Permit Monthly Average	0.04	NPDES Permit Monthly Average	0
Nickel	3.1	Chronic Water Quality Criteria	3	Chronic Water Quality Criteria	0.1
Selenium	1.4	Chronic Water Quality Criteria	1.4	Chronic Water Quality Criteria	0
Silver	6.4	Acute Water Quality Criteria	6.4	Acute Water Quality Criteria	0
Zinc)	114	Chronic Water Quality Criteria	115	Chronic Water Quality Criteria	1
Benzene	13	Human Health Criteria	13	Human Health Criteria	0
Carbon Tetrachloride	0.74	Human Health Criteria	0.74	Human Health Criteria	0
Chloroform	18	Anaerobic Digester Inhibition	18	Anaerobic Digester Inhibition	0
Methylene Chloride	331	Human Health Criteria	338	Human Health Criteria	7
Tetrachloroethene	2.3	Human Health Criteria	2.3	Human Health Criteria	0
Cyanide	2.7	NPDES Permit Monthly Average	2.6	NPDES Permit Monthly Average	1
cBOD	63600	Design Capacity	63600	Design Capacity	0
TDS	190000	Recycled Water Criteria	190000	Recycled Water Criteria	0
EC	280	Recycled Water Criteria	280	Recycled Water Criteria	0

Table 8. Comparison of WWTP Influent Loadings to Maximum Allowable Headworks Loadings

Pollutant	Most Stringent MAHL (lb/day)	Driving Factor	Average Daily Headworks Loadings (lb/day)	MAHL (%)	SVCW's MAHL (%)	MAHL (%) Difference
Arsenic	3.8	Anaerobic Digester Inhibition	0.18	4.7	4.4	0.3
Cadmium	1.9	Federal Sludge Criteria	0.037	1.9	1.9	0
Chromium	49	Chronic Water Quality Criteria	0.54	1.1	1.1	0
Copper	40	Anaerobic Digester Inhibition	7	18	18	0
Lead	18	Federal Sludge Criteria	0.52	3.0	3.0	0
Mercury	0.04	NPDES Permit Monthly Average	0.026	**59**	**59**	0
Nickel	3.1	Chronic Water Quality Criteria	1	32	33	1
Selenium	1.4	Chronic Water Quality Criteria	0.12	8.6	8.3	0.3
Silver	6.4	Acute Water Quality Criteria	0.084	1.3	1.3	0
Zinc)	114	Chronic Water Quality Criteria	20	18	17	1
Benzene	13	Human Health Criteria	0.086	0.65	0.69	0.04
Carbon Tetrachloride	0.74	Human Health Criteria	0.12	16	16	0
Chloroform	18	Anaerobic Digester Inhibition	0.5	2.7	2.8	1
Methylene Chloride	331	Human Health Criteria	0.31	0.09	0.092	0.002
Tetrachloroethene	2.3	Human Health Criteria	0.084	3.7	3.7	0
Cyanide	2.7	NPDES Permit Monthly Average	0.34	13	13	0
cBOD	63600	Design Capacity	23000	36	36	0
TDS	190000	Recycled Water Criteria	110000	58	58	0
EC	280	Recycled Water Criteria	200	**71**	**71**	0

Table 8 (Continued). Comparison of WWTP Influent Loadings to Maximum Allowable Headworks Loadings

Pollutant	Maximum Daily Headworks Loadings (lb/day)	MAHL (%)	SVCW's MAHL (%)	MAHL (%) Difference
Arsenic	1.0	26	26	0
Cadmium	0.2	10	10	0
Chromium	4.7	9.6	10	0.4
Copper	21	53	53	0
Lead	3.6	21	20	1
Mercury	0.17	**425**	**391**	34
Nickel	7.9	**255**	**259**	4
Selenium	0.36	26	25	1
Silver	0.27	4.2	4.2	0
Zinc)	57	50	50	0
Benzene	0.089	0.67	0.71	0.04
Carbon Tetrachloride	0.12	16	16	0
Chloroform	0.96	5.2	5.5	0.3
Methylene Chloride	1.2	0.36	0.36	0
Tetrachloroethene	0.35	15	15	0
Cyanide	0.68	25	26	0
cBOD	26300	41	41	0
TDS	163000	**86**	**86**	0
EC	771	**275**	**275**	0

Table 9. Summay of Domestic Loadings and Maximum Allowable Industrial Loadings

Pollutant	MAHL (lb/day)	Domestic Loading (lb/day)	MAIL (lb/day)	SVCW's MAIL (lb/day)	MAIL Difference
Arsenic	3.8	0.1	2.8	2.9	0.1
Cadmium	1.9	0.018	1.4	1.4	0.0
Chromium (Total)	49	0.21	37	36	1.0
Copper	40	5	25	25	0.0
Lead	18	0.27	13	12	1.0
Mercury	0.04	0.023	0.007	0.011	0.004
Nickel	3.1	0.49	1.8	1.8	0.0
Selenium	1.4	0.023	1.0	1.1	0.1
Silver	6.4	0.027	4.8	4.8	0.0
Zinc	114	15	71	71	0.0
Benzene	13	0.068	9.9	9.3	0.6
Carbon Tetrachloride	0.74	0.09	0.47	0.46	0.0
Chloroform	18	0.35	13	13	0.0
Methylene Chloride	331	0.15	248	254	6.0
Tetrachloroethene	2.3	0.09	1.6	1.6	0.0
Cyanide	2.7	0.14	1.9	1.8	0.1
cBOD	63,600	26,000	21,700	21,700	0
TDS	190,000	104,000	39,000	39,000	0
EC	280	190	20	20	0

Table 10. Calculation of Potential Uniform Concentration-Based Local Limits

Pollutant	MAIL (lb/day)	Potential Uniform Concentration Local Limits (mg/L)	SVCW's Potential Uniform Concentration Local Limits (mg/L)	Difference
Arsenic	2.8	0.25	0.27	0.2
Cadmium	1.4	0.13	0.13	0
Chromium (Total)	37	3.4	3.3	0.1
Copper	25	2.3	2.3	0
Lead	13	1.2	1.2	0
Mercury	0.01	0.00065	0.00097	0.00032
Nickel	1.8	0.17	0.17	0
Selenium	1.0	0.095	0.098	0.003
Silver	4.8	0.44	0.44	0
Zinc	71	6.5	6.5	0
Benzene	9.9	0.91	0.86	0.05
Carbon Tetrachloride	0.47	0.043	0.043	0
Chloroform	13	1.2	1.2	0
Methylene Chloride	248	23	23	0
Tetrachloroethene	1.6	0.15	0.15	0
Cyanide	1.9	0.17	0.17	0
cBOD	21700	2000	2000	0
TDS	38500	3600	3600	0
EC	20	1800	1800	0

Attachment 2: Equations

Equation for Attachment 1 – Table 1: Mean Removal Efficiency

$$MRE = \frac{I_{AVG} - E_{AVG}}{I_{AVG}}$$

Where:

MRE = Mean Removal Efficiency

I_{AVG} = Average Infleunt Concentration

E_{AVG} = Average Effluent Concentration

Equation for Attachment 1 – Table 3: Allowable Headworks Loadings Based on NPDES Permit Limits

$$L_{NPDES} = \frac{8.34 \times Q_{WWTP} \times C_{NPDES}}{1 - R_{WWTP}}$$

Where:

L_{NPDES} = Allowable headworks loadings based on NPDES permit requirements, $\frac{lb}{day}$

Q_{WWTP} = WWTP flow, MGD

C_{NPDES} = NPDES permit limit, $\frac{mg}{L}$ or $\frac{\mu g}{L}$

R_{WWTP} = WWTP removal efficiency from headworks to plant effluent (as decimal)

8.34 = Conversion factor for $\frac{mg}{L}$ units. For $\frac{\mu g}{L}$, use 0.00834

Equation for Attachment 1 – Table 3: Allowable Headworks Loadings Based on Chronic Water Quality Criteria, Acute Water Quality Criteria, and Human Health Criteria

$$L_{CRIT} = \frac{8.34 \times (C_{CRIT} \times (Q_{WWTP} + Q_{STR}) - (C_{STR} \times Q_{STR})}{1 - R_{WWTP}}$$

Where:

L_{CRIT} = Allowable headworks loadings based on either a water quality criteria or human health criteria, $\frac{lb}{day}$

C_{CRIT} = Criteria for a particular pollutant, $\frac{mg}{L}$

Q_{WWTP} = WWTP flow, MGD

Q_{STR} = Receiving stream (upstream)flow, MGD

C_{STR} = Receiving stream background level, $\frac{mg}{L}$

R_{WWTP} = WWTP mean removal efficiency from headworks to plant effluent (as decimal)

8.34 = Conversion factor for $\frac{mg}{L}$ units. For $\frac{\mu g}{L}$, use 0.00834

Equation for Attachment 1 – Table 4: Allowable Headworks Loadings Based on California Hazardous Waste Sludge Criteria and Federal Sludge Criiteria

$$L_{BIO} = \frac{Q_{BIO} \times C_{BIO} \times 2000}{R_{WWTP} \times 1000000}$$

Where:

L_{BIO} = Allowable headworks loadings based on biosolids criteria, $\frac{lb}{day}$

Q_{BIO} = Biosolids production, $\frac{\text{dry tons}}{day}$ and/or $\frac{\text{wet tons}}{day}$

C_{BIO} = Biosolids concentration limit, $\frac{mg}{kg}$ dry basis

R_{WWTP} = WWTP mean removal efficiency from headworks to plant effluent (as decimal)

2,000 = Conversion factor (tons to pounds)

1,000,000 = Conversion factor (converts $\frac{mg}{kg}$ to $\frac{kg}{kg}$)

Equation for Attachment 1 – Table 5: Allowable Headworks Loadings Based on Activated Sludge Inhibition (Secondary Treatment)

$$L_{INHIB} = \frac{8.34 \times Q_{WWTP} \times C_{INHIB}}{1 - R_{PRIM}}$$

Where:

L_{BIO} = Allowable headworks loadings based on activated sludge inhibition, $\frac{lb}{day}$

Q_{WWTP} = WWTP Flow, MGD

C_{INHIB} = Inhibition criteria for activated sludge (secondary treatment), $\frac{mg}{l}$

R_{PRIM} = Removal efficiency from headworks to primary treament effluent (as decimal)

8.34 = Conversion factor

Equation for Attachment 1 – Table 5: Allowable Headworks Loadings Based on Anaerobic Digestion Inhibition

$$L_{DIG} = \frac{8.34 \times Q_{DIG} \times C_{DIG}}{R_{WWTP}}$$

Where:

L_{DIG} = Allowable headworks loadings based on anaerobic digestion inhibition, $\frac{lb}{day}$

Q_{DIG} = Sludge flow to digesters, MGD

C_{DIG} = Inhibition criteria for sludge digestion, $\frac{mg}{l}$

R_{PRIM} = Removal efficiency from headworks to plant effluent (as decimal)

$8.34 =$ Conversion factor

Equation for Attachment 1 – Table 6: Allowable Headworks Loading Based on Fume Toxicity

$$L_{FUME} = 8.34 \times C_{LVL} \times Q_{WWTP}$$

Where:

$L_{FUME} =$ Allowable headworks loadings based on fume toxicity, $\frac{lb}{day}$

$C_{LVL} =$ Discharge screening level, $\frac{mg}{L}$

$Q_{WWTP} =$ WWTP average influent flow, MGD

$8.34 =$ Conversion factor

Equation for Attachment 1 – Table 6: Discharge Screening Level

$$C_{LVL} = \frac{C_{VP}}{H}$$

Where:

$C_{LVL} =$ Discharge screening level, $\frac{mg}{L}$

$C_{VP} =$ Vapor phase concentration, $\frac{mol}{m^3}$

$H =$ Henry's Constant, $\frac{mg/m\text{^}3}{mg/L}$

Equation for Attachment 1 – Table 7: Maximum Allowable Headworks Loadings as a Percent

$$\%MAHL = \frac{\text{Average or Maximum Daily Headworks Loading}}{\text{Maximum Allowable Headworks Loading}}$$

Equation for Attachment 1 – Table 9: Maximum Allowable Industrial Loadings

$$MAIL = MAHL \times (1 - SF) - (L_{UNC} + HW)$$

Where:

$MAIL =$ Maximum allowable industrial loadings, $\frac{lb}{day}$

$MAHL =$ Maximum allowable headworks loadings, $\frac{lb}{day}$

$SF =$ Safety factor

L_{UNC} = Loadings from uncontrolled sources, $\frac{lb}{day}$

HW = Hauled waste loadings

Equation for Attachment 1 – Table 10: Uniform Concentration-Based Local Limits

$$\text{Uniform Concentration Based Local Limits} = \frac{MAIL}{8.34 \times Q_{IND}}$$

Where:

MAIL = Maximum allowable industrial loadings, $\frac{lb}{day}$

Q_{IND} = Total permitted industrial flow, MGD

Attachment 3:
Wastewater Treatment Plant Variables

Wastewater Treatment Plant Variables

$Q_{WWTP} = 13.8$ MGD

$Q_{WWTP} = 29$ MGD for cBOD and mercury (NPDES monthly average limit)

$Q_{BIO} = 10\ \frac{\text{dry tons}}{\text{day}}$ and/or $36\ \frac{\text{wet tons}}{\text{day}}$

$Q_{DIG} = 0.108$ MGD

$SF = 0.25$

$HW = 0$

$Q_{IND} = 1.3$ MGD