Newton County Water & Sewerage Authority
11325 Brown Bridge Road
Covington, GA 30016
(770) 787-1375
www.ncwsa.us

September 15, 2021

Ms. Karen Sauler,
Environmental Compliance Specialist
Industrial Compliance Unit
Environmental Protection Division
2 MLK Jr. Dr., Suite 1152 East
Atlanta, GA 30334

Subject: Industrial Pretreatment Program, Sewer Use Ordinance and Local Limits Report

Dear Karen,

Attached please find the Authority's updated Program Documents. These are provided for EPD review, comment and approval as requested in our NPDES Permits for our two WRF's as follows:

- Yellow River WRF: GAJ020013
- A. Scott Emmons WRF at the Little River: GA0050304

Please call or write me at (678) 342-4180 if you have questions or need further clarification.

Sincerely,

Andy Butts

Andy Butts,
Environmental Compliance Coordinator

cc: Kevin Miller, Manager Wastewater, NCWSA
Wayne Haynie, P.E., NCWSA
Rosa Lee-Eng, P.E., Jacobs

Attachments

Technically-Based Local Limits for Industrial Users

NCWSA Task Order No. 2019-002

March 2021

Prepared for

Newton County Water and Sewerage Authority

Contents

1. Introduction

Jacobs was contracted by the Newton County Water and Sewerage Authority (NCWSA) to develop local limits. Local limits are site-specific limits developed by the treatment works to enforce general and specific prohibitions on industrial discharges. NCWSA currently owns and operates the Yellow River Water Reclamation Facility (YR WRF) and has started construction of a second facility to be completed by April 2022. This report presents the technical evaluation of local limits for industrial dischargers to the Newton County wastewater collection system along with recommended limits. Additional analyses were completed to develop provisional theoretical local limits for the future A. Scott Emmons Water Reclamation Facility (ASE WRF) and for an alternative biosolids management approach: land application. These additional analyses will be used to help identify potential challenges and inform the planning process for the near-term growth of the industrial user base. The overall objective is to revise the existing sewer use ordinance (SUO) based on the evaluation and recommendations provided within this report.

2. Background

As required by their LAS Permit No. GAJ020013, NCWSA administers an Industrial Pretreatment Program (IPP) to monitor and enforce technically-based local limits for all industrial users of their sewer system. The objective of the IPP is to protect the municipal wastewater treatment plants (WWTPs) from inhibition and ensure compliance with permit limitations and other water quality requirements according to the Georgia Rules for environmental protection (Chapter 391-3-6). “Technically-based” local limits are calculated based on flow data, site-specific pollutant discharge limits, characterization of background (non-industrial) wastewater flow, and treatment plant removal efficiencies.

The United States Environmental Protection Agency (USEPA) recommends re-evaluation of technically based local limits whenever there has been significant change to treatment plants or industrial user base. NCWSA is required by Georgia Environmental Protection Division (GAEPD) to review the need to update their technically-based local limits for industrial pretreatment once every five years in alignment with their LAS permit renewal cycle.

As part of this work, NCWSA also sought to gain insight on how the local limits would be impacted by the future ASE WRF (formerly referred to as the Little River WRF) that is scheduled to come online in April 2022. Since the new ASE WRF will be a surface water discharge, the calculated local limits for some parameters would be more restrictive for this future plant in comparison to the YR WRF. Additionally, NCWSA wanted to gain an understanding of how their local limits might be impacted if they were to change their biosolids management approach. Currently, biosolids generated at the YR WRF are landfilled. With a reduction in the number of local landfills accepting biosolids and a related increase in biosolids disposal costs around the Region, NCWSA wants to keep their options open with respect to alternate disposal methods. If land application were considered in the future, NCWSA would have to comply with Federal biosolids use and disposal regulations (40 CRF Part 503) which have established land application limits for nine pollutants. Meeting these limits will depend on influent wastewater concentrations of the nine pollutants and could place added constraints on allowable industrial discharge levels.

2.1 Yellow River WRF

The YR WRF has a maximum monthly average daily flow capacity of 4 million gallons per day (MGD) and has two process trains – an older 1.15 MGD oxidation ditch followed by secondary clarifiers, and a 2.85 MGD Sequencing Batch Reactor (SBR). Solids are dewatered via a centrifuge and are hauled to a County-owned landfill. The YR WRF currently discharges treated effluent to the Covington NCWSA Land Application Facility through spray field irrigation. While new and increased industrial flows will initially go to YR WRF, several major industrial customers will be diverted to the new ASE WRF once it comes online with an initial capacity of 1.25 MGD.

The current industrial user base in the YR WRF collection system is summarized in Table 2-1.

TABLE 2-1
Newton County Industrial Users
Technically-Based Local Limits for Industrial Users

Industry	Industry Type	Principle Product	Discharge Flow (gpd)			
			Current Average Flow[a]	Average Daily Flow Used for Evaluation[b]	Monthly Average Allowable	Daily Maximum Allowable
Takeda	Pharmaceuticals, SIC 2836 (Biological Products, Except Diagnostic Substances - Plasma)	Flexbumin - Fractated Plasma	525,414	604,000	1,000,000	1,000,000
Aqua-Terra	Groundwater remediation, SIC 4952 (40CFR437.46(d))	Variable	14,789	17,000	40,000	50,000
Newton County Landfill	Landfill, SIC 4953	Treated Solid waste - Leachate	21,199	24,000	40,000	108,000
Facebook	Computer Processing and Data Preparation and Processing Services, SIC 7374	Data Center	5,500 [c]	109,000	NA	125,000
		Total	**566,902**	**754,000**	**1,080,000**	**1,158,000**

[a] Updated by NCWSA from 2020 self-compliance data.
[b] Escalations of 15% of current average flows to accommodate for daily flow variabilities.
[c] Facebook is not ramped up yet.

In addition to local limits, WWTPs are also protected by categorical pretreatment standards developed by the USEPA to limit pollutant discharges into WWTPs and these apply to specific process wastewaters of certain industrial categories. These are national, technology-based standards that apply regardless of whether the WWTP has an approved IPP or whether the industrial user has been issued a permit. Such industries are called Categorical Industrial Users (CIUs). The standards applicable to industrial discharges from CIUs to a WWTP are designated in the Effluent Guidelines & Limitations [Parts 405-471] by the terms "Pretreatment Standards for Existing Sources" (or "PSES") and "Pretreatment Standards for New Sources" (or "PSNS").

NCWSA has identified Aqua-Terra has a CIU, subject to pretreatment standards identified in 40CFR437.46(d). The corresponding PSES for this industry are provided in Table 2-2. A WWTP may impose on an industrial user a local limit that is more stringent than an applicable categorical standard to protect the WWTP. If a local limit is less stringent than an applicable categorical standard, however, the industry must meet the more stringent categorical standard.

TABLE 2-2
Pretreatment Standards Applicable to Aqua-Terra for Existing Sources (PSES) under 40CFR437.46(d)
Technically-Based Local Limits for Industrial Users

Parameter	Units	Daily Maximum	Monthly Average Maximum
Antimony	mg/L	0.249	0.206
Arsenic	mg/L	0.162	0.104
Cadmium	mg/L	0.474	0.0962
Chromium	mg/L	15.5	3.07
Cobalt	mg/L	0.192	0.124
Copper	mg/L	4.14	1.06

TABLE 2-2
Pretreatment Standards Applicable to Aqua-Terra for Existing Sources (PSES) under 40CFR437.46(d)
Technically-Based Local Limits for Industrial Users

Parameter	Units	Daily Maximum	Monthly Average Maximum
Lead	mg/L	1.32	0.283
Mercury	mg/L	0.00234	0.000739
Nickel	mg/L	3.95	1.45
Silver	mg/L	0.120	0.0351
Tin	mg/L	0.409	0.120
Titanium	mg/L	0.0947	0.0618
Vanadium	mg/L	0.218	0.0662
Zinc	mg/L	2.87	0.641
o-Cresol	mg/L	1.92	0.561
p-Cresol	mg/L	0.698	0.205
2,4,6-Trichlorophenol	mg/L	0.155	0.106

2.2 ASE WRF

The future ASE WRF will receive more stringent effluent limits than the YR WRF due to a surface water discharge to the Little River. The process units will include sequencing batch reactors and cloth media filtration to meet effluent nitrogen and phosphorus limits. Construction of the 1.25 MGD ASE WRF will be completed soon. Subsequent phases of construction established in the permit and design of the ASE WRF will enable expansions to 2.5 MGD and then 3.75 MGD. Upon commissioning, ASE WRF will receive wastewater flows from two current industrial users. The two industrial customers that will served by the ASE WRF will be Facebook’s newly constructed data center producing cooling water blowdown and Takeda, a large pharmaceutical plant. It is anticipated that the ASE WRF will be near its phase 1 capacity within two years of commissioning. As the ASE WRF is not yet online, only provisional theoretical limits could be calculated based on projected conditions.

2.3 Plant and Stream Flow Summary

Technically-based local limit calculations are based on current background and industrial flows and loads and plant performance capabilities. As flows and loads and industrial contributions change over time, so must the local limits to accurately reflect the plant’s maximum allowable headworks loads. Since the ASE WRF is not currently online, only provisional theoretical limits can be developed based on approximated flows and loads that represent the estimated condition at the time of plant startup. Flows used in the calculation of technically-based local limits for the YR WRF and provisional theoretical limits for the ASE WRF are summarized in Table 2-3.

The estimated average industrial flow contribution to the YR WRF is 754,000 gpd as shown in Table 2-1.

The estimated projected industrial flow contribution to the ASE WRF is 713,000 gpd, based on plans by NCWSA to divert discharge flows from Takeda and Facebook to the ASE WRF after its startup.

TABLE 2-3
Plant Influent Flow, Industrial Flow, and Stream Flows at Effluent Discharge Location
Technically-Based Local Limits for Industrial Users

Parameter	Units	YR WRF	ASE WRF
Permitted/Design MMADF	MGD	4.0	1.25
Design AAF	MGD	4.0	1.01
Current AAF	MGD	2.7	0.9[a]
Industrial User Flow[b]	MGD	0.754	0.713
Average Flow of Receiving Stream[c]	gpd	-	11,434,200
1Q10 of Receiving Stream[c]	gpd	-	45,220
7Q10 of Receiving Stream[c]	gpd	-	71,060
Hardness of Receiving Stream[c] as $CaCO_3$	mg/L	-	14.7

MMADF = Maximum monthly average daily flow.
AAF = Average annual flow.
[a] For ASE WRF, the AAF at the time of commissioning estimated by NCWSA.
[b] Sum of respective industries in Table 2-1.
[c] GAEPD Wasteload Allocation, 2017.

2.4 Existing Local Limits

Existing local limits in the current NCWSA SUO are summarized in Table 2-4. In September 2014, Stantec proposed new local limits that require more stringent limits on chromium, copper, zinc, and cyanide. The industrial users [Takeda, Newton County Landfill, and Aqua-Terra] have permits specifying the limits on their flows being sent to the YR WRF. These values are also included in Table 2-4 below for reference.

2.5 Pollutants of Concern

A pollutant of concern (POC) is any pollutant that might reasonably be expected to be discharged to the WWTP in amounts sufficient to interfere with the plant operations, violate effluent water quality requirements, contaminate the biosolids beyond acceptable levels for disposal, cause problems in the collection system, or jeopardize WWTP workers. Interference includes inhibition of the biological treatment process capability to meet effluent requirements at the intended design capacity. Most potential POCs are those established by federal guidelines. Potential POCs analyzed in this study are summarized in Table 2-5. The pollutant groupings as established by the USEPA are as follows:

Georgia Water Quality Standards – This includes Organic Priority Pollutants (110 chemical pollutants with instream concentration limits designated by the USEPA) and Georgia (Potential) Pollutants of Concern.

National (Potential) Pollutants of Concern – Includes 15 pollutants which are commonly found in WWTP sludge and effluent. Instream concentration limits for these pollutants are designated by the USEPA. The USEPA requires that WWTPs, at a minimum, screen for these pollutants.

Plant-Specific Parameters – Standard plant parameters which are routinely monitored and (depending on the individual plant) are regulated under the NPDES permits.

TABLE 2-4
Existing Local Limits, Previous Recommendations, and Current Industrial User-Specific Limits
Technically-Based Local Limits for Industrial Users

Parameter	Existing Local Limit (mg/L)	2014 Evaluation (mg/L)	Industrial User Permit Concentration Limit (mg/L) [a]					
			Takeda		Newton County Landfill		Aqua-Terra	
			Maximum Monthly Average	Daily Maximum	Maximum Monthly Average	Daily Maximum	Maximum Monthly Average	Daily Maximum
Arsenic	0.013	0.013	---	---	0.013	---	0.013	0.0156
Cadmium	0.008	0.008	0.008	0.0096	---	0.0156[e]	0.008	0.0096
Chromium	2.000	0.25 [b]	2	2.4	2	2.4	2	2.4
Copper	1.305	0.48 [b]	1.305	1.566	1.305	1.566	1.305[c]	1.566
Cyanide	3.762	0.5 [b]	1.45	33.5[e]	---	---	---	---
Lead	0.116	0.116	0.116	0.139	0.116	0.139	0.116	0.139
Mercury	0.025	0.025	---	0.025	---	---	0.000739	0.00234
Molybdenum	0.034	0.034	---	---	---	---	---	---
Nickel	0.034	0.034	0.034	0.041	0.034	0.041	0.034	---
Selenium	0.091	0.091	---	---	---	---	---	---
Silver	0.85	0.85	0.85	---	---	---	0.0351	0.12
Zinc	2.432	0.3 [b]	2.432	2.918	2.432	2.918	0.641	2.87
Phenol	2.0	2.0	---	---	---	---	---	---
Surfactants (as MBAS)	150	100	---	---	150	---	150	---
Total Toxic Organics (TTO)	2.13	2.13	2.13	---	2.13	---	2.13	---
Total Oil and Grease	100	100	---	---	100	---	100	---
Petroleum Oil and Grease	25	25	---	---	25	---	25	---
Ammonia (as N)	35[d]	35	---	35	35	35	35	42 [e]
5-day Biochemical Oxygen Demand (BOD_5)	250[d]	250	240	250	250	250	250	250
Chemical Oxygen Demand (COD)	750[d]	750	480	750	750	750	750	750
Total Suspended Solids (TSS)	250[d]	250	260 [d]	250	250	250	250	250
Phosphorus	---	---	---	6	---	---	---	---
True Color (ADMI Units)	400	400	---	---	---	---	---	---
Antimony	---	---	---	---	---	---	0.206	0.249
Cobalt	---	---	---	---	---	---	0.124	0.192
Tin	---	---	---	---	---	---	0.12	0.409
Titanium	---	---	---	---	---	---	0.0618	0.0947
Vanadium	---	---	---	---	---	---	0.0662	0.218
o-cresol	---	---	---	---	---	---	0.561	1.92
p-cresol	---	---	---	---	---	---	0.205	0.698
2,4,6-Trichlorophenol	---	---	---	---	---	---	0.106	0.155

[a] Industrial users are currently given two sets of limits: maximum monthly averages and daily maximums. The daily maximum limits are 1.2 times the monthly average limits.
[b] Recommended reduction with previous local limits evaluation (Local Limits Evaluation, September 12, 2014).

[c] Industrial user permit limit should not be higher than the applicable categorical standard.
[d] May be exceeded/surcharged at the discretion of NCWSA. Specific "not-to- exceed" upper limits may be established through permitting on a case-by-case basis.
[e] Industrial users should not be granted permit limits higher than local limits.

TABLE 2-5
Potential Pollutants of Concern Analyzed for Local Limits Determination
Technically-Based Local Limits for Industrial Users

Georgia Water Quality Standards		
Organic Priority Pollutants		
1,1,1-Trichloroethane	4-Nitrophenol	Ethylbenzene
1,1,2,2-Tetrachloroethane	Acenaphthene	Fluoranthene
1,1,2-Trichloroethane	Acenaphthylene	Fluorene
Benzo(ghi)perylene	Acrolein	BHC-gamma (Lindane)
1,1-Dichloroethane	Acrylonitrile	Heptachlor
1,2,4-Trichlorobenzene	Aldrin	Heptachlor epoxide
Dibenzo(a,h)anthracene	BHC-alpha	Hexachlorobenzene
Benzo(a)anthracene	Endosulfan I	Hexachlorobutadiene
1,2-Dichlorobenzene	Anthracene	Hexachloroethane
1,2-Dichloroethane	Benzene	Hexachlorocyclopentadiene
1,2-Dichloropropane	Benzidine	Indeno(1,2,3-cd)pyrene
cis-1,3-Dichloropropene	Benzo(a)pyrene	Isophorone
1,2-Diphenylhydrazine	BHC-beta	Bromomethane
trans-1,2-Dichloroethene	Endosulfan II	Chloromethane
1,3-Dichlorobenzene	Bis(2-chloroethoxy)methane	Methylene Chloride
1,4-Dichlorobenzene	Bis(2-chloroethyl)ether	Naphthalene
Benzo(k)fluoranthene	Bis(2-chloroisopropyl)ether	Nitrobenzene
2,4,6-Trichlorophenol	Bis(2-ethylhexyl)phthalate	N-Nitrosodimethylamine
2,4-Dichlorophenol	Bromoform	N-Nitrosodi-n-propylamine
2,4-Dimethylphenol	Benzyl butyl phthalate	N- Nitrosodiphenylamine
2,4-Dinitrophenol	Carbon Tetrachloride	PCB 1016
2,4-Dinitrotoluene	Chlordane	PCB 1221
2,6-Dinitrotoluene	Chlorobenzene	PCB 1232
2-Chloroethyl Vinyl Ether	Dibromochloromethane	PCB 1242
2-Chloronaphthalene	Chloroethane	PCB 1248
2-Chlorophenol	Chloroform	PCB 1254
2-Nitrophenol	Chrysene	PCB 1260
3,3´-Dichlorobenzidine	BHC-delta	Pentachlorophenol
Benzo(b)fluoranthene	Bromodichloromethane	Phenanthrene
4,4'-DDD	Dieldrin	Phenol
4,4'-DDE	Diethyl phthalate	Pyrene
4,4'-DDT	Dimethyl phthalate	Tetrachloroethene
4,6-Dinitro-2-methylphenol	Di-n-butyl phthalate	Toluene
4-Bromophenyl phenyl ether	Di-n-octyl phthalate	Toxaphene
4-Chlorophenyl phenyl ether	Endosulfan sulfate	Trichloroethene
4-Chloro-3-methylphenol	Endrin	Vinyl Chloride
Endrin aldehyde		
Georgia Pollutants of Concern[a]		
2,4,5-TP (Silvex)	2,4-D	Methoxychlor
National Pollutants of Concern		
Total Arsenic	Total Mercury	Total Zinc
Total Cadmium	Total Molybdenum	Total Cyanide
Total Chromium	Total Nickel	Biochemical Oxygen Demand
Total Copper	Total Selenium	Total Suspended Solids

TABLE 2-5
Potential Pollutants of Concern Analyzed for Local Limits Determination
Technically-Based Local Limits for Industrial Users

Total Lead	Total Silver	Ammonia (as N)
Additional Metal		
Total Antimony		
Plant-Specific Parameters		
Oil & Grease (HEM)	Total Phosphorus	Nitrate/Nitrite as N
% Solids	Total Kjeldahl Nitrogen as N	Chemical Oxygen Demand

[a] Toxic potential pollutants of concern as designated by the State of Georgia with state-specific stream concentration limits for 7Q10 stream flows.

3. Sampling Campaign

3.1 Sampling Procedures

For local limits determination, sampling was required to establish background concentrations (to characterize non-industrial wastewater) and to capture concurrent data for typical WWTP influent, effluent, and biosolids pollutant concentrations. Sampling is necessary to characterize flow through existing plants such as the YR WRF. For "small" plants (up to 5 MGD), a minimum of one week of sampling is recommended by the USEPA for determination of technically-based local limits.

A one-week sampling campaign was conducted by Jacobs in July 2019 for the YR WRF. Samples collected during the July 2019 sampling campaign included the following:

- Samples for YR WRF local limits calculation:
  - Background, at collection system location determined by NCWSA to have exclusively residential and commercial contributions
  - Plant influent at existing influent sampler location
  - Plant effluent at existing effluent sampler location
  - Dewatered biosolids in truck loading area

- Samples to inform the local limits calculations (but not intended for use in the calculations):
  - Takeda manufacturing facility (current significant industrial user)
  - Newton County Landfill (current significant industrial user)

Samples were analyzed for all potential pollutants of concern listed in Table 2-5. For wastewater samples, depending on the parameter, composite or grab samples were collected to meet information needs while adhering to preservation requirements and hold time windows. For biosolids, grab samples were collected periodically during the dewatering operation and a daily composite was formed from these samples. It was requested that the laboratory provide all results including concentrations which were above the method detection limit (MDL) but below the reporting limit (RL) of the test methods. Many pollutants identified had concentrations above the method detection level but below the reporting limit. These values were collected to provide context for interpreting unusual or inconsistent results.

3.2 Sampling Results

A summary of average concentration results from the July 2019 sampling campaign are provided in Tables 3-1 and 3-2. Summary tables include all parameters detected from all sample locations during the July 2019 sampling campaign. Average results include assumed minimum values for days on which the pollutant was not detected. The assumed minimum concentration was one half of the method detection limit (MDL). Complete results from the July 2019 sampling campaign are provided in Appendix A.

TABLE 3-1
Yellow River WRF Pollutant Sampling Results Summary from July 2019 Sampling Campaign
Technically-Based Local Limits for Industrial Users

Pollutant	Units	Concentration[a]			
		Background	Influent	Effluent	Biosolids(ug/kg)
Arsenic	ug/L	< 1.47	< 1.47	< 1.47	< 273
Cadmium	ug/L	0.03	0.026	< 0.03	< 33.3
Chromium	ug/L	0.92	1.08	< 1.84	15,190
Copper	ug/L	20.87	28.60	8.31	182,750
Cyanide	mg/L	< 0.004	< 0.004	< 0.004	-
Lead	ug/L	0.18	0.41	< 0.2	6,963
Mercury	ug/L	0.025	0.024	< 0.04	385
Molybdenum	ug/L	0.29	0.62	0.34	3,628

TABLE 3-1
Yellow River WRF Pollutant Sampling Results Summary from July 2019 Sampling Campaign
Technically-Based Local Limits for Industrial Users

Pollutant	Units	Concentration[a]			
		Background	Influent	Effluent	Biosolids(ug/kg)
Nickel	ug/L	0.32	0.62	1.60	8,383
Selenium	ug/L	0.26	0.35	0.31	< 148
Silver	ug/L	0.044	0.042	< 0.06	1,204
Zinc	ug/L	104.9	92.1	44.2	417,500
Ammonia (as N)	mg/L	36.8	30.7	0.241	-
5-Day Biochemical Oxygen Demand (BOD_5)	mg/L	208	162	14.1	-
Chemical Oxygen Demand (COD)	mg/L	532	438	23.9	-
COD/BOD_5 Ratio	-	2.6	2.7	-	-
Total Suspended Solids	mg/L	194	183	2.5	-
Total Phosphorus	mg/L	4.66	4.38	3.23	-
Total Kjeldahl Nitrogen	mg/L	45.8	36.4	< 0.41	-
Chloroform	ug/L	4.47	2.17	< 0.43	-
1,2-Dichlorobenzene	ug/L	0.61	< 0.24	1.55	-
1,4-Dichlorobenzene	ug/L	1.01	< 0.34	0.36	-
Methylene Chloride	ug/L	0.28	< 0.34	< 0.34	-
Phenol	ug/L	11.3	< 11	< 2.3	-
Bis(2-ethylhexyl) phthalate	ug/L	37.5	< 31	< 6.3	-
Toluene	ug/L	0.21	< 0.32	< 0.32	-

[a] When all the results from the sampling campaign were below the method detection limit (MDL), the POC's MDL is provided.

TABLE 3-2
Industrial User Pollutant Sampling Results Summary from July 2019 Sampling Campaign
Technically-Based Local Limits for Industrial Users

Pollutant	Concentration[a]		
	Units	Takeda - Effluent	Newton County Landfill - Effluent
Arsenic	ug/L	< 1.47	35.03
Cadmium	ug/L	< 0.03	0.22
Chromium	ug/L	< 1.84	185
Copper	ug/L	22.9	3.15
Cyanide	mg/L	0.024	0.012
Lead	ug/L	0.12	4.65
Mercury	ug/L	< 0.04	< 0.16
Molybdenum	ug/L	9.76	0.76
Nickel	ug/L	4.37	150.43
Selenium	ug/L	0.34	5.98
Silver	ug/L	< 0.06	< 0.11
Zinc	ug/L	11.15	63.83
Chloroform	ug/L	5.07	< 0.43
Ammonia (as N)	mg/L	2.40	733
Biochemical Oxygen Demand (5-Day)	mg/L	39.1	645
Chemical Oxygen Demand	mg/L	149	1,737
Total Suspended Solids	mg/L	45.9	15.1
Total Phosphorus	mg/L	2.85	6,946
Total Kjeldahl Nitrogen	mg/L	6.10	749

[a] When all the results from the sampling campaign were below the method detection limit (MDL), the POC's MDL is provided.

Notable observations on the sampling campaign results are as follows:

Yellow River WRF:

- Background copper concentration averaged 21 ug/L and was consistently present in daily samples. Presence of copper in the background sample suggests that the background loading originates in the potable water distribution system which is consistent with NCWSA routine tap water analysis, which has indicated a 90th percentile copper concentration of 91 ug/L (NCWSA 2017 Water Quality Report).

- Zinc was consistently detected in background samples. While zinc may also originate from the potable water distribution system, there could be another source of zinc. It should be noted that Takeda effluent concentrations of zinc were significantly lower, averaging 11 ug/L (See Table 3-2).

- Lead was detected in a single background sample, but at a concentration below the reporting limit of 1 ug/L. This was consistent with the NCWSA 2017 water quality report which indicated a 90th percentile lead concentration of 1.1 ug/L. As with copper, background loading for lead appears to originate in the potable water distribution system.

- Chloroform, which was only analyzed in two samples for each sample location, was present in both background samples. Chloroform is a disinfection byproduct, likely originating from chlorine disinfection at the water treatment plant.

- Concentrations of the following additional organic pollutants were detected in the background samples: 1,2-Dichlorobenzene, 1,4-Dichlorobenzene, methylene chloride, phenol, Bis(2-ethylhexyl) phthalate, and toluene. These compounds were not detected in the influent, indicating dilution by other influent flows. The presence of these compounds in the background samples only indicates they do not originate from a permitted industrial user but some other source in the collection system.

- Chromium was detected on a single day (Saturday) in the influent sample but not the background sample indicating likely origination from an industrial source.

- Also on a Saturday, the following pollutants were detected in both the background and influent samples but not detected on any other day: cadmium, mercury, selenium, silver, and molybdenum. Since this was detected in the background sample, with no known industrial user connections, it is possible an illegal use of the collection system occurred on this day.

Industrial Users:

- Takeda – Other than chloroform, which was detected at near background concentrations, no other organic pollutants were detected in Takeda effluent.

- Takeda – Copper concentrations, which averaged 23 ug/L, were consistent with background copper concentrations.

- Takeda – Zinc was consistently detected at concentrations lower than YR WRF background concentrations.

- Takeda – Molybdenum was consistently detected in Takeda effluent.

- Takeda – Cyanide was detected in three of the seven Takeda effluent samples, at levels much higher than background concentrations.

- Newton County Landfill Leachate – Arsenic, cadmium, chromium, cyanide, lead, molybdenum, nickel, selenium, and zinc were consistently detected in the landfill leachate at levels higher than background concentrations.

4. Local Limits Development

The maximum allowable headworks loading (MAHL) is the estimated loading of a pollutant that can be received in a day at a WWTP's headworks without causing unacceptable pass-through to effluent or biosolids or process interference. After determining the MAHL, a safety factor is applied as are case-specific reserves for future growth. Then, the non-industrial or "background" loading must be subtracted from the adjusted MAHL to determine the maximum allowable industrial loading (MAIL). The background loading is considered a non-controllable load and represents the portion of the MAHL that is not available to the industrial user base. The MAIL is the maximum loading of a pollutant that can be received in a day at a WWTP's headworks from all permitted industrial users combined. Details regarding the calculation of the MAIL are provided in this section.

4.1 Pollutants and Criteria Evaluated in Local Limits Calculations – YR WRF

All technically-based local limits calculated for the YR WRF are summarized in Table 4-1 below. Sampling data was used to establish representative concentrations, WWTP removal efficiencies, and load contributions from domestic/commercial sources (i.e., non-industrial). In cases where data was insufficient to establish pollutant removal rates through the plant, published values (USEPA's Local Limits Development Guidance Manual, dated July 2004) were used. Also indicated in Table 4-1 are the relevant criteria for each pollutant which were used to determine the Allowable Headworks Loadings (AHLs). These are described further in Section 4.3. Note that Georgia Water Quality Standards do not apply to the YR WRF since it has a LAS discharge.

TABLE 4-1
Pollutants and Criteria Evaluated in Local Limits Calculations for YR WRF
Technically-Based Local Limits for Industrial Users

Pollutant	Applicable Pollutant Limiting Criteria				
	Activated Sludge Inhibition	Nitrification Inhibition	Biosolids Disposal	Collection System – Human Health	Design Load
Arsenic	X	X	X		
Cadmium	X	X	X		
Chromium	X	X			
Copper	X	X	X		
Cyanide	X	X		X	
Lead	X	X	X		
Mercury	X		X		
Molybdenum			X		
Nickel	X	X	X		
Selenium			X		
Silver					
Zinc	X	X	X		
Ammonia (as N)	X				X
Biochemical Oxygen Demand (5-Day)					X
Chemical Oxygen Demand					X
Total Suspended Solids					X
Total Phosphorus					X
Total Kjeldahl Nitrogen					X
Chloroform		X		X	
1,2-Dichlorobenzene	X				
1,4-Dichlorobenzene	X			X	
Methylene Chloride				X	
Phenol	X	X		X	
Bis(2-ethylhexyl) phthalate				X	
Toluene	X			X	

4.2 Pollutants and Criteria Evaluated in Local Limits Calculations – ASE WRF

All pollutants for which provisional theoretical local limits for the ASE WRF were calculated are summarized in Table 4-2 below. The POCs evaluated for YR WRF were also used as POCs for ASE WRF, as wastewater from the YR WRF will be diverted to ASE WRF. Sampling results from the YR WRF were used to establish estimated background loads to the future ASE WRF. Published pollutant removal rates applicable to the planned plant and inhibition levels for the planned process were used for the calculations. Also shown in Table 4-2 are the relevant criteria for each pollutant which were used to determine the AHLs. These are described further in Section 4.3.

TABLE 4-2
Pollutants and Criteria Evaluated in Theoretical Local Limits Calculations for ASE WRF
Technically-Based Local Limits for Industrial Users

Pollutant	Applicable Pollutant Limiting Criteria					
	Activated Sludge Inhibition	Nitrification Inhibition	Biosolids Disposal	Collection System – Human Health	Water Quality	Design Load
Arsenic	X	X	X		X	
Cadmium	X	X	X		X	
Chromium	X	X			X	
Copper	X	X	X		X	
Cyanide	X	X		X	X	
Lead	X	X	X		X	
Mercury	X		X		X	
Molybdenum			X			
Nickel	X	X	X		X	
Selenium			X		X	
Silver						
Zinc	X	X	X		X	
Ammonia as N	X					X
Biochemical Oxygen Demand (5-Day)						X
Chemical Oxygen Demand						X
Total Suspended Solids						X
Total Phosphorus						X
Total Kjeldahl Nitrogen						X
Chloroform		X	X	X	X	
1,2-Dichlorobenzene	X				X	
1,4-Dichlorobenzene	X			X	X	
Methylene Chloride				X	X	
Phenol	X	X		X	X	
Bis(2-ethylhexyl) phthalate				X	X	
Toluene	X			X	X	

4.3 Pollutant Limit Criteria

Several criteria were used to calculate the AHLs for each pollutant. These included protection of activated sludge and nitrification processes from inhibition, biosolids disposal requirements, water quality standards, human health protection, and WWTP design criteria to meet effluent limits. The most stringent (lowest) AHL calculated based on the criteria evaluated is then used as the MAHL for that pollutant. From the MAHL, the MAIL are determined for each pollutant.

Water Quality:

Water quality criteria for Georgia waters have been promulgated through Rule 391-3-6-.03 of the Rules and Regulations of the State of Georgia to protect both aquatic life and human health. They are largely consistent with USEPA's National Recommended Water Quality Criteria but include three additional parameters specific to Georgia. The instream concentrations limits apply to the stream water quality downstream of WWTP discharge locations (after the mixing zone). Limits for various pollutants apply to low flows 1Q10 (for acute limits) and/or 7Q10 (for chronic limits) for the receiving stream. There are also additional water quality limits for the protection of human health against known carcinogens. These additional limits for known carcinogens are applied to the average stream flow. Water quality-based AHLs depend on the estimated removal efficiency through the plant and effluent dilution at the discharge location. Water quality criteria used in establishing AHLs are summarized in Appendix B, Tables 4, 5, and 6 for the ASE WRF.

Most numeric criteria for metals are expressed in terms of the dissolved fraction. The dissolved fraction of some metals is based on the water hardness and other site-specific conditions at the discharge location. Therefore, instream metals limits must be calculated for each discharge. Since it is the total recoverable metal concentration that is measured at the plant and by industrials users, the dissolved criteria must be translated to the total recoverable form. Calculation of site-specific instream criteria used in establishing AHLs for water quality are summarized in Appendix C.

Biological Process Inhibition:

Inhibition of activated sludge or nitrification processes may occur at high enough concentrations of various metals, non-metal inorganics, and organics. Inhibition AHLs were only calculated for pollutants with published inhibition criteria. Inhibition criteria used in establishing AHLs are summarized in Appendix B, Tables 8 and 10.

Biosolids Disposal:

Biosolids produced at the YR WRF are currently hauled to the Newton County Landfill. Federal biosolids use and disposal regulations (CRF 40 Part 503) establish limits for 9 pollutants for land application. Regardless of the biosolids disposal method, USEPA recommends that utilities evaluate AHLs for land application of biosolids to understand the impact of this biosolids disposal method on pretreatment requirements. Criteria used in establishing AHLs to protect the option of land application are summarized in Appendix B, Tables 14.

To understand how changing the biosolids management approach to land application may affect the local limits, AHLs to protect sludge disposal by land application were incorporated into the selection of MAHLs for both plants. Again, as the ASE WRF is not yet online, these AHLs were calculated using published pollutant removal efficiencies and an estimated sludge flow, instead of site-specific data.

Design Load:

The influent design basis for YR WRF and ASE WRF were used to set MAHLs for BOD_5, TSS, Total Kjeldahl Nitrogen (TKN), and Total Phosphorus, as shown in Appendix B, Tables 17. The design basis for the YR WRF was taken from Table 6 of the Yellow River WRF Capacity Assessment to Confirm Receipt of Pharma Wastewater Load (2014), as this was the most recent plant capacity evaluation available. The design basis for the ASE WRF was determined from Table 6.6 in the 2018 Design Development Report (DDR). Since each plant has an established design capacity for these pollutants, the industrial load must be controlled to ensure that influent loads do not exceed the plant's design capacity. Design loads for each plant are shown in Table 4-3.

TABLE 4-3
Plant Influent Design Criteria
Technically-Based Local Limits for Industrial Users

Parameter	Units	YR WRF[a]	ASE WRF[b]
Permitted/Design MMADF	MGD	4.0	1.25
Ammonia (as N)	lb/day	841	367.5 [c]
BOD_5	lb/day	5,479	3,002
COD[d]	lb/day	14,814	8,105
TSS	lb/day	6,386	3,524
Total Phosphorus	lb/day	160	78
TKN	lb/day	1,216	588

MMADF = Maximum monthly average daily flow.

[a] Table 6 of the Yellow River WRF Capacity Assessment to Confirm Receipt of Pharma Wastewater Load (2014).
[b] Table 6.6 in the 2018 DDR.
[c] Calculated using the literature NH3-N/TKN ratio of 0.625.
[d] Calculated using the COD/BOD_5 ratio of 2.7.

For the ASE WRF, the influent design criterion for Ammonia as N (NH_3-N) was established using the literature NH3-N/TKN ratio of 0.625 for medium strength wastewater (M&E Wastewater Engineering, Third Edition, page 109). The influent design criteria for COD were not available in the above two documents. To establish MAHLs for COD, the influent COD/BOD_5 ratio calculated from the July 2019 sampling campaign influent data shown in Table 3-1) was used.

Collection System Human Health:

Human health is also a concern for workers who may encounter wastewater while performing maintenance in the collection system. Human health concerns for contact in the collection system are based on the threshold concentrations for volatile organic priority pollutants as designated by the National Institute for Occupational Safety and Health (NIOSH), the Occupational Safety and Health Administration (OSHA), or the American Conference of Governmental Industrial Hygienists (ACGIH). In cases where limits were different among the three agencies, the most stringent (lowest) was used in the human health calculations. Dilution in the collection system is not considered in establishing human health limits because worker contact can occur anywhere in the collection system including immediately downstream of the industrial discharge. Following the calculations of AHLs for the other criteria (activated sludge inhibition, nitrification inhibition, water quality, and biosolids disposal), the most stringent concentration was compared to the human health limit. These human health limits are summarized in Appendix B, Tables 18.

4.4 Calculations for MAHLs

Local limits calculations were completed for all pollutants and criteria listed above in Tables 4-1 and 4-2 for YR WRF and ASE WRF, respectively.

A spreadsheet tool designed by USEPA Region 3 (mid-Atlantic) was used to perform these calculations. USEPA Region 4, which includes Georgia, does not publish a similar tool, or require a particular format for calculations. The spreadsheet tool includes three worksheets: “Monitoring Data,” “Inhibition Removals,” and “Limits Calculation”. The first worksheet is used for entering analytical data, and it calculates statistics and pollutant removal efficiencies. Data from the sampling campaign (Appendix A) was used to populate this worksheet. The second worksheet is used to calculate site-specific pollutant removal efficiencies in primary treatment to allow for calculation of AHLs based on inhibition criteria. This sheet is not used for the cases of YR WRF or ASE WRF because primary treatment is not part of their process trains. All local limits calculations are completed in the third worksheet, “Limits Calculation”. All tables resulting from these worksheets are provided in Appendix B. Tables not used are indicated below (and were not provided in Appendix B), however the default table numbering in the tool was maintained to prevent confusion.

Descriptions of Appendix B tables and their contents and functions are below. To understand how changing the biosolids management approach to land application may affect the local limits, AHLs to protect sludge disposal by land application were also incorporated into the selection of MAHLs and the calculation of concentration limits for both plants. Therefore, there are four sets of tables from four uses of the spreadsheet tool: YR WRF with sludge landfilled, YR WRF with biosolids land applied, ASE WRF with sludge landfilled, and ASE WRF with biosolids land applied.

- Tables 1 and 2: Includes input data for plant influent flow, industrial user flow, sludge flow, and stream flows.
- Table 3: Summarizes the pollutant plant removal efficiencies used in the local limits calculations. The user may select to use observed removal efficiencies, published default removal efficiencies, or other user-entered removal efficiencies based on alternate information. In cases where there was not enough plant-specific data to establish pollutant removal efficiencies, published removal

efficiencies were used. This sheet also calculates AHLs based on the NPDES permit limits (those which are not related to design basis parameters), but this part of the table was not used

- Table 4: Calculates AHLs based on chronic water quality standards. These “chronic” limits apply to the 7Q10 flow of the receiving river which is the 7-day minimum flow expected to occur over a 10-year period. (Not used for YR WRF calculations due to LAS discharge.)

  GAEPD’s guidance has been to assume zero background (upstream) pollutant concentrations in the receiving streams (Cstr) for the calculations of AHLs based on water quality standards. Therefore, this evaluation assumes zero background pollutant concentrations in the receiving stream.

- Table 5: Calculates AHLs based on acute water quality standards. These “acute” limits apply to the 1Q10 flow of the receiving river which is the 1-day minimum flow expected to occur over a 10-year period. (Not used for YR WRF calculations due to LAS discharge.)
- Table 6: Calculates AHLs based on human health water quality standards, which are based on average stream flow. (Not used for YR WRF calculations due to LAS discharge.)
- Table 7: This table compares the water quality-based AHLs and designates the most stringent (lowest) as the AHL for water quality. (Not used for YR WRF calculations due to LAS discharge.)
- Table 8: This table calculates AHLs based on published activated sludge inhibition levels.

  Based on past work, the published activated sludge inhibition levels for zinc is very restrictive.

  The nitrification process is more sensitive to inhibition than the activated sludge process, also evident with zinc’s lower published inhibition concentrations for nitrification (0.08 – 0.5 mg/L) than activated sludge (0.3 - 5 mg/L). Therefore, the nitrification inhibition level of 0.5 mg/L used for zinc (see Appendix B, Table 10) has also been used as zinc’s activated sludge inhibition threshold value, instead of the minimum of the published range.

- Table 9: Not applicable to YR WRF or ASE WRF.
- Table 10: This table calculates AHLs based on published nitrification inhibition levels.

  GAEPD recommends using the minimum nitrification inhibition threshold values of the published ranges; the drawback is that they may indicate inhibition at much lower concentrations than in the actual biological process. Based on past work, the published nitrification inhibition levels for copper and zinc are very restrictive.

  USEPA’s Guidance Manual for Preventing Interference at POTWs, dated September 1987, acknowledges the wide range of values are a result of apparently contradictory data and that it would be reasonable to expect the lower end of a range to correspond to threshold levels inhibiting a system not acclimated while the upper end of the range would correspond to threshold levels inhibiting an acclimated system. However, the biological treatment processes at the YR WRF is exposed to very low influent concentrations of copper and zinc.

  On the other hand, the YR WRF does not have an effluent limit for Ammonia, just monitor and report requirements for nitrogen. Although nitrification inhibition is considered in the evaluation for YR WRF, the nitrification inhibition based AHLs have been calculated using the maximum values of the published ranges for copper and zinc (0.48 and 0.5 mg/L, respectively).

  An investigation of nitrification inhibition as a result of zinc at WWTPs has shown no significant inhibition at a zinc level of 0.5 mg/L (Fox et al, "Assessing the Potential for Nitrification Inhibition at Wastewater Treatment Facilities as a Result of Zinc Orthophosphate Addition to Potable Water Distribution Systems", WEFTEC 2006).

  Based on these sources, a nitrification inhibition threshold level of 0.5 mg/L was used to calculate the AHL for zinc for the ASE WRF as well as YR WRF. The minimum nitrification inhibition threshold value of the published range for copper was used for the ASE WRF because site-specific data is not available for this future WRF and ASE WRF will have an ammonia limit (requiring nitrification) for its stream discharge, unlike YR WRF.

- Tables 11 and 12: Not applicable to YR WRF or ASE WRF.
- Table 13: This table compares the inhibition-based AHLs and designates the most stringent (lowest) as the AHL for inhibition.
- Table 14: This table calculates AHLs for biosolids disposal by land application.
- Table 15: Not applicable to YRWRF or ASE WRF.
- Table 16: This table compares the sludge disposal-based AHLs and designates the most stringent (lowest) as the AHL for sludge disposal. (Only used for land application scenario. Also included in this table are AHLs for incineration but are not relevant to NCWSA WRFs).
- Table 17: This table tallies AHLs based on water quality, inhibition, and sludge. The worksheet selects the limiting criteria (lowest loading) for each parameter as the MAHL. Also included in this table are the design loads for the conventional pollutants (BOD_5, COD, TSS, and Ammonia, TKN, and Phosphorus). The design loads presented in Table 4-3 were used as MAHLs for these parameters.
- Table 18: This table allows the MAHLs to be adjusted for a safety factor (a select percent of MAHL) and for reserving a portion for future growth (another select percent of MAHL, further discussed in Section 5).

  A safety factor is inherent to a WWTP's "monthly average" influent design criteria for conventional pollutants. For YR WRF, the influent loadings from its most recent capacity evaluation were used as the influent design criteria for this evaluation. However, the plant was evaluated for an average flow of 3.2 MGD and the plant is rated for 4 MGD. Therefore, YR WRF's AHLs based on plant design criteria (e.g., conventional pollutants) were not adjusted for a safety factor. For ASE WRF, the influent design criteria were adjusted with a 10% safety factor, as it will have a river discharge with more stringent limits (than YR WRF) and nitrification and phosphorus removal requirements.

  Table 4-4 is a compilation of the MAHLs, the safety factor reserves, and the limiting criteria from Table 18 for each of the four scenarios evaluated: YR WRF with sludge landfilled, YR WRF with biosolids land applied, ASE WRF with sludge landfilled, and ASE WRF with biosolids land applied.

  Managing headworks loadings to be below the MAHLs adjusted for the safety factors will ensure the NCWSA's treatment processes are protected from being overtaxed and from inhibition. The adjusted MAHLs are what are available for allocation to the users (domestic, commercial, industrial) of the WRFs. The allocation steps are shown in the remaining columns of Table 18 and are discussed in the following section.

  Published inhibition data is not available for every pollutant and in those cases, an AHL based on inhibition could not be calculated. Published inhibition data is not available for molybdenum, selenium, silver, methylene chloride, and bis(2-ethylhexyl) phthalate. Based on the land application standards for molybdenum and selenium, MAHLs were calculated for these two pollutants.

  For the ASE WRF, AHLs were calculated based on inhibition, water quality standards, and/or land application standards. For silver, no criteria were found for inhibition, water quality, or biosolids land application on which to base an AHL.

  Due to the capacity of the plant, its planned surface water discharge, and associated Georgia water quality standards, the MAHL values are more stringent for ASE WRF than for YR WRF. Table 4-4 also shows how changing to the sludge management approach from landfill disposal to land application affects the MAHLs. For Yellow River WRF, since there is no surface water discharge, when sludge is landfilled, the only applicable limiting criteria are based on process inhibition and plant influent design criteria. However, when biosolids land application is incorporated into the local limits evaluation, land application of sludge becomes the limiting basis for all nine pollutants regulated under 40 CFR 503. For ASE WRF, even after considering biosolids land application, the water quality standards are still the limiting criteria for most of the non-conventional pollutants.

As the ASE WRF is not yet online, Table 4-4 provides provisional theoretical values, calculated based on estimated conditions, such as the sludge flow wasted, and published pollutant removal efficiencies and process inhibition values, as site-specific data is not currently available to do otherwise.

4.5 Calculation of Background Loadings

As described previously, the MAIL is the maximum loading of a pollutant that can be received in a day at a WWTP's headworks from all permitted industrial users combined. To calculate each MAIL, the background loading must be subtracted from the WRF's MAHL. The background component is considered "uncontrollable," meaning that the pollutant loading is from domestic/commercial dischargers and therefore cannot be mitigated by regulating industrial discharge. A portion of each MAHL must be reserved for this non-industrial loading prior to determining allocation available for industrial users. The background loading for each POC is determined with the corresponding background flow and concentration. Site-specific background concentrations were established during the sampling campaign.

NCWSA has decided to use the industrial user contributory flow method to allocate the resulting MAILs. With this method, each POC's MAIL is divided by the corresponding industrial contributory flow (flows only from the industries discharging the POC above background levels) and therefore the allocation and resulting concentration-based limits apply only to those industrial users. Industrial users that have been identified to be discharging at or below the background level must be held to that domestic/commercial level.

TABLE 4-4
Comparison of Calculated Loadings[a]
Technically-Based Local Limits for Industrial Users

Pollutant	Yellow River WRF								ASE WRF						
	With Sludge Landfill Disposal				With Biosolids Land Applied				With Sludge Landfill Disposal			With Biosolids Land Applied			
	MAHL (lb/day)	Safety Reserve (lb/day)	MAHL Adjusted for Safety Factor (lb/day)	Limiting Criteria	MAHL (lb/day)	Safety Reserve (lb/day)	MAHL Adjusted for Safety Factor (lb/day)	Limiting Criteria	MAHL (lb/day)	Safety Reserve (lb/day)	MAHL Adjusted for Safety Factor (lb/day)	MAHL (lb/day)	Safety Reserve (lb/day)	MAHL Adjusted for Safety Factor (lb/day)	Limiting Criteria
Arsenic	2.252	0.2252	2.0268	Inhibition	0.1653	0.0165	0.1488	Sludge	0.7506	0.07506	0.67554	Same as sludge landfill disposal			Inhibition
Cadmium	22.52	2.252	20.268	Inhibition	0.1664	0.0166	0.1498	Sludge	0.01544	0.001544	0.013896				Water Quality
Chromium	5.630	0.563	5.067	Inhibition	Same as sludge landfill disposal				1.877	0.1877	1.6893				Inhibition
Copper	10.81	1.081	9.729	Inhibition	3.835	0.384	3.451	Sludge	0.3248	0.03248	0.29232				Water Quality
Cyanide	2.252	0.2252	2.0268	Inhibition	Same as sludge landfill disposal				0.1358	0.01358	0.12222				Water Quality
Lead	11.26	1.126	10.134	Inhibition	0.8921	0.0892	0.8029	Sludge	0.03739	0.00379	0.033651				Water Quality
Mercury	2.252	0.2252	2.0268	Inhibition	0.0514	0.0051	0.0463	Sludge	0.000243	0.0000243	0.0002187				Water Quality
Molybdenum	-	-	-	NA	0.2973	0.0297	0.2676	Sludge	-	-	-	0.0891	0.00891	0.08019	Sludge
Nickel	5.630	0.563	5.067	Inhibition	1.814	0.181	1.633	Sludge	0.3938	0.03938	0.35442	Same as sludge landfill disposal			Water Quality
Selenium	-	-	-	NA	1.770	0.177	1.593	Sludge	0.0810	0.0081	0.0729				Water Quality
Silver	-	-	-	NA	-	-	-	NA	-	-	-	-	-	-	NA
Zinc	11.26	1.126	10.134	Inhibition	9.768	0.977	8.791	Sludge	3.476	0.3476	3.1284	Same as sludge landfill disposal			Water Quality
Ammonia (as N)	841	0	841	Design	Same as sludge landfill disposal				367.5	36.75	330.75				Design
BOD_5	5,479	0	5,479	Design					3,002	300.2	2,701.8				Design
COD	14,814	0	14,814	Design					8,105	810.5	7,294.5				Design
TSS	6,386	0	6,386	Design					3,524	352.4	3,171.6				Design
Phosphorus	160	0	160	Design					78.00	7.8	70.2				Design
TKN	1,216	0	1,216	Design					588.0	58.8	529.2				Design
Chloroform	225.2	22.52	202.68	Inhibition					48.67	4.867	43.803				Water Quality
1,2-Dichlorobenzene	112.6	11.26	101.34	Inhibition					37.53	3.753	33.777				Inhibition
1,4-Dichlorobenzene	112.6	11.26	101.34	Inhibition					19.54	1.954	17.586				Water Quality
Methylene Chloride	-	-	-	NA					61.07	6.107	54.963				Water Quality
Phenol	90.07	9.007	81.063	Inhibition					2.452	0.2452	2.2068				Water Quality
Bis(2-ethylhexyl) phthalate	-	-	-	NA					0.2279	0.02279	0.20511				Water Quality
Toluene	4,504	450.4	4,053.6	Inhibition					620.9	62.09	558.81				Water Quality

[a] Source: Table 18 of each scenario's spreadsheet tool and corresponding discussion in Section 4.4.

Therefore, the background loading is comprised of contributions from both domestic/ commercial (non-industrial) and industrial users discharging at or below the background concentrations. With the industrial user contributory flow method, the background flow of each POC is calculated from the difference between the WRF's current average annual flow and the POC's industrial contributory flow (sum of flows from the industries discharging the POC at above background levels).

First, the industries discharging POCs at above background levels must be identified. By using the results from the sampling campaign, specific industrial users were identified as above background level dischargers of each POC. These identifications are presented in Table 4-5.

TABLE 4-5
Industrial Users Discharging each Pollutant above Background Concentrations
Technically-Based Local Limits for Industrial Users

Parameter	Contributor above Background Concentrations			
	Aqua-Terra[a]	Newton County Landfill[b]	Takeda[b]	Facebook[c]
Arsenic	Yes	Yes	No	No
Cadmium	Yes	Yes	No	No
Chromium	Yes	Yes	No	No
Copper	Yes	Yes	No	No
Cyanide	No	Yes	Yes	No
Lead	Yes	Yes	Yes	No
Mercury	Yes	No	No	No
Molybdenum	No	Yes	Yes	Yes
Nickel	Yes	Yes	Yes	No
Selenium	No	Yes	Yes	No
Silver	Yes	No	No	No
Zinc	Yes	Yes	No	No
Ammonia (as N)	No	Yes	No	No
5-day Biochemical Oxygen Demand (BOD5)	No	Yes	No	No
Chemical Oxygen Demand (COD)	No	Yes	No	No
Total Suspended Solids (TSS)	No	Yes	No	No
Total Phosphorus	No	Yes	No	No
Total Kjeldahl Nitrogen	No	Yes	No	No
Chloroform	No	No	Yes	No
1,2-Dichlorobenzene	No	No	No	No
1,4-Dichlorobenzene	No	No	No	No
Methylene Chloride	No	No	No	No
Phenol	No	No	No	No
Bis(2-ethylhexyl) phthalate	No	No	No	No
Toluene	No	No	No	No

[a] Potential discharger of POC as identified by Pretreatment Standards for Existing Sources (PSES) under 40CFR437.46(d).
[b] Potential discharger of POC as identified from July 2019 Sampling Campaign.
[c] Potential discharger of POC as identified by NCWSA.

With the information from Tables 2-1 and 4-5, the industrial user contributory flows and resulting background flows used for determining background loadings are summarized in Table 4-6 and used in Tables 18 of the spreadsheet tools.

TABLE 4-6
POC's Background and Contributory Flows for MAIL Allocation using the Industrial User Contributory Flow Method
Technically-Based Local Limits for Industrial Users

Parameter	YR WRF		ASE WRF	
	Background Flows (MGD)	Industrial Contributory Flows (MGD)	Background Flows (MGD)	Industrial Contributory Flows (MGD)
Arsenic	2.659	0.041	0.9	0
Cadmium	2.659	0.041	0.9	0
Chromium	2.659	0.041	0.9	0
Copper	2.659	0.041	0.9	0
Cyanide	2.072	0.628	0.296	0.604
Lead	2.055	0.645	0.296	0.604
Mercury	2.683	0.017	0.9	0
Molybdenum	1.963	0.737	0.187	0.713
Nickel	2.055	0.645	0.296	0.604
Selenium	2.072	0.628	0.296	0.604
Silver	2.683	0.017	0.9	0
Zinc	2.659	0.041	0.9	0
Ammonia (as N)	2.676	0.024	0.9	0
5-day Biochemical Oxygen Demand (BOD_5)	2.676	0.024	0.9	0
Chemical Oxygen Demand (COD)	2.676	0.024	0.9	0
Total Suspended Solids (TSS)	2.676	0.024	0.9	0
Total Phosphorus	2.676	0.024	0.9	0
Total Kjeldahl Nitrogen	2.676	0.024	0.9	0
Chloroform	2.096	0.604	0.296	0.604
1,2-Dichlorobenzene	2.7	0	0.9	0
1,4-Dichlorobenzene	2.7	0	0.9	0
Methylene Chloride	2.7	0	0.9	0
Phenol	2.7	0	0.9	0
Bis(2-ethylhexyl) phthalate	2.7	0	0.9	0
Toluene	2.7	0	0.9	0

The concentrations of conventional pollutants from the larger industrial users are significantly less than those of domestic/commercial users, as evident in the resulting dilution at the plant headworks (indicated by comparing the sampling campaign's background and influent results for the conventional pollutants in Table 3-1). (Discharge data on Facebook is currently unavailable; however, based on wastewater characterization information provided by NCWSA, Facebook is expected to discharge conventional pollutants at below background concentrations.)

During the 2019 sampling campaign, it was found that samples intended to reflect domestic/commercial sources had higher levels of conventional pollutants than samples from the plant influent. This is likely attributable to these samples being less diluted by infiltration and inflow to the collection system. Based on this understanding, plant influent samples were judged to be more representative of background conventional pollutant concentrations and loads than the domestic/commercial samples taken in the collection system. In addition to influent samples from the sampling campaign, influent DMR data for 2020 and typical design values were considered. As shown in Table 4-7, between the 2019 sampling campaign and the 2020 discharge monitoring reports (DMR) data, plant influent concentrations for Ammonia decreased while concentrations for BOD_5 and TSS increased. It was decided to use the literature data for medium strength domestic wastewater for background concentrations instead of the data from the 2019 sampling campaign for the conventional POCs excluding Phosphorus. For BOD_5, COD, TSS, and TKN the selected literature values were in the middle of the range of available sampling results. For ammonia, the literature value was very similar to the average plant influent data for 2020.

TABLE 4-7
Comparison of YR WRF Conventional POCs Data with Literature Values
Technically-Based Local Limits for Industrial Users

Source	Units	Ammonia (as N)	BOD_5	COD	TSS	Total Phosphorus	TKN
2019 Sampling Campaign Influent Average	mg/L	30.7	162	438	183	4.38	36.4
2019 Sampling Campaign Domestic/ Commercial Average	mg/L	36.8	208	532	194	4.66	45.8
2020 DMR Influent Average	mg/L	25.7	236	NA	271	4.62	NA
Literature Value for Medium Strength Domestic Wastewater [a]	mg/L	25	220	500	220	8	40

[a] M&E Wastewater Engineering, Third Edition, page 109.

By using the background flows in Table 4-6 and selected background concentrations in Table 4-7 (for conventional pollutants), and the results from the sampling campaign in Table 3-1 (for non-conventional pollutants), the background loadings are calculated for each of the pollutants in Tables 18 of the spreadsheet tools.

Descriptions of the remaining Appendix B tables and their contents and functions are below.

- Table 19: This table is not used. Instead a comprehensive table has been provided in Section 5 of this document.
- Table 20: This table compares the calculated MAHL to the average and maximum influent loadings, as measured during the sampling campaign. Pollutant loading as a percent of the MAHL is indicated - non-conventional pollutants that are currently received at loads greater than 60% are flagged and conventional pollutants that are currently received at loads greater than 80% are flagged.

  However, since ASE WRF is not online, this assessment could not be done for ASE WRF influent. For ASE WRF, influent quality to the YR WRF measured during the sampling campaign was used for the assessment.

5. Calculation of MAILs and Concentration Limits

Table 5-1 is a compilation of the background loadings, the adjusted MAHLs after subtracting the safety factor reserves (Table 4-4), the loadings reserved for future growth (Section 4.5), the MAILs (from subtracting the background loadings and future growth reserves from the adjusted MAHLs), and the resulting calculated concentration limits from Appendix B, Tables 18 of the spreadsheet tools for the four scenarios evaluated.

As shown in Table 2-4, the industrial users are currently given two sets of limits: monthly averages and daily maximums. The daily maximum limits are 1.2 times the monthly average limits. The spreadsheet tool used in this evaluation provides one set of concentration limits and they are taken to be daily maximum limits.

While the MAHLs adjusted for the safety factors represent the estimated pollutant loadings that can be received in a day at each WRF's headworks, the MAILs (as used in this local limits evaluation and spreadsheet tool) represent the estimated amount of pollutant loadings available to existing industrial users. Allocations for future industrial users would come from the loads reserved for future growth as shown in Table 5-1.

Because the industrial user contributory flow method was selected for MAIL allocation, as discussed in Section 4.5, the MAILs in Table 5-1 are the loadings available for disbursement to the industrial users identified (those discharging the pollutant above background levels). Industrial users that have been determined to discharge at or below the background level for a POC must be held to that standard or exceedance of the MAHL may result. There must be continuous confirmations that these industrial users are discharging those pollutants at levels comparable to domestic/commercial dischargers, through NCWSA's compliance monitoring. Also added to Table 5-1 are the current local limits for comparison with the calculated concentration limits. The most stringent concentration limit calculated for each WRF (identified in red font) was compared to the POC's current local limit and marked with an up arrow to indicate it is higher than the current local limit or a down arrow to indicate it is lower than current local limit.

Observations on the calculation results for the Yellow River WRF:

- By using the industrial contributory flow method, the calculated concentration limits for the identified industries are predominantly higher than the current local limits, except for cyanide.
- After the industrial flows from Takeda and Facebook are diverted to ASE WRF, their allocations become available for the growth of current industrial users or for future industrial users.
- NCWSA's existing local limits for Ammonia, BOD_5, COD, and TSS are comparable to domestic/commercial concentrations. Currently, in NCWSA's SUO these local limits coincide with surcharge threshold levels and may be exceeded, accompanied by surcharge fees collected by NCWSA. The plant's performance history shows that these allowances by NCWSA have not prevented the YR WRF from meeting its NPDES Permit effluent limits for BOD_5 and TSS. NCWSA has monitor and report requirements for nitrate-nitrite and TKN for the discharge onto the spray fields. The plant's performance history shows that the plant can handle the current loading of conventional pollutants.

  However, local limits, by definition, are not to be exceeded, and exceedances of local limits should be treated as violations and managed in accordance to NCWSA's enforcement response plan. Therefore, the current local limits should be eliminated as limits, while they continue to be enforced as surcharge threshold concentrations (Section 14.1 of the SUO).

TABLE 5-1
Comparison of Calculated Concentration Limits Using Industrial User Contributory Flows [a]
Technically-Based Local Limits for Industrial Users

Pollutant	Yellow River WRF										ASE WRF						Existing Local Limit (mg/L)
		With Sludge Landfill Disposal					With Biosolids Land Application					With Sludge Landfill Disposal or With Biosolids Land Application					
	Background Loading (lb/day)	MAHL Adjusted for Safety Factor (lb/day)	Reserves for Future Growth [b] (lb/day)	MAIL (lb/day)	Calculated Concentration Limit (mg/L)[c]	Industries given MAIL Allocation	MAHL Adjusted for Safety Factor (lb/day)	Reserves for Future Growth [b] (lb/day)	MAIL (lb/day)	Calculated Concentration Limit (mg/L)[c]	Background Loading (lb/day)	MAHL Adjusted for Safety Factor (lb/day)	Reserves for Future Growth [b] (lb/day)	MAIL (lb/day)	Calculated Concentration Limit (mg/L)[c]	Industries given MAIL Allocation	
Arsenic	0.0163	2.0268	0.3378	1.6727	4.89	Aqua-Terra NC Landfill	0.1488	0.0248	0.1077	0.315↑	0.00552	0.67554	0.11259	0.55743	-[d]	None	0.013
Cadmium	0.001	20.268	3.378	16.889	49.4	Aqua-Terra NC Landfill	0.1498	0.0250	0.1238	0.363↑	0.000216	0.013896	0.002316	0.011364	-[d]	None	0.008
Chromium	0.0204	5.067	0.8445	4.2021	12.3↑	Aqua-Terra NC Landfill	Same as sludge landfill disposal				0.00691	1.6893	0.28155	1.40084	-[d]	None	2.0
Copper	0.4627	9.729	1.6215	7.6448	22.4	Aqua-Terra NC Landfill	3.451	0.5753	2.413	7.06↑	0.15663	0.29232	0.04872	0.08697	-[d]	None	1.305
Cyanide	0.0346	2.0268	0.3378	1.6544	0.316↓	NC Landfill Takeda	Same as sludge landfill disposal				0.00494	0.12222	0.02037	0.09691	0.0192↓	Takeda	3.762
Lead	0.003	10.134	1.689	8.442	1.57	Aqua-Terra NC Landfill Takeda	0.8029	0.1338	0.6661	0.124↑	0.000453	0.033651	0.0056085	0.0275895	0.00548↓	Takeda	0.116
Mercury	0.0006	2.0268	0.3378	1.6884	11.9	Aqua-Terra	0.0463	0.0077	0.0380	0.268↑	0.0001877	0.0002187	0	0.000031	NA	None	0.025
Molybdenum	0.0047	NA	-	-	-	NC Landfill Takeda, Facebook	0.2676	0.0446	0.2183	0.0355↑	0.000444	0.08019	0.013365	0.066381	0.0112↓	Takeda Facebook	0.034
Nickel	0.0054	5.067	0.8445	4.2171	0.784	Aqua-Terra NC Landfill Takeda	1.633	0.2721	1.3555	0.252↑	0.00078	0.35442	0.05907	0.29457	0.0585↑	Takeda	0.034
Selenium	0.0045	NA	-	-	-	NC Landfill Takeda	1.593	0.2655	1.323	0.253↑	0.00064	0.0729	0.01215	0.06011	0.0119↓	Takeda	0.091
Silver	0.0010	NA	-	-	-	Aqua-Terra	NA	-	-	-	0.0003	NA	-	-	-	None	0.85
Zinc	2.326	10.134	1.689	6.119	17.9	Aqua-Terra NC Landfill	8.791	1.4652	4.9998	14.6↑	0.7873	3.1284	0.5214	1.8197	-[d]	None	2.432
Ammonia (as N)	557.9	841	84.1	199	994↑	NC Landfill	Same as sludge landfill disposal				187.65	330.75	55.13	87.975	-[d]	None	35
BOD_5	4,909.9	5,479	520.5	48.6	243↓	NC Landfill	Same as sludge landfill disposal				1,651.32	2,701.8	450.3	600.18	-[d]	None	250
COD	11,158.9	14,814	2,222.1	1,433	7,159↑	NC Landfill	Same as sludge landfill disposal				3,753	7,294.5	1,216	2325.75	-[d]	None	750
TSS	4,909.9	6,386	957.9	518.2	2,589↑	NC Landfill	Same as sludge landfill disposal				1,651.32	3,171.6	528.6	991.68	-[d]	None	250
Phosphorus	104	160	24	32	160	NC Landfill	Same as sludge landfill disposal				35.0	70.2	11.7	23.5	-[d]	None	-
TKN	892.7	1,216	121.6	201.7	1,008	NC Landfill	Same as sludge landfill disposal				300.2	529.2	88.2	140.8	-[d]	None	-
Chloroform	0.08	202.68	33.78	168.82	33.5	Takeda	Same as sludge landfill disposal				0.0110	43.803	7.3005	36.4915	7.24	Takeda	-
1,2-Dichlorobenzene	0.01	101.34	16.89	84.44	-[d]	None	Same as sludge landfill disposal				0.0046	33.777	5.6295	28.1429	-[d]	None	-
1,4-Dichlorobenzene	0.02	101.34	16.89	84.43	-[d]	None	Same as sludge landfill disposal				0.0076	17.586	2.931	14.6474	-[d]	None	-
Methylene Chloride	0.0064	NA	-	-	-	NA	Same as sludge landfill disposal				0.0021	54.963	9.1605	45.8004	-[d]	None	-
Phenol	0.19	81.063	13.51	67.36	-[d]	None	Same as sludge landfill disposal				0.0644	2.2068	0.3678	1.7746	-[d]	None	2.0
Bis(2-ethylhexyl)phthalate	0.6997	NA	-	-	-	NA	Same as sludge landfill disposal				0.23325	0.20511	0	-0.02814	NA	None	-

Pollutant	Yellow River WRF										ASE WRF						Existing Local Limit (mg/L)
	Background Loading (lb/day)	With Sludge Landfill Disposal					With Biosolids Land Application				Background Loading (lb/day)	With Sludge Landfill Disposal or With Biosolids Land Application					
		MAHL Adjusted for Safety Factor (lb/day)	Reserves for Future Growth [b] (lb/day)	MAIL (lb/day)	Calculated Concentration Limit (mg/L)[c]	Industries given MAIL Allocation	MAHL Adjusted for Safety Factor (lb/day)	Reserves for Future Growth [b] (lb/day)	MAIL (lb/day)	Calculated Concentration Limit (mg/L)[c]		MAHL Adjusted for Safety Factor (lb/day)	Reserves for Future Growth [b] (lb/day)	MAIL (lb/day)	Calculated Concentration Limit (mg/L)[c]	Industries given MAIL Allocation	
Toluene	0.005	4,053.6	675.6	3,378	NA	NA	Same as sludge landfill disposal				0.0016	558.81	93.135	465.6734	-[d]	None	-

[a] Source: Table 18 of each scenario's spreadsheet tool, as provided in Appendix B.
[b] 15% of MAHL except where shown with red font; refer to Table 5-3 for select percentages.
[c] Applicable only to the identified industrial dischargers in the corresponding columns.
[d] Arrows indicate whether the calculated limit is higher or lower than the current local limit. Concentration limit was not calculated where not provided, as there are currently no identified industrial discharges of the POC.

- As noted in Table 5-1's second footnote, with the plant influent design criteria and estimated background loadings, the YR WRF does not have the treatment capacity for NCWSA to reserve 15% of the MAHLs for Ammonia/TKN and BOD_5 for future growth and also meet the needs of one of its current users. The characteristics of the NC Landfill discharge are presented in Table 5-2.

TABLE 5-2
Summary of Newton County Landfill 2020 Compliance Monitoring Results
Technically-Based Local Limits for Industrial Users

Parameter	Units	Average	Max	Min
Ammonia (as N)	mg/L	660	1,210	220.5
BOD_5	mg/L	189	272	48
COD	mg/L	1,390	2,370	750
TSS	mg/L	19	33	9.5
Total Phosphorus	mg/L	NA	NA	NA
TKN	mg/L	NA	NA	NA

By using the spreadsheet tool to decrease the percent reserved for future growth of these three POCs (Appendix B, Tables 18 for the YR WRF), the calculated concentration limits for ammonia/TKN and BOD_5 can be raised to meet the needs of the NC Landfill. Examples are shown in Table 5-3.

TABLE 5-3
Calculated Concentration Limits for NC Landfill with Different Growth Reserves
Technically-Based Local Limits for Industrial Users

Parameter	Growth Reserves (% of MAHL)	MAIL (lb/day)	Calculated Concentration Limit for NC Landfill @ 0.024 MGD (mg/L)
	15	157	784
Ammonia (as N)	10[a]	199	994
	9	207	1,036
	15	141	704
TKN	10[a]	202	1,008
	9	214	1,068
	15	negative	negative
	10	21	106
BOD_5	9.5[a]	49	243
	9	76	380

[a] Percentage used in the Table 18 of the spreadsheet tool to generate Tables 5-1 and 6-1.

Observations on the calculation results for ASE WRF:

- The low flow of ASE WRF's receiving stream is the most influential factor in the calculations of the AHLs based on water quality standards.
- NCWSA may consider monitoring the instream hardness of the Little River between now and commissioning of the ASE WRF. The low instream hardness provided on the plant's GAEPD Wasteload Allocation, 2017, results in lower instream criteria for cadmium, chromium, copper, lead, nickel, and zinc which translates into more stringent plant effluent limits to protect the receiving stream.
- After using the industrial contributory flow method for MAIL allocation, the calculated concentration limits for the identified industries are lower than the calculated concentration limits for YR WRF. For example, Takeda will have a more stringent local limit for cyanide when discharging into the ASE WRF collection system.

- There was no allocation of the MAILs done for the POCs that do not have identified industrial dischargers into the plant: arsenic, cadmium, chromium, copper, zinc, BOD_5, COD, TSS, Phosphorus, TKN, 1,2-Dichlorobenzene, 1,4-Dichlorobenzene, methylene chloride, phenol, and toluene. Their MAILs remain available for future industrial dischargers requiring an allocation.
- Because of surface water discharge and the resulting stringent instream criteria, there are no growth reserves or MAILs for mercury and bis(2-ethylhexyl)phthalate to allocate to future industrial users.

6. Summary Discussion and Recommendations

Jacobs was contracted by NCWSA to update its local limits. As part of this work, NCWSA sought to gain insight on how the local limits would be impacted by the future ASE WRF that is scheduled to come online in April 2022. Additionally, NCWSA wanted to gain an understanding of how their local limits might be impacted if they were to change their biosolids management approach from landfilling to land application. Since the ASE WRF is not currently online, only provisional theoretical limits were developed, based on approximated flows and characteristics to represent the estimated condition at the time of plant startup. The POCs evaluated for YR WRF were also used as POCs for ASE WRF and sampling results from the YR WRF collection system was used to establish estimated background loadings to the future ASE WRF.

The general methodology for the development and revision of the technically-based local limits is detailed in USEPA's Local Limits Development Guidance Manual, dated July 2004. Allowable headworks loadings for a variety of environmental criteria were calculated for each POC using a spreadsheet tool. Local limits calculations were done for the four scenarios: YR WRF with sludge landfilled, YR WRF with biosolids land applied, ASE WRF with sludge landfilled, and ASE WRF with biosolids land applied. All tables resulting from these worksheets are provided in Appendix B.

NCWSA has decided to use the industrial user contributory flow method to allocate the resulting MAILs. and therefore, the allocations and resulting concentration-based limits for each POC apply only to the industrial users that have been identified to be discharging above the domestic/commercial concentrations.

Table 6-1 allows for the comparison of the calculated concentration limits for the Yellow River WRF with sludge landfilled and biosolids land applied; the ASE WRF with sludge landfilled and biosolids land applied; the industries contributing above background levels and thereby given MAIL allocations; the current local limits; the calculated collection system human health protection concentrations; the categorical pretreatment standards applicable to Aqua-Terra; the basis of the proposed local limits to the contributing industries; and the average discharge POC concentrations for the two industries that were measured during the sampling campaign.

Aqua-Terra is subject to pretreatment standards identified under 40CFR437.46(d). Aqua-Terra must comply with the local limit if it is more stringent than the corresponding categorical standard and the categorical standard if the local limit is less stringent.

6.1 Recommendations

6.1.1 Consider two sets of local limits

Because of plant capacity, surface water discharge, and the associated Georgia water quality standards, the calculated MAHLs, MAILs, and resulting concentration limits for the ASE WRF are more stringent than those for the YR WRF; examples are the calculated concentration limits for cyanide, lead, mercury, molybdenum, nickel, selenium, and chloroform, and bis(2-ethylhexyl) phthalate that would be applicable to Takeda and/or Facebook. Implementing two sets of limits considers the differences in the MAHLs/MAILs between the two plants. The Yellow River WRF would be overprotected by using the more stringent limits for the ASE WRF.

TABLE 6-1
Summary of Calculated Concentration Limits
Technically-Based Local Limits for Industrial Users

Pollutant	Calculated Concentration Limits[a] and Industries given MAIL Allocation (mg/L)						Current Local Limits (mg/L)	Collection System Human Health Protection Criteria (mg/L)[b]	2014 Local Limits Evaluation Calculated Concentration Limit (mg/L)	PSES under 40CFR437.46(d)[c]		Proposed Industrial User Permit Limits		Industrial User Effluent Average Concentrations (mg/L)[d]			
	YR WRF with Sludge Landfilled	YR WRF with Biosolids Land Applied	Industries	ASE WRF with Sludge Landfilled	ASE WRF with Biosolids Land Applied	Industries				Daily Maximum (mg/L)	Monthly Average Maximum (mg/L)	YR WRF	ASE WRF	Aqua-Terra	Newton County (NC) Landfill	Takeda	Facebook
Arsenic	4.89	0.315↑	Aqua-Terra NC Landfill	-[e]	-[e]	None	0.013	-	0.013	0.162	0.104	40CFR437.46(d)	Not Needed	NA	0.035	ND	NA
Cadmium	49.4	0.363↑	Aqua-Terra NC Landfill	-[e]	-[e]	None	0.008	-	0.008	0.474	0.0962	YR WRF with Biosolids Land Applied	Not Needed	NA	0.00022	ND	NA
Chromium	12.3↑		Aqua-Terra NC Landfill	-[e]	-[e]	None	2.0	-	0.25	15.5	3.07	YR WRF with Biosolids Land Applied	Not Needed	NA	0.185	ND	NA
Copper	22.4	7.06↑	Aqua-Terra NC Landfill	-[e]	-[e]	None	1.305	-	0.48	4.14	1.06	40CFR437.46(d)	Not Needed	NA	0.0032	0.023	NA
Cyanide	0.316↓		NC Landfill Takeda	0.0192↓		Takeda	3.762	1.1	0.5	-	-	YR WRF with Biosolids Land Applied	ASE WRF with Biosolids Land Applied	NA	0.012	0.024	NA
Lead	1.57	0.124↑	Aqua-Terra NC Landfill Takeda	0.00548↓		Takeda	0.116	-	0.116	1.32	0.283	YR WRF with Biosolids Land Applied	ASE WRF with Biosolids Land Applied	NA	0.0047	0.00012	NA
Mercury	11.9	0.268	Aqua-Terra	Prohibited		None	0.025	-	-	0.00234	0.000739	40CFR437.46(d)	Not Needed	NA	ND	ND	NA
Molybdenum	NA	0.0355↑	NC Landfill Takeda, Facebook	NA	0.0112↓	Takeda Facebook	0.034	-	-	-	-	YR WRF with Biosolids Land Applied	ASE WRF with Biosolids Land Applied	NA	0.00076	0.0098	NA
Nickel	0.784	0.252↑	Aqua-Terra NC Landfill Takeda	0.0585↑		Takeda	0.034	-	0.034	3.95	1.45	YR WRF with Biosolids Land Applied	ASE WRF with Biosolids Land Applied	NA	0.15	0.0044	NA
Selenium	NA	0.253↑	NC Landfill Takeda	0.0119↓		Takeda	0.091	-	-	-	-	YR WRF with Biosolids Land Applied	ASE WRF with Biosolids Land Applied	NA	0.006	0.00034	NA
Silver	NA	NA	Aqua-Terra	NA	NA	NA	0.85	-	0.85	0.120	0.0351	40CFR437.46(d)	NA	NA	ND	ND	NA
Zinc	17.9	14.6↑	Aqua-Terra NC Landfill	-[e]	-[e]	None	2.432	-	0.3	2.87	0.641	40CFR437.46(d)	Not Needed	NA	0.064	0.011	NA
Ammonia (as N)	994↑		NC Landfill	-[e]	-[e]	None	35	-	35	-	-		Not Needed	NA	733	2.40	NA
BOD_5	243↑		NC Landfill	-[e]	-[e]	None	250	-	250	-	-		Not Needed	NA	645	39.1	NA
COD	7,159↑		NC Landfill	-[e]	-[e]	None	750	-	750	-	-		Not Needed	NA	1,737	149	NA
TSS	2,589↑		NC Landfill	-[e]	-[e]	None	250	-	250	-	-		Not Needed	NA	15.1	45.9	NA
Phosphorus	160		NC Landfill	-[e]	-[e]	None	-	-	-	-	-		Not Needed	NA	4.02	2.85	NA

Pollutant	Calculated Concentration Limits[a] and Industries given MAIL Allocation (mg/L)						Current Local Limits (mg/L)	Collection System Human Health Protection Criteria (mg/L)[b]	2014 Local Limits Evaluation Calculated Concentration Limit (mg/L)	PSES under 40CFR437.46(d)[c]		Proposed Industrial User Permit Limits		Industrial User Effluent Average Concentrations (mg/L)[d]			
	YR WRF with Sludge Landfilled	YR WRF with Biosolids Land Applied	Industries	ASE WRF with Sludge Landfilled	ASE WRF with Biosolids Land Applied	Industries				Daily Maximum (mg/L)	Monthly Average Maximum (mg/L)	YR WRF	ASE WRF	Aqua-Terra	Newton County (NC) Landfill	Takeda	Facebook
TKN	1,008		NC Landfill	- [e]	- [e]	None	-	-	-	-	-		Not Needed	NA	749	6.10	NA
Chloroform	33.5		Takeda	7.24		Takeda	-	0.06	6.21	-	-	Human Health Protection		NA	ND	0.0051	NA
1,2-Dichlorobenzene	- [e]	- [e]	None	- [e]	- [e]	None	-	-	-	-	-	Not Needed	Not Needed	NA	ND	ND	NA
1,4-Dichlorobenzene	- [e]	- [e]	None	- [e]	- [e]	None	-	5.7	-	-	-	Not Needed	Not Needed	NA	ND	ND	NA
Methylene Chloride	NA	NA	NA	- [e]	- [e]	None	-	0.83	-	-	-	Not Needed	Not Needed	NA	ND	ND	NA
Phenol	- [e]	- [e]	None	- [e]	- [e]	None	2.0	1,186	2.0	-	-	Not Needed	Not Needed	NA	ND	ND	NA
Bis(2-ethylhexyl) phthalate	NA	NA	NA	Prohibited		NA	-	7,233	-	-	-	Not Needed	Not Needed	NA	ND	ND	NA
Toluene	NA	NA	NA	- [e]	- [e]	None	-	1.4	-	-	-	Not Needed	Not Needed	NA	ND	ND	NA
TTO	-	-	-	-	-		2.13	-	2.13	-	-	2.13		NA	-	-	NA

[a] Values in red text under these columns indicate that the calculated concentration limit is the most stringent of the two sets of calculations for the plant (sludge landfilled vs. biosolids land applied). Arrows indicate whether the calculated limit is higher or lower than the current local limit.
[b] Values in red text under this column indicate that the calculated human health protection criterion is more stringent than a calculated concentration limit.
[c] Values in red text under this column indicate that the pretreatment standard 40CFR437.46(d) is more stringent than the calculated local limit for YR WRF.
[d] Values in red text under this column indicate that industrial user effluent concentration measured during the sampling campaign exceeds the calculated local limit for YR WRF.
[e] Concentration limit not calculated as there are currently no identified industrial discharges of the POC.

Disadvantages would include the appearance of an economic favoritism to industries located in the YR WRF collection system, industrial wastewaters in the YR WRF collection system cannot be switched to the ASE WRF without changing the limits, a need to control where in the county industrial growth will be allowed, more administration required by the NCWSA IPP staff to manage compliance with two sets of limits, and the SUO must contain two sets of limits.

There are currently facilities to divert flow from the ASE WRF collection system to the Yellow River WRF, but not vice versa.

6.1.2 Consider not having the local limits for every POC in the SUO

The allocation of MAILs is left to the discretion of the utility, if the implementation method does not allow the MAHLs to be exceeded, to prevent pass through and interference and to comply with the prohibitions in the Federal regulations. By using the industrial contributory flow method for NCWSA's MAIL allocation, the calculated concentration limits are higher than limits calculated using the uniform concentration method (based on total industrial flow) because MAILs are only allocated to industries discharging the POCs at above background levels. Regular compliance monitoring must be used to confirm industries identified as non-contributing remain so, in order not to exceed a MAHL.

Since the concentration limits are tailored to specific industries (as opposed to uniform limits in the SUO for all industrial users to comply with), the NCWSA IPP staff must issue permits with individual pollutant limits to the industrial users. The SUO would have general language about users needing to comply with the individual limits in their industrial user permits to protect the MAHLs. Each industrial user, with wastewater discharge characterization information, must enter discussion with NCWSA IPP staff for NCWSA to determine specific pollutant limits that will protect the specific WRF.

While this allocation method provides the needed flexibility to support the industrial customer base, disadvantages are the perception of inequity and the detailed tracking and documentation required of NCWSA IPP staff to support the allocations.

An example of how the flexibility can be used: because of the difference between the potential concentration limits and the average discharge pollutant concentrations that were measured during the sampling campaign, there is room for NCWSA to accommodate any hardships Aqua-Terra may have with its concentration limits. Aqua-Terra's discharge was not evaluated during the 2019 sampling campaign. An example from Table 6-1 is lead – if Aqua-Terra has trouble meeting a concentration limit of 0.124 mg/L, its lead concentration limit can be increased while concurrently reducing the limit for the Newton County Landfill and Takeda, and the lower limit will not be a hardship for either the Newton County Landfill and Takeda.

6.1.3 Consider local limits that incorporate the land application standards

Even though sludge treatment processes for the land application of the biosolids are not in place yet, the calculated concentration limits that incorporate land application standards can be selected as the local limits to specific industrial users. After using the industrial contributory flow method for MAIL allocation, the calculated concentration limits for YR WRF with biosolids land applied scenario are higher for the identified industries than the current local limits, except for cyanide, so using the calculated concentration limits that incorporate land application standards will not cause new hardships to the current industrial users. The calculated concentration limit for cyanide, although more stringent than the current limit, will also not be a hardship to the pertinent industrial users of the YR WRF collection system.

For the ASE WRF, the land application standards were not the limiting criteria for any of the POCs.

Also, regardless of the disposal method, USEPA recommends that utilities consider AHLs for land application of biosolids to maintain the broadest range of options for biosolids disposal and to maintain consistency with the objectives of the National Pretreatment Program.

6.1.4 Keep Using Local Limits for non-conventional POCs and add local limit for Total Dissolved Solids

Based on Table 20 for the YR WRF biosolids land applied scenario, the average influent loading (as established from the July 2019 sampling campaign) is less than 60 percent of the calculated MAHL for all the non-conventional pollutants. Based on Table 20 for the ASE WRF biosolids land applied scenario, the estimated average loading (using the influent quality to the YR WRF measured during the sampling campaign) is more than 60 percent of the calculated MAHL for copper and mercury.

It is recommended that NCWSA IPP staff issue permits with limits for these pollutants to industrial users that are above background level dischargers: arsenic, cadmium, chromium, copper, cyanide, lead, mercury, molybdenum, nickel, selenium, zinc.

A calculation could not be done for silver to develop a numerical control, as there are no design, inhibition, or water quality criteria applicable for the development of a MAHL. Silver was not detected in the discharges of NC Landfill and Takeda; and a local limit for silver is not available for addition to their permits. Aqua-Terra is subject to pretreatment standards for silver.

A local limit for Total Dissolved Solids (TDS) of 1,000 mg/L has been previously established for the SUO.

6.1.5 Change the current local limits for Ammonia, BOD_5, COD, and TSS

As discussed in Section 5, the current local limits for Ammonia, BOD_5, COD, and TSS are comparable to domestic/commercial concentrations. Therefore, the current local limits for these pollutants should be eliminated, as they are already managed as surcharge threshold concentrations (Section 14.1 of the SUO). A surcharge threshold concentration should be added for Phosphorus in the same section of the SUO. The recommended surcharge threshold value for phosphorus is 8 mg/L, the literature value for medium strength domestic wastewater presented in Table 4-7.

NCWSA should continue to establish “not-to- exceed” upper limits (for Ammonia, BOD_5, COD, TSS, and Phosphorus) for wastewater discharge permits, to protect the WRF from inhibition, pass through, and its reserves for future growth, and continue collecting surcharges, which are extra fees to cover O&M expenses for treating higher strength wastewater.

It is recommended that a unit cost for treatment be developed for phosphorus after ASE WRF goes online, so that NCWSA can sample industrial discharges for Phosphorus and start collecting surcharge fees when applicable.

6.1.6 Consider updating the YR WRF design criteria for conventional pollutants

As noted in Table 5-1, the YR WRF design criteria indicate the plant does not have the treatment capacity for NCWSA to reserve 15% of the MAHLs for Ammonia and BOD_5 for future growth and meet the needs of its current industrial users. The influent design basis used to set MAHLs for Ammonia, BOD_5, TSS, TKN, and Phosphorus for the YR WRF came from the most recent plant capacity evaluation.

An option to consider would be to engage a consultant to model the plant and establish revised design criteria for the plant. This could serve as a basis for revising the design criteria for conventional pollutants upward and possibly result in additional allocation for future customers.

6.1.7 Consider mass-based local limits to promote water conservation

Concentration-based local limits penalize water conservation, as reduced flow may increase pollutant concentrations in the industry’s discharge and thereby reducing incentive to conserve water. Implementation of mass-based limits provide industrial users with the operational flexibility to increase pollutant concentrations as flows decrease.

6.1.8 Keep the Local Limit for Total Toxic Organics (TTO)

The organic priority pollutants that were considered in this evaluation are bis(2-ethylhexyl) phthalate, 1,2-dichlorobenzene, 1,4-dichlorobenzene, chloroform, methylene chloride, phenol, and toluene, as these were detected in the background samples from the collection system of YR WRF.

The current loadings of these POCs into the plants are very low, as there are no significant contributions of these POCs. Therefore, local limits are not needed at this time at this time to protect biological processes and receiving waters from these POCs.

There is currently a local limit for TTO of 2.13 mg/L. Sources of TTO include spent solvents and degreasers used by industries. The toxic organic compounds that define the TTO group include bis(2-ethylhexyl) phthalate, 1,2-dichlorobenzene, 1,4-dichlorobenzene, chloroform, methylene chloride, and toluene, POCs that were identified in this evaluation. The local limit for TTO will continue to serve as a numerical control of these POCs.

6.2 Example Allocation Table with Proposed Industrial User Limits

Use of a tracking mechanism (i.e., spreadsheet) is recommended to ensure that the sum of the allocated loadings does not exceed the POC's MAHL (with safety factor). The following table shows possible loadings allocated to each controlled industrial user, the estimated background loading, and the reserve for future growth.

TABLE 6-2
Comparison of MAHL and Examples of Allocated Loadings
Technically-Based Local Limits for Industrial Users

Pollutant	Yellow River WRF with Biosolids Land Applied MAHLs									ASE WRF with Biosolids Land Applied MAHLs						
	MAHL Adjusted for Safety Factor (lb/day)	Proposed Daily Max Concentration Limit (mg/L)	Reserves for Future Growth (lb/day)	MAIL Allocation (lb/day) @ Current Average Daily Flow						MAHL Adjusted for Safety Factor (lb/day)	Proposed Daily Max Concentration Limit (mg/L)	Reserves for Future Growth (lb/day)	Allocated Loading (lb/day) @ Current Average Daily Flow			
				Background Loading (lb/day)	Aqua-Terra @ 0.017 MGD	NC Landfill @ 0.025 MGD	Takeda @ 0.604 MGD	Facebook @ 0.109 MGD	Total[a]				Background Loading (lb/day)	Takeda @ 0.604 MGD	Facebook @ 0.109 MGD	Total[a]
Arsenic	0.1488	0.162	0.0248	0.0163	0.0230	0.0324	0	0	0.0965	0.67554	None	0.11259	0.00552	0	0	0.11811
Cadmium	0.1498	0.362↓	0.0250	0.001	0.0514	0.0725	0	0	0.1498	0.013896	None	0.002316	0.000216	0	0	0.002532
Chromium	5.067	12.2↓	0.8445	0.0204	1.7308	2.4434	0	0	5.0390	1.6893	None	0.28155	0.00691	0	0	0.28846
Copper	3.451	4.14	0.5753	0.4627	0.5873	0.8292	0	0	2.4545	0.29232	None	0.04872	0.15663	0	0	0.20535
Cyanide	2.0268	0.315↓	0.3378	0.0346	0	0.0631	1.5877	0	2.0232	0.12222	0.0192	0.02037	0.00494	0.0968	0	0.1221
Lead	0.8029	0.123↓	0.1338	0.003	0.0174	0.0246	0.62	0	0.7989	0.033651	0.00548	0.0056085	0.000453	0.0276	0	0.0337
Mercury	0.0463	0.00234	0.0077	0.0006	0.00033	0	0	0	0.0086	0.0002187	None	0	0.0001877	0	0	0.000188
Molybdenum	0.2676	0.035	0.0446	0.0047	0	0.007	0.1764	0.0318	0.2646	0.08019	0.0112	0.013365	0.000444	0.0565	0.0102	0.0804
Nickel	1.633	0.251↓	0.2721	0.0054	0.0356	0.0503	1.2651	0	1.6285	0.35442	0.0585	0.05907	0.00078	0.2949	0	0.3547
Selenium	1.593	0.252↓	0.2656	0.0045	0	0.0505	1.2702	0	1.5907	0.0729	0.0119	0.01215	0.00064	0.0600	0	0.0728
Silver	NA	-	-	0.0010	-	-	-	-	-	NA	-	-	0.0003	0	0	-
Zinc	8.791	2.87	1.4652	2.326	0.4072	0.5748	0	0	4.7731	3.1284	None	0.5214	0.7873	0	0	1.3087
Ammonia (as N)	841	1,000	84.1	557.9	0	200.3	0	0	842.3	330.75	None	55.13	187.65	0	0	242.78
BOD_5	5,479	250↑	520.5	4,909.9	0	50.1	0	0	5,480	2,701.8	None	450.3	1,651.32	0	0	2,102.62
COD	14,814	2,500	2,222.1	11,158.9	0	500.7	0	0	13,882	7,294.5	None	1,216	3,753	0	0	4,969
TSS	6,386	250	957.9	4,909.9	0	50.1	0	0	5,918	3,171.6	None	528.6	1,651.32	0	0	2179.92
Phosphorus	160	160	24	104	0	32.0	0	0	160	70.2	None	11.7	35.0	0	0	46.7
TKN	1,216	1,008	121.6	892.7	0	201.9	0	0	1,216	529.2	None	88.2	300.2	0	0	388.4
Chloroform	202.68	0.06	33.78	0.08	0	0	0.3024	0	34.16	43.803	7.24	7.3005	0.0110	36.5	0	43.8039
1,2-Dichlorobenzene	101.34	-	16.89	0.01	0	0	0	0	16.90	33.777	None	5.6295	0.0046	0	0	5.6341
1,4-Dichlorobenzene	101.34	-	16.89	0.02	0	0	0	0	16.90	17.586	None	2.931	0.0076	0	0	2.9386
Methylene Chloride	NA	-	-	0.0064	-	-	-	-	-	54.963	None	9.1605	0.0021	0	0	9.1626
Phenol	81.063	-	13.51	0.19	0	0	0	0	13.70	2.2068	None	0.3678	0.0644	0	0	0.4322
Bis(2-ethylhexyl) phthalate	NA	-	-	0.6997	-	-	-	-	-	0.20511	None	0	0.23325	0	0	0.2333
Toluene	4,053.6	-	675.6	0.005	0	0	0	0	675.5	558.81	None	93.135	0.0016	0	0	93.1366
TTO	NA	2.13	-	NA	-	-	-	-	-	NA	2.13	-	-	-	-	-
Total Dissolved Solids (TDS)		1,000	-	-	-	-	-	-	-	-	1,000	-	-	-	-	-

[a] Total allocated is the sum of the reserves for future growth , background loading, and industrial user allocations.

Appendix A. Sampling Results

TABLE A-1
NCWSA Local Limits Sampling Results-Yellow River Background
Technically-Based Local Limits for Industrial Users

EPA PP No.	Analyte	EPA Method	Units	Method Detection Level	Reporting Limit	Concentration							Sample Quantity
						Tues 16-Jul	Wed 17-Jul	Thurs 18-Jul	Fri 19-Jul	Sat 20-Jul	Sun 21-Jul	Mon 22-Jul	
Organic Priority Pollutants													
1-1	Acenaphthene	EPA 625	ug/L	23	56	--	ND	--	--	ND	--	--	2
1-2	Acrolein	EPA 624	ug/L	2.9	50	ND	ND	--	--	ND	--	--	3
1-3	Acrylonitrile	EPA 624	ug/L	2.1	50	ND	ND	--	--	ND	--	--	3
1-4	Benzene	EPA 624	ug/L	0.27	2	ND	ND	--	--	ND	--	--	3
1-5	Benzidine	EPA 625	ug/L	22	440	--	ND	--	--	ND	--	--	2
1-6	Carbon tetrachloride	EPA 624	ug/L	0.53	2	ND	ND	--	--	ND	--	--	3
1-7	Chlorobenzene	EPA 624	ug/L	0.36	10	ND	ND	--	--	ND	--	--	3
1-8	1,2,4-Trichlorobenzene	EPA 625	ug/L	23	56	--	ND	--	--	ND	--	--	2
1-9	Hexachlorobenzene	EPA 625	ug/L	19	56	--	ND	--	--	ND	--	--	2
1-10	1,2-Dichloroethane	EPA 624	ug/L	0.33	2	ND	ND	--	--	ND	--	--	3
1-11	1,1,1-Trichloroethane	EPA 624	ug/L	0.36	2	ND	ND	--	--	ND	--	--	3
1-12	Hexachloroethane	EPA 625	ug/L	28	56	--	ND	--	--	ND	--	--	2
1-13	1,1-Dichloroethane	EPA 624	ug/L	0.27	2	ND	ND	--	--	ND	--	--	3
1-14	1,1,2-Trichloroethane	EPA 624	ug/L	0.32	2	ND	ND	--	--	ND	--	--	3
1-15	1,1,2,2-Tetrachloroethane	EPA 624	ug/L	0.3	2	ND	ND	--	--	ND	--	--	3
1-16	Chloroethane	EPA 624	ug/L	0.38	5	ND	ND	--	--	ND	--	--	3
1-18	Bis(2-chloroethyl)ether	EPA 625	ug/L	19	56	--	ND	--	--	ND	--	--	2
1-19	2-Chloroethyl vinyl ether	EPA 624	ug/L	0.78	10	ND	ND	--	--	ND	--	--	3
1-20	2-Chloronaphthalene	EPA 625	ug/L	40	56	--	ND	--	--	ND	--	--	2
1-21	2,4,6-Trichlorophenol	EPA 625	ug/L	20	56	--	ND	--	--	ND	--	--	2
1-22	4-Chloro-3-methylphenol	EPA 625	ug/L	17	56	--	ND	--	--	ND	--	--	2
1-23	Chloroform	EPA 624	ug/L	0.43	2	5.6	4.3	--	--	3.5	--	--	3
1-24	2-Chlorophenol	EPA 625	ug/L	20	56	--	ND	--	--	ND	--	--	2
1-25	1,2-Dichlorobenzene	EPA 624	ug/L	0.24	5	ND	ND	--	--	1.6	--	--	3
1-26	1,3-Dichlorobenzene	EPA 624	ug/L	0.29	5	ND	ND	--	--	ND	--	--	3
1-27	1,4-Dichlorobenzene	EPA 624	ug/L	0.34	5	ND	ND	--	--	2.7	--	--	3
1-28	3,3´-Dichlorobenzidine	EPA 625	ug/L	26	56	--	ND	--	--	ND	--	--	2
1-29	1,1-Dichloroethene	EPA 624	ug/L	0.56	2	ND	ND	--	--	ND	--	--	3
1-30	trans-1,2-Dichloroethene	EPA 624	ug/L	0.35	2	ND	ND	--	--	ND	--	--	3
1-31	2,4-Dichlorophenol	EPA 625	ug/L	17	56	--	ND	--	--	ND	--	--	2
1-32	1,2-Dichloropropane	EPA 624	ug/L	0.48	2	ND	ND	--	--	ND	--	--	3
1-33	cis-1,3-Dichloropropene	EPA 624	ug/L	0.41	2	ND	ND	--	--	ND	--	--	3
1-34	2,4-Dimethylphenol	EPA 625	ug/L	25	56	--	ND	--	--	ND	--	--	2
1-35	2,4-Dinitrotoluene	EPA 625	ug/L	30	56	--	ND	--	--	ND	--	--	2
1-36	2,6-Dinitrotoluene	EPA 625	ug/L	19	56	--	ND	--	--	ND	--	--	2
1-37	1,2-Diphenylhydrazine	EPA 625	ug/L	19	56	--	ND	--	--	ND	--	--	2
1-38	Ethylbenzene	EPA 624	ug/L	0.24	2	ND	ND	--	--	ND	--	--	3
1-39	Fluoranthene	EPA 625	ug/L	15	56	--	ND	--	--	ND	--	--	2
1-40	4-Chlorophenyl phenyl ether	EPA 625	ug/L	22	56	--	ND	--	--	ND	--	--	2
1-41	4-Bromophenyl phenyl ether	EPA 625	ug/L	18	56	--	ND	--	--	ND	--	--	2
1-42	Bis(2-chloroisopropyl)ether	EPA 625	ug/L	31	56	--	ND	--	--	ND	--	--	2
1-43	Bis(2-chloroethoxy)methane	EPA 625	ug/L	16	56	--	ND	--	--	ND	--	--	2
1-44	Methylene chloride	EPA 624	ug/L	0.34	10	ND	ND	--	--	0.51	--	--	3
1-45	Chloromethane	EPA 624	ug/L	0.42	10	ND	ND	--	--	ND	--	--	3
1-46	Bromomethane	EPA 624	ug/L	0.79	10	ND	ND	--	--	ND	--	--	3
1-47	Bromoform	EPA 624	ug/L	0.48	10	ND	ND	--	--	ND	--	--	3
1-48	Dichlorobromomethane	EPA 624	--	--	--	--	--	--	--	--	--	--	0
1-51	Chlorodibromomethane	EPA 624	--	--	--	--	--	--	--	--	--	--	0
1-52	Hexachlorobutadiene	EPA 625	ug/L	21	56	--	ND	--	--	ND	--	--	2
1-53	Hexachlorocyclopentadiene	EPA 625	ug/L	47	56	--	ND	--	--	ND	--	--	2
1-54	Isophorone	EPA 625	ug/L	16	56	--	ND	--	--	ND	--	--	2
1-55	Naphthalene	EPA 625	ug/L	22	56	--	ND	--	--	ND	--	--	2
1-56	Nitrobenzene	EPA 625	ug/L	15	56	--	ND	--	--	ND	--	--	2
1-57	2-Nitrophenol	EPA 625	ug/L	19	56	--	ND	--	--	ND	--	--	2
1-58	4-Nitrophenol	EPA 625	ug/L	16	140	--	ND	--	--	ND	--	--	2
1-59	2,4-Dinitrophenol	EPA 625	ug/L	49	140	--	ND	--	--	ND	--	--	2
1-60	4,6-Dinitro-2-methylphenol	EPA 625	ug/L	42	110	--	ND	--	--	ND	--	--	2
1-61	N-Nitrosodimethylamine	EPA 625	ug/L	25	56	--	ND	--	--	ND	--	--	2
1-62	N-Nitrosodiphenylamine	EPA 625	ug/L	17	56	--	ND	--	--	ND	--	--	2
1-63	N-Nitrosodi-n-propylamine	EPA 625	ug/L	28	56	--	ND	--	--	ND	--	--	2
1-64	Pentachlorophenol	EPA 625	ug/L	53	140	--	ND	--	--	ND	--	--	2
1-65	Phenol	EPA 625	ug/L	13	56	--	ND	--	--	16	--	--	2
1-66	Bis(2-ethylhexyl)phthalate	EPA 625	ug/L	35	56	--	59	--	--	ND	--	--	2
1-67	Butyl benzyl phthalate	EPA 625	ug/L	28	56	--	ND	--	--	ND	--	--	2
1-68	Di-n-butyl phthalate	EPA 625	ug/L	15	56	--	ND	--	--	ND	--	--	2
1-69	Di-n-octyl phthalate	EPA 625	ug/L	36	56	--	ND	--	--	ND	--	--	2
1-70	Diethyl phthalate	EPA 625	ug/L	16	56	--	ND	--	--	ND	--	--	2
1-71	Dimethyl phthalate	EPA 625	ug/L	16	56	--	ND	--	--	ND	--	--	2
1-72	Benz(a)anthracene	EPA 625	ug/L	18	56	--	ND	--	--	ND	--	--	2
1-73	Benzo(a)pyrene	EPA 625	ug/L	11	56	--	ND	--	--	ND	--	--	2
1-74	Benzo(b)fluoranthene	EPA 625	ug/L	13	56	--	ND	--	--	ND	--	--	2
1-75	Benzo(k)fluoranthene	EPA 625	ug/L	19	56	--	ND	--	--	ND	--	--	2
1-76	Chrysene	EPA 625	ug/L	13	56	--	ND	--	--	ND	--	--	2
1-77	Acenaphthylene	EPA 625	ug/L	22	56	--	ND	--	--	ND	--	--	2
1-78	Anthracene	EPA 625	ug/L	18	56	--	ND	--	--	ND	--	--	2
1-79	Benzo(g,h,i)perylene	EPA 625	ug/L	8.6	56	--	ND	--	--	ND	--	--	2
1-80	Fluorene	EPA 625	ug/L	21	56	--	ND	--	--	ND	--	--	2
1-81	Phenanthrene	EPA 625	ug/L	15	56	--	ND	--	--	ND	--	--	2
1-82	Dibenz(a,h)anthracene	EPA 625	ug/L	6.7	56	--	ND	--	--	ND	--	--	2
1-83	Indeno(1,2,3-cd)pyrene	EPA 625	ug/L	7.6	56	--	ND	--	--	ND	--	--	2
1-84	Pyrene	EPA 624	ug/L	20	56	--	ND	--	--	ND	--	--	2
1-85	Tetrachloroethene	EPA 624	ug/L	0.31	2	ND	ND	--	--	ND	--	--	3
1-86	Toluene	EPA 624	ug/L	0.32	2	ND	ND	--	--	0.32	--	--	3
1-87	Trichloroethene	EPA 624	ug/L	0.36	2	ND	ND	--	--	ND	--	--	3
1-88	Vinyl chloride	EPA 624	ug/L	0.34	10	ND	ND	--	--	ND	--	--	3
1-89	Aldrin	EPA 608	ug/L	0.0038	0.05	--	ND	--	--	ND	--	--	2
1-90	Dieldrin	EPA 608	ug/L	0.012	0.05	--	ND	--	--	ND	--	--	2
1-91	Chlordane	EPA 608	ug/L	0.19	0.5	--	ND	--	--	ND	--	--	2
1-92	4,4´-DDT	EPA 608	ug/L	0.014	0.05	--	ND	--	--	ND	--	--	2
1-93	4,4´-DDE	EPA 608	ug/L	0.008	0.05	--	ND	--	--	ND	--	--	2
1-94	4,4´-DDD	EPA 608	ug/L	0.016	0.05	--	ND	--	--	ND	--	--	2
1-95	Endosulfan I	EPA 608	ug/L	0.0097	0.05	--	ND	--	--	ND	--	--	2
1-96	Endosulfan II	EPA 608	ug/L	0.018	0.05	--	ND	--	--	ND	--	--	2
1-97	Endosulfan sulfate	EPA 608	ug/L	0.018	0.05	--	ND	--	--	ND	--	--	2
1-98	Endrin	EPA 608	ug/L	0.03	0.05	--	ND	--	--	ND	--	--	2
1-99	Endrin aldehyde	EPA 608	ug/L	0.01	0.05	--	ND	--	--	ND	--	--	2

TABLE A-1

NCWSA Local Limits Sampling Results-Yellow River Background

Technically-Based Local Limits for Industrial Users

EPA PP No.	Analyte	EPA Method	Units	Method Detection Level	Reporting Limit	Concentration Tues 16-Jul	Concentration Wed 17-Jul	Concentration Thurs 18-Jul	Concentration Fri 19-Jul	Concentration Sat 20-Jul	Concentration Sun 21-Jul	Concentration Mon 22-Jul	Sample Quantity
1-100	Heptachlor	EPA 608	ug/L	0.01	0.05	--	ND	--	--	ND	--	--	2
1-101	Heptachlor epoxide	EPA 608	ug/L	0.019	0.05	--	ND	--	--	ND	--	--	2
1-102	alpha-BHC	EPA 608	ug/L	0.0086	0.05	--	ND	--	--	ND	--	--	2
1-103	beta-BHC	EPA 608	ug/L	0.018	0.05	--	ND	--	--	ND	--	--	2
1-104	gamma-BHC	EPA 608	ug/L	0.006	0.05	--	ND	--	--	ND	--	--	2
1-105	delta-BHC	EPA 608	ug/L	0.009	0.05	--	ND	--	--	ND	--	--	2
1-106	Aroclor 1242	EPA 608	ug/L	0.1	0.5	--	ND	--	--	ND	--	--	2
1-107	Aroclor 1254	EPA 608	ug/L	0.17	0.5	--	ND	--	--	ND	--	--	2
1-108	Aroclor 1221	EPA 608	ug/L	0.13	0.5	--	ND	--	--	ND	--	--	2
1-109	Aroclor 1232	EPA 608	ug/L	0.09	0.5	--	ND	--	--	ND	--	--	2
1-110	Aroclor 1248	EPA 608	ug/L	0.08	0.5	--	ND	--	--	ND	--	--	2
1-111	Aroclor 1260	EPA 608	ug/L	0.16	0.5	--	ND	--	--	ND	--	--	2
1-112	Aroclor 1016	EPA 608	ug/L	0.21	0.5	--	ND	--	--	ND	--	--	2
1-113	Toxaphene	EPA 608	ug/L	0.24	0.5	--	ND	--	--	ND	--	--	2
1-114	Antimony	EPA 200.8	--	--	--	--	--	--	--	--	--	--	0
1-129	2,3,7,8 tertrachloro-dibenzo-p-dioxin (TCDD)		--	--	--	--	--	--	--	--	--	--	0
National Pollutants of Concern (NPC)													
1-115	Arsenic	EPA 200.8	ug/L	1.47	5	ND	ND	ND	ND	ND	--	ND	6
1-118	Cadmium	EPA 200.8	ug/L	0.0324	0.7	ND	ND	ND	ND	0.097	--	ND	6
1-119	Chromium	EPA 200.8	ug/L	1.84	5	ND	ND	ND	ND	ND	--	ND	6
1-120	Copper	EPA 200.8	ug/L	0.773	5	16.9	19.6	24.7	25.4	20.0	--	18.6	6
1-121	Cyanide, Total	SM 4500-CN B.E	mg/L	0.004	0.01	ND	ND	ND	ND	ND	ND	ND	7
1-122	Lead	EPA 200.8	ug/L	0.203	1	ND	ND	ND	ND	0.601	--	ND	6
1-123	Mercury	EPA 245.1	mg/L	0.00004	0.0002	ND	ND	ND	ND	0.00005	--	ND	6
1-124	Nickel	EPA 200.8	ug/L	0.341	5	ND	ND	ND	ND	1.05	--	ND	6
1-125	Selenium	EPA 200.8	ug/L	0.434	5	ND	ND	ND	ND	0.484	--	ND	6
1-126	Silver	EPA 200.8	ug/L	0.0551	1	ND	ND	ND	ND	0.112	--	ND	6
1-127	Zinc	EPA 200.8	ug/L	2.89	10	94.9	112.0	124.0	114.0	87.4	--	97.0	6
2-11	Molybdenum		ug/L	0.222	5	ND	ND	ND	ND	1.16	--	ND	6
2-13	Biochemical Oxygen Demand	SM 5210 B	mg/L	50	50	185	183	226	256	195	--	203	6
2-14	Residue, Suspended (TSS)	SM 2450 D	mg/L	1.6	7.9	111	238	214	219	238	--	145	6
2-15	Nitrogen, Ammonia (As N)	EPA 350.1	mg/L	0.874	2	32.8	35.0	33.8	35.1	36.9	--	47.4	6
Georgia Pollutants of Concern (GPC)													
2-1	Methoxychlor	EPA 608.2	ug/L	0.06	0.3	--	ND	--	--	ND	--	--	2
2-2	2,4-D	EPA 615	ug/L	0.45	2	--	ND	--	--	ND	--	--	2
2-3	2,4,5-TP (Silvex)	EPA 615	ug/L	0.34	2	--	ND	--	--	ND	--	--	2
Plant-Specific Parameters (PSP)													
3-1	Oil and Grease	EPA 1664	mg/L	2.6	10	26.2	21.8	34.8	23.4	24.4	44.8	21.3	7
3-2	Residue, Total (TS)	SM 2450 G	mg/L	0.001	0.001	384	500	432	444	440	--	448	6
3-3	Phosphorus, Total (As P)	SM 4500-P	mg/L	0.15	0.5	4.57	4.52	4.12	4.63	4.63	--	5.50	6
3-4	Nitrogen, total Kjeldahl (TKN)	EPA 351.2	mg/L	4.06	5	41.4	41.5	46.7	48.2	45.1	--	52.0	6
3-5	Nitrogen, Nitrate-Nitrite (as N)	EPA 353.2	mg/L	0.016	0.05	ND	ND	ND	ND	ND	--	ND	6
3-6	Chemical Oxygen Demand	EPA 410.4	mg/L	4.59	10	467	544	637	544	528	--	469	6

Notes:

ND Not detected. Pollutant not present or is below the minimum detection limit.

-- Analysis not performed.

(highlighted) Indicates analyte was detected.

TABLE A-2
NCWSA Local Limits Sampling Results-Yellow River Influent
Technically-Based Local Limits for Industrial Users

EPA PP No.	Analyte	EPA Method	Units	Method Detection Level	Reporting Limit	Concentration							Sample Quantity
						Tues 7/16/2019	Wed 7/17/2019	Thurs 7/18/2019	Fri 7/19/2019	Sat 7/20/2019	Sun 7/21/2019	Mon 7/22/2019	
Organic Priority Pollutants													
1-1	Acenaphthene	EPA 625	ug/L	21	50	--	--	ND	--	--	ND	--	2
1-2	Acrolein	EPA 624	ug/L	2.9	50	ND	--	ND	--	--	ND	--	3
1-3	Acrylonitrile	EPA 624	ug/L	2.1	50	ND	--	ND	--	--	ND	--	3
1-4	Benzene	EPA 624	ug/L	0.27	2	ND	--	ND	--	--	ND	--	3
1-5	Benzidine	EPA 625	ug/L	20	400	--	--	ND	--	--	ND	--	2
1-6	Carbon tetrachloride	EPA 624	ug/L	0.53	2	ND	--	ND	--	--	ND	--	3
1-7	Chlorobenzene	EPA 624	ug/L	0.36	10	ND	--	ND	--	--	ND	--	3
1-8	1,2,4-Trichlorobenzene	EPA 625	ug/L	21	50	--	--	ND	--	--	ND	--	2
1-9	Hexachlorobenzene	EPA 625	ug/L	17	50	--	--	ND	--	--	ND	--	2
1-10	1,2-Dichloroethane	EPA 624	ug/L	0.33	2	ND	--	ND	--	--	ND	--	3
1-11	1,1,1-Trichloroethane	EPA 624	ug/L	0.36	2	ND	--	ND	--	--	ND	--	3
1-12	Hexachloroethane	EPA 625	ug/L	25	50	--	--	ND	--	--	ND	--	2
1-13	1,1-Dichloroethane	EPA 624	ug/L	0.27	2	ND	--	ND	--	--	ND	--	3
1-14	1,1,2-Trichloroethane	EPA 624	ug/L	0.32	2	ND	--	ND	--	--	ND	--	3
1-15	1,1,2,2-Tetrachloroethane	EPA 624	ug/L	0.3	2	ND	--	ND	--	--	ND	--	3
1-16	Chloroethane	EPA 624	ug/L	0.38	5	ND	--	ND	--	--	ND	--	3
1-18	Bis(2-chloroethyl)ether	EPA 625	ug/L	17	50	--	--	ND	--	--	ND	--	2
1-19	2-Chloroethyl vinyl ether	EPA 624	ug/L	0.78	10	ND	--	ND	--	--	ND	--	3
1-20	2-Chloronaphthalene	EPA 625	ug/L	36	50	--	--	ND	--	--	ND	--	2
1-21	2,4,6-Trichlorophenol	EPA 625	ug/L	18	50	--	--	ND	--	--	ND	--	2
1-22	4-Chloro-3-methylphenol	EPA 625	ug/L	16	50	--	--	ND	--	--	ND	--	2
1-23	Chloroform	EPA 624	ug/L	0.43	2	2.9	--	ND	--	--	3.4	--	3
1-24	2-Chlorophenol	EPA 625	ug/L	18	50	--	--	ND	--	--	ND	--	2
1-25	1,2-Dichlorobenzene	EPA 624	ug/L	0.24	5	ND	--	ND	--	--	ND	--	3
1-26	1,3-Dichlorobenzene	EPA 624	ug/L	0.29	5	ND	--	ND	--	--	ND	--	3
1-27	1,4-Dichlorobenzene	EPA 624	ug/L	0.34	5	ND	--	ND	--	--	ND	--	3
1-28	3,3´-Dichlorobenzidine	EPA 625	ug/L	24	50	--	--	ND	--	--	ND	--	2
1-29	1,1-Dichloroethene	EPA 624	ug/L	0.56	2	ND	--	ND	--	--	ND	--	3
1-30	trans-1,2-Dichloroethene	EPA 624	ug/L	0.35	2	ND	--	ND	--	--	ND	--	3
1-31	2,4-Dichlorophenol	EPA 625	ug/L	15	50	--	--	ND	--	--	ND	--	2
1-32	1,2-Dichloropropane	EPA 624	ug/L	0.48	2	ND	--	ND	--	--	ND	--	3
1-33	cis-1,3-Dichloropropene	EPA 624	ug/L	0.41	2	ND	--	ND	--	--	ND	--	3
1-34	2,4-Dimethylphenol	EPA 625	ug/L	23	50	--	--	ND	--	--	ND	--	2
1-35	2,4-Dinitrotoluene	EPA 625	ug/L	27	50	--	--	ND	--	--	ND	--	2
1-36	2,6-Dinitrotoluene	EPA 625	ug/L	17	50	--	--	ND	--	--	ND	--	2
1-37	1,2-Diphenylhydrazine	EPA 625	ug/L	17	50	--	--	ND	--	--	ND	--	2
1-38	Ethylbenzene	EPA 624	ug/L	0.24	2	ND	--	ND	--	--	ND	--	3
1-39	Fluoranthene	EPA 625	ug/L	13	50	--	--	ND	--	--	ND	--	2
1-40	4-Chlorophenyl phenyl ether	EPA 625	ug/L	20	50	--	--	ND	--	--	ND	--	2
1-41	4-Bromophenyl phenyl ether	EPA 625	ug/L	17	50	--	--	ND	--	--	ND	--	2
1-42	Bis(2-chloroisopropyl)ether	EPA 625	ug/L	28	50	--	--	ND	--	--	ND	--	2
1-43	Bis(2-chloroethoxy)methane	EPA 625	ug/L	14	50	--	--	ND	--	--	ND	--	2
1-44	Methylene chloride	EPA 624	ug/L	0.34	10	ND	--	ND	--	--	ND	--	3
1-45	Chloromethane	EPA 624	ug/L	0.42	10	ND	--	ND	--	--	ND	--	3
1-46	Bromomethane	EPA 624	ug/L	0.79	10	ND	--	ND	--	--	ND	--	3
1-47	Bromoform	EPA 624	ug/L	0.48	10	ND	--	ND	--	--	ND	--	3
1-48	Dichlorobromomethane	EPA 624	--	--	--	--	--	--	--	--	--	--	0
1-51	Chlorodibromomethane	EPA 624	--	--	--	--	--	--	--	--	--	--	0
1-52	Hexachlorobutadiene	EPA 625	ug/L	19	50	--	--	ND	--	--	ND	--	2
1-53	Hexachlorocyclopentadiene	EPA 625	ug/L	42	50	--	--	ND	--	--	ND	--	2
1-54	Isophorone	EPA 625	ug/L	14	50	--	--	ND	--	--	ND	--	2
1-55	Naphthalene	EPA 625	ug/L	20	50	--	--	ND	--	--	ND	--	2
1-56	Nitrobenzene	EPA 625	ug/L	13	50	--	--	ND	--	--	ND	--	2
1-57	2-Nitrophenol	EPA 625	ug/L	17	50	--	--	ND	--	--	ND	--	2
1-58	4-Nitrophenol	EPA 625	ug/L	15	130	--	--	ND	--	--	ND	--	2
1-59	2,4-Dinitrophenol	EPA 625	ug/L	44	130	--	--	ND	--	--	ND	--	2
1-60	4,6-Dinitro-2-methylphenol	EPA 625	ug/L	38	100	--	--	ND	--	--	ND	--	2
1-61	N-Nitrosodimethylamine	EPA 625	ug/L	22	50	--	--	ND	--	--	ND	--	2
1-62	N-Nitrosodiphenylamine	EPA 625	ug/L	16	50	--	--	ND	--	--	ND	--	2
1-63	N-Nitrosodi-n-propylamine	EPA 625	ug/L	25	50	--	--	ND	--	--	ND	--	2
1-64	Pentachlorophenol	EPA 625	ug/L	48	130	--	--	ND	--	--	ND	--	2
1-65	Phenol	EPA 625	ug/L	11	50	--	--	ND	--	--	ND	--	2
1-66	Bis(2-ethylhexyl)phthalate	EPA 625	ug/L	31	50	--	--	ND	--	--	ND	--	2
1-67	Butyl benzyl phthalate	EPA 625	ug/L	25	50	--	--	ND	--	--	ND	--	2
1-68	Di-n-butyl phthalate	EPA 625	ug/L	14	50	--	--	ND	--	--	ND	--	2
1-69	Di-n-octyl phthalate	EPA 625	ug/L	32	50	--	--	ND	--	--	ND	--	2
1-70	Diethyl phthalate	EPA 625	ug/L	15	50	--	--	ND	--	--	ND	--	2
1-71	Dimethyl phthalate	EPA 625	ug/L	14	50	--	--	ND	--	--	ND	--	2
1-72	Benz(a)anthracene	EPA 625	ug/L	16	50	--	--	ND	--	--	ND	--	2
1-73	Benzo(a)pyrene	EPA 625	ug/L	9.8	50	--	--	ND	--	--	ND	--	2
1-74	Benzo(b)fluoranthene	EPA 625	ug/L	12	50	--	--	ND	--	--	ND	--	2
1-75	Benzo(k)fluoranthene	EPA 625	ug/L	17	50	--	--	ND	--	--	ND	--	2
1-76	Chrysene	EPA 625	ug/L	12	50	--	--	ND	--	--	ND	--	2
1-77	Acenaphthylene	EPA 625	ug/L	20	50	--	--	ND	--	--	ND	--	2
1-78	Anthracene	EPA 625	ug/L	16	50	--	--	ND	--	--	ND	--	2
1-79	Benzo(g,h,i)perylene	EPA 625	ug/L	7.7	50	--	--	ND	--	--	ND	--	2
1-80	Fluorene	EPA 625	ug/L	19	50	--	--	ND	--	--	ND	--	2
1-81	Phenanthrene	EPA 625	ug/L	14	50	--	--	ND	--	--	ND	--	2
1-82	Dibenz(a,h)anthracene	EPA 625	ug/L	6	50	--	--	ND	--	--	ND	--	2
1-83	Indeno(1,2,3-cd)pyrene	EPA 625	ug/L	6.8	50	--	--	ND	--	--	ND	--	2
1-84	Pyrene	EPA 624	ug/L	18	50	--	--	ND	--	--	ND	--	2
1-85	Tetrachloroethene	EPA 624	ug/L	0.31	2	ND	--	ND	--	--	ND	--	3
1-86	Toluene	EPA 624	ug/L	0.32	2	ND	--	ND	--	--	ND	--	3
1-87	Trichloroethene	EPA 624	ug/L	0.36	2	ND	--	ND	--	--	ND	--	3
1-88	Vinyl chloride	EPA 624	ug/L	0.34	10	ND	--	ND	--	--	ND	--	3
1-89	Aldrin	EPA 608	ug/L	0.0038	0.05	--	--	ND	--	--	ND	--	2
1-90	Dieldrin	EPA 608	ug/L	0.012	0.05	--	--	ND	--	--	ND	--	2
1-91	Chlordane	EPA 608	ug/L	0.19	0.5	--	--	ND	--	--	ND	--	2
1-92	4,4´-DDT	EPA 608	ug/L	0.014	0.05	--	--	ND	--	--	ND	--	2
1-93	4,4´-DDE	EPA 608	ug/L	0.008	0.05	--	--	ND	--	--	ND	--	2
1-94	4,4´-DDD	EPA 608	ug/L	0.016	0.05	--	--	ND	--	--	ND	--	2
1-95	Endosulfan I	EPA 608	ug/L	0.01	0.05	--	--	ND	--	--	ND	--	2
1-96	Endosulfan II	EPA 608	ug/L	0.018	0.05	--	--	ND	--	--	ND	--	2
1-97	Endosulfan sulfate	EPA 608	ug/L	0.018	0.05	--	--	ND	--	--	ND	--	2
1-98	Endrin	EPA 608	ug/L	0.03	0.05	--	--	ND	--	--	ND	--	2

TABLE A-2
NCWSA Local Limits Sampling Results-Yellow River Influent
Technically-Based Local Limits for Industrial Users

EPA PP No.	Analyte	EPA Method	Units	Method Detection Level	Reporting Limit	Concentration							Sample Quantity
						Tues	Wed	Thurs	Fri	Sat	Sun	Mon	
						7/16/2019	7/17/2019	7/18/2019	7/19/2019	7/20/2019	7/21/2019	7/22/2019	
1-99	Endrin aldehyde	EPA 608	ug/L	0.01	0.05	--	--	ND	--	--	ND	--	2
1-100	Heptachlor	EPA 608	ug/L	0.01	0.05	--	--	ND	--	--	ND	--	2
1-101	Heptachlor epoxide	EPA 608	ug/L	0.019	0.05	--	--	ND	--	--	ND	--	2
1-102	alpha-BHC	EPA 608	ug/L	0.009	0.05	--	--	ND	--	--	ND	--	2
1-103	beta-BHC	EPA 608	ug/L	0.018	0.05	--	--	ND	--	--	ND	--	2
1-104	gamma-BHC	EPA 608	ug/L	0.006	0.05	--	--	ND	--	--	ND	--	2
1-105	delta-BHC	EPA 608	ug/L	0.009	0.05	--	--	ND	--	--	ND	--	2
1-106	Aroclor 1242	EPA 608	ug/L	0.1	0.5	--	--	ND	--	--	ND	--	2
1-107	Aroclor 1254	EPA 608	ug/L	0.17	0.5	--	--	ND	--	--	ND	--	2
1-108	Aroclor 1221	EPA 608	ug/L	0.13	0.5	--	--	ND	--	--	ND	--	2
1-109	Aroclor 1232	EPA 608	ug/L	0.09	0.5	--	--	ND	--	--	ND	--	2
1-110	Aroclor 1248	EPA 608	ug/L	0.08	0.5	--	--	ND	--	--	ND	--	2
1-111	Aroclor 1260	EPA 608	ug/L	0.16	0.5	--	--	ND	--	--	ND	--	2
1-112	Aroclor 1016	EPA 608	ug/L	0.21	0.5	--	--	ND	--	--	ND	--	2
1-113	Toxaphene	EPA 608	ug/L	0.24	0.5	--	--	ND	--	--	ND	--	2
1-114	Antimony	EPA 200.8	--	--	--	--	--	--	--	--	--	--	0
1-129	2,3,7,8 tertrachloro-dibenzo-p-dioxin (TCDD)		--	--	--	--	--	--	--	--	--	--	0
National Pollutants of Concern (NPC)													
1-115	Arsenic	**EPA 200.8**	ug/L	1.47	5	ND	ND	ND	ND	ND	ND	ND	7
1-118	Cadmium	EPA 200.8	ug/L	0.032	0.7	ND	ND	ND	ND	0.093	ND	ND	7
1-119	Chromium	EPA 200.8	ug/L	1.84	5	ND	ND	ND	ND	2.02	ND	ND	7
1-120	Copper	EPA 200.8	ug/L	0.77	5	18.1	26.8	25.7	26.9	29.6	16.9	56.2	7
1-121	Cyanide, Total	SM 4500-CN B.E	mg/L	0.004	0.01	ND	ND	ND	ND	ND	ND	ND	7
1-122	Lead	EPA 200.8	ug/L	0.2	1	ND	ND	ND	ND	1.09	ND	1.25	7
1-123	Mercury	EPA 245.1	mg/L	0.00004	0.0002	ND	ND	ND	ND	0.00005	ND	ND	7
1-124	Nickel	EPA 200.8	ug/L	0.34	5	ND	ND	ND	ND	3.35	ND	ND	7
1-125	Selenium	EPA 200.8	ug/L	0.43	5	ND	ND	ND	ND	1.15	ND	ND	7
1-126	Silver	EPA 200.8	ug/L	0.06	1	ND	ND	ND	ND	0.13	ND	ND	7
1-127	Zinc	EPA 200.8	ug/L	2.89	10	73.4	101.0	108.0	106.0	102.0	52.2	102.0	7
2-11	Molybdenum		ug/L	0.22	5	ND	ND	ND	ND	3.71	ND	ND	7
2-13	Biochemical Oxygen Demand	SM 5210 B	mg/L	50	50	150	138	171	135	159	204	176	7
2-14	Residue, Suspended (TSS)	SM 2450 D	mg/L	2	10	134	213	135	151	266	179	200	7
2-15	Nitrogen, Ammonia (As N)	EPA 350.1	mg/L	0.874	2	29.6	30.3	33.2	30.1	30.1	27.2	34.7	7
Georgia Pollutants of Concern (GPC)													
2-1	Methoxychlor	EPA 608.2	ug/L	0.06	0.3	--	--	ND	--	--	ND	--	2
2-2	2,4-D	EPA 615	ug/L	0.45	2	--	--	ND	--	--	ND	--	2
2-3	2,4,5-TP (Silvex)	EPA 615	ug/L	0.34	2	--	--	ND	--	--	ND	--	2
Plant-Specific Parameters (PSP)													
3-1	Oil and Grease	EPA 1664	mg/L	2.1	7.9	16.8	20.3	10.3	11.5	11.2	12.6	58.9	7
3-2	Residue, Total (TS)	SM 2450 G	mg/L	0.001	0.001	692	664	612	652	1090	1500	1080	7
3-3	Phosphorus, Total (As P)	SM 4500-P	mg/L	0.15	0.5	4.16	4.46	4.69	3.90	4.84	4.17	4.45	7
3-4	Nitrogen, total Kjeldahl (TKN)	EPA 351.2	mg/L	4.06	5	35.9	35.1	41.9	39.1	35.8	25.9	40.8	7
3-5	Nitrogen, Nitrate-Nitrite (as N)	EPA 353.2	mg/L	0.016	0.05	0.88	0.58	0.35	1.21	1.29	2.14	2.55	7
3-6	Chemical Oxygen Demand	EPA 410.4	mg/L	4.59	10	250	508	447	469	451	386	553	7

Notes:
ND Not detected. Pollutant not present or is below the minimum detection limit.
-- Analysis not performed.
(yellow shading) Indicates analyte was detected.

TABLE A-3
NCWSA Local Limits Sampling Results-Yellow River Effluent
Technically-Based Local Limits for Industrial Users

EPA PP No.	Analyte	EPA Method	Units	Method Detection Level	Reporting Limit	Concentration							Sample Quantity
						Tues 16-Jul	Wed 17-Jul	Thurs 18-Jul	Fri 19-Jul	Sat 20-Jul	Sun 21-Jul	Mon 22-Jul	
Organic Priority Pollutants													
1-1	Acenaphthene	EPA 625	ug/L	4.1	10	--	--	ND	--	ND	--	--	2
1-2	Acrolein	EPA 624	ug/L	2.9	50	ND	--	ND	--	ND	--	--	3
1-3	Acrylonitrile	EPA 624	ug/L	2.1	50	ND	--	ND	--	ND	--	--	3
1-4	Benzene	EPA 624	ug/L	0.27	2	ND	--	ND	--	ND	--	--	3
1-5	Benzidine	EPA 625	ug/L	4	80	--	--	ND	--	ND	--	--	2
1-6	Carbon tetrachloride	EPA 624	ug/L	0.53	2	ND	--	ND	--	ND	--	--	3
1-7	Chlorobenzene	EPA 624	ug/L	0.36	10	ND	--	ND	--	ND	--	--	3
1-8	1,2,4-Trichlorobenzene	EPA 625	ug/L	4.2	10	--	--	ND	--	ND	--	--	2
1-9	Hexachlorobenzene	EPA 625	ug/L	3.4	10	--	--	ND	--	ND	--	--	2
1-10	1,2-Dichloroethane	EPA 624	ug/L	0.33	2	ND	--	ND	--	ND	--	--	3
1-11	1,1,1-Trichloroethane	EPA 624	ug/L	0.36	2	ND	--	ND	--	ND	--	--	3
1-12	Hexachloroethane	EPA 625	ug/L	5.1	10	--	--	ND	--	ND	--	--	2
1-13	1,1-Dichloroethane	EPA 624	ug/L	0.27	2	ND	--	ND	--	ND	--	--	3
1-14	1,1,2-Trichloroethane	EPA 624	ug/L	0.32	2	ND	--	ND	--	ND	--	--	3
1-15	1,1,2,2-Tetrachloroethane	EPA 624	ug/L	0.3	2	ND	--	ND	--	ND	--	--	3
1-16	Chloroethane	EPA 624	ug/L	0.38	5	ND	--	ND	--	ND	--	--	3
1-18	Bis(2-chloroethyl)ether	EPA 625	ug/L	3.4	10	--	--	ND	--	ND	--	--	2
1-19	2-Chloroethyl vinyl ether	EPA 624	ug/L	0.78	10	ND	--	ND	--	ND	--	--	3
1-20	2-Chloronaphthalene	EPA 625	ug/L	7.1	10	--	--	ND	--	ND	--	--	2
1-21	2,4,6-Trichlorophenol	EPA 625	ug/L	3.6	10	--	--	ND	--	ND	--	--	2
1-22	4-Chloro-3-methylphenol	EPA 625	ug/L	3.1	10	--	--	ND	--	ND	--	--	2
1-23	Chloroform	EPA 624	ug/L	0.43	2	ND	--	ND	--	ND	--	--	3
1-24	2-Chlorophenol	EPA 625	ug/L	3.6	10	--	--	ND	--	ND	--	--	2
1-25	1,2-Dichlorobenzene	EPA 624	ug/L	0.24	5	ND	--	ND	--	4.4	--	--	3
1-26	1,3-Dichlorobenzene	EPA 624	ug/L	0.29	5	ND	--	ND	--	ND	--	--	3
1-27	1,4-Dichlorobenzene	EPA 624	ug/L	0.34	5	ND	--	ND	--	0.75	--	--	3
1-28	3,3´-Dichlorobenzidine	EPA 625	ug/L	4.7	10	--	--	ND	--	ND	--	--	2
1-29	1,1-Dichloroethene	EPA 624	ug/L	0.56	2	ND	--	ND	--	ND	--	--	3
1-30	trans-1,2-Dichloroethene	EPA 624	ug/L	0.35	2	ND	--	ND	--	ND	--	--	3
1-31	2,4-Dichlorophenol	EPA 625	ug/L	3	10	--	--	ND	--	ND	--	--	2
1-32	1,2-Dichloropropane	EPA 624	ug/L	0.48	2	ND	--	ND	--	ND	--	--	3
1-33	cis-1,3-Dichloropropene	EPA 624	ug/L	0.41	2	ND	--	ND	--	ND	--	--	3
1-34	2,4-Dimethylphenol	EPA 625	ug/L	4.5	10	--	--	ND	--	ND	--	--	2
1-35	2,4-Dinitrotoluene	EPA 625	ug/L	5.5	10	--	--	ND	--	ND	--	--	2
1-36	2,6-Dinitrotoluene	EPA 625	ug/L	3.4	10	--	--	ND	--	ND	--	--	2
1-37	1,2-Diphenylhydrazine	EPA 625	ug/L	3.4	10	--	--	ND	--	ND	--	--	2
1-38	Ethylbenzene	EPA 624	ug/L	0.24	2	ND	--	ND	--	ND	--	--	3
1-39	Fluoranthene	EPA 625	ug/L	2.7	10	--	--	ND	--	ND	--	--	2
1-40	4-Chlorophenyl phenyl ether	EPA 625	ug/L	4	10	--	--	ND	--	ND	--	--	2
1-41	4-Bromophenyl phenyl ether	EPA 625	ug/L	3.3	10	--	--	ND	--	ND	--	--	2
1-42	Bis(2-chloroisopropyl)ether	EPA 625	ug/L	5.6	10	--	--	ND	--	ND	--	--	2
1-43	Bis(2-chloroethoxy)methane	EPA 625	ug/L	2.8	10	--	--	ND	--	ND	--	--	2
1-44	Methylene chloride	EPA 624	ug/L	0.34	10	ND	--	ND	--	ND	--	--	3
1-45	Chloromethane	EPA 624	ug/L	0.42	10	ND	--	ND	--	ND	--	--	3
1-46	Bromomethane	EPA 624	ug/L	0.79	10	ND	--	ND	--	ND	--	--	3
1-47	Bromoform	EPA 624	ug/L	0.48	10	ND	--	ND	--	ND	--	--	3
1-48	Dichlorobromomethane	EPA 624	--	--	--	--	--	--	--	--	--	--	0
1-51	Chlorodibromomethane	EPA 624	--	--	--	--	--	--	--	--	--	--	0
1-52	Hexachlorobutadiene	EPA 625	ug/L	3.8	10	--	--	ND	--	ND	--	--	2
1-53	Hexachlorocyclopentadiene	EPA 625	ug/L	8.4	10	--	--	ND	--	ND	--	--	2
1-54	Isophorone	EPA 625	ug/L	2.9	10	--	--	ND	--	ND	--	--	2
1-55	Naphthalene	EPA 625	ug/L	4	10	--	--	ND	--	ND	--	--	2
1-56	Nitrobenzene	EPA 625	ug/L	2.7	10	--	--	ND	--	ND	--	--	2
1-57	2-Nitrophenol	EPA 625	ug/L	3.4	10	--	--	ND	--	ND	--	--	2
1-58	4-Nitrophenol	EPA 625	ug/L	3	25	--	--	ND	--	ND	--	--	2
1-59	2,4-Dinitrophenol	EPA 625	ug/L	8.8	25	--	--	ND	--	ND	--	--	2
1-60	4,6-Dinitro-2-methylphenol	EPA 625	ug/L	7.5	20	--	--	ND	--	ND	--	--	2
1-61	N-Nitrosodimethylamine	EPA 625	ug/L	4.5	10	--	--	ND	--	ND	--	--	2
1-62	N-Nitrosodiphenylamine	EPA 625	ug/L	3.1	10	--	--	ND	--	ND	--	--	2
1-63	N-Nitrosodi-n-propylamine	EPA 625	ug/L	5	10	--	--	ND	--	ND	--	--	2
1-64	Pentachlorophenol	EPA 625	ug/L	9.5	25	--	--	ND	--	ND	--	--	2
1-65	Phenol	EPA 625	ug/L	2.3	10	--	--	ND	--	ND	--	--	2
1-66	Bis(2-ethylhexyl)phthalate	EPA 625	ug/L	6.3	10	--	--	ND	--	ND	--	--	2
1-67	Butyl benzyl phthalate	EPA 625	ug/L	5.1	10	--	--	ND	--	ND	--	--	2
1-68	Di-n-butyl phthalate	EPA 625	ug/L	2.7	10	--	--	ND	--	ND	--	--	2
1-69	Di-n-octyl phthalate	EPA 625	ug/L	6.5	10	--	--	ND	--	ND	--	--	2
1-70	Diethyl phthalate	EPA 625	ug/L	3	10	--	--	ND	--	ND	--	--	2
1-71	Dimethyl phthalate	EPA 625	ug/L	2.8	10	--	--	ND	--	ND	--	--	2
1-72	Benz(a)anthracene	EPA 625	ug/L	3.2	10	--	--	ND	--	ND	--	--	2
1-73	Benzo(a)pyrene	EPA 625	ug/L	2	10	--	--	ND	--	ND	--	--	2
1-74	Benzo(b)fluoranthene	EPA 625	ug/L	2.3	10	--	--	ND	--	ND	--	--	2
1-75	Benzo(k)fluoranthene	EPA 625	ug/L	3.4	10	--	--	ND	--	ND	--	--	2
1-76	Chrysene	EPA 625	ug/L	2.4	10	--	--	ND	--	ND	--	--	2
1-77	Acenaphthylene	EPA 625	ug/L	4	10	--	--	ND	--	ND	--	--	2
1-78	Anthracene	EPA 625	ug/L	3.2	10	--	--	ND	--	ND	--	--	2
1-79	Benzo(g,h,i)perylene	EPA 625	ug/L	1.5	10	--	--	ND	--	ND	--	--	2
1-80	Fluorene	EPA 625	ug/L	3.9	10	--	--	ND	--	ND	--	--	2
1-81	Phenanthrene	EPA 625	ug/L	2.8	10	--	--	ND	--	ND	--	--	2
1-82	Dibenz(a,h)anthracene	EPA 625	ug/L	1.2	10	--	--	ND	--	ND	--	--	2
1-83	Indeno(1,2,3-cd)pyrene	EPA 625	ug/L	1.4	10	--	--	ND	--	ND	--	--	2
1-84	Pyrene	EPA 624	ug/L	3.5	10	--	--	ND	--	ND	--	--	2
1-85	Tetrachloroethene	EPA 624	ug/L	0.31	2	ND	--	ND	--	ND	--	--	3
1-86	Toluene	EPA 624	ug/L	0.32	2	ND	--	ND	--	ND	--	--	3
1-87	Trichloroethene	EPA 624	ug/L	0.36	2	ND	--	ND	--	ND	--	--	3
1-88	Vinyl chloride	EPA 624	ug/L	0.34	10	ND	--	ND	--	ND	--	--	3
1-89	Aldrin	EPA 608	ug/L	0.0038	0.05	--	--	ND	--	ND	--	--	2
1-90	Dieldrin	EPA 608	ug/L	0.012	0.05	--	--	ND	--	ND	--	--	2
1-91	Chlordane	EPA 608	ug/L	0.19	0.5	--	--	ND	--	ND	--	--	2
1-92	4,4´-DDT	EPA 608	ug/L	0.014	0.05	--	--	ND	--	ND	--	--	2
1-93	4,4´-DDE	EPA 608	ug/L	0.008	0.05	--	--	ND	--	ND	--	--	2
1-94	4,4´-DDD	EPA 608	ug/L	0.016	0.05	--	--	ND	--	ND	--	--	2
1-95	Endosulfan I	EPA 608	ug/L	0.01	0.05	--	--	ND	--	ND	--	--	2
1-96	Endosulfan II	EPA 608	ug/L	0.018	0.05	--	--	ND	--	ND	--	--	2
1-97	Endosulfan sulfate	EPA 608	ug/L	0.018	0.05	--	--	ND	--	ND	--	--	2
1-98	Endrin	EPA 608	ug/L	0.03	0.05	--	--	ND	--	ND	--	--	2
1-99	Endrin aldehyde	EPA 608	ug/L	0.01	0.05	--	--	ND	--	ND	--	--	2

TABLE A-3

NCWSA Local Limits Sampling Results-Yellow River Effluent

Technically-Based Local Limits for Industrial Users

EPA PP No.	Analyte	EPA Method	Units	Method Detection Level	Reporting Limit	Concentration							Sample Quantity
						Tues 16-Jul	Wed 17-Jul	Thurs 18-Jul	Fri 19-Jul	Sat 20-Jul	Sun 21-Jul	Mon 22-Jul	
1-100	Heptachlor	EPA 608	ug/L	0.01	0.05	--	--	ND	--	ND	--	--	2
1-101	Heptachlor epoxide	EPA 608	ug/L	0.019	0.05	--	--	ND	--	ND	--	--	2
1-102	alpha-BHC	EPA 608	ug/L	0.009	0.05	--	--	ND	--	ND	--	--	2
1-103	beta-BHC	EPA 608	ug/L	0.018	0.05	--	--	ND	--	ND	--	--	2
1-104	gamma-BHC	EPA 608	ug/L	0.006	0.05	--	--	ND	--	ND	--	--	2
1-105	delta-BHC	EPA 608	ug/L	0.009	0.05	--	--	ND	--	ND	--	--	2
1-106	Aroclor 1242	EPA 608	ug/L	0.1	0.5	--	--	ND	--	ND	--	--	2
1-107	Aroclor 1254	EPA 608	ug/L	0.17	0.5	--	--	ND	--	ND	--	--	2
1-108	Aroclor 1221	EPA 608	ug/L	0.13	0.5	--	--	ND	--	ND	--	--	2
1-109	Aroclor 1232	EPA 608	ug/L	0.09	0.5	--	--	ND	--	ND	--	--	2
1-110	Aroclor 1248	EPA 608	ug/L	0.08	0.5	--	--	ND	--	ND	--	--	2
1-111	Aroclor 1260	EPA 608	ug/L	0.16	0.5	--	--	ND	--	ND	--	--	2
1-112	Aroclor 1016	EPA 608	ug/L	0.21	0.5	--	--	ND	--	ND	--	--	2
1-113	Toxaphene	EPA 608	ug/L	0.24	0.5	--	--	ND	--	ND	--	--	2
1-114	Antimony	EPA 200.8	--	--	--	--	--	--	--	--	--	--	0
1-129	2,3,7,8 tertrachloro-dibenzo-p-dioxin (TCDD)		--	--	--	--	--	--	--	--	--	--	0
National Pollutants of Concern (NPC)													
1-115	Arsenic	EPA 200.8	ug/L	1.47	5	ND	ND	ND	ND	ND	ND	ND	7
1-118	Cadmium	EPA 200.8	ug/L	0.03	0.7	ND	ND	ND	ND	ND	ND	ND	7
1-119	Chromium	EPA 200.8	ug/L	1.84	5	ND	ND	ND	ND	ND	ND	ND	7
1-120	Copper	EPA 200.8	ug/L	0.77	5	13.10	6.66	7.32	7.61	8.34	7.36	7.78	7
1-121	Cyanide, Total	SM 4500-CN B.E	mg/L	0.004	0.01	ND	ND	ND	ND	ND	ND	ND	7
1-122	Lead	EPA 200.8	ug/L	0.2	1	ND	ND	ND	ND	ND	ND	ND	7
1-123	Mercury	EPA 245.1	mg/L	0.00004	0.0002	ND	ND	ND	ND	ND	ND	ND	7
1-124	Nickel	EPA 200.8	ug/L	0.34	5	8.01	ND	ND	ND	2.33	ND	ND	7
1-125	Selenium	EPA 200.8	ug/L	0.43	5	ND	ND	ND	ND	0.90	ND	ND	7
1-126	Silver	EPA 200.8	ug/L	0.06	1	ND	ND	ND	ND	ND	ND	ND	7
1-127	Zinc	EPA 200.8	ug/L	2.89	10	52.9	43.7	44.0	46.3	39.8	38.8	43.9	7
2-11	Molybdenum		ug/L	0.22	5	ND	ND	ND	ND	1.71	ND	ND	7
2-13	Biochemical Oxygen Demand	SM 5210 B	mg/L	5	5	8.8	ND	ND	ND	11.7	21.9	ND	7
2-14	Residue, Suspended (TSS)	SM 2450 D	mg/L	1	5	ND	ND	ND	ND	2.50	ND	ND	7
2-15	Nitrogen, Ammonia (As N)	EPA 350.1	mg/L	0.087	0.2	ND	0.24	ND	ND	ND	ND	ND	7
Georgia Pollutants of Concern (GPC)													
2-1	Methoxychlor	EPA 608.2	ug/L	0.06	0.3	--	--	ND	--	ND	--	--	2
2-2	2,4-D	EPA 615	ug/L	0.45	2	--	--	ND	--	ND	--	--	2
2-3	2,4,5-TP (Silvex)	EPA 615	ug/L	0.34	2	--	--	ND	--	ND	--	--	2
Plant-Specific Parameters (PSP)													
3-1	Oil and Grease	EPA 1664	mg/L	2.2	8.3	--	ND	ND	ND	1.60	ND	ND	6
3-2	Residue, Total (TS)	SM 2450 G	mg/L	0.001	0.001	508	524	616	508	520	708	840	7
3-3	Phosphorus, Total (As P)	SM 4500-P	mg/L	0.15	0.5	2.49	2.83	3.31	3.39	3.55	3.67	3.36	7
3-4	Nitrogen, total Kjeldahl (TKN)	EPA 351.2	mg/L	0.41	0.5	ND	ND	ND	ND	ND	ND	ND	7
3-5	Nitrogen, Nitrate-Nitrite (as N)	EPA 353.2	mg/L	0.32	1	12.2	14.2	17.0	15.9	16.2	18.6	16.2	7
3-6	Chemical Oxygen Demand	EPA 410.4	mg/L	4.59	10	14.5	19.0	16.8	28.1	19.0	34.9	34.9	7

Notes:

ND Not detected. Pollutant not present or is below the minimum detection limit.

-- Analysis not performed.

(shaded) Indicates analyte was detected.

TABLE A-4
NCWSA Local Limits Sampling Results-Yellow River Sludge
Technically-Based Local Limits for Industrial Users

EPA PP No.	Organic Priority Pollutants	EPA Method	Units	Method Detection Level	Reporting Limit	Concentration				Sample Quantity
						Sample 1	Sample 2	Sample 3	Sample 4	
						16-Jul	16-Jul	22-Jul	22-Jul	
Organic Priority Pollutants										
1-1	Acenaphthene	EPA 625	--	--	--	--	--	--	--	0
1-2	Acrolein	EPA 624	--	--	--	--	--	--	--	0
1-3	Acrylonitrile	EPA 624	--	--	--	--	--	--	--	0
1-4	Benzene	EPA 624	--	--	--	--	--	--	--	0
1-5	Benzidine	EPA 625	--	--	--	--	--	--	--	0
1-6	Carbon tetrachloride	EPA 624	--	--	--	--	--	--	--	0
1-7	Chlorobenzene	EPA 624	--	--	--	--	--	--	--	0
1-8	1,2,4-Trichlorobenzene	EPA 625	--	--	--	--	--	--	--	0
1-9	Hexachlorobenzene	EPA 625	--	--	--	--	--	--	--	0
1-10	1,2-Dichloroethane	EPA 624	--	--	--	--	--	--	--	0
1-11	1,1,1-Trichloroethane	EPA 624	--	--	--	--	--	--	--	0
1-12	Hexachloroethane	EPA 625	--	--	--	--	--	--	--	0
1-13	1,1-Dichloroethane	EPA 624	--	--	--	--	--	--	--	0
1-14	1,1,2-Trichloroethane	EPA 624	--	--	--	--	--	--	--	0
1-15	1,1,2,2-Tetrachloroethane	EPA 624	--	--	--	--	--	--	--	0
1-16	Chloroethane	EPA 624	--	--	--	--	--	--	--	0
1-18	Bis(2-chloroethyl)ether	EPA 625	--	--	--	--	--	--	--	0
1-19	2-Chloroethyl vinyl ether	EPA 624	--	--	--	--	--	--	--	0
1-20	2-Chloronaphthalene	EPA 625	--	--	--	--	--	--	--	0
1-21	2,4,6-Trichlorophenol	EPA 625	--	--	--	--	--	--	--	0
1-22	4-Chloro-3-methylphenol	EPA 625	--	--	--	--	--	--	--	0
1-23	Chloroform	EPA 624	--	--	--	--	--	--	--	0
1-24	2-Chlorophenol	EPA 625	--	--	--	--	--	--	--	0
1-25	1,2-Dichlorobenzene	EPA 624	--	--	--	--	--	--	--	0
1-26	1,3-Dichlorobenzene	EPA 624	--	--	--	--	--	--	--	0
1-27	1,4-Dichlorobenzene	EPA 624	--	--	--	--	--	--	--	0
1-28	3,3´-Dichlorobenzidine	EPA 625	--	--	--	--	--	--	--	0
1-29	1,1-Dichloroethene	EPA 624	--	--	--	--	--	--	--	0
1-30	trans-1,2-Dichloroethene	EPA 624	--	--	--	--	--	--	--	0
1-31	2,4-Dichlorophenol	EPA 625	--	--	--	--	--	--	--	0
1-32	1,2-Dichloropropane	EPA 624	--	--	--	--	--	--	--	0
1-33	cis-1,3-Dichloropropene	EPA 624	--	--	--	--	--	--	--	0
1-34	2,4-Dimethylphenol	EPA 625	--	--	--	--	--	--	--	0
1-35	2,4-Dinitrotoluene	EPA 625	--	--	--	--	--	--	--	0
1-36	2,6-Dinitrotoluene	EPA 625	--	--	--	--	--	--	--	0
1-37	1,2-Diphenylhydrazine	EPA 625	--	--	--	--	--	--	--	0
1-38	Ethylbenzene	EPA 624	--	--	--	--	--	--	--	0
1-39	Fluoranthene	EPA 625	--	--	--	--	--	--	--	0
1-40	4-Chlorophenyl phenyl ether	EPA 625	--	--	--	--	--	--	--	0
1-41	4-Bromophenyl phenyl ether	EPA 625	--	--	--	--	--	--	--	0
1-42	Bis(2-chloroisopropyl)ether	EPA 625	--	--	--	--	--	--	--	0
1-43	Bis(2-chloroethoxy)methane	EPA 625	--	--	--	--	--	--	--	0
1-44	Methylene chloride	EPA 624	--	--	--	--	--	--	--	0
1-45	Chloromethane	EPA 624	--	--	--	--	--	--	--	0
1-46	Bromomethane	EPA 624	--	--	--	--	--	--	--	0
1-47	Bromoform	EPA 624	--	--	--	--	--	--	--	0
1-48	Dichlorobromomethane	EPA 624	--	--	--	--	--	--	--	0
1-51	Chlorodibromomethane	EPA 624	--	--	--	--	--	--	--	0
1-52	Hexachlorobutadiene	EPA 625	--	--	--	--	--	--	--	0
1-53	Hexachlorocyclopentadiene	EPA 625	--	--	--	--	--	--	--	0
1-54	Isophorone	EPA 625	--	--	--	--	--	--	--	0
1-55	Naphthalene	EPA 625	--	--	--	--	--	--	--	0
1-56	Nitrobenzene	EPA 625	--	--	--	--	--	--	--	0
1-57	2-Nitrophenol	EPA 625	--	--	--	--	--	--	--	0
1-58	4-Nitrophenol	EPA 625	--	--	--	--	--	--	--	0
1-59	2,4-Dinitrophenol	EPA 625	--	--	--	--	--	--	--	0
1-60	4,6-Dinitro-2-methylphenol	EPA 625	--	--	--	--	--	--	--	0
1-61	N-Nitrosodimethylamine	EPA 625	--	--	--	--	--	--	--	0
1-62	N-Nitrosodiphenylamine	EPA 625	--	--	--	--	--	--	--	0
1-63	N-Nitrosodi-n-propylamine	EPA 625	--	--	--	--	--	--	--	0
1-64	Pentachlorophenol	EPA 625	--	--	--	--	--	--	--	0
1-65	Phenol	EPA 625	--	--	--	--	--	--	--	0
1-66	Bis(2-ethylhexyl)phthalate	EPA 625	--	--	--	--	--	--	--	0
1-67	Butyl benzyl phthalate	EPA 625	--	--	--	--	--	--	--	0
1-68	Di-n-butyl phthalate	EPA 625	--	--	--	--	--	--	--	0
1-69	Di-n-octyl phthalate	EPA 625	--	--	--	--	--	--	--	0
1-70	Diethyl phthalate	EPA 625	--	--	--	--	--	--	--	0
1-71	Dimethyl phthalate	EPA 625	--	--	--	--	--	--	--	0
1-72	Benz(a)anthracene	EPA 625	--	--	--	--	--	--	--	0
1-73	Benzo(a)pyrene	EPA 625	--	--	--	--	--	--	--	0
1-74	Benzo(b)fluoranthene	EPA 625	--	--	--	--	--	--	--	0
1-75	Benzo(k)fluoranthene	EPA 625	--	--	--	--	--	--	--	0
1-76	Chrysene	EPA 625	--	--	--	--	--	--	--	0
1-77	Acenaphthylene	EPA 625	--	--	--	--	--	--	--	0
1-78	Anthracene	EPA 625	--	--	--	--	--	--	--	0
1-79	Benzo(g,h,i)perylene	EPA 625	--	--	--	--	--	--	--	0
1-80	Fluorene	EPA 625	--	--	--	--	--	--	--	0
1-81	Phenanthrene	EPA 625	--	--	--	--	--	--	--	0
1-82	Dibenz(a,h)anthracene	EPA 625	--	--	--	--	--	--	--	0
1-83	Indeno(1,2,3-cd)pyrene	EPA 625	--	--	--	--	--	--	--	0
1-84	Pyrene	EPA 624	--	--	--	--	--	--	--	0
1-85	Tetrachloroethene	EPA 624	--	--	--	--	--	--	--	0
1-86	Toluene	EPA 624	--	--	--	--	--	--	--	0
1-87	Trichloroethene	EPA 624	--	--	--	--	--	--	--	0
1-88	Vinyl chloride	EPA 624	--	--	--	--	--	--	--	0
1-89	Aldrin	EPA 608	--	--	--	--	--	--	--	0

TABLE A-4

NCWSA Local Limits Sampling Results-Yellow River Sludge

Technically-Based Local Limits for Industrial Users

EPA PP No.	Organic Priority Pollutants	EPA Method	Units	Method Detection Level	Reporting Limit	Concentration Sample 1	Sample 2	Sample 3	Sample 4	Sample Quantity
						16-Jul	16-Jul	22-Jul	22-Jul	
1-90	Dieldrin	EPA 608	--	--	--	--	--	--	--	0
1-91	Chlordane	EPA 608	--	--	--	--	--	--	--	0
1-92	4,4´-DDT	EPA 608	--	--	--	--	--	--	--	0
1-93	4,4´-DDE	EPA 608	--	--	--	--	--	--	--	0
1-94	4,4´-DDD	EPA 608	--	--	--	--	--	--	--	0
1-95	Endosulfan I	EPA 608	--	--	--	--	--	--	--	0
1-96	Endosulfan II	EPA 608	--	--	--	--	--	--	--	0
1-97	Endosulfan sulfate	EPA 608	--	--	--	--	--	--	--	0
1-98	Endrin	EPA 608	--	--	--	--	--	--	--	0
1-99	Endrin aldehyde	EPA 608	--	--	--	--	--	--	--	0
1-100	Heptachlor	EPA 608	--	--	--	--	--	--	--	0
1-101	Heptachlor epoxide	EPA 608	--	--	--	--	--	--	--	0
1-102	alpha-BHC	EPA 608	--	--	--	--	--	--	--	0
1-103	beta-BHC	EPA 608	--	--	--	--	--	--	--	0
1-104	gamma-BHC	EPA 608	--	--	--	--	--	--	--	0
1-105	delta-BHC	EPA 608	--	--	--	--	--	--	--	0
1-106	Aroclor 1242	EPA 608	--	--	--	--	--	--	--	0
1-107	Aroclor 1254	EPA 608	--	--	--	--	--	--	--	0
1-108	Aroclor 1221	EPA 608	--	--	--	--	--	--	--	0
1-109	Aroclor 1232	EPA 608	--	--	--	--	--	--	--	0
1-110	Aroclor 1248	EPA 608	--	--	--	--	--	--	--	0
1-111	Aroclor 1260	EPA 608	--	--	--	--	--	--	--	0
1-112	Aroclor 1016	EPA 608	--	--	--	--	--	--	--	0
1-113	Toxaphene	EPA 608	--	--	--	--	--	--	--	0
1-114	Antimony	EPA 200.8	--	--	--	--	--	--	--	0
1-129	2,3,7,8 tertrachloro-dibenzo-p-dioxin (TCDD)		--	--	--	--	--	--	--	0
National Pollutants of Concern (NPC)										
1-115	Arsenic	EPA 200.8	ug/Kg-dry	273	1410	ND	ND	ND	ND	4
1-118	Cadmium	EPA 200.8	ug/Kg-dry	33.3	564	ND	ND	ND	ND	4
1-119	Chromium	EPA 200.8	ug/Kg-dry	261	1130	7860	8900	22500	21500	4
1-120	Copper	EPA 200.8	ug/Kg-dry	111	564	98000	110000	277000	246000	4
1-121	Cyanide, Total	SM 4500-CN B.E	--	--	--	--	--	--	--	0
1-122	Lead	EPA 200.8	ug/Kg-dry	52.9	564	3700	4250	10200	9700	4
1-123	Mercury	EPA 245.1	mg/Kg-dry	0.022	0.156	0.189	0.198	0.722	0.432	4
1-124	Nickel	EPA 200.8	ug/Kg-dry	25.4	1130	4760	5870	12000	10900	4
1-125	Selenium	EPA 200.8	ug/Kg-dry	148	2820	ND	ND	ND	ND	4
1-126	Silver	EPA 200.8	ug/Kg-dry	5.74	282	491	956	1790	1580	4
1-127	Zinc	EPA 200.8	ug/Kg-dry	276	2820	210000	227000	648000	585000	4
2-11	Molybdenum		ug/Kg-dry	86.5	564	1830	2040	5400	5240	4
2-13	Biochemical Oxygen Demand	SM 5210 B	--	--	--	--	--	--	--	0
2-14	Residue, Suspended (TSS)	SM 2450 D	--	--	--	--	--	--	--	0
2-15	Nitrogen, Ammonia (As N)	EPA 350.1	--	--	--	--	--	--	--	0
Georgia Pollutants of Concern (GPC)										
2-1	Methoxychlor	EPA 608.2	--	--	--	--	--	--	--	0
2-2	2,4-D	EPA 615	--	--	--	--	--	--	--	0
2-3	2,4,5-TP (Silvex)	EPA 615	--	--	--	--	--	--	--	0
Plant-Specific Parameters (PSP)										
3-1	Oil and Grease	EPA 1664	--	--	--	--	--	--	--	0
3-2	Residue, Total (TS)	SM 2450 G	--	--	--	--	--	--	--	0
3-3	Phosphorus, Total (As P)	SM 4500-P	--	--	--	--	--	--	--	0
3-4	Nitrogen, total Kjeldahl (TKN)	EPA 351.2	--	--	--	--	--	--	--	0
3-5	Nitrogen, Nitrate-Nitrite (as N)	EPA 353.2	--	--	--	--	--	--	--	0
3-6	Chemical Oxygen Demand	EPA 410.4	--	--	--	--	--	--	--	0
	Percent Moisture		wt%	0	0	35.8	41.9	74.6	73.2	4
	% Total Solids		wt%	0.001	0.001	64.2	58.1	25.4	28.8	4

Notes:

ND Not detected. Pollutant not present or is below the minimum detection limit.

-- Analysis not performed.

(shaded) Indicates analyte was detected.

TABLE A-5

NCWSA Local Limits Sampling Results- Social Circle WRF

Technically-Based Local Limits for Industrial Users

EPA PP No.	Analyte	EPA Method	Units	Method Detection Level	Reporting Limit	Concentration							Sample Quantity
						Tues 7/16/2019	Wed 7/17/2019	Thurs 7/18/2019	Fri 7/19/2019	Sat 7/20/2019	Sun 7/21/2019	Mon 7/22/2019	
Organic Priority Pollutants													
1-1	Acenaphthene	EPA 625	ug/L	4.1	10	--	--	--	ND	--	--	ND	2
1-2	Acrolein	EPA 624	ug/L	2.9	50	--	--	--	ND	--	--	ND	2
1-3	Acrylonitrile	EPA 624	ug/L	2.1	50	--	--	--	ND	--	--	ND	2
1-4	Benzene	EPA 624	ug/L	0.27	2	--	--	--	ND	--	--	ND	2
1-5	Benzidine	EPA 625	ug/L	4	80	--	--	--	ND	--	--	ND	2
1-6	Carbon tetrachloride	EPA 624	ug/L	0.53	2	--	--	--	ND	--	--	ND	2
1-7	Chlorobenzene	EPA 624	ug/L	0.36	10	--	--	--	ND	--	--	ND	2
1-8	1,2,4-Trichlorobenzene	EPA 625	ug/L	4.2	10	--	--	--	ND	--	--	ND	2
1-9	Hexachlorobenzene	EPA 625	ug/L	3.4	10	--	--	--	ND	--	--	ND	2
1-10	1,2-Dichloroethane	EPA 624	ug/L	0.33	2	--	--	--	ND	--	--	ND	2
1-11	1,1,1-Trichloroethane	EPA 624	ug/L	0.36	2	--	--	--	ND	--	--	ND	2
1-12	Hexachloroethane	EPA 625	ug/L	5.1	10	--	--	--	ND	--	--	ND	2
1-13	1,1-Dichloroethane	EPA 624	ug/L	0.27	2	--	--	--	ND	--	--	ND	2
1-14	1,1,2-Trichloroethane	EPA 624	ug/L	0.32	2	--	--	--	ND	--	--	ND	2
1-15	1,1,2,2-Tetrachloroethane	EPA 624	ug/L	0.3	2	--	--	--	ND	--	--	ND	2
1-16	Chloroethane	EPA 624	ug/L	0.38	5	--	--	--	ND	--	--	ND	2
1-18	Bis(2-chloroethyl)ether	EPA 625	ug/L	3.4	10	--	--	--	ND	--	--	ND	2
1-19	2-Chloroethyl vinyl ether	EPA 624	ug/L	0.78	10	--	--	--	ND	--	--	ND	2
1-20	2-Chloronaphthalene	EPA 625	ug/L	7.1	10	--	--	--	ND	--	--	ND	2
1-21	2,4,6-Trichlorophenol	EPA 625	ug/L	3.6	10	--	--	--	ND	--	--	ND	2
1-22	4-Chloro-3-methylphenol	EPA 625	ug/L	3.1	10	--	--	--	ND	--	--	ND	2
1-23	Chloroform	EPA 624	ug/L	0.43	2	--	--	--	3.0	--	--	2.7	2
1-24	2-Chlorophenol	EPA 625	ug/L	3.6	10	--	--	--	ND	--	--	ND	2
1-25	1,2-Dichlorobenzene	EPA 624	ug/L	0.24	5	--	--	--	ND	--	--	ND	2
1-26	1,3-Dichlorobenzene	EPA 624	ug/L	0.29	5	--	--	--	ND	--	--	ND	2
1-27	1,4-Dichlorobenzene	EPA 624	ug/L	0.34	5	--	--	--	ND	--	--	ND	2
1-28	3,3´-Dichlorobenzidine	EPA 625	ug/L	4.7	10	--	--	--	ND	--	--	ND	2
1-29	1,1-Dichloroethene	EPA 624	ug/L	0.56	2	--	--	--	ND	--	--	ND	2
1-30	trans-1,2-Dichloroethene	EPA 624	ug/L	0.35	2	--	--	--	ND	--	--	ND	2
1-31	2,4-Dichlorophenol	EPA 625	ug/L	3	10	--	--	--	ND	--	--	ND	2
1-32	1,2-Dichloropropane	EPA 624	ug/L	0.48	2	--	--	--	ND	--	--	ND	2
1-33	cis-1,3-Dichloropropene	EPA 624	ug/L	0.41	2	--	--	--	ND	--	--	ND	2
1-34	2,4-Dimethylphenol	EPA 625	ug/L	4.5	10	--	--	--	ND	--	--	ND	2
1-35	2,4-Dinitrotoluene	EPA 625	ug/L	5.5	10	--	--	--	ND	--	--	ND	2
1-36	2,6-Dinitrotoluene	EPA 625	ug/L	3.4	10	--	--	--	ND	--	--	ND	2
1-37	1,2-Diphenylhydrazine	EPA 625	ug/L	3.4	10	--	--	--	ND	--	--	ND	2
1-38	Ethylbenzene	EPA 624	ug/L	0.24	2	--	--	--	ND	--	--	ND	2
1-39	Fluoranthene	EPA 625	ug/L	2.7	10	--	--	--	ND	--	--	ND	2
1-40	4-Chlorophenyl phenyl ether	EPA 625	ug/L	4	10	--	--	--	ND	--	--	ND	2
1-41	4-Bromophenyl phenyl ether	EPA 625	ug/L	3.3	10	--	--	--	ND	--	--	ND	2
1-42	Bis(2-chloroisopropyl)ether	EPA 625	ug/L	5.6	10	--	--	--	ND	--	--	ND	2
1-43	Bis(2-chloroethoxy)methane	EPA 625	ug/L	2.8	10	--	--	--	ND	--	--	ND	2
1-44	Methylene chloride	EPA 624	ug/L	0.34	10	--	--	--	ND	--	--	ND	2
1-45	Chloromethane	EPA 624	ug/L	0.42	10	--	--	--	ND	--	--	ND	2
1-46	Bromomethane	EPA 624	ug/L	0.79	10	--	--	--	ND	--	--	ND	2
1-47	Bromoform	EPA 624	ug/L	0.48	10	--	--	--	ND	--	--	ND	2
1-48	Dichlorobromomethane	EPA 624	--	--	--	--	--	--	--	--	--	--	0
1-51	Chlorodibromomethane	EPA 624	--	--	--	--	--	--	--	--	--	--	0
1-52	Hexachlorobutadiene	EPA 625	ug/L	3.8	10	--	--	--	ND	--	--	ND	2
1-53	Hexachlorocyclopentadiene	EPA 625	ug/L	8.4	10	--	--	--	ND	--	--	ND	2
1-54	Isophorone	EPA 625	ug/L	2.9	10	--	--	--	ND	--	--	ND	2
1-55	Naphthalene	EPA 625	ug/L	4	10	--	--	--	ND	--	--	ND	2
1-56	Nitrobenzene	EPA 625	ug/L	2.7	10	--	--	--	ND	--	--	ND	2
1-57	2-Nitrophenol	EPA 625	ug/L	3.4	10	--	--	--	ND	--	--	ND	2
1-58	4-Nitrophenol	EPA 625	ug/L	3	25	--	--	--	ND	--	--	ND	2
1-59	2,4-Dinitrophenol	EPA 625	ug/L	8.8	25	--	--	--	ND	--	--	ND	2
1-60	4,6-Dinitro-2-methylphenol	EPA 625	ug/L	7.5	20	--	--	--	ND	--	--	ND	2
1-61	N-Nitrosodimethylamine	EPA 625	ug/L	4.5	10	--	--	--	ND	--	--	ND	2
1-62	N-Nitrosodiphenylamine	EPA 625	ug/L	3.1	10	--	--	--	ND	--	--	ND	2
1-63	N-Nitrosodi-n-propylamine	EPA 625	ug/L	5	10	--	--	--	ND	--	--	ND	2
1-64	Pentachlorophenol	EPA 625	ug/L	9.5	25	--	--	--	ND	--	--	ND	2
1-65	Phenol	EPA 625	ug/L	2.3	10	--	--	--	ND	--	--	ND	2
1-66	Bis(2-ethylhexyl)phthalate	EPA 625	ug/L	6.3	10	--	--	--	ND	--	--	ND	2
1-67	Butyl benzyl phthalate	EPA 625	ug/L	5.1	10	--	--	--	ND	--	--	ND	2
1-68	Di-n-butyl phthalate	EPA 625	ug/L	2.7	10	--	--	--	ND	--	--	ND	2
1-69	Di-n-octyl phthalate	EPA 625	ug/L	6.5	10	--	--	--	ND	--	--	ND	2
1-70	Diethyl phthalate	EPA 625	ug/L	3	10	--	--	--	ND	--	--	ND	2
1-71	Dimethyl phthalate	EPA 625	ug/L	2.8	10	--	--	--	ND	--	--	ND	2
1-72	Benz(a)anthracene	EPA 625	ug/L	3.2	10	--	--	--	ND	--	--	ND	2
1-73	Benzo(a)pyrene	EPA 625	ug/L	2	10	--	--	--	ND	--	--	ND	2
1-74	Benzo(b)fluoranthene	EPA 625	ug/L	2.3	10	--	--	--	ND	--	--	ND	2
1-75	Benzo(k)fluoranthene	EPA 625	ug/L	3.4	10	--	--	--	ND	--	--	ND	2
1-76	Chrysene	EPA 625	ug/L	2.4	10	--	--	--	ND	--	--	ND	2
1-77	Acenaphthylene	EPA 625	ug/L	4	10	--	--	--	ND	--	--	ND	2
1-78	Anthracene	EPA 625	ug/L	3.2	10	--	--	--	ND	--	--	ND	2
1-79	Benzo(g,h,i)perylene	EPA 625	ug/L	1.5	10	--	--	--	ND	--	--	ND	2
1-80	Fluorene	EPA 625	ug/L	3.9	10	--	--	--	ND	--	--	ND	2
1-81	Phenanthrene	EPA 625	ug/L	2.8	10	--	--	--	ND	--	--	ND	2
1-82	Dibenz(a,h)anthracene	EPA 625	ug/L	1.2	10	--	--	--	ND	--	--	ND	2
1-83	Indeno(1,2,3-cd)pyrene	EPA 625	ug/L	1.4	10	--	--	--	ND	--	--	ND	2
1-84	Pyrene	EPA 624	ug/L	3.5	10	--	--	--	ND	--	--	ND	2
1-85	Tetrachloroethene	EPA 624	ug/L	0.31	2	--	--	--	ND	--	--	ND	2
1-86	Toluene	EPA 624	ug/L	0.32	2	--	--	--	ND	--	--	ND	2
1-87	Trichloroethene	EPA 624	ug/L	0.36	2	--	--	--	ND	--	--	ND	2
1-88	Vinyl chloride	EPA 624	ug/L	0.34	10	--	--	--	ND	--	--	ND	2
1-89	Aldrin	EPA 608	ug/L	0.0038	0.05	--	--	--	ND	--	--	ND	2
1-90	Dieldrin	EPA 608	ug/L	0.012	0.05	--	--	--	ND	--	--	ND	2
1-91	Chlordane	EPA 608	ug/L	0.19	0.5	--	--	--	ND	--	--	ND	2
1-92	4,4´-DDT	EPA 608	ug/L	0.014	0.05	--	--	--	ND	--	--	ND	2
1-93	4,4´-DDE	EPA 608	ug/L	0.008	0.05	--	--	--	ND	--	--	ND	2
1-94	4,4´-DDD	EPA 608	ug/L	0.016	0.05	--	--	--	ND	--	--	ND	2

TABLE A-5

NCWSA Local Limits Sampling Results- Social Circle WRF

Technically-Based Local Limits for Industrial Users

EPA PP No.	Analyte	EPA Method	Units	Method Detection Level	Reporting Limit	Concentration							Sample Quantity
						Tues	Wed	Thurs	Fri	Sat	Sun	Mon	
						7/16/2019	7/17/2019	7/18/2019	7/19/2019	7/20/2019	7/21/2019	7/22/2019	
1-95	Endosulfan I	EPA 608	ug/L	0.01	0.05	--	--	--	ND	--	--	ND	2
1-96	Endosulfan II	EPA 608	ug/L	0.018	0.05	--	--	--	ND	--	--	ND	2
1-97	Endosulfan sulfate	EPA 608	ug/L	0.018	0.05	--	--	--	ND	--	--	ND	2
1-98	Endrin	EPA 608	ug/L	0.03	0.05	--	--	--	ND	--	--	ND	2
1-99	Endrin aldehyde	EPA 608	ug/L	0.01	0.05	--	--	--	ND	--	--	ND	2
1-100	Heptachlor	EPA 608	ug/L	0.01	0.05	--	--	--	ND	--	--	ND	2
1-101	Heptachlor epoxide	EPA 608	ug/L	0.019	0.05	--	--	--	ND	--	--	ND	2
1-102	alpha-BHC	EPA 608	ug/L	0.009	0.05	--	--	--	ND	--	--	ND	2
1-103	beta-BHC	EPA 608	ug/L	0.018	0.05	--	--	--	ND	--	--	ND	2
1-104	gamma-BHC	EPA 608	ug/L	0.006	0.05	--	--	--	ND	--	--	ND	2
1-105	delta-BHC	EPA 608	ug/L	0.009	0.05	--	--	--	ND	--	--	ND	2
1-106	Aroclor 1242	EPA 608	ug/L	0.1	0.5	--	--	--	ND	--	--	ND	2
1-107	Aroclor 1254	EPA 608	ug/L	0.17	0.5	--	--	--	ND	--	--	ND	2
1-108	Aroclor 1221	EPA 608	ug/L	0.13	0.5	--	--	--	ND	--	--	ND	2
1-109	Aroclor 1232	EPA 608	ug/L	0.09	0.5	--	--	--	ND	--	--	ND	2
1-110	Aroclor 1248	EPA 608	ug/L	0.08	0.5	--	--	--	ND	--	--	ND	2
1-111	Aroclor 1260	EPA 608	ug/L	0.16	0.5	--	--	--	ND	--	--	ND	2
1-112	Aroclor 1016	EPA 608	ug/L	0.21	0.5	--	--	--	ND	--	--	ND	2
1-113	Toxaphene	EPA 608	ug/L	0.24	0.5	--	--	--	ND	--	--	ND	2
1-114	Antimony	EPA 200.8	--	--	--	--	--	--	--	--	--	--	0
1-129	2,3,7,8 tetrachloro-dibenzo-p-dioxin (TCDD)		--	--	--	--	--	--	--	--	--	--	0
National Pollutants of Concern (NPC)													
1-115	Arsenic	**EPA 200.8**	ug/L	1.47	5	ND	ND	ND	ND	ND	ND	ND	7
1-118	Cadmium	EPA 200.8	ug/L	0.03	0.7	ND	ND	ND	ND	0.10	ND	ND	7
1-119	Chromium	EPA 200.8	ug/L	1.84	5	ND	ND	ND	ND	ND	ND	ND	7
1-120	Copper	EPA 200.8	ug/L	0.77	5	71.9	113.0	89.0	67.6	53.4	80.0	52.1	7
1-121	Cyanide, Total	SM 4500-CN B	mg/L	0.004	0.01	ND	ND	ND	ND	ND	ND	ND	7
1-122	Lead	EPA 200.8	ug/L	0.2	1	3.96	4.98	8.45	2.11	1.71	2.50	1.01	7
1-123	Mercury	EPA 245.1	mg/L	0.00004	0.0002	ND	ND	ND	ND	0.0001	ND	ND	7
1-124	Nickel	EPA 200.8	ug/L	0.34	5	6.29	6.08	ND	9.75	1.96	ND	ND	7
1-125	Selenium	EPA 200.8	ug/L	0.43	5	ND	ND	ND	ND	1.08	ND	ND	7
1-126	Silver	EPA 200.8	ug/L	0.06	1	ND	ND	ND	ND	0.06	ND	ND	7
1-127	Zinc	EPA 200.8	ug/L	2.89	10	259.0	471.0	193.0	135.0	87.4	140.0	74.4	7
2-11	Molybdenum		ug/L	0.22	5	14.6	14.8	12.2	17.9	20.7	27.8	16.6	7
2-13	Biochemical Oxygen Demand	SM 5210 B	mg/L	50	50	134.0	249.0	206.0	136.0	96.8	230.0	71.5	7
2-14	Residue, Suspended (TSS)	SM 2450 D	mg/L	2.6	12.8	246.0	444.0	290.0	169.0	204.0	354.0	96.2	7
2-15	Nitrogen, Ammonia (As N)	EPA 350.1	mg/L	0.87	2	27.6	85.0	18.1	23.2	24.5	21.1	26.8	7
Georgia Pollutants of Concern (GPC)													
2-1	Methoxychlor	EPA 608.2	ug/L	0.06	0.3	--	--	--	ND	--	--	ND	2
2-2	2,4-D	EPA 615	ug/L	0.64	2.9	--	--	--	ND	--	--	ND	2
2-3	2,4,5-TP (Silvex)	EPA 615	ug/L	0.49	2.9	--	--	--	ND	--	--	ND	2
Plant-Specific Parameters (PSP)													
3-1	Oil and Grease	EPA 1664	mg/L	2.8	10.9	15.0	9.8	10.4	9.9	22.6	13.1	16.8	7
3-2	Residue, Total (TS)	SM 2450 G	mg/L	0.001	0.001	972	1060	912	1190	1610	2210	1180	7
3-3	Phosphorus, Total (As P)	SM 4500-P	mg/L	0.15	0.5	4.28	4.04	3.29	3.59	4.75	3.28	4.88	7
3-4	Nitrogen, total Kjeldahl (TKN)	EPA 351.2	mg/L	4.06	5	39.7	30.5	13.6	32.3	31.4	23.4	32.8	7
3-5	Nitrogen, Nitrate-Nitrite (as N)	EPA 353.2	mg/L	0.32	1	13.8	16.3	16.1	16.8	33.8	43.4	14.8	7
3-6	Chemical Oxygen Demand	EPA 410.4	mg/L	4.59	10	531	854	512	359	469	748	331	7

Notes:

ND Not detected. Pollutant not present or is below the minimum detection limit.

-- Analysis not performed.

(highlighted) Indicates analyte was detected.

TABLE A-6
NCWSA Local Limits Sampling Results-Takeda
Technically-Based Local Limits for Industrial Users

EPA PP No.	Analyte	EPA Method	Units	Method Detection Level	Reporting Limit	Concentration							Sample Quantity
						Tues 7/16/2019	Wed 7/17/2019	Thurs 7/18/2019	Fri 7/19/2019	Sat 7/20/2019	Sun 7/21/2019	Mon 7/22/2019	
Organic Priority Pollutants													
1-1	Acenaphthene	EPA 625	ug/L	4.1	10	--	--	--	ND	--	ND	--	2
1-2	Acrolein	EPA 624	ug/L	2.9	50	ND	--	--	ND	--	ND	--	3
1-3	Acrylonitrile	EPA 624	ug/L	2.1	50	ND	--	--	ND	--	ND	--	3
1-4	Benzene	EPA 624	ug/L	0.27	2	ND	--	--	ND	--	ND	--	3
1-5	Benzidine	EPA 625	ug/L	4	80	--	--	--	ND	--	ND	--	2
1-6	Carbon tetrachloride	EPA 624	ug/L	0.53	2	ND	--	--	ND	--	ND	--	3
1-7	Chlorobenzene	EPA 624	ug/L	0.36	10	ND	--	--	ND	--	ND	--	3
1-8	1,2,4-Trichlorobenzene	EPA 625	ug/L	4.2	10	--	--	--	ND	--	ND	--	2
1-9	Hexachlorobenzene	EPA 625	ug/L	3.4	10	--	--	--	ND	--	ND	--	2
1-10	1,2-Dichloroethane	EPA 624	ug/L	0.33	2	ND	--	--	ND	--	ND	--	3
1-11	1,1,1-Trichloroethane	EPA 624	ug/L	0.36	2	ND	--	--	ND	--	ND	--	3
1-12	Hexachloroethane	EPA 625	ug/L	5.1	10	--	--	--	ND	--	ND	--	2
1-13	1,1-Dichloroethane	EPA 624	ug/L	0.27	2	ND	--	--	ND	--	ND	--	3
1-14	1,1,2-Trichloroethane	EPA 624	ug/L	0.32	2	ND	--	--	ND	--	ND	--	3
1-15	1,1,2,2-Tetrachloroethane	EPA 624	ug/L	0.3	2	ND	--	--	ND	--	ND	--	3
1-16	Chloroethane	EPA 624	ug/L	0.38	5	ND	--	--	ND	--	ND	--	3
1-18	Bis(2-chloroethyl)ether	EPA 625	ug/L	3.4	10	--	--	--	ND	--	ND	--	2
1-19	2-Chloroethyl vinyl ether	EPA 624	ug/L	0.78	10	ND	--	--	ND	--	ND	--	3
1-20	2-Chloronaphthalene	EPA 625	ug/L	7.1	10	--	--	--	ND	--	ND	--	2
1-21	2,4,6-Trichlorophenol	EPA 625	ug/L	3.6	10	--	--	--	ND	--	ND	--	2
1-22	4-Chloro-3-methylphenol	EPA 625	ug/L	3.1	10	--	--	--	ND	--	ND	--	2
1-23	Chloroform	EPA 624	ug/L	0.43	2	11	--	--	ND	--	4	--	3
1-24	2-Chlorophenol	EPA 625	ug/L	3.6	10	--	--	--	ND	--	ND	--	2
1-25	1,2-Dichlorobenzene	EPA 624	ug/L	0.24	5	ND	--	--	ND	--	ND	--	3
1-26	1,3-Dichlorobenzene	EPA 624	ug/L	0.29	5	ND	--	--	ND	--	ND	--	3
1-27	1,4-Dichlorobenzene	EPA 624	ug/L	0.34	5	ND	--	--	ND	--	ND	--	3
1-28	3,3′-Dichlorobenzidine	EPA 625	ug/L	4.7	10	--	--	--	ND	--	ND	--	2
1-29	1,1-Dichloroethene	EPA 624	ug/L	0.56	2	ND	--	--	ND	--	ND	--	3
1-30	trans-1,2-Dichloroethene	EPA 624	ug/L	0.35	2	ND	--	--	ND	--	ND	--	3
1-31	2,4-Dichlorophenol	EPA 625	ug/L	3	10	--	--	--	ND	--	ND	--	2
1-32	1,2-Dichloropropane	EPA 624	ug/L	0.48	2	ND	--	--	ND	--	ND	--	3
1-33	cis-1,3-Dichloropropene	EPA 624	ug/L	0.41	2	ND	--	--	ND	--	ND	--	3
1-34	2,4-Dimethylphenol	EPA 625	ug/L	4.5	10	--	--	--	ND	--	ND	--	2
1-35	2,4-Dinitrotoluene	EPA 625	ug/L	5.5	10	--	--	--	ND	--	ND	--	2
1-36	2,6-Dinitrotoluene	EPA 625	ug/L	3.4	10	--	--	--	ND	--	ND	--	2
1-37	1,2-Diphenylhydrazine	EPA 625	ug/L	3.4	10	--	--	--	ND	--	ND	--	2
1-38	Ethylbenzene	EPA 624	ug/L	0.24	2	ND	--	--	ND	--	ND	--	3
1-39	Fluoranthene	EPA 625	ug/L	2.7	10	--	--	--	ND	--	ND	--	2
1-40	4-Chlorophenyl phenyl ether	EPA 625	ug/L	4	10	--	--	--	ND	--	ND	--	2
1-41	4-Bromophenyl phenyl ether	EPA 625	ug/L	3.3	10	--	--	--	ND	--	ND	--	2
1-42	Bis(2-chloroisopropyl)ether	EPA 625	ug/L	5.6	10	--	--	--	ND	--	ND	--	2
1-43	Bis(2-chloroethoxy)methane	EPA 625	ug/L	2.8	10	--	--	--	ND	--	ND	--	2
1-44	Methylene chloride	EPA 624	ug/L	0.34	10	ND	--	--	ND	--	ND	--	3
1-45	Chloromethane	EPA 624	ug/L	0.42	10	ND	--	--	ND	--	ND	--	3
1-46	Bromomethane	EPA 624	ug/L	0.79	10	ND	--	--	ND	--	ND	--	3
1-47	Bromoform	EPA 624	ug/L	0.48	10	ND	--	--	ND	--	ND	--	3
1-48	Dichlorobromomethane	EPA 624	--	--	--	--	--	--	--	--	--	--	0
1-51	Chlorodibromomethane	EPA 624	--	--	--	--	--	--	--	--	--	--	0
1-52	Hexachlorobutadiene	EPA 625	ug/L	3.8	10	--	--	--	ND	--	ND	--	2
1-53	Hexachlorocyclopentadiene	EPA 625	ug/L	8.4	10	--	--	--	ND	--	ND	--	2
1-54	Isophorone	EPA 625	ug/L	2.9	10	--	--	--	ND	--	ND	--	2
1-55	Naphthalene	EPA 625	ug/L	4	10	--	--	--	ND	--	--	ND	2
1-56	Nitrobenzene	EPA 625	ug/L	2.7	10	--	--	--	ND	--	--	ND	2
1-57	2-Nitrophenol	EPA 625	ug/L	3.4	10	--	--	--	ND	--	ND	--	2
1-58	4-Nitrophenol	EPA 625	ug/L	3	25	--	--	--	ND	--	ND	--	2
1-59	2,4-Dinitrophenol	EPA 625	ug/L	8.8	25	--	--	--	ND	--	ND	--	2
1-60	4,6-Dinitro-2-methylphenol	EPA 625	ug/L	7.5	20	--	--	--	ND	--	ND	--	2
1-61	N-Nitrosodimethylamine	EPA 625	ug/L	4.5	10	--	--	--	ND	--	ND	--	2
1-62	N-Nitrosodiphenylamine	EPA 625	ug/L	3.1	10	--	--	--	ND	--	ND	--	2
1-63	N-Nitrosodi-n-propylamine	EPA 625	ug/L	5	10	--	--	--	ND	--	ND	--	2
1-64	Pentachlorophenol	EPA 625	ug/L	9.5	25	--	--	--	ND	--	--	ND	2
1-65	Phenol	EPA 625	ug/L	2.3	10	--	--	--	ND	--	--	ND	2
1-66	Bis(2-ethylhexyl)phthalate	EPA 625	ug/L	6.3	10	--	--	--	ND	--	ND	--	2
1-67	Butyl benzyl phthalate	EPA 625	ug/L	5.1	10	--	--	--	ND	--	ND	--	2
1-68	Di-n-butyl phthalate	EPA 625	ug/L	2.7	10	--	--	--	ND	--	ND	--	2
1-69	Di-n-octyl phthalate	EPA 625	ug/L	6.5	10	--	--	--	ND	--	ND	--	2
1-70	Diethyl phthalate	EPA 625	ug/L	3	10	--	--	--	ND	--	ND	--	2
1-71	Dimethyl phthalate	EPA 625	ug/L	2.8	10	--	--	--	ND	--	ND	--	2
1-72	Benz(a)anthracene	EPA 625	ug/L	3.2	10	--	--	--	ND	--	ND	--	2
1-73	Benzo(a)pyrene	EPA 625	ug/L	2	10	--	--	--	ND	--	ND	--	2
1-74	Benzo(b)fluoranthene	EPA 625	ug/L	2.3	10	--	--	--	ND	--	ND	--	2
1-75	Benzo(k)fluoranthene	EPA 625	ug/L	3.4	10	--	--	--	ND	--	ND	--	2
1-76	Chrysene	EPA 625	ug/L	2.4	10	--	--	--	ND	--	ND	--	2
1-77	Acenaphthylene	EPA 625	ug/L	4	10	--	--	--	ND	--	ND	--	2
1-78	Anthracene	EPA 625	ug/L	3.2	10	--	--	--	ND	--	ND	--	2
1-79	Benzo(g,h,i)perylene	EPA 625	ug/L	1.5	10	--	--	--	ND	--	ND	--	2
1-80	Fluorene	EPA 625	ug/L	3.9	10	--	--	--	ND	--	ND	--	2
1-81	Phenanthrene	EPA 625	ug/L	2.8	10	--	--	--	ND	--	--	ND	2
1-82	Dibenz(a,h)anthracene	EPA 625	ug/L	1.2	10	--	--	--	ND	--	ND	--	2
1-83	Indeno(1,2,3-cd)pyrene	EPA 625	ug/L	1.4	10	--	--	--	ND	--	ND	--	2
1-84	Pyrene	EPA 624	ug/L	3.5	10	--	--	--	ND	--	--	ND	2
1-85	Tetrachloroethene	EPA 624	ug/L	0.31	2	ND	--	--	ND	--	ND	--	3
1-86	Toluene	EPA 624	ug/L	0.32	2	ND	--	--	ND	--	ND	--	3
1-87	Trichloroethene	EPA 624	ug/L	0.36	2	ND	--	--	ND	--	ND	--	3
1-88	Vinyl chloride	EPA 624	ug/L	0.34	10	ND	--	--	ND	--	ND	--	3
1-89	Aldrin	EPA 608	ug/L	0.0038	0.05	--	--	--	ND	--	ND	--	2
1-90	Dieldrin	EPA 608	ug/L	0.012	0.05	--	--	--	ND	--	ND	--	2
1-91	Chlordane	EPA 608	ug/L	0.19	0.5	--	--	--	ND	--	ND	--	2
1-92	4,4′-DDT	EPA 608	ug/L	0.01	0.05	--	--	--	ND	--	ND	--	2
1-93	4,4′-DDE	EPA 608	ug/L	0.008	0.05	--	--	--	ND	--	ND	--	2
1-94	4,4′-DDD	EPA 608	ug/L	0.016	0.05	--	--	--	ND	--	ND	--	2
1-95	Endosulfan I	EPA 608	ug/L	0.01	0.05	--	--	--	ND	--	ND	--	2

TABLE A-6

NCWSA Local Limits Sampling Results-Takeda

Technically-Based Local Limits for Industrial Users

EPA PP No.	Analyte	EPA Method	Units	Method Detection Level	Reporting Limit	Concentration							Sample Quantity
						Tues	Wed	Thurs	Fri	Sat	Sun	Mon	
						7/16/2019	7/17/2019	7/18/2019	7/19/2019	7/20/2019	7/21/2019	7/22/2019	
1-96	Endosulfan II	EPA 608	ug/L	0.018	0.05	--	--	--	ND	--	ND	--	2
1-97	Endosulfan sulfate	EPA 608	ug/L	0.018	0.05	--	--	--	ND	--	ND	--	2
1-98	Endrin	EPA 608	ug/L	0.03	0.05	--	--	--	ND	--	ND	--	2
1-99	Endrin aldehyde	EPA 608	ug/L	0.01	0.05	--	--	--	ND	--	ND	--	2
1-100	Heptachlor	EPA 608	ug/L	0.01	0.05	--	--	--	ND	--	ND	--	2
1-101	Heptachlor epoxide	EPA 608	ug/L	0.019	0.05	--	--	--	ND	--	ND	--	2
1-102	alpha-BHC	EPA 608	ug/L	0.009	0.05	--	--	--	ND	--	ND	--	2
1-103	beta-BHC	EPA 608	ug/L	0.018	0.05	--	--	--	ND	--	ND	--	2
1-104	gamma-BHC	EPA 608	ug/L	0.006	0.05	--	--	--	ND	--	ND	--	2
1-105	delta-BHC	EPA 608	ug/L	0.009	0.05	--	--	--	ND	--	ND	--	2
1-106	Aroclor 1242	EPA 608	ug/L	0.1	0.5	--	--	--	ND	--	ND	--	2
1-107	Aroclor 1254	EPA 608	ug/L	0.17	0.5	--	--	--	ND	--	ND	--	2
1-108	Aroclor 1221	EPA 608	ug/L	0.13	0.5	--	--	--	ND	--	ND	--	2
1-109	Aroclor 1232	EPA 608	ug/L	0.09	0.5	--	--	--	ND	--	ND	--	2
1-110	Aroclor 1248	EPA 608	ug/L	0.08	0.5	--	--	--	ND	--	ND	--	2
1-111	Aroclor 1260	EPA 608	ug/L	0.16	0.5	--	--	--	ND	--	ND	--	2
1-112	Aroclor 1016	EPA 608	ug/L	0.21	0.5	--	--	--	ND	--	ND	--	2
1-113	Toxaphene	EPA 608	ug/L	0.24	0.5	--	--	--	ND	--	ND	--	2
1-114	Antimony	EPA 200.8	--	--	--	--	--	--	--	--	--	--	0
1-129	2,3,7,8 tertrachloro-dibenzo-p-dioxin (TCDD)		--	--	--	--	--	--	--	--	--	--	0
National Pollutants of Concern (NPC)													
1-115	Arsenic	**EPA 200.8**	ug/L	1.47	5	ND	ND	ND	ND	ND	ND	ND	7
1-118	Cadmium	EPA 200.8	ug/L	0.03	0.7	ND	ND	ND	ND	ND	ND	ND	7
1-119	Chromium	EPA 200.8	ug/L	1.84	5	ND	ND	ND	ND	ND	ND	ND	7
1-120	Copper	EPA 200.8	ug/L	0.77	5	14.4	27.3	28.0	22.4	23.2	27.7	17.2	7
1-121	Cyanide, Total	SM 4500-CN B.E	mg/L	0.004	0.01	0.038	0.082	ND	0.037	ND	ND	ND	7
1-122	Lead	EPA 200.8	ug/L	0.2	1	ND	ND	ND	ND	0.23	ND	ND	7
1-123	Mercury	EPA 245.1	mg/L	0.00004	0.0002	ND	ND	ND	ND	ND	ND	ND	7
1-124	Nickel	EPA 200.8	ug/L	0.34	5	5.69	ND	ND	6.48	5.66	6.97	5.44	7
1-125	Selenium	EPA 200.8	ug/L	0.43	5	ND	ND	ND	ND	1.05	ND	ND	7
1-126	Silver	EPA 200.8	ug/L	0.06	1	ND	ND	ND	ND	ND	ND	ND	7
1-127	Zinc	EPA 200.8	ug/L	2.89	10	ND	35.40	24.50	ND	6.89	6.89	ND	7
2-11	Molybdenum		ug/L	0.22	5	9.08	7.83	7.56	12.20	11.50	11.40	8.78	7
2-13	Biochemical Oxygen Demand	SM 5210 B	mg/L	5	5	16.5	57.8	59.4	21.2	8.1	71.6	ND	7
2-14	Residue, Suspended (TSS)	SM 2450 D	mg/L	1	5	55.0	72.0	78.1	24.5	24.0	48.5	19.0	7
2-15	Nitrogen, Ammonia (As N)	EPA 350.1	mg/L	0.087	0.2	1.42	2.92	5.45	3.68	0.77	1.35	1.23	7
Georgia Pollutants of Concern (GPC)													
2-1	Methoxychlor	EPA 608.2	ug/L	0.06	0.3	--	--	--	ND	--	ND	--	2
2-2	2,4-D	EPA 615	ug/L	0.45	2	--	--	--	ND	--	ND	--	2
2-3	2,4,5-TP (Silvex)	EPA 615	ug/L	0.34	2	--	--	--	ND	--	ND	--	2
Plant-Specific Parameters (PSP)													
3-1	Oil and Grease	EPA 1664	mg/L	2.8	10.6	ND	ND	ND	ND	ND	ND	ND	7
3-2	Residue, Total (TS)	SM 2450 G	mg/L	0.001	0.001	1290	1120	1130	2260	2730	3330	2760	7
3-3	Phosphorus, Total (As P)	SM 4500-P	mg/L	0.15	0.5	2.96	2.30	2.57	2.62	3.71	2.88	2.92	7
3-4	Nitrogen, total Kjeldahl (TKN)	EPA 351.2	mg/L	0.41	0.5	4.52	6.17	12.00	7.55	3.63	4.91	3.95	7
3-5	Nitrogen, Nitrate-Nitrite (as N)	EPA 353.2	mg/L	0.16	0.5	2.52	1.43	2.21	4.84	3.90	6.68	8.70	7
3-6	Chemical Oxygen Demand	EPA 410.4	mg/L	4.59	10	73.4	144.0	180.0	107.0	93.7	352.0	93.7	7

Notes:

ND	Not detected. Pollutant not present or is below the minimum detection limit.
--	Analysis not performed.
(shaded)	Indicates analyte was detected.

TABLE A-7

NCWSA Local Limits Sampling Results-Landfill Leachate

Technically-Based Local Limits for Industrial Users

EPA PP No.	Analyte	EPA Method	Units	Method Detection Level	Reporting Limit	Concentration							Sample Quantity
						Tues 7/16/2019	Wed 7/17/2019	Thurs 7/18/2019	Fri 7/19/2019	Sat 7/20/2019	Sun 7/21/2019	Mon 7/22/2019	
Organic Priority Pollutants													
1-1	Acenaphthene	EPA 625	ug/L	21	50	--	--	ND	--	--	--	--	1
1-2	Acrolein	EPA 624	ug/L	2.9	50	ND	--	ND	--	--	--	--	2
1-3	Acrylonitrile	EPA 624	ug/L	2.1	50	ND	--	ND	--	--	--	--	2
1-4	Benzene	EPA 624	ug/L	0.27	2	ND	--	ND	--	--	--	--	2
1-5	Benzidine	EPA 625	ug/L	20	400	--	--	ND	--	--	--	--	1
1-6	Carbon tetrachloride	EPA 624	ug/L	0.53	2	ND	--	ND	--	--	--	--	2
1-7	Chlorobenzene	EPA 624	ug/L	0.36	10	ND	--	ND	--	--	--	--	2
1-8	1,2,4-Trichlorobenzene	EPA 625	ug/L	21	50	--	--	ND	--	--	--	--	1
1-9	Hexachlorobenzene	EPA 625	ug/L	17	50	--	--	ND	--	--	--	--	1
1-10	1,2-Dichloroethane	EPA 624	ug/L	0.33	2	ND	--	ND	--	--	--	--	2
1-11	1,1,1-Trichloroethane	EPA 624	ug/L	0.36	2	ND	--	ND	--	--	--	--	2
1-12	Hexachloroethane	EPA 625	ug/L	25	50	--	--	ND	--	--	--	--	1
1-13	1,1-Dichloroethane	EPA 624	ug/L	0.27	2	ND	--	ND	--	--	--	--	2
1-14	1,1,2-Trichloroethane	EPA 624	ug/L	0.32	2	ND	--	ND	--	--	--	--	2
1-15	1,1,2,2-Tetrachloroethane	EPA 624	ug/L	0.3	2	ND	--	ND	--	--	--	--	2
1-16	Chloroethane	EPA 624	ug/L	0.38	5	ND	--	ND	--	--	--	--	2
1-18	Bis(2-chloroethyl)ether	EPA 625	ug/L	17	50	--	--	ND	--	--	--	--	1
1-19	2-Chloroethyl vinyl ether	EPA 624	ug/L	0.78	10	ND	--	ND	--	--	--	--	2
1-20	2-Chloronaphthalene	EPA 625	ug/L	36	50	--	--	ND	--	--	--	--	1
1-21	2,4,6-Trichlorophenol	EPA 625	ug/L	18	50	--	--	ND	--	--	--	--	1
1-22	4-Chloro-3-methylphenol	EPA 625	ug/L	16	50	--	--	ND	--	--	--	--	1
1-23	Chloroform	EPA 624	ug/L	0.43	2	ND	--	ND	--	--	--	--	2
1-24	2-Chlorophenol	EPA 625	ug/L	18	50	--	--	ND	--	--	--	--	1
1-25	1,2-Dichlorobenzene	EPA 624	ug/L	0.24	5	ND	--	ND	--	--	--	--	2
1-26	1,3-Dichlorobenzene	EPA 624	ug/L	0.29	5	ND	--	ND	--	--	--	--	2
1-27	1,4-Dichlorobenzene	EPA 624	ug/L	0.34	5	ND	--	ND	--	--	--	--	2
1-28	3,3´-Dichlorobenzidine	EPA 625	ug/L	24	50	--	--	ND	--	--	--	--	1
1-29	1,1-Dichloroethene	EPA 624	ug/L	0.56	2	ND	--	ND	--	--	--	--	2
1-30	trans-1,2-Dichloroethene	EPA 624	ug/L	0.35	2	ND	--	ND	--	--	--	--	2
1-31	2,4-Dichlorophenol	EPA 625	ug/L	15	50	--	--	ND	--	--	--	--	1
1-32	1,2-Dichloropropane	EPA 624	ug/L	0.48	2	ND	--	ND	--	--	--	--	2
1-33	cis-1,3-Dichloropropene	EPA 624	ug/L	0.41	2	ND	--	ND	--	--	--	--	2
1-34	2,4-Dimethylphenol	EPA 625	ug/L	23	50	--	--	ND	--	--	--	--	1
1-35	2,4-Dinitrotoluene	EPA 625	ug/L	27	50	--	--	ND	--	--	--	--	1
1-36	2,6-Dinitrotoluene	EPA 625	ug/L	17	50	--	--	ND	--	--	--	--	1
1-37	1,2-Diphenylhydrazine	EPA 625	ug/L	17	50	--	--	ND	--	--	--	--	1
1-38	Ethylbenzene	EPA 624	ug/L	0.24	2	ND	--	ND	--	--	--	--	2
1-39	Fluoranthene	EPA 625	ug/L	13	50	--	--	ND	--	--	--	--	1
1-40	4-Chlorophenyl phenyl ether	EPA 625	ug/L	20	50	--	--	ND	--	--	--	--	1
1-41	4-Bromophenyl phenyl ether	EPA 625	ug/L	17	50	--	--	ND	--	--	--	--	1
1-42	Bis(2-chloroisopropyl)ether	EPA 625	ug/L	28	50	--	--	ND	--	--	--	--	1
1-43	Bis(2-chloroethoxy)methane	EPA 625	ug/L	14	50	--	--	ND	--	--	--	--	1
1-44	Methylene chloride	EPA 624	ug/L	0.34	10	ND	--	ND	--	--	--	--	2
1-45	Chloromethane	EPA 624	ug/L	0.42	10	ND	--	ND	--	--	--	--	2
1-46	Bromomethane	EPA 624	ug/L	0.79	10	ND	--	ND	--	--	--	--	2
1-47	Bromoform	EPA 624	ug/L	0.48	10	ND	--	ND	--	--	--	--	2
1-48	Dichlorobromomethane	EPA 624	--	--	--	--	--	--	--	--	--	--	0
1-51	Chlorodibromomethane	EPA 624	--	--	--	--	--	--	--	--	--	--	0
1-52	Hexachlorobutadiene	EPA 625	ug/L	19	50	--	--	ND	--	--	--	--	1
1-53	Hexachlorocyclopentadiene	EPA 625	ug/L	42	50	--	--	ND	--	--	--	--	1
1-54	Isophorone	EPA 625	ug/L	14	50	--	--	ND	--	--	--	--	1
1-55	Naphthalene	EPA 625	ug/L	20	50	--	--	ND	--	--	--	--	1
1-56	Nitrobenzene	EPA 625	ug/L	13	50	--	--	ND	--	--	--	--	1
1-57	2-Nitrophenol	EPA 625	ug/L	17	50	--	--	ND	--	--	--	--	1
1-58	4-Nitrophenol	EPA 625	ug/L	15	130	--	--	ND	--	--	--	--	1
1-59	2,4-Dinitrophenol	EPA 625	ug/L	44	130	--	--	ND	--	--	--	--	1
1-60	4,6-Dinitro-2-methylphenol	EPA 625	ug/L	38	100	--	--	ND	--	--	--	--	1
1-61	N-Nitrosodimethylamine	EPA 625	ug/L	22	50	--	--	ND	--	--	--	--	1
1-62	N-Nitrosodiphenylamine	EPA 625	ug/L	16	50	--	--	ND	--	--	--	--	1
1-63	N-Nitrosodi-n-propylamine	EPA 625	ug/L	25	50	--	--	ND	--	--	--	--	1
1-64	Pentachlorophenol	EPA 625	ug/L	48	130	--	--	ND	--	--	--	--	1
1-65	Phenol	EPA 625	ug/L	11	50	--	--	ND	--	--	--	--	1
1-66	Bis(2-ethylhexyl)phthalate	EPA 625	ug/L	31	50	--	--	ND	--	--	--	--	1
1-67	Butyl benzyl phthalate	EPA 625	ug/L	25	50	--	--	ND	--	--	--	--	1
1-68	Di-n-butyl phthalate	EPA 625	ug/L	14	50	--	--	ND	--	--	--	--	1
1-69	Di-n-octyl phthalate	EPA 625	ug/L	32	50	--	--	ND	--	--	--	--	1
1-70	Diethyl phthalate	EPA 625	ug/L	15	50	--	--	ND	--	--	--	--	1
1-71	Dimethyl phthalate	EPA 625	ug/L	14	50	--	--	ND	--	--	--	--	1
1-72	Benz(a)anthracene	EPA 625	ug/L	16	50	--	--	ND	--	--	--	--	1
1-73	Benzo(a)pyrene	EPA 625	ug/L	9.8	50	--	--	ND	--	--	--	--	1
1-74	Benzo(b)fluoranthene	EPA 625	ug/L	12	50	--	--	ND	--	--	--	--	1
1-75	Benzo(k)fluoranthene	EPA 625	ug/L	17	50	--	--	ND	--	--	--	--	1
1-76	Chrysene	EPA 625	ug/L	12	50	--	--	ND	--	--	--	--	1
1-77	Acenaphthylene	EPA 625	ug/L	20	50	--	--	ND	--	--	--	--	1
1-78	Anthracene	EPA 625	ug/L	16	50	--	--	ND	--	--	--	--	1
1-79	Benzo(g,h,i)perylene	EPA 625	ug/L	7.7	50	--	--	ND	--	--	--	--	1
1-80	Fluorene	EPA 625	ug/L	19	50	--	--	ND	--	--	--	--	1
1-81	Phenanthrene	EPA 625	ug/L	14	50	--	--	ND	--	--	--	--	1
1-82	Dibenz(a,h)anthracene	EPA 625	ug/L	6	50	--	--	ND	--	--	--	--	1
1-83	Indeno(1,2,3-cd)pyrene	EPA 625	ug/L	6.8	50	--	--	ND	--	--	--	--	1
1-84	Pyrene	EPA 624	ug/L	18	50	--	--	ND	--	--	--	--	1
1-85	Tetrachloroethene	EPA 624	ug/L	0.31	2	ND	--	ND	--	--	--	--	2
1-86	Toluene	EPA 624	ug/L	0.32	2	ND	--	ND	--	--	--	--	2
1-87	Trichloroethene	EPA 624	ug/L	0.36	2	ND	--	ND	--	--	--	--	2
1-88	Vinyl chloride	EPA 624	ug/L	0.34	10	ND	--	ND	--	--	--	--	2
1-89	Aldrin	EPA 608	ug/L	0.0038	0.05	--	--	ND	--	--	--	--	1
1-90	Dieldrin	EPA 608	ug/L	0.012	0.05	--	--	ND	--	--	--	--	1
1-91	Chlordane	EPA 608	ug/L	0.19	0.5	--	--	ND	--	--	--	--	1
1-92	4,4´-DDT	EPA 608	ug/L	0.014	0.05	--	--	ND	--	--	--	--	1
1-93	4,4´-DDE	EPA 608	ug/L	0.008	0.05	--	--	ND	--	--	--	--	1
1-94	4,4´-DDD	EPA 608	ug/L	0.016	0.05	--	--	ND	--	--	--	--	1
1-95	Endosulfan I	EPA 608	ug/L	0.01	0.05	--	--	ND	--	--	--	--	1

TABLE A-7

NCWSA Local Limits Sampling Results-Landfill Leachate

Technically-Based Local Limits for Industrial Users

EPA PP No.	Analyte	EPA Method	Units	Method Detection Level	Reporting Limit	Concentration							Sample Quantity
						Tues	Wed	Thurs	Fri	Sat	Sun	Mon	
						7/16/2019	7/17/2019	7/18/2019	7/19/2019	7/20/2019	7/21/2019	7/22/2019	
1-96	Endosulfan II	EPA 608	ug/L	0.018	0.05	--	--	ND	--	--	--	--	1
1-97	Endosulfan sulfate	EPA 608	ug/L	0.018	0.05	--	--	ND	--	--	--	--	1
1-98	Endrin	EPA 608	ug/L	0.03	0.05	--	--	ND	--	--	--	--	1
1-99	Endrin aldehyde	EPA 608	ug/L	0.01	0.05	--	--	ND	--	--	--	--	1
1-100	Heptachlor	EPA 608	ug/L	0.01	0.05	--	--	ND	--	--	--	--	1
1-101	Heptachlor epoxide	EPA 608	ug/L	0.019	0.05	--	--	ND	--	--	--	--	1
1-102	alpha-BHC	EPA 608	ug/L	0.009	0.05	--	--	ND	--	--	--	--	1
1-103	beta-BHC	EPA 608	ug/L	0.018	0.05	--	--	ND	--	--	--	--	1
1-104	gamma-BHC	EPA 608	ug/L	0.006	0.05	--	--	ND	--	--	--	--	1
1-105	delta-BHC	EPA 608	ug/L	0.009	0.05	--	--	ND	--	--	--	--	1
1-106	Aroclor 1242	EPA 608	ug/L	0.1	0.5	--	--	ND	--	--	--	--	1
1-107	Aroclor 1254	EPA 608	ug/L	0.17	0.5	--	--	ND	--	--	--	--	1
1-108	Aroclor 1221	EPA 608	ug/L	0.13	0.5	--	--	ND	--	--	--	--	1
1-109	Aroclor 1232	EPA 608	ug/L	0.09	0.5	--	--	ND	--	--	--	--	1
1-110	Aroclor 1248	EPA 608	ug/L	0.08	0.5	--	--	ND	--	--	--	--	1
1-111	Aroclor 1260	EPA 608	ug/L	0.16	0.5	--	--	ND	--	--	--	--	1
1-112	Aroclor 1016	EPA 608	ug/L	0.21	0.5	--	--	ND	--	--	--	--	1
1-113	Toxaphene	EPA 608	ug/L	0.24	0.5	--	--	ND	--	--	--	--	1
1-114	Antimony	EPA 200.8	--	--	--	--	--	--	--	--	--	--	0
1-129	2,3,7,8 tetrachloro-dibenzo-p-dioxin (TCDD)		--	--	--	--	--	--	--	--	--	--	0
National Pollutants of Concern (NPC)													
1-115	Arsenic	EPA 200.8	ug/L	2.94	5	35.1	33.0	32.3	28.4	37.1	40.9	38.4	7
1-118	Cadmium	EPA 200.8	ug/L	0.06	0.7	ND	ND	ND	ND	0.52	0.84	ND	7
1-119	Chromium	EPA 200.8	ug/L	3.68	5	192	176	191	167	198	181	188	7
1-120	Copper	EPA 200.8	ug/L	1.55	10	ND	ND	5.68	5.31	3.72	5.00	ND	7
1-121	Cyanide, Total	SM 4500-CN B.E	mg/L	0.004	0.01	0.016	ND	0.020	0.022	0.018	ND	ND	7
1-122	Lead	EPA 200.8	ug/L	0.41	1	4.46	4.14	5.79	4.39	5.36	4.18	4.21	7
1-123	Mercury	EPA 245.1	mg/L	0.00016	0.0008	ND	ND	ND	ND	ND	ND	ND	7
1-124	Nickel	EPA 200.8	ug/L	0.68	5	136	140	162	152	147	159	157	7
1-125	Selenium	EPA 200.8	ug/L	0.87	5	5.17	ND	8.25	8.77	1.71	8.88	8.63	7
1-126	Silver	EPA 200.8	ug/L	0.11	4	ND	ND	ND	ND	ND	ND	ND	7
1-127	Zinc	EPA 200.8	ug/L	5.78	10	51.2	45.4	82.2	65.2	65.0	69.2	68.6	7
2-11	Molybdenum		ug/L	0.44	5	ND	ND	ND	ND	3.96	ND	ND	7
2-13	Biochemical Oxygen Demand	SM 5210 B	mg/L	50	50	107	118	ND	ND	1420	933	ND	7
2-14	Residue, Suspended (TSS)	SM 2450 D	mg/L	1	5	23.5	16.5	14.0	17.0	8.0	10.0	17.0	7
2-15	Nitrogen, Ammonia (As N)	EPA 350.1	mg/L	8.74	20	652	670	768	716	751	838	736	7
Georgia Pollutants of Concern (GPC)													
2-1	Methoxychlor	EPA 608.2	ug/L	0.06	0.3	--	--	ND	--	--	--	--	1
2-2	2,4-D	EPA 615	ug/L	0.45	2	--	--	ND	--	--	--	--	1
2-3	2,4,5-TP (Silvex)	EPA 615	ug/L	0.34	2	--	--	ND	--	--	--	--	1
Plant-Specific Parameters (PSP)													
3-1	Oil and Grease	EPA 1664	mg/L	2.6	10	ND	ND	ND	ND	7.8	ND	ND	7
3-2	Residue, Total (TS)	SM 2450 G	mg/L	0.001	0.001	5480	5870	7070	7420	6800	8030	7950	7
3-3	Phosphorus, Total (As P)	SM 4500-P	mg/L	0.15	0.5	2.41	3.14	4.53	4.15	4.85	4.65	4.38	7
3-4	Nitrogen, total Kjeldahl (TKN)	EPA 351.2	mg/L	40.6	50	702	673	849	785	804	697	733	7
3-5	Nitrogen, Nitrate-Nitrite (as N)	EPA 353.2	mg/L	0.16	0.5	ND	ND	ND	ND	ND	ND	ND	7
3-6	Chemical Oxygen Demand	EPA 410.4	mg/L	23	50	1340	1950	1670	1760	1880	1800	1760	7

Notes:

ND Not detected. Pollutant not present or is below the minimum detection limit.

-- Analysis not performed.

(highlighted) Indicates analyte was detected.

Appendix B. Calculations

Appendix B.1 – Yellow River WRF with Sludge Landfilling Calculations

YR WRF with Sludge Landfilling Calculations

Table 1 - Unit Operations (X if present)

Activated Sludge Present?	Trickling Filter Present?	Nitrification Present?	Anaerobic Digestion Present?	Sludge Incineration Present?
X		X		

Placing an "X" in the cell under a treament unit will activate the inhibition calclations for that unit or the sludge incineration calculations.

TABLE 2a - Stream Flow Partial Mix Factors

Q7-10 Stream Flow (MGD) (Q7-10)	Harmonic Mean Stream Flow (MGD) (Qhm)	Drinking Water Intake Stream Flow (MGD) (Qdw)	Chronic Partial Mix Factor (PMFc)	Acute Partial Mix Factor (PMFa)	Cancer Risk Level Partial Mix Factor (PMFcrl)

(Q7-10) 7-day, 10-year low flow for receiving stream in MGD (user entered).
(Qhm) Harmonic mean flow for receiving stream in MGD (user entered).
(Qdw) Flow for receiving stream at nearest downstream drinking water intake (user entered).
(PMFa) Partial mix factor for acute water quality standards (user entered).
(PMFc) Partial mix factor for chronic water quality standards (user entered).
(PMFcrl) Partial mix factor for cancer risk level water quality standards (user entered).

TABLE 2b - POTW and Receiving Stream Data

POTW Flow (MGD) (Qpotw)	IU Flow (MGD) (Qind)	Sludge Flow to Digester (MGD) (Qdig)	Sludge Flow to Disposal (MTD) (Qsldg)	Stream Flow for Chronic WQS (MGD) (Qstr1)	Stream Flow for Acute WQS (MGD) (Qstr2)	Stream Flow for Threshold Human Health WQS (MGD) (Qstr3)	Stream Flow for Carcinogen Human Health WQS (MGD) (Qstr4)	Receiving Stream Hardness (mg/l) (H)	Hauled Waste Flow to Influent (MGD) (Qhwi)	Hauled Waste Flow to Sludge Processing (MGD) (Qhws)	Sludge Flow to Incineration (MTD) (Qinc)
2.7	0.754		0.832149497	-	-	-	-				

(Qpotw) POTW's average flow in MGD (user entered).
(Qind) Average discharge flow of Industrial Users to be regulated through the local limits in MGD (user entered).
(Qdig) Average sludge flow to digester in MGD (user entered).
(Qsldg) Average sludge flow to disposal in dry metric tons per day (user entered).
(Qstr1) Receiving stream (upstream) flow used with chronic water quality standards in MGD (calculated).
Qstr1 = Q7-10 * PMFc (data from Table 2(a), cells B17 and E17); if cell E17 is blank, PMFc assumed to be 1.
(Qstr2) Receiving stream (upstream) flow used with acute water quality standards in MGD (calculated).
Qstr2 = Q7-10 * PMFa (data from Table 2(a), cells B17 and F17); if cell F17 is blank, PMFa assumed to be 1.
(Qstr3) Receiving stream (upstream) flow used with threshold human health water quality standards in MGD (from Table 2(a), cell B17).
(Qstr4) Receiving stream (upstream) flow used with carcinogen human health water quality standards in MGD (calculated).
Qstr4 = Qhm * PMFcrl (data from Table 2(a), cells C17 and G17); if cell G17 is blank, PMFcrl assumed to be 1; if cell C17 is blank, formula below is used:
or Qstr4 = PMFcrl * 7.43 * $(Q7\text{-}10)^{0.874}$ (data from Table 2(a), cell G17 and B17)
(H) Receiving stream hardness in mg/l (user entered).
(Qhwi) Hauled waste flow discharged at the influent of the treatment plant in MGD (user entered).
(Qhws) Hauled waste flow discharged directly to the sludge processing units in MGD (user entered).
(Qinc) Average sludge flow to incineration in dry metric tons per day (user entered).

YR WRF with Sludge Landfilling Calculations

TABLE 3 - Allowable Headworks Loadings Based on NPDES Effluent Limits

	LOCAL LIMITS CALCULATION DATA				MAXIMUM LOADING	
Pollutant	POTW Flow (MGD) (Qpotw)	NPDES Limit (mg/l) (Ccrit)	Select Removal Efficiency (from list)	Removal Efficiency (%) (Rpotw)	Allowable Headworks Loading (lbs/day) (AHLnpdes)	User Entered Removal Efficiency (%)
Arsenic	2.7		Default (activated sludge)	45.00	-	
Cadmium	2.7		Influent/Effluent	42.53	-	
Chromium	2.7		Default (activated sludge)	82.00	-	
Copper	2.7		Influent/Effluent	70.94	-	
Cyanide	2.7		Default (activated sludge)	69.00	-	
Lead	2.7		Default (activated sludge)	61.00	-	
Mercury	2.7		Default (activated sludge)	60.00	-	
Molybdenum	2.7		Influent/Effluent	45.77	-	
Nickel	2.7		Default (activated sludge)	42.00	-	
Selenium	2.7		Influent/Effluent	10.25	-	
Silver	2.7		Influent/Effluent	31.60	-	
Zinc	2.7		Influent/Effluent	52.00	-	
Ammonia	2.7		Influent/Effluent	98.67	-	
BOD5	2.7		Influent/Effluent	87.43	-	
TSS	2.7		Influent/Effluent	99.33	-	
Phosphorus (T)	2.7		Influent/Effluent	26.31	-	
TKN	2.7		Influent/Effluent	99.44	-	
Beryllium	2.7		Influent/Effluent	-	-	
Chloroform	2.7		Influent/Effluent	90.10	-	
1,2-Dichlorobenzene	2.7		User Entered	0.00	-	0
1,4-Dichlorobenzene	2.7		User Entered	0.00	-	0
Methylene Chloride	2.7		User Entered	62.00	-	62
Phenol	2.7		User Entered	90.00	-	90
Bis(2-ethylhexyl)phthalate	2.7		User Entered	72.00	-	72
Toluene	2.7		User Entered	93.00	-	93
COD	2.7		Influent/Effluent	94.54	-	
	2.7		Influent/Effluent	-	-	
	2.7		Influent/Effluent	-	-	
	2.7		Influent/Effluent	-	-	
	2.7		Influent/Effluent	-	-	
	2.7		Influent/Effluent	-	-	
	2.7		Influent/Effluent	-	-	
	2.7		Influent/Effluent	-	-	
	2.7		Influent/Effluent	-	-	
	2.7		Influent/Effluent	-	-	
	2.7		Influent/Effluent	-	-	
	2.7		Influent/Effluent	-	-	

(Qpotw)	POTW's average flow in MGD (from Table 2(b), cell B34).
(Ccrit)	NPDES permit limit or calculated WQBEL for a particular pollutant in mg/l (user entered)
Select Removal Efficiency	Select removal efficiency for column E from drop down list.
(Rpotw)	Removal efficiency across POTW as percent (Inf/Eff Removal (row 48), Inf/Sldg Removal (row 49), or Daily Removal (row 43) from 'Monitoring Data' worksheet, EPA default for specified treatment process, or user entered (column G)).
(AHLnpdes)	Allowable headworks pollutant loading to the POTW in pounds per day based on NPDES permit limits (lbs/day - calculated).
AHLnpdes =	(8.34 * Ccrit * Qpotw) / (1-Rpotw/100)
8.34	Unit conversion factor

YR WRF with Sludge Landfilling Calculations

TABLE 8 - Allowable Headworks Loadings Based on Activated Sludge Inhibition Level

	LOCAL LIMITS CALCULATIONS DATA				MAXIMUM LOADING	
Pollutant	POTW Flow (MGD) (Qpotw)	Activated Sludge Inhibition Level (mg/l) (Ccrit)	Select Removal Efficiency (from list)	Removal Efficiency (%) (Rprim)	Allowable Headworks Loading (lbs/day) (AHLasi)	User Entered Removal Efficiency (%)
Arsenic	2.7	0.1	User Entered	0.00	2.2518	0
Cadmium	2.7	1	User Entered	0.00	22.5180	0
Chromium	2.7	1	User Entered	0.00	22.5180	0
Copper	2.7	1	User Entered	0.00	22.5180	0
Cyanide	2.7	0.1	User Entered	0.00	2.2518	0
Lead	2.7	1	User Entered	0.00	22.5180	0
Mercury	2.7	0.1	User Entered	0.00	2.2518	0
Molybdenum	2.7		User Entered	-	-	
Nickel	2.7	1	User Entered	0.00	22.5180	0
Selenium	2.7		User Entered	-	-	0
Silver	2.7		User Entered	-	-	0
Zinc	2.7	0.5	User Entered	0.00	11.2590	0
Ammonia	2.7	480	User Entered	0.00	10808.6400	0
BOD5	2.7		User Entered	-	-	
TSS	2.7		User Entered	-	-	
Phosphorus (T)	2.7		User Entered	-	-	
TKN	2.7		User Entered	-	-	
Beryllium	2.7		User Entered	-	-	
Chloroform	2.7		User Entered	-	-	0
1,2-Dichlorobenzene	2.7	5	User Entered	0.00	112.5900	0
1,4-Dichlorobenzene	2.7	5	User Entered	0.00	112.5900	0
Methylene Chloride	2.7		User Entered	-	-	0
Phenol	2.7	50	User Entered	0.00	1125.9000	0
Bis(2-ethylhexyl)phthalate	2.7		User Entered	-	-	0
Toluene	2.7	200	User Entered	0.00	4503.6000	0
COD	2.7		User Entered	-	-	
	2.7		User Entered	-	-	
	2.7		User Entered	-	-	
	2.7		User Entered	-	-	
	2.7		User Entered	-	-	
	2.7		User Entered	-	-	
	2.7		User Entered	-	-	
	2.7		User Entered	-	-	
	2.7		User Entered	-	-	
	2.7		User Entered	-	-	
	2.7		User Entered	-	-	
	2.7		User Entered	-	-	

(Qpotw) POTW's average flow in MGD (from Table 2(b), cell B34).
(Ccrit) Activated sludge threshold inhibition level, mg/l (EPA default or user entered).
Select Removal Efficiency Select removal efficiency for column E from drop down list.
(Rprim) Removal efficiency prior to activated sludge treatment unit as percent (Prior to Act Sl ('Inhibition Removals' worksheet row 48), EPA default, or user entered).
(AHLasi) Allowable headworks pollutant loading to the POTW in pounds per day based on inhibition of activated sludge units (lbs/day - calculated).
AHLasi = 8.34 * (Ccrit * Qpotw) / (1-Rprim/100)
8.34 Unit conversion factor

YR WRF with Sludge Landfilling Calculations

TABLE 10 - Allowable Headworks Loadings Based on Nitrification Inhibition Level

	LOCAL LIMITS CALCULATIONS DATA				MAXIMUM LOADING	
Pollutant	POTW Flow (MGD) (Qpotw)	Nitrification Inhibition Level (mg/l) (Ccrit)	Select Removal Efficiency (from list)	Removal Efficiency (%) (Rsec)	Allowable Headworks Loading (lbs/day) (AHLni)	User Entered Removal Efficiency (%)
Arsenic	2.7	1.5	User Entered	0.00	33.7770	
Cadmium	2.7	5.2	User Entered	0.00	117.0936	
Chromium	2.7	0.25	User Entered	0.00	5.6295	
Copper	2.7	0.48	User Entered	0.00	10.8086	
Cyanide	2.7	0.34	User Entered	0.00	7.6561	
Lead	2.7	0.5	User Entered	0.00	11.2590	
Mercury	2.7		User Entered	-	-	
Molybdenum	2.7		User Entered	-	-	
Nickel	2.7	0.25	User Entered	0.00	5.6295	
Selenium	2.7		User Entered	-	-	
Silver	2.7		User Entered		-	
Zinc	2.7	0.5	User Entered	0.00	11.2590	
Ammonia	2.7		User Entered	-	-	
BOD5	2.7		User Entered	-	-	
TSS	2.7		User Entered	-	-	
Phosphorus (T)	2.7		User Entered	-	-	
TKN	2.7		User Entered	-	-	
Beryllium	2.7		User Entered	-	-	
Chloroform	2.7	10	User Entered	0.00	225.1800	
1,2-Dichlorobenzene	2.7		User Entered	-	-	
1,4-Dichlorobenzene	2.7		User Entered	-	-	
Methylene Chloride	2.7		User Entered	-	-	
Phenol	2.7	4	User Entered	0.00	90.0720	
Bis(2-ethylhexyl)phthalate	2.7		User Entered	-	-	
Toluene	2.7		User Entered	-	-	
COD	2.7		User Entered	-	-	
	2.7		User Entered	-	-	
	2.7		User Entered	-	-	
	2.7		User Entered	-	-	
	2.7		User Entered	-	-	
	2.7		User Entered	-	-	
	2.7		User Entered	-	-	
	2.7		User Entered	-	-	
	2.7		User Entered	-	-	
	2.7		User Entered	-	-	
	2.7		User Entered	-	-	
	2.7		User Entered	-	-	

(Qpotw)	POTW's average flow in MGD (from Table 2(b), cell B34).
(Ccrit)	Nitrification threshold inhibition level, mg/l (EPA default or user entered).
Select Removal Efficiency	Select removal efficiency for column E from drop down list.
(Rsec)	Removal efficiency prior to nitrification treatment unit as percent (Prior to Nitrif ('Inhibition Removals' worksheet row 50), Prior to Act Sl (row 48), Prior to Trick Fil (row 49), EPA default, or user entered).
(AHLni)	Allowable headworks pollutant loading to the POTW in pounds per day based on inhibition of nitrification units (lbs/day - calculated).
AHLni =	(8.34 * Ccrit * Qpotw) / (1-Rsec/100)
8.34	Unit conversion factor

YR WRF with Sludge Landfilling Calculations

TABLE 13 - Comparison of Allowable Headworks Loadings Based on Inhibition

Has the POTW Experienced Inhibition or Construction Within the Data Time Frame? **Yes** | **No**: X

Pollutant	AHL (ACT. SLUDGE) (lbs/day)	AHL (TRICK. FILTER) (lbs/day)	AHL (NITRIF) (lbs/day)	AHL (DIG. - CONSERV.) (lbs/day)	AHL (DIG. - NON-CONS.) (lbs/day)	Most Stringent (INHIBITION) (lbs/day)	Monitoring Data Maximum Influent Concentration (Cmaxin - mg/l)	Other Maximum Influent Concentration (Cmaxino - mg/l)	Maximum Influent Loading (Lmaxin - lbs/d)	AHL (INHIBITION) (lbs/d)
Arsenic	2.2518	-	33.7770	-	-	2.2518	0.000735		0.0166	2.2518
Cadmium	22.5180	-	117.0936	-	-	22.5180	0.0000927		0.0021	22.5180
Chromium	22.5180	-	5.6295	-	-	5.6295	0.00202		0.0455	5.6295
Copper	22.5180	-	10.8086	-	-	10.8086	0.0562		1.2655	10.8086
Cyanide	2.2518	-	7.6561	-	-	2.2518	0.002		0.0450	2.2518
Lead	22.5180	-	11.2590	-	-	11.2590	0.00125		0.0281	11.2590
Mercury	2.2518	-	-	-	-	2.2518	0.00005		0.0011	2.2518
Molybdenum	-	-	-	-	-	-	0.00371		0.0835	-
Nickel	22.5180	-	5.6295	-	-	5.6295	0.00335		0.0754	5.6295
Selenium	-	-	-	-	-	-	0.00115		0.0259	-
Silver	-	-	-	-	-	-	0.000127		0.0029	-
Zinc	11.2590	-	11.2590	-	-	11.2590	0.108		2.4319	11.2590
Ammonia	10808.6400	-	-	-	-	10808.6400	34.7		781.3746	10808.6400
BOD5	-	-	-	-	-	-	204		4593.6720	-
TSS	-	-	-	-	-	-	266		5989.7880	-
Phosphorus (T)	-	-	-	-	-	-	4.84		108.9871	-
TKN	-	-	-	-	-	-	41.9		943.5042	-
Beryllium	-	-	-	-		-	-		-	-
Chloroform	-	-	225.1800	-	-	225.1800	0.0034		0.0766	225.1800
1,2-Dichlorobenzene	112.5900	-	-	-	-	112.5900	0.00012		0.0027	112.5900
1,4-Dichlorobenzene	112.5900	-	-	-	-	112.5900	0.00017		0.0038	112.5900
Methylene Chloride	-	-	-	-	-	-	0.00017		0.0038	-
Phenol	1125.9000	-	90.0720	-	-	90.0720	0.0055		0.1238	90.0720
Bis(2-ethylhexyl)phthalate	-	-	-	-	-	-	0.016		0.3603	-
Toluene	4503.6000	-	-	-	-	4503.6000	0.00016		0.0036	4503.6000
COD	-	-	-	-	-	-	553		12452.4540	-
	-	-	-	-	-	-	-		-	-
	-	-	-	-	-	-	-		-	-
	-	-	-	-	-	-	-		-	-
	-	-	-	-	-	-	-		-	-
	-	-	-	-	-	-	-		-	-
	-	-	-	-	-	-	-		-	-
	-	-	-	-	-	-	-		-	-
	-	-	-	-	-	-	-		-	-
	-	-	-	-	-	-	-		-	-
	-	-	-	-	-	-	-		-	-
	-	-	-	-	-	-	-		-	-

AHL (ACT. SLUDGE) =	Allowable Headworks Loading based on inhibition of the activated sludge treatment units from Table 8, column F.
AHL (TRICK. FILTER) =	Allowable Headworks Loading based on inhibition of the trickling filter treatment units from Table 9, column F.
AHL (NITRIF.) =	Allowable Headworks Loading based on inhibition of the nitrification treatment units from Table 10, column F.
AHL (DIG. - CONSERV.) =	Allowable Headworks Loading based on inhibition of the anaerobic digester treatment units for conservative pollutants from Table 11 column F.
AHL (DIG. - NON-CONS.) =	Allowable Headworks Loading based on inhibition of the anaerobic digester treatment units for non-conservative pollutants from Table 12, column G.
Most Stringent (INHIBITION)	Lowest value for each pollutant from columns B through F.
(Cmaxin)	Maximum Influent Concentration (from 'Monitoring Data' worksheet, row 44).
(Cmaxino)	Maximum Influent Concentration observed at treatment plant but not listed (or eliminated from) 'Monitoring Data' worksheet (user entered).
(Lmaxin)	Maximum Influent Loading (calculated).
Lmaxin =	8.34 * Cmaxin * Qpotw; where Cmaxin is the greater of Cmaxin and Cmaxino.
8.34	Unit conversion factor
(Qpotw)	POTW's average flow in MGD (from Table 2(b), cell B34).
AHL (INHIBITION) =	Highest value for each pollutant from column G or J.
	Red Bold in column K indicates that the allowable headworks loading is based on the maximum influent loading.

TABLE 17 - Comparison of Allowable Headworks Loadings

Pollutant	AHL (WATER QUALITY) (lbs/day)	AHL (INHIBITION) (lbs/d)	AHL (SLUDGE) (lbs/d)	Design Loading (lbs/d)	Maximum Allowable Headworks Loading (MAHL - lbs/d)
Arsenic	-	2.2518	-	-	2.2518
Cadmium	-	22.5180	-	-	22.5180
Chromium	-	5.6295	-	-	5.6295
Copper	-	10.8086	-	-	10.8086
Cyanide	-	2.2518	-	-	2.2518
Lead	-	11.2590	-	-	11.2590
Mercury	-	2.2518	-	-	2.2518
Molybdenum	-	-	-	-	-
Nickel	-	5.6295	-	-	5.6295
Selenium	-	-	-	-	-
Silver	-	-	-	-	-
Zinc	-	11.2590	-	-	11.2590
Ammonia	-	10808.6400	-	841	841.0000
BOD5	-	-	-	5479	5479.0000
TSS	-	-	-	6386	6386.0000
Phosphorus (T)	-	-	-	160	160.0000
TKN	-	-	-	1216	1216.0000
Beryllium	-	-	-		-
Chloroform	-	225.1800	-	-	225.1800
1,2-Dichlorobenzene	-	112.5900	-	-	112.5900
1,4-Dichlorobenzene	-	112.5900	-	-	112.5900
Methylene Chloride	-	-	-	-	-
Phenol	-	90.0720	-	-	90.0720
Bis(2-ethylhexyl)phthalate	-	-	-	-	-
Toluene	-	4503.6000	-	-	4503.6000
COD	-	-	-	14,814	14814.0000
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-

AHL (WATER QUALITY) = Allowable Headworks Loading based on protection of water quality from Table 7, column F.
AHL (INHIBITION) = Allowable Headworks Loading based on prevention of inhibition from Table 13, column K.
AHL (SLUDGE) = Allowable Headworks Loading based on protection of sludge quality from Table 16, column G.
Design Loading of POTW treatment plant (user entered).
MAHL Maximum allowable headworks loading is the lowest value for each pollutant from columns B through E.

YR WRF with Sludge Landfilling Calculations

TABLE 18 - Calculation of Local Limit

Pollutant	Maximum Allowable Headworks (MAHL - lbs/d)	Safety Factor (%) (SF)	Growth Allowance (%) (GA)	Nonindustrial Concentration (mg/l) (Cback)	Nonindustrial Flow (MGD) (Qback)	Nonindustrial Loading (lbs/day) (Lback)	Hauled Waste to Influent Concentration (mg/l) (Chwi)	Hauled Waste to Influent Flow (MGD) (Qhwi)	Hauled Waste to Influent Loading (lbs/day) (Lhwi)	Allowable Industrial Loading (MAIL - lbs/day)	Calculated Concentration Limit (mg/l) (Cind)	Basis of Limitation	Human Health Calculation	Industrial Contributory Flow (MGD)
Arsenic	2.252	10	15	0.0007	2.659	0.0163	-	0	0.0000	1.673	4.891	Inhibition	-	0.041
Cadmium	22.52	10	15	0.00003	2.659	0.00064	-	0	0.0000	16.89	49.4	Inhibition	-	0.041
Chromium	5.630	10	15	0.00092	2.659	0.02040	-	0	0.0000	4.2017	12.29	Inhibition	-	0.041
Copper	10.81	10	15	0.02087	2.659	0.46274	-	0	0.0000	7.6437	22.35	Inhibition	-	0.041
Cyanide	2.252	10	15	0.0020	2.072	0.0346	-	0	0.0000	1.6543	0.316	Inhibition	1.1	0.628
Lead	11.26	10	15	0.00018	2.055	0.00314	-	0	0.0000	8.4411	1.569	Inhibition	-	0.645
Mercury	2.252	10	15	0.000025	2.683	0.00056	-	0	0.0000	1.6883	11.91	Inhibition	-	0.017
Molybdenum	-	10	15	0.00029	1.963	0.00467	-	0	0.0000	-	-	-	-	0.737
Nickel	5.630	10	15	0.00032	2.055	0.00543	-	0	0.0000	4.2167	0.784	Inhibition	-	0.645
Selenium	-	10	15	0.00026	2.072	0.00449	-	0	0.0000	-	-	-	-	0.628
Silver	-	10	15	0.000044	2.683	0.000977	-	0	0.0000	-	-	-	-	0.017
Zinc	11.26	10	15	0.1049	2.659	2.3259	-	0	0.0000	6.1184	17.89	Inhibition	-	0.041
Ammonia	841.0	**0**	10	25.0	2.676	557.9	-	0	0.0000	199	994	Design	-	0.024
BOD5	5479	**0**	**9.5**	220	2.676	4909.9	-	0	0.0000	49	243	Design	-	0.024
TSS	6386	**0**	15	220	2.676	4909.9	-	0	0.0000	518	2589	Design	-	0.024
Phosphorus (T)	160.0	**0**	15	4.7	2.676	104.0	-	0	0.0000	32	160	Design	-	0.024
TKN	1216	**0**	10	40.0	2.676	892.7	-	0	0.0000	202	1008	Design	-	0.024
Beryllium	-	10	15	-	2.7	0.0000	-	0	0.0000	-	-	-	-	0
Chloroform	225.2	10	15	0.00447	2.096	0.07808	-	0	0.0000	168.8	33.5	Inhibition	0.060	0.604
1,2-Dichlorobenzene	112.6	10	15	0.00061	2.7	0.01381	-	0	0.0000	84.4	-	Inhibition	-	0
1,4-Dichlorobenzene	112.6	10	15	0.00101	2.7	0.02282	-	0	0.0000	84.4	-	Inhibition	5.7	0
Methylene Chloride	-	10	15	0.00028	2.7	0.00638	-	0	0.0000	-	-	-	0.83	0
Phenol	90.07	10	15	0.00858	2.7	0.19309	-	0	0.0000	67.4	-	Inhibition	1186	0
Bis(2-ethylhexyl)phthalate	-	10	15	0.03108	2.7	0.69975	-	0	0.0000	-	-	-	7233	0
Toluene	4504	10	15	0.00021	2.7	0.00480	-	0	0.0000	3378	-	Inhibition	1.4	0
COD	14814	**0**	15	500	2.676	11158.9	-	0	0.0000	1433	7159	Design	-	0.024
	-			-	1.946	0.0000	-	0	0.0000	-	-	-		
	-			-	1.946	0.0000	-	0	0.0000	-	-	-		
	-			-	1.946	0.0000	-	0	0.0000	-	-	-		
	-			-	1.946	0.0000	-	0	0.0000	-	-	-		
	-			-	1.946	0.0000	-	0	0.0000	-	-	-		
	-			-	1.946	0.0000	-	0	0.0000	-	-	-		
	-			-	1.946	0.0000	-	0	0.0000	-	-	-		
	-			-	1.946	0.0000	-	0	0.0000	-	-	-		
	-			-	1.946	0.0000	-	0	0.0000	-	-	-		
	-			-	1.946	0.0000	-	0	0.0000	-	-	-		
	-			-	1.946	0.0000	-	0	0.0000	-	-	-		

(MAHL)	Maximum allowable headworks loading (from Table 17, column F).
(SF)	Safety factor as a percent (user entered).
(GA)	Growth allowance as a percent (user entered).
(Cback)	Average nonindustrial background concentration for a particular pollutant in mg/l (from 'Monitoring Data' worksheet row 43 or user entered).
(Qback)	Average nonindustrial background flow in MGD (calculated).
Qback =	Qpotw - Qind - Qhwi (values from Table 2(b), cells B34, C34, and K34)
(Lback)	Average nonindustrial background loading to the POTW for a particular pollutant in pounds per day (calculated).
Lback =	8.34 * Cback * Qback
8.34	Unit conversion factor
(Chwi)	Average concentration for a particular pollutant in mg/l for hauled waste discharged at the POTW influent (from 'Monitoring Data' worksheet, row 43).
(Qhwi)	Average flow in MGD for hauled waste discharged at the POTW influent (from Table 2(b), cell K34).
(Lhwi)	Average loading to the POTW for a particular pollutant in pounds per day for hauled waste discharged at the POTW influent (calculated).
Lhwi =	8.34 * Chwi * Qhwi
(MAIL)	Maximum Allowable Industrial Load (calculated).
MAIL =	MAHL - (MAHL * SF/100) - (MAHL * GA/100) - Lback - Lhwi
(Cind)	Industrial allowable local limit for a given pollutant in mg/l (calculated).
Cind =	MAIL/(8.34 * Qind)
(Qind)	Average discharge flow of Industrial Users to be regulated through the local limits in MGD (from Table 2(b), cell C34).
Basis of Limitation	An identification of the lowest allowable headworks loading from Table 17 columns B through D.
	Red Bold in column C or D indicates a safety factor or growth allowance of less than 10%.

Appendix B.2 – ASE WRF with Sludge Landfilling Calculations

ASE WRF Sludge Landfilling Calculations

Table 1 - Unit Operations (X if present)

Activated Sludge Present?	Trickling Filter Present?	Nitrification Present?	Anaerobic Digestion Present?	Sludge Incineration Present?
X		X		

Placing an "X" in the cell under a treament unit will activate the inhibition calclations for that unit or the sludge incineration calculations.

TABLE 2a - Stream Flow Partial Mix Factors

Q7-10 Stream Flow (MGD) (Q7-10)	Harmonic Mean Stream Flow (MGD) (Qhm)	Drinking Water Intake Stream Flow (MGD) (Qdw)	Chronic Partial Mix Factor (PMFc)	Acute Partial Mix Factor (PMFa)	Cancer Risk Level Partial Mix Factor (PMFcrl)

(Q7-10) 7-day, 10-year low flow for receiving stream in MGD (user entered).
(Qhm) Harmonic mean flow for receiving stream in MGD (user entered).
(Qdw) Flow for receiving stream at nearest downstream drinking water intake (user entered).
(PMFa) Partial mix factor for acute water quality standards (user entered).
(PMFc) Partial mix factor for chronic water quality standards (user entered).
(PMFcrl) Partial mix factor for cancer risk level water quality standards (user entered).

TABLE 2b - POTW and Receiving Stream Data

POTW Flow (MGD) (Qpotw)	IU Flow (MGD) (Qind)	Sludge Flow to Digester (MGD) (Qdig)	Sludge Flow to Disposal (MTD) (Qsldg)	Stream Flow for Chronic WQS (MGD) (Qstr1)	Stream Flow for Acute WQS (MGD) (Qstr2)	Stream Flow for Threshold Human Health WQS (MGD) (Qstr3)	Stream Flow for Carcinogen Human Health WQS (MGD) (Qstr4)	Receiving Stream Hardness (mg/l) (H)	Hauled Waste Flow to Influent (MGD) (Qhwi)	Hauled Waste Flow to Sludge Processing (MGD) (Qhws)	Sludge Flow to Incineration (MTD) (Qinc)
0.9	0.713		0.27	0.07	0.05	11.43	11.43	14.7			

(Qpotw) POTW's average flow in MGD (user entered).
(Qind) Average discharge flow of Industrial Users to be regulated through the local limits in MGD (user entered).
(Qdig) Average sludge flow to digester in MGD (user entered).
(Qsldg) Average sludge flow to disposal in dry metric tons per day (user entered).
(Qstr1) Receiving stream (upstream) flow used with chronic water quality standards in MGD (calculated).
Qstr1 = Q7-10 * PMFc (data from Table 2(a), cells B17 and E17); if cell E17 is blank, PMFc assumed to be 1.
(Qstr2) Receiving stream (upstream) flow used with acute water quality standards in MGD (calculated).
Qstr2 = Q7-10 * PMFa (data from Table 2(a), cells B17 and F17); if cell F17 is blank, PMFa assumed to be 1.
(Qstr3) Receiving stream (upstream) flow used with threshold human health water quality standards in MGD (from Table 2(a), cell B17).
(Qstr4) Receiving stream (upstream) flow used with carcinogen human health water quality standards in MGD (calculated).
Qstr4 = Qhm * PMFcrl (data from Table 2(a), cells C17 and G17); if cell G17 is blank, PMFcrl assumed to be 1; if cell C17 is blank, formula below is used:
or Qstr4 = PMFcrl * 7.43 * $(Q7\text{-}10)^{0.874}$ (data from Table 2(a), cell G17 and B17)
(H) Receiving stream hardness in mg/l (user entered).
(Qhwi) Hauled waste flow discharged at the influent of the treatment plant in MGD (user entered).
(Qhws) Hauled waste flow discharged directly to the sludge processing units in MGD (user entered).
(Qinc) Average sludge flow to incineration in dry metric tons per day (user entered).

ASE WRF Sludge Landfilling Calculations

TABLE 3 - Allowable Headworks Loadings Based on NPDES Effluent Limits

	LOCAL LIMITS CALCULATION DATA				MAXIMUM LOADING	
Pollutant	POTW Flow (MGD) (Qpotw)	NPDES Limit (mg/l) (Ccrit)	Select Removal Efficiency (from list)	Removal Efficiency (%) (Rpotw)	Allowable Headworks Loading (lbs/day) (AHLnpdes)	User Entered Removal Efficiency (%)
Arsenic	0.9		Default (activated sludge)	45.00	-	
Cadmium	0.9		Default (activated sludge)	67.00	-	
Chromium	0.9		Default (activated sludge)	82.00	-	
Copper	0.9		Default (activated sludge)	86.00	-	
Cyanide	0.9		Default (activated sludge)	69.00	-	
Lead	0.9		Default (activated sludge)	61.00	-	
Mercury	0.9		Default (activated sludge)	60.00	-	
Molybdenum	0.9		Default (activated sludge)	50.00	-	
Nickel	0.9		Default (activated sludge)	42.00	-	
Selenium	0.9		Default (activated sludge)	50.00	-	
Silver	0.9		Default (activated sludge)	75.00	-	
Zinc	0.9		Default (activated sludge)	79.00	-	
Ammonia	0.9		User Entered	-	-	
BOD5	0.9		User Entered	-	-	
TSS	0.9		User Entered	-	-	
Phosphorus (T)	0.9		User Entered	-	-	
TKN	0.9		User Entered	-	-	
Beryllium	0.9		User Entered	-	-	
Chloroform	0.9		User Entered	0.67	-	0.67
1,2-Dichlorobenzene	0.9		User Entered	0.00	-	
1,4-Dichlorobenzene	0.9		User Entered	0.00	-	
Methylene Chloride	0.9		User Entered	0.62	-	0.62
Phenol	0.9		User Entered	0.90	-	0.9
Bis(2-ethylhexyl)phthalate	0.9		User Entered	0.72	-	0.72
Toluene	0.9		User Entered	0.93	-	0.93
COD	0.9		User Entered		-	
	0.9		Influent/Effluent	-	-	
	0.9		Influent/Effluent	-	-	
	0.9		Influent/Effluent	-	-	
	0.9		Influent/Effluent	-	-	
	0.9		Influent/Effluent	-	-	
	0.9		Influent/Effluent	-	-	
	0.9		Influent/Effluent	-	-	
	0.9		Influent/Effluent	-	-	
	0.9		Influent/Effluent	-	-	
	0.9		Influent/Effluent	-	-	
	0.9		Influent/Effluent	-	-	

(Qpotw)	POTW's average flow in MGD (from Table 2(b), cell B34).
(Ccrit)	NPDES permit limit or calculated WQBEL for a particular pollutant in mg/l (user entered)
Select Removal Efficiency	Select removal efficiency for column E from drop down list.
(Rpotw)	Removal efficiency across POTW as percent (Inf/Eff Removal (row 48), Inf/Sldg Removal (row 49), or Daily Removal (row 43) from 'Monitoring Data' worksheet, EPA default for specified treatment process, or user entered (column G)).
(AHLnpdes)	Allowable headworks pollutant loading to the POTW in pounds per day based on NPDES permit limits (lbs/day - calculated).
AHLnpdes =	(8.34 * Ccrit * Qpotw) / (1-Rpotw/100)
8.34	Unit conversion factor

ASE WRF Sludge Landfilling Calculations

TABLE 4 - Allowable Headworks Loadings Based on Chronic Water Quality Standards

	LOCAL LIMITS CALCULATION DATA					MAXIMUM LOADING
Pollutant	POTW Flow (MGD) (Qpotw)	Receiving Stream Flow (MGD) (Qstr1)	Receiving Stream Concentration (mg/l) (Cstr)	Chronic WQS (mg/l) (Ccrit)	Removal Efficiency (%) (Rpotw)	Allowable Headworks Loading (lbs/day) (AHLcwq)
Arsenic	0.9	0.07		0.31115	45.00	4.5816
Cadmium	0.9	0.07		0.00063	67.00	0.0154
Chromium	0.9	0.07		0.07909	82.00	3.5587
Copper	0.9	0.07		0.00561	86.00	0.3248
Cyanide	0.9	0.07		0.00520	69.00	0.1358
Lead	0.9	0.07		0.00180	61.00	0.0374
Mercury	0.9	0.07		0.000012	60.00	0.0002
Molybdenum	0.9	0.07			50.00	-
Nickel	0.9	0.07		0.02821	42.00	0.3938
Selenium	0.9	0.07		0.005	50.00	0.0810
Silver	0.9	0.07			75.00	-
Zinc	0.9	0.07		0.09336	79.00	3.6004
Ammonia	0.9	0.07			-	-
BOD5	0.9	0.07			-	-
TSS	0.9	0.07			-	-
Phosphorus (T)	0.9	0.07			-	-
TKN	0.9	0.07			-	-
Beryllium	0.9	0.07			-	-
Chloroform	0.9	0.07			0.67	-
1,2-Dichlorobenzene	0.9	0.07			0.00	-
1,4-Dichlorobenzene	0.9	0.07			0.00	-
Methylene Chloride	0.9	0.07			0.62	-
Phenol	0.9	0.07		0.3	0.90	2.4517
Bis(2-ethylhexyl)phthalate	0.9	0.07			0.72	-
Toluene	0.9	0.07			0.93	-
COD	0.9	0.07			0.00	-
	0.9	0.07			-	-
	0.9	0.07			-	-
	0.9	0.07			-	-
	0.9	0.07			-	-
	0.9	0.07			-	-
	0.9	0.07			-	-
	0.9	0.07			-	-
	0.9	0.07			-	-
	0.9	0.07			-	-
	0.9	0.07			-	-
	0.9	0.07			-	-

(Qpotw)	POTW's average flow in MGD (from Table 2(b), cell B34).
(Qstr1)	Receiving stream (upstream) flow used with chronic water quality standards in MGD (from Table 2(b), cell F34).
(Cstr)	Receiving stream background concentration in mg/l (user entered)
(Ccrit)	State chronic water quality standard for a particular pollutant in mg/l.
(Rpotw)	Removal efficiency across POTW as percent (from Table 3, column E).
(AHLcwq)	Allowable headworks pollutant loading to the POTW in pounds per day based on chronic water quality standards (lbs/day - calculated).
AHLcwq =	8.34 * (Ccrit * (Qstr1 + Qpotw) - (Cstr * Qstr1)) / (1-Rpotw/100)
8.34	Unit conversion factor

ASE WRF Sludge Landfilling Calculations

TABLE 5 - Allowable Headworks Loadings Based on Acute Water Quality Standards

	LOCAL LIMITS CALCULATION DATA					MAXIMUM LOADING
Pollutant	POTW Flow (MGD) (Qpotw)	Receiving Stream Flow (MGD) (Qstr2)	Receiving Stream Concentration (mg/l) (Cstr)	Acute WQS (mg/l) (Ccrit)	Removal Efficiency (%) (Rpotw)	Allowable Headworks Loading (lbs/day) (AHLawq)
Arsenic	0.9	0.05	0	0.70526	45.00	10.1085
Cadmium	0.9	0.05	0	0.00111	67.00	0.0264
Chromium	0.9	0.05	0	0.60805	82.00	26.6296
Copper	0.9	0.05	0	0.00712	86.00	0.4010
Cyanide	0.9	0.05	0	0.02200	69.00	0.5594
Lead	0.9	0.05	0	0.04620	61.00	0.9338
Mercury	0.9	0.05	0	0.00140	60.00	0.0276
Molybdenum	0.9	0.05	0		50.00	-
Nickel	0.9	0.05	0	0.25395	42.00	3.4516
Selenium	0.9	0.05	0		50.00	-
Silver	0.9	0.05	0		75.00	-
Zinc	0.9	0.05	0	0.09260	79.00	3.4761
Ammonia	0.9	0.05	0		-	-
BOD5	0.9	0.05	0		-	-
TSS	0.9	0.05	0		-	-
Phosphorus (T)	0.9	0.05	0		-	-
TKN	0.9	0.05	0		-	-
Beryllium	0.9	0.05	0		-	-
Chloroform	0.9	0.05	0		0.67	-
1,2-Dichlorobenzene	0.9	0.05	0		0.00	-
1,4-Dichlorobenzene	0.9	0.05	0		0.00	-
Methylene Chloride	0.9	0.05	0		0.62	-
Phenol	0.9	0.05	0		0.90	-
Bis(2-ethylhexyl)phthalate	0.9	0.05	0		0.72	-
Toluene	0.9	0.05	0		0.93	-
COD	0.9	0.05	0		0.00	-
	0.9	0.05	0		-	-
	0.9	0.05	0		-	-
	0.9	0.05	0		-	-
	0.9	0.05	0		-	-
	0.9	0.05	0		-	-
	0.9	0.05	0		-	-
	0.9	0.05	0		-	-
	0.9	0.05	0		-	-
	0.9	0.05	0		-	-
	0.9	0.05	0		-	-
	0.9	0.05	0		-	-

(Qpotw) POTW's average flow in MGD (from Table 2(b), cell B34).
(Qstr2) Receiving stream (upstream) flow used with acute water quality standards in MGD (from Table 2(b), cell G34).
(Cstr) Receiving stream background concentration in mg/l (from Table 4, column D).
(Ccrit) State acute water quality standard for a particular pollutant in mg/l.
(Rpotw) Removal efficiency across POTW as percent (from Table 3, column E).
(AHLawq) Allowable headworks pollutant loading to the POTW in pounds per day based on acute water quality standards (lbs/day - calculated).
AHLawq = 8.34 * (Ccrit * (Qstr2 + Qpotw) - (Cstr * Qstr2)) / (1-Rpotw/100)
8.34 Unit conversion factor

ASE WRF Sludge Landfilling Calculations

TABLE 6 - Allowable Headworks Loadings Based on Human Health Water Quality Standards

	LOCAL LIMITS CALCULATION DATA						MAXIMUM LOADING
Pollutant	POTW Flow (MGD) (Qpotw)	Receiving Stream Flow (MGD) (Qstr3 Qstr4 or Qdw)	Receiving Stream Concentration (mg/l) (Cstr)	Human Health WQS (mg/l) (Ccrit)	Select Basis of Standard (from list)	Removal Efficiency (%) (Rpotw)	Allowable Headworks Loading (lbs/day) (AHLhhwq)
Arsenic	0.9	11.43	0	0.05	Threshold Human Health	45.00	9.3516
Cadmium	0.9	-	0			67.00	-
Chromium	0.9	-	0			82.00	-
Copper	0.9	-	0			86.00	-
Cyanide	0.9	-	0			69.00	-
Lead	0.9	-	0			61.00	-
Mercury	0.9	-	0			60.00	-
Molybdenum	0.9	-	0			50.00	-
Nickel	0.9	-	0			42.00	-
Selenium	0.9	-	0			50.00	-
Silver	0.9	-	0			75.00	-
Zinc	0.9	-	0			79.00	-
Ammonia	0.9	-	0			-	-
BOD5	0.9	-	0			-	-
TSS	0.9	-	0			-	-
Phosphorus (T)	0.9	-	0			-	-
TKN	0.9	-	0			-	-
Beryllium	0.9	-	0			-	-
Chloroform	0.9	11.43	0	0.47	Threshold Human Health	0.67	48.6737
1,2-Dichlorobenzene	0.9	11.43	0	1.3	Threshold Human Health	0.00	133.7274
1,4-Dichlorobenzene	0.9	11.43	0	0.19	Threshold Human Health	0.00	19.5448
Methylene Chloride	0.9	11.43	0	0.59	Threshold Human Health	0.62	61.0703
Phenol	0.9	11.43	0	857	Threshold Human Health	0.90	88957.8349
Bis(2-ethylhexyl)phthalate	0.9	11.43	0	0.0022	Threshold Human Health	0.72	0.2279
Toluene	0.9	11.43	0	5.98	Threshold Human Health	0.93	620.9206
COD	0.9	-	0			0.00	-
	0.9	-	0			-	-
	0.9	-	0			-	-
	0.9	-	0			-	-
	0.9	-	0			-	-
	0.9	-	0			-	-
	0.9	-	0			-	-
	0.9	-	0			-	-
	0.9	-	0			-	-
	0.9	-	0			-	-
	0.9	-	0			-	-
	0.9	-	0			-	-

(Qpotw)	POTW's average flow in MGD (from Table 2(b), cell B34).
(Qstr3)	Receiving stream (upstream) flow used with threshold human health water quality standards in MGD (from Table 2(b), cell H34).
(Qstr4)	Receiving stream (upstream) flow used with cancer risk level human health water quality standards in MGD (from Table 2(b), cell I36).
(Qdw)	Receiving stream (upstream) flow used with water quality standards based on drinking water supply in MGD (from Table 2(a), cell D17).
(Cstr)	Receiving stream background concentration in mg/l (from Table 4, column D).
(Ccrit)	State human health water quality standard for a particular pollutant in mg/l.
Select Basis of Standard	Select the basis of the standard listed in column E from drop down list. Selection of basis of the standard will determine which flow is entered in column C (Qstr3, Qstr4, or Qdw).
(Rpotw)	Removal efficiency across POTW as percent (from Table 3, column E).
(AHLhhwq)	Allowable headworks pollutant loading to the POTW in pounds per day based on human health water quality standards (lbs/day - calculated).
AHLhhwq =	8.34 * (Ccrit * (Q + Qpotw) - (Cstr * Q)) / (1-Rpotw/100); where Q is Qstr3, Qstr4, or Qdw
8.34	Unit conversion factor

TABLE 7 - Comparison of Allowable Headworks Loadings Based on Water Quality

Pollutant	AHL (NPDES) (lbs/day)	AHL (CHRONIC) (lbs/day)	AHL (ACUTE) (lbs/day)	AHL (HUMAN HEALTH) (lbs/day)	AHL (WATER QUALITY) (lbs/day)
Arsenic	-	4.5816	10.1085	9.3516	4.5816
Cadmium	-	0.0154	0.0264	-	0.0154
Chromium	-	3.5587	26.6296	-	3.5587
Copper	-	0.3248	0.4010	-	0.3248
Cyanide	-	0.1358	0.5594	-	0.1358
Lead	-	0.0374	0.9338	-	0.0374
Mercury	-	0.0002	0.0276	-	0.0002
Molybdenum	-	-	-	-	-
Nickel	-	0.3938	3.4516	-	0.3938
Selenium	-	0.0810	-	-	0.0810
Silver	-	-	-	-	-
Zinc	-	3.6004	3.4761	-	3.4761
Ammonia	-	-	-	-	-
BOD5	-	-	-	-	-
TSS	-	-	-	-	-
Phosphorus (T)	-	-	-	-	-
TKN	-	-	-	-	-
Beryllium	-	-	-	-	-
Chloroform	-	-	-	48.6737	48.6737
1,2-Dichlorobenzene	-	-	-	133.7274	133.7274
1,4-Dichlorobenzene	-	-	-	19.5448	19.5448
Methylene Chloride	-	-	-	61.0703	61.0703
Phenol	-	2.4517	-	88957.8349	2.4517
Bis(2-ethylhexyl)phthalate	-	-	-	0.2279	0.2279
Toluene	-	-	-	620.9206	620.9206
COD	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-

AHL (NPDES) = Allowable headworks loading based on NPDES limits, from Table 3, column F.
AHL (CHRONIC) = Allowable headworks loading based on chronic water quality criteria, from Table 4, column G.
AHL (ACUTE) = Allowable headworks loading based on acute water quality criteria, from Table 5, column G.
AHL (HUMAN HEALTH) = Allowable headworks loading based on human health water quality criteria, from Table 6, column H.
AHL (WATER QUALITY) = Allowable headworks loading based on water quality; lowest value from columns B through E for each pollutant.

ASE WRF Sludge Landfilling Calculations

TABLE 8 - Allowable Headworks Loadings Based on Activated Sludge Inhibition Level

	LOCAL LIMITS CALCULATIONS DATA				MAXIMUM LOADING	
Pollutant	POTW Flow (MGD) (Qpotw)	Activated Sludge Inhibition Level (mg/l) (Ccrit)	Select Removal Efficiency (from list)	Removal Efficiency (%) (Rprim)	Allowable Headworks Loading (lbs/day) (AHLasi)	User Entered Removal Efficiency (%)
Arsenic	0.9	0.1	User Entered	0.00	0.7506	
Cadmium	0.9	1	User Entered	0.00	7.5060	
Chromium	0.9	1	User Entered	0.00	7.5060	
Copper	0.9	1	User Entered	0.00	7.5060	
Cyanide	0.9	0.1	User Entered	0.00	0.7506	
Lead	0.9	1	User Entered	0.00	7.5060	
Mercury	0.9	0.1	User Entered	0.00	0.7506	
Molybdenum	0.9		User Entered	-	-	
Nickel	0.9	1	User Entered	0.00	7.5060	
Selenium	0.9		User Entered	-	-	
Silver	0.9		User Entered	-	-	
Zinc	0.9	0.5	User Entered	0.00	3.7530	
Ammonia	0.9	480	User Entered	0.00	3602.8800	
BOD5	0.9		User Entered	-	-	
TSS	0.9		User Entered	-	-	
Phosphorus (T)	0.9		User Entered	-	-	
TKN	0.9		User Entered	-	-	
Beryllium	0.9		User Entered	-	-	
Chloroform	0.9		User Entered	-	-	
1,2-Dichlorobenzene	0.9	5	User Entered	0.00	37.5300	
1,4-Dichlorobenzene	0.9	5	User Entered	0.00	37.5300	
Methylene Chloride	0.9		User Entered	-	-	
Phenol	0.9	50	User Entered	0.00	375.3000	
Bis(2-ethylhexyl)phthalate	0.9		User Entered	-	-	
Toluene	0.9	200	User Entered	0.00	1501.2000	
COD	0.9		User Entered	-	-	
	0.9		User Entered	-	-	
	0.9		User Entered	-	-	
	0.9		User Entered	-	-	
	0.9		User Entered	-	-	
	0.9		User Entered	-	-	
	0.9		User Entered	-	-	
	0.9		User Entered	-	-	
	0.9		User Entered	-	-	
	0.9		User Entered	-	-	
	0.9		User Entered	-	-	
	0.9		User Entered	-	-	

(Qpotw)	POTW's average flow in MGD (from Table 2(b), cell B34).
(Ccrit)	Activated sludge threshold inhibition level, mg/l (EPA default or user entered).
Select Removal Efficiency	Select removal efficiency for column E from drop down list.
(Rprim)	Removal efficiency prior to activated sludge treatment unit as percent (Prior to Act Sl ('Inhibition Removals' worksheet row 48), EPA default, or user entered).
(AHLasi)	Allowable headworks pollutant loading to the POTW in pounds per day based on inhibition of activated sludge units (lbs/day - calculated).
AHLasi =	8.34 * (Ccrit * Qpotw) / (1-Rprim/100)
8.34	Unit conversion factor

ASE WRF Sludge Landfilling Calculations

TABLE 10 - Allowable Headworks Loadings Based on Nitrification Inhibition Level

	LOCAL LIMITS CALCULATIONS DATA				MAXIMUM LOADING	
Pollutant	POTW Flow (MGD) (Qpotw)	Nitrification Inhibition Level (mg/l) (Ccrit)	Select Removal Efficiency (from list)	Removal Efficiency (%) (Rsec)	Allowable Headworks Loading (lbs/day) (AHLni)	User Entered Removal Efficiency (%)
Arsenic	0.9	1.5	User Entered	0.00	11.2590	
Cadmium	0.9	5.2	User Entered	0.00	39.0312	
Chromium	0.9	0.25	User Entered	0.00	1.8765	
Copper	0.9	0.05	User Entered	0.00	0.3753	
Cyanide	0.9	0.34	User Entered	0.00	2.5520	
Lead	0.9	0.5	User Entered	0.00	3.7530	
Mercury	0.9		User Entered	-	-	
Molybdenum	0.9		User Entered	-	-	
Nickel	0.9	0.25	User Entered	0.00	1.8765	
Selenium	0.9		User Entered	-	-	
Silver	0.9		User Entered		-	
Zinc	0.9	0.5	User Entered	0.00	3.7530	
Ammonia	0.9		User Entered	-	-	
BOD5	0.9		User Entered	-	-	
TSS	0.9		User Entered	-	-	
Phosphorus (T)	0.9		User Entered	-	-	
TKN	0.9		User Entered	-	-	
Beryllium	0.9		User Entered	-	-	
Chloroform	0.9	10	User Entered	0.00	75.0600	
1,2-Dichlorobenzene	0.9		User Entered	-	-	
1,4-Dichlorobenzene	0.9		User Entered	-	-	
Methylene Chloride	0.9		User Entered	-	-	
Phenol	0.9	4	User Entered	0.00	30.0240	
Bis(2-ethylhexyl)phthalate	0.9		User Entered	-	-	
Toluene	0.9		User Entered	-	-	
COD	0.9		User Entered	-	-	
	0.9		User Entered	-	-	
	0.9		User Entered	-	-	
	0.9		User Entered	-	-	
	0.9		User Entered	-	-	
	0.9		User Entered	-	-	
	0.9		User Entered	-	-	
	0.9		User Entered	-	-	
	0.9		User Entered	-	-	
	0.9		User Entered	-	-	
	0.9		User Entered	-	-	
	0.9		User Entered	-	-	

(Qpotw)	POTW's average flow in MGD (from Table 2(b), cell B34).
(Ccrit)	Nitrification threshold inhibition level, mg/l (EPA default or user entered).
Select Removal Efficiency	Select removal efficiency for column E from drop down list.
(Rsec)	Removal efficiency prior to nitrification treatment unit as percent (Prior to Nitrif ('Inhibition Removals' worksheet row 50), Prior to Act Sl (row 48), Prior to Trick Fil (row 49), EPA default, or user entered).
(AHLni)	Allowable headworks pollutant loading to the POTW in pounds per day based on inhibition of nitrification units (lbs/day - calculated).
AHLni =	(8.34 * Ccrit * Qpotw) / (1-Rsec/100)
8.34	Unit conversion factor

ASE WRF Sludge Landfilling Calculations

TABLE 13 - Comparison of Allowable Headworks Loadings Based on Inhibition

	Yes	No
Has the POTW Experienced Inhibition or Construction Within the Data Time Frame?		x

Pollutant	AHL (ACT. SLUDGE) (lbs/day)	AHL (TRICK. FILTER) (lbs/day)	AHL (NITRIF) (lbs/day)	AHL (DIG. - CONSERV.) (lbs/day)	AHL (DIG. - NON-CONS.) (lbs/day)	Most Stringent (INHIBITION) (lbs/day)	Monitoring Data Maximum Influent Concentration (Cmaxin - mg/l)	Other Maximum Influent Concentration (Cmaxino - mg/l)	Maximum Influent Loading (Lmaxin - lbs/d)	AHL (INHIBITION) (lbs/d)
Arsenic	0.7506	-	11.2590	-	-	0.7506	-		-	0.7506
Cadmium	7.5060	-	39.0312	-	-	7.5060	-		-	7.5060
Chromium	7.5060	-	1.8765	-	-	1.8765	0.00202		0.0152	1.8765
Copper	7.5060	-	0.3753	-	-	0.3753	-		-	0.3753
Cyanide	0.7506	-	2.5520	-	-	0.7506	-		-	0.7506
Lead	7.5060	-	3.7530	-	-	3.7530	-		-	3.7530
Mercury	0.7506	-	-	-	-	0.7506	-		-	0.7506
Molybdenum	-	-	-	-	-	-	-		-	-
Nickel	7.5060	-	1.8765	-	-	1.8765	-		-	1.8765
Selenium	-	-	-	-	-	-	-		-	-
Silver	-	-	-	-	-	-	-		-	-
Zinc	3.7530	-	3.7530	-	-	3.7530	-		-	3.7530
Ammonia	3602.8800	-	-	-	-	3602.8800	-		-	3602.8800
BOD5	-	-	-	-	-	-	-		-	-
TSS	-	-	-	-	-	-	-		-	-
Phosphorus (T)	-	-	-	-	-	-	-		-	-
TKN	-	-	-	-	-	-	-		-	-
Beryllium	-	-	-	-	-	-	-		-	-
Chloroform	-	-	75.0600	-	-	75.0600	-		-	75.0600
1,2-Dichlorobenzene	37.5300	-	-	-	-	37.5300	-		-	37.5300
1,4-Dichlorobenzene	37.5300	-	-	-	-	37.5300	0.00012		0.0009	37.5300
Methylene Chloride	-	-	-	-	-	-	0.00017		0.0013	-
Phenol	375.3000	-	30.0240	-	-	30.0240	0.00017		0.0013	30.0240
Bis(2-ethylhexyl)phthalate	-	-	-	-	-	-	0.00115		0.0086	-
Toluene	1501.2000	-	-	-	-	1501.2000	0.00315		0.0236	1501.2000
COD	-	-	-	-	-	-	0.00016		0.0012	-
	-	-	-	-	-	-	-		-	-
	-	-	-	-	-	-	-		-	-
	-	-	-	-	-	-	-		-	-
	-	-	-	-	-	-	-		-	-
	-	-	-	-	-	-	-		-	-
	-	-	-	-	-	-	-		-	-
	-	-	-	-	-	-	-		-	-
	-	-	-	-	-	-	-		-	-
	-	-	-	-	-	-	-		-	-
	-	-	-	-	-	-	-		-	-
	-	-	-	-	-	-	-		-	-

AHL (ACT. SLUDGE) =	Allowable Headworks Loading based on inhibition of the activated sludge treatment units from Table 8, column F.
AHL (TRICK. FILTER) =	Allowable Headworks Loading based on inhibition of the trickling filter treatment units from Table 9, column F.
AHL (NITRIF.) =	Allowable Headworks Loading based on inhibition of the nitrification treatment units from Table 10, column F.
AHL (DIG. - CONSERV.) =	Allowable Headworks Loading based on inhibition of the anaerobic digester treatment units for conservative pollutants from Table 11 column F.
AHL (DIG. - NON-CONS.) =	Allowable Headworks Loading based on inhibition of the anaerobic digester treatment units for non-conservative pollutants from Table 12, column G.
Most Stringent (INHIBITION)	Lowest value for each pollutant from columns B through F.
(Cmaxin)	Maximum Influent Concentration (from 'Monitoring Data' worksheet, row 44).
(Cmaxino)	Maximum Influent Concentration observed at treatment plant but not listed (or eliminated from) 'Monitoring Data' worksheet (user entered).
(Lmaxin)	Maximum Influent Loading (calculated).
Lmaxin =	8.34 * Cmaxin * Qpotw; where Cmaxin is the greater of Cmaxin and Cmaxino.
8.34	Unit conversion factor
(Qpotw)	POTW's average flow in MGD (from Table 2(b), cell B34).
AHL (INHIBITION) =	Highest value for each pollutant from column G or J.
	Red Bold in column K indicates that the allowable headworks loading is based on the maximum influent loading.

ASE WRF Sludge Landfilling Calculations

TABLE 17 - Comparison of Allowable Headworks Loadings

Pollutant	AHL (WATER QUALITY) (lbs/day)	AHL (INHIBITION) (lbs/d)	AHL (SLUDGE) (lbs/d)	Design Loading (lbs/d)	Maximum Allowable Headworks Loading (MAHL - lbs/d)
Arsenic	4.5816	0.7506	-	-	0.7506
Cadmium	0.0154	7.5060	-	-	0.0154
Chromium	3.5587	1.8765	-	-	1.8765
Copper	0.3248	0.3753	-	-	0.3248
Cyanide	0.1358	0.7506	-	-	0.1358
Lead	0.0374	3.7530	-	-	0.0374
Mercury	0.0002	0.7506	-	-	0.0002
Molybdenum	-	-	-	-	-
Nickel	0.3938	1.8765	-	-	0.3938
Selenium	0.0810	-	-	-	0.0810
Silver	-	-	-	-	-
Zinc	3.4761	3.7530	-	-	3.4761
Ammonia	-	3602.8800	-	367.5	367.5000
BOD5	-	-	-	3002	3002.0000
TSS	-	-	-	3524	3524.0000
Phosphorus (T)	-	-	-	78	78.0000
TKN	-	-	-	588	588.0000
Beryllium	-	-	-	-	-
Chloroform	48.6737	75.0600	-	-	48.6737
1,2-Dichlorobenzene	133.7274	37.5300	-	-	37.5300
1,4-Dichlorobenzene	19.5448	37.5300	-	-	19.5448
Methylene Chloride	61.0703	-	-	-	61.0703
Phenol	2.4517	30.0240	-	-	2.4517
Bis(2-ethylhexyl)phthalate	0.2279	-	-	-	0.2279
Toluene	620.9206	1501.2000	-	-	620.9206
COD	-	-	-	8,105	8105.4000
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-

AHL (WATER QUALITY) = Allowable Headworks Loading based on protection of water quality from Table 7, column F.
AHL (INHIBITION) = Allowable Headworks Loading based on prevention of inhibition from Table 13, column K.
AHL (SLUDGE) = Allowable Headworks Loading based on protection of sludge quality from Table 16, column G.
Design Loading of POTW treatment plant (user entered).
MAHL Maximum allowable headworks loading is the lowest value for each pollutant from columns B through E.

ASE WRF Sludge Landfilling Calculations

TABLE 18 - Calculation of Local Limit

Pollutant	Maximum Allowable Headworks (MAHL - lbs/d)	Safety Factor (%) (SF)	Growth Allowance (%) (GA)	Nonindustrial Concentration (mg/l) (Cback)	Nonindustrial Flow (MGD) (Qback)	Nonindustrial Loading (lbs/day) (Lback)	Hauled Waste to Influent Concentration (mg/l) (Chwi)	Hauled Waste to Influent Flow (MGD) (Qhwi)	Hauled Waste to Influent Loading (lbs/day) (Lhwi)	Allowable Industrial Loading (MAIL - lbs/day)	Calculated Concentration Limit (mg/l) (Cind)	Basis of Limitation	Human Health Concentration	Industrial Contributory Flow (MGD)
Arsenic	0.7506	10	15	0.0007	0.9	0.0055	-	0	0.0000	0.5574	-	Inhibition	-	0
Cadmium	0.0154	10	15	0.00003	0.9	0.0002	-	0	0.0000	0.0114	-	Water Quality	-	0
Chromium	1.877	10	15	0.00092	0.9	0.0069	-	0	0.0000	1.4005	-	Inhibition	-	0
Copper	0.3248	10	15	0.02087	0.9	0.1566	-	0	0.0000	0.0869	-	Water Quality	-	0
Cyanide	0.1358	10	15	0.0020	0.296	0.0049	-	0	0.0000	0.0969	0.0192	Water Quality	1.1	0.604
Lead	0.0374	10	15	0.00018	0.296	0.0005	-	0	0.0000	0.0276	0.0055	Water Quality	-	0.604
Mercury	0.00024	10	0	0.000025	0.9	0.0002	-	0	0.0000	0.00003	-	Water Quality	-	0
Molybdenum	-	10	15	0.00029	0.187	0.0004	-	0	0.0000	-	-	-	-	0.713
Nickel	0.3938	10	15	0.00032	0.296	0.0008	-	0	0.0000	0.2946	0.0585	Water Quality	-	0.604
Selenium	0.0810	10	15	0.00026	0.296	0.0006	-	0	0.0000	0.0601	0.0119	Water Quality	-	0.604
Silver	-	10	15	0.000044	0.9	0.0003	-	0	0.0000	-	-	-	-	0
Zinc	3.476	10	15	0.1049	0.9	0.7873	-	0	0.0000	1.8199	-	Water Quality	-	0
Ammonia	367.5	10	15	25.0	0.9	187.7	-	0	0.0000	87.9750	-	Design	-	0
BOD5	3002	10	15	220	0.9	1651	-	0	0.0000	600.180	-	Design	-	0
TSS	3524	10	15	220	0.9	1651	-	0	0.0000	991.6800	-	Design	-	0
Phosphorus (T)	78.00	10	15	4.7	0.9	34.99	-	0	0.0000	23.5095	-	Design	-	0
TKN	588.0	10	15	40.0	0.9	300.2	-	0	0.0000	140.7600	-	Design	-	0
Beryllium	-			-	0.9	0.0000	-	0	0.0000	-	-	-	-	0
Chloroform	48.67	10	15	0.00447	0.296	0.0110	-	0	0.0000	36.4943	7.2447	Water Quality	0.060	0.604
1,2-Dichlorobenzene	37.53	10	15	0.00061	0.9	0.0046	-	0	0.0000	28.1429	-	Inhibition	-	0
1,4-Dichlorobenzene	19.54	10	15	0.00101	0.9	0.0076	-	0	0.0000	14.6510	-	Water Quality	5.7	0
Methylene Chloride	61.07	10	15	0.00028	0.9	0.0021	-	0	0.0000	45.8006	-	Water Quality	0.83	0
Phenol	2.452	10	15	0.00858	0.9	0.0644	-	0	0.0000	1.7744	-	Water Quality	1186	0
Bis(2-ethylhexyl)phthalate	0.2279	10	0	0.03108	0.9	0.2332	-	0	0.0000	-0.0281	-	Water Quality	7233	0
Toluene	620.9	10	15	0.00021	0.9	0.0016	-	0	0.0000	465.6888	-	Water Quality	1.4	0
COD	8105	10	15	500	0.9	3753	-	0	0.0000	2326.0500	-	Design	-	0
	-			-	0.187	0.0000	-	0	0.0000	-	-	-		
	-			-	0.187	0.0000	-	0	0.0000	-	-	-		
	-			-	0.187	0.0000	-	0	0.0000	-	-	-		
	-			-	0.187	0.0000	-	0	0.0000	-	-	-		
	-			-	0.187	0.0000	-	0	0.0000	-	-	-		
	-			-	0.187	0.0000	-	0	0.0000	-	-	-		
	-			-	0.187	0.0000	-	0	0.0000	-	-	-		
	-			-	0.187	0.0000	-	0	0.0000	-	-	-		
	-			-	0.187	0.0000	-	0	0.0000	-	-	-		
	-			-	0.187	0.0000	-	0	0.0000	-	-	-		
	-			-	0.187	0.0000	-	0	0.0000	-	-	-		

(MAHL)	Maximum allowable headworks loading (from Table 17, column F).
(SF)	Safety factor as a percent (user entered).
(GA)	Growth allowance as a percent (user entered).
(Cback)	Average nonindustrial background concentration for a particular pollutant in mg/l (from 'Monitoring Data' worksheet row 43 or user entered).
(Qback)	Average nonindustrial background flow in MGD (calculated).
Qback =	Qpotw - Qind - Qhwi (values from Table 2(b), cells B34, C34, and K34)
(Lback)	Average nonindustrial background loading to the POTW for a particular pollutant in pounds per day (calculated).
Lback =	8.34 * Cback * Qback
8.34	Unit conversion factor
(Chwi)	Average concentration for a particular pollutant in mg/l for hauled waste discharged at the POTW influent (from 'Monitoring Data' worksheet, row 43).
(Qhwi)	Average flow in MGD for hauled waste discharged at the POTW influent (from Table 2(b), cell K34).
(Lhwi)	Average loading to the POTW for a particular pollutant in pounds per day for hauled waste discharged at the POTW influent (calculated).
Lhwi =	8.34 * Chwi * Qhwi
(MAIL)	Maximum Allowable Industrial Load (calculated).
MAIL =	MAHL - (MAHL * SF/100) - (MAHL * GA/100) - Lback - Lhwi
(Cind)	Industrial allowable local limit for a given pollutant in mg/l (calculated).
Cind =	MAIL/(8.34 * Qind)
(Qind)	Average discharge flow of Industrial Users to be regulated through the local limits in MGD (from Table 2(b), cell C34).
Basis of Limitation	An identification of the lowest allowable headworks loading from Table 17 columns B through D.
	Red Bold in column C or D indicates a safety factor or growth allowance of less than 10%.

Appendix B.3 – Yellow River WRF with Biosolids Land Application Calculations

Yellow River WRF with Biosolids Land Applied Calculations

Table 1 - Unit Operations (X if present)

Activated Sludge Present?	Trickling Filter Present?	Nitrification Present?	Anaerobic Digestion Present?	Sludge Incineration Present?
X		X		

Placing an "X" in the cell under a treament unit will activate the inhibition calclations for that unit or the sludge incineration calculations.

TABLE 2a - Stream Flow Partial Mix Factors

Q7-10 Stream Flow (MGD) (Q7-10)	Harmonic Mean Stream Flow (MGD) (Qhm)	Drinking Water Intake Stream Flow (MGD) (Qdw)	Chronic Partial Mix Factor (PMFc)	Acute Partial Mix Factor (PMFa)	Cancer Risk Level Partial Mix Factor (PMFcrl)

(Q7-10) 7-day, 10-year low flow for receiving stream in MGD (user entered).
(Qhm) Harmonic mean flow for receiving stream in MGD (user entered).
(Qdw) Flow for receiving stream at nearest downstream drinking water intake (user entered).
(PMFa) Partial mix factor for acute water quality standards (user entered).
(PMFc) Partial mix factor for chronic water quality standards (user entered).
(PMFcrl) Partial mix factor for cancer risk level water quality standards (user entered).

TABLE 2b - POTW and Receiving Stream Data

POTW Flow (MGD) (Qpotw)	IU Flow (MGD) (Qind)	Sludge Flow to Digester (MGD) (Qdig)	Sludge Flow to Disposal (MTD) (Qsldg)	Stream Flow for Chronic WQS (MGD) (Qstr1)	Stream Flow for Acute WQS (MGD) (Qstr2)	Stream Flow for Threshold Human Health WQS (MGD) (Qstr3)	Stream Flow for Carcinogen Human Health WQS (MGD) (Qstr4)	Receiving Stream Hardness (mg/l) (H)	Hauled Waste Flow to Influent (MGD) (Qhwi)	Hauled Waste Flow to Sludge Processing (MGD) (Qhws)	Sludge Flow to Incineration (MTD) (Qinc)
2.7	0.754		0.824553112	-	-	-	-				

(Qpotw) POTW's average flow in MGD (user entered).
(Qind) Average discharge flow of Industrial Users to be regulated through the local limits in MGD (user entered).
(Qdig) Average sludge flow to digester in MGD (user entered).
(Qsldg) Average sludge flow to disposal in dry metric tons per day (user entered).
(Qstr1) Receiving stream (upstream) flow used with chronic water quality standards in MGD (calculated).
Qstr1 = Q7-10 * PMFc (data from Table 2(a), cells B17 and E17); if cell E17 is blank, PMFc assumed to be 1.
(Qstr2) Receiving stream (upstream) flow used with acute water quality standards in MGD (calculated).
Qstr2 = Q7-10 * PMFa (data from Table 2(a), cells B17 and F17); if cell F17 is blank, PMFa assumed to be 1.
(Qstr3) Receiving stream (upstream) flow used with threshold human health water quality standards in MGD (from Table 2(a), cell B17).
(Qstr4) Receiving stream (upstream) flow used with carcinogen human health water quality standards in MGD (calculated).
Qstr4 = Qhm * PMFcrl (data from Table 2(a), cells C17 and G17); if cell G17 is blank, PMFcrl assumed to be 1; if cell C17 is blank, formula below is used:
or Qstr4 = PMFcrl * 7.43 * $(Q7\text{-}10)^{0.874}$ (data from Table 2(a), cell G17 and B17)
(H) Receiving stream hardness in mg/l (user entered).
(Qhwi) Hauled waste flow discharged at the influent of the treatment plant in MGD (user entered).
(Qhws) Hauled waste flow discharged directly to the sludge processing units in MGD (user entered).
(Qinc) Average sludge flow to incineration in dry metric tons per day (user entered).

Yellow River WRF with Biosolids Land Applied Calculations

TABLE 3 - Allowable Headworks Loadings Based on NPDES Effluent Limits

	LOCAL LIMITS CALCULATION DATA				MAXIMUM LOADING	
Pollutant	POTW Flow (MGD) (Qpotw)	NPDES Limit (mg/l) (Ccrit)	Select Removal Efficiency (from list)	Removal Efficiency (%) (Rpotw)	Allowable Headworks Loading (lbs/day) (AHLnpdes)	User Entered Removal Efficiency (%)
Arsenic	2.7		Default (activated sludge)	45.00	-	
Cadmium	2.7		Influent/Effluent	42.53	-	
Chromium	2.7		Default (activated sludge)	82.00	-	
Copper	2.7		Influent/Effluent	70.94	-	
Cyanide	2.7		Default (activated sludge)	69.00	-	
Lead	2.7		Default (activated sludge)	61.00	-	
Mercury	2.7		Default (activated sludge)	60.00	-	
Molybdenum	2.7		Influent/Effluent	45.77	-	
Nickel	2.7		Default (activated sludge)	42.00	-	
Selenium	2.7		Influent/Effluent	10.25	-	
Silver	2.7		Influent/Effluent	31.60	-	
Zinc	2.7		Influent/Effluent	52.00	-	
Ammonia	2.7		Influent/Effluent	98.67	-	
BOD5	2.7		Influent/Effluent	87.43	-	
TSS	2.7		Influent/Effluent	99.33	-	
Phosphorus (T)	2.7		Influent/Effluent	26.31	-	
TKN	2.7		Influent/Effluent	99.44	-	
Beryllium	2.7		Influent/Effluent	-	-	
Chloroform	2.7		Influent/Effluent	90.10	-	
1,2-Dichlorobenzene	2.7		User Entered	0.00	-	0
1,4-Dichlorobenzene	2.7		User Entered	0.00	-	0
Methylene Chloride	2.7		User Entered	62.00	-	62
Phenol	2.7		User Entered	90.00	-	90
Bis(2-ethylhexyl)phthalate	2.7		User Entered	72.00	-	72
Toluene	2.7		User Entered	93.00	-	93
COD	2.7		Influent/Effluent	94.54	-	
	2.7		Influent/Effluent	-	-	
	2.7		Influent/Effluent	-	-	
	2.7		Influent/Effluent	-	-	
	2.7		Influent/Effluent	-	-	
	2.7		Influent/Effluent	-	-	
	2.7		Influent/Effluent	-	-	
	2.7		Influent/Effluent	-	-	
	2.7		Influent/Effluent	-	-	
	2.7		Influent/Effluent	-	-	
	2.7		Influent/Effluent	-	-	
	2.7		Influent/Effluent	-	-	

(Qpotw) POTW's average flow in MGD (from Table 2(b), cell B34).
(Ccrit) NPDES permit limit or calculated WQBEL for a particular pollutant in mg/l (user entered)
Select Removal Efficiency Select removal efficiency for column E from drop down list.
(Rpotw) Removal efficiency across POTW as percent (Inf/Eff Removal (row 48), Inf/Sldg Removal (row 49), or Daily Removal (row 43) from 'Monitoring Data' worksheet, EPA default for specified treatment process, or user entered (column G)).
(AHLnpdes) Allowable headworks pollutant loading to the POTW in pounds per day based on NPDES permit limits (lbs/day - calculated).
AHLnpdes = (8.34 * Ccrit * Qpotw) / (1-Rpotw/100)
8.34 Unit conversion factor

Yellow River WRF with Biosolids Land Applied Calculations

TABLE 8 - Allowable Headworks Loadings Based on Activated Sludge Inhibition Level

	LOCAL LIMITS CALCULATIONS DATA				MAXIMUM LOADING	
Pollutant	POTW Flow (MGD) (Qpotw)	Activated Sludge Inhibition Level (mg/l) (Ccrit)	Select Removal Efficiency (from list)	Removal Efficiency (%) (Rprim)	Allowable Headworks Loading (lbs/day) (AHLasi)	User Entered Removal Efficiency (%)
Arsenic	2.7	0.1	User Entered	0.00	2.2518	0
Cadmium	2.7	1	User Entered	0.00	22.5180	0
Chromium	2.7	1	User Entered	0.00	22.5180	0
Copper	2.7	1	User Entered	0.00	22.5180	0
Cyanide	2.7	0.1	User Entered	0.00	2.2518	0
Lead	2.7	1	User Entered	0.00	22.5180	0
Mercury	2.7	0.1	User Entered	0.00	2.2518	0
Molybdenum	2.7		User Entered	-	-	
Nickel	2.7	1	User Entered	0.00	22.5180	0
Selenium	2.7		User Entered	-	-	0
Silver	2.7		User Entered	-	-	0
Zinc	2.7	0.5	User Entered	0.00	11.2590	0
Ammonia	2.7	480	User Entered	0.00	10808.6400	0
BOD5	2.7		User Entered	-	-	
TSS	2.7		User Entered	-	-	
Phosphorus (T)	2.7		User Entered	-	-	
TKN	2.7		User Entered	-	-	
Beryllium	2.7		User Entered	-	-	
Chloroform	2.7		User Entered	-	-	0
1,2-Dichlorobenzene	2.7	5	User Entered	0.00	112.5900	0
1,4-Dichlorobenzene	2.7	5	User Entered	0.00	112.5900	0
Methylene Chloride	2.7		User Entered	-	-	0
Phenol	2.7	50	User Entered	0.00	1125.9000	0
Bis(2-ethylhexyl)phthalate	2.7		User Entered	-	-	0
Toluene	2.7	200	User Entered	0.00	4503.6000	0
COD	2.7		User Entered	-	-	
	2.7		User Entered	-	-	
	2.7		User Entered	-	-	
	2.7		User Entered	-	-	
	2.7		User Entered	-	-	
	2.7		User Entered	-	-	
	2.7		User Entered	-	-	
	2.7		User Entered	-	-	
	2.7		User Entered	-	-	
	2.7		User Entered	-	-	
	2.7		User Entered	-	-	
	2.7		User Entered	-	-	

(Qpotw) POTW's average flow in MGD (from Table 2(b), cell B34).
(Ccrit) Activated sludge threshold inhibition level, mg/l (EPA default or user entered).
Select Removal Efficiency Select removal efficiency for column E from drop down list.
(Rprim) Removal efficiency prior to activated sludge treatment unit as percent (Prior to Act Sl ('Inhibition Removals' worksheet row 48), EPA default, or user entered).
(AHLasi) Allowable headworks pollutant loading to the POTW in pounds per day based on inhibition of activated sludge units (lbs/day - calculated).
AHLasi = 8.34 * (Ccrit * Qpotw) / (1-Rprim/100)
8.34 Unit conversion factor

Yellow River WRF with Biosolids Land Applied Calculations

TABLE 10 - Allowable Headworks Loadings Based on Nitrification Inhibition Level

	LOCAL LIMITS CALCULATIONS DATA				MAXIMUM LOADING	
Pollutant	POTW Flow (MGD) (Qpotw)	Nitrification Inhibition Level (mg/l) (Ccrit)	Select Removal Efficiency (from list)	Removal Efficiency (%) (Rsec)	Allowable Headworks Loading (lbs/day) (AHLni)	User Entered Removal Efficiency (%)
Arsenic	2.7	1.5	User Entered	0.00	33.7770	
Cadmium	2.7	5.2	User Entered	0.00	117.0936	
Chromium	2.7	0.25	User Entered	0.00	5.6295	
Copper	2.7	0.48	User Entered	0.00	10.8086	
Cyanide	2.7	0.34	User Entered	0.00	7.6561	
Lead	2.7	0.5	User Entered	0.00	11.2590	
Mercury	2.7		User Entered	-	-	
Molybdenum	2.7		User Entered	-	-	
Nickel	2.7	0.25	User Entered	0.00	5.6295	
Selenium	2.7		User Entered	-	-	
Silver	2.7		User Entered		-	
Zinc	2.7	0.5	User Entered	0.00	11.2590	
Ammonia	2.7		User Entered	-	-	
BOD5	2.7		User Entered	-	-	
TSS	2.7		User Entered	-	-	
Phosphorus (T)	2.7		User Entered	-	-	
TKN	2.7		User Entered	-	-	
Beryllium	2.7		User Entered	-	-	
Chloroform	2.7	10	User Entered	0.00	225.1800	
1,2-Dichlorobenzene	2.7		User Entered	-	-	
1,4-Dichlorobenzene	2.7		User Entered	-	-	
Methylene Chloride	2.7		User Entered	-	-	
Phenol	2.7	4	User Entered	0.00	90.0720	
Bis(2-ethylhexyl)phthalate	2.7		User Entered	-	-	
Toluene	2.7		User Entered	-	-	
COD	2.7		User Entered	-	-	
	2.7		User Entered	-	-	
	2.7		User Entered	-	-	
	2.7		User Entered	-	-	
	2.7		User Entered	-	-	
	2.7		User Entered	-	-	
	2.7		User Entered	-	-	
	2.7		User Entered	-	-	
	2.7		User Entered	-	-	
	2.7		User Entered	-	-	
	2.7		User Entered	-	-	
	2.7		User Entered	-	-	

(Qpotw)	POTW's average flow in MGD (from Table 2(b), cell B34).
(Ccrit)	Nitrification threshold inhibition level, mg/l (EPA default or user entered).
Select Removal Efficiency	Select removal efficiency for column E from drop down list.
(Rsec)	Removal efficiency prior to nitrification treatment unit as percent (Prior to Nitrif ('Inhibition Removals' worksheet row 50), Prior to Act Sl (row 48), Prior to Trick Fil (row 49), EPA default, or user entered).
(AHLni)	Allowable headworks pollutant loading to the POTW in pounds per day based on inhibition of nitrification units (lbs/day - calculated).
AHLni =	(8.34 * Ccrit * Qpotw) / (1-Rsec/100)
8.34	Unit conversion factor

Yellow River WRF with Biosolids Land Applied Calculations

TABLE 13 - Comparison of Allowable Headworks Loadings Based on Inhibition

Has the POTW Experienced Inhibition or Construction Within the Data Time Frame?

Yes	No
	X

Pollutant	AHL (ACT. SLUDGE) (lbs/day)	AHL (TRICK. FILTER) (lbs/day)	AHL (NITRIF) (lbs/day)	AHL (DIG. - CONSERV.) (lbs/day)	AHL (DIG. - NON-CONS.) (lbs/day)	Most Stringent (INHIBITION) (lbs/day)	Monitoring Data Maximum Influent Concentration (Cmaxin - mg/l)	Other Maximum Influent Concentration (Cmaxino - mg/l)	Maximum Influent Loading (Lmaxin - lbs/d)	AHL (INHIBITION) (lbs/d)
Arsenic	2.2518	-	33.7770	-	-	2.2518	-		-	2.2518
Cadmium	22.5180	-	117.0936	-	-	22.5180	0.0000927		0.0021	22.5180
Chromium	22.5180	-	5.6295	-	-	5.6295	0.00202		0.0455	5.6295
Copper	22.5180	-	10.8086	-	-	10.8086	0.0562		1.2655	10.8086
Cyanide	2.2518	-	7.6561	-	-	2.2518	-		-	2.2518
Lead	22.5180	-	11.2590	-	-	11.2590	0.00125		0.0281	11.2590
Mercury	2.2518	-	-	-	-	2.2518	0.00005		0.0011	2.2518
Molybdenum	-	-	-	-	-	-	0.00371		0.0835	-
Nickel	22.5180	-	5.6295	-	-	5.6295	0.00335		0.0754	5.6295
Selenium	-	-	-	-	-	-	0.00115		0.0259	-
Silver	-	-	-	-	-	-	0.000127		0.0029	-
Zinc	11.2590	-	11.2590	-	-	11.2590	0.108		2.4319	11.2590
Ammonia	10808.6400	-	-	-	-	10808.6400	34.7		781.3746	10808.6400
BOD5	-	-	-	-	-	-	204		4593.6720	-
TSS	-	-	-	-	-	-	266		5989.7880	-
Phosphorus (T)	-	-	-	-	-	-	4.84		108.9871	-
TKN	-	-	-	-	-	-	41.9		943.5042	-
Beryllium	-	-	-	-		-	-		-	-
Chloroform	-	-	225.1800	-	-	225.1800	0.0034		0.0766	225.1800
1,2-Dichlorobenzene	112.5900	-	-	-	-	112.5900	0.00012		0.0027	112.5900
1,4-Dichlorobenzene	112.5900	-	-	-	-	112.5900	0.00017		0.0038	112.5900
Methylene Chloride	-	-	-	-	-	-	0.00017		0.0038	-
Phenol	1125.9000	-	90.0720	-	-	90.0720	0.00115		0.0259	90.0720
Bis(2-ethylhexyl)phthalate	-	-	-	-	-	-	0.00315		0.0709	-
Toluene	4503.6000	-	-	-	-	4503.6000	0.00016		0.0036	4503.6000
COD	-	-	-	-	-	-	553		12452.4540	-
	-	-	-	-	-	-	-		-	-
	-	-	-	-	-	-	-		-	-
	-	-	-	-	-	-	-		-	-
	-	-	-	-	-	-	-		-	-
	-	-	-	-	-	-	-		-	-
	-	-	-	-	-	-	-		-	-
	-	-	-	-	-	-	-		-	-
	-	-	-	-	-	-	-		-	-
	-	-	-	-	-	-	-		-	-
	-	-	-	-	-	-	-		-	-
	-	-	-	-	-	-	-		-	-

AHL (ACT. SLUDGE) =	Allowable Headworks Loading based on inhibition of the activated sludge treatment units from Table 8, column F.
AHL (TRICK. FILTER) =	Allowable Headworks Loading based on inhibition of the trickling filter treatment units from Table 9, column F.
AHL (NITRIF.) =	Allowable Headworks Loading based on inhibition of the nitrification treatment units from Table 10, column F.
AHL (DIG. - CONSERV.) =	Allowable Headworks Loading based on inhibition of the anaerobic digester treatment units for conservative pollutants from Table 11 column F.
AHL (DIG. - NON-CONS.) =	Allowable Headworks Loading based on inhibition of the anaerobic digester treatment units for non-conservative pollutants from Table 12, column G.
Most Stringent (INHIBITION)	Lowest value for each pollutant from columns B through F.
(Cmaxin)	Maximum Influent Concentration (from 'Monitoring Data' worksheet, row 44).
(Cmaxino)	Maximum Influent Concentration observed at treatment plant but not listed (or eliminated from) 'Monitoring Data' worksheet (user entered).
(Lmaxin)	Maximum Influent Loading (calculated).
Lmaxin =	8.34 * Cmaxin * Qpotw; where Cmaxin is the greater of Cmaxin and Cmaxino.
8.34	Unit conversion factor
(Qpotw)	POTW's average flow in MGD (from Table 2(b), cell B34).
AHL (INHIBITION) =	Highest value for each pollutant from column G or J.
	Red Bold in column K indicates that the allowable headworks loading is based on the maximum influent loading.

Yellow River WRF with Biosolids Land Applied Calculations

TABLE 14 - Allowable Headworks Loadings Based on Land Application Sludge Disposal

	LOCAL LIMITS CALCULATIONS DATA				MAXIMUM LOADING
Pollutant	POTW Flow (MGD) (Qpotw)	Sludge Flow to Disposal (MTD) (Qsldg)	Land Application Standard (mg/kg) (Cslcrit)	Removal Efficiency (%) (Rpotw)	Allowable Headworks Loading (lbs/day) (AHLlas)
Arsenic	2.7	0.824553112	41	45.00	0.1653
Cadmium	2.7	0.824553112	39	42.53	0.1664
Chromium	2.7	0.824553112		82.00	-
Copper	2.7	0.824553112	1500	70.94	3.8355
Cyanide	2.7	0.824553112		69.00	-
Lead	2.7	0.824553112	300	61.00	0.8921
Mercury	2.7	0.824553112	17	60.00	0.0514
Molybdenum	2.7	0.824553112	75	45.77	0.2973
Nickel	2.7	0.824553112	420	42.00	1.8140
Selenium	2.7	0.824553112	100	10.25	1.7705
Silver	2.7	0.824553112		31.60	-
Zinc	2.7	0.824553112	2800	52.00	9.7675
Ammonia	2.7	0.824553112		98.67	-
BOD5	2.7	0.824553112		87.43	-
TSS	2.7	0.824553112		99.33	-
Phosphorus (T)	2.7	0.824553112		26.31	-
TKN	2.7	0.824553112		99.44	-
Beryllium	2.7	0.824553112		-	-
Chloroform	2.7	0.824553112		90.10	-
1,2-Dichlorobenzene	2.7	0.824553112		0.00	-
1,4-Dichlorobenzene	2.7	0.824553112		0.00	-
Methylene Chloride	2.7	0.824553112		62.00	-
Phenol	2.7	0.824553112		90.00	-
Bis(2-ethylhexyl)phthalate	2.7	0.824553112		72.00	-
Toluene	2.7	0.824553112		93.00	-
COD	2.7	0.824553112		94.54	-
	2.7	0.824553112		-	-
	2.7	0.824553112		-	-
	2.7	0.824553112		-	-
	2.7	0.824553112		-	-
	2.7	0.824553112		-	-
	2.7	0.824553112		-	-
	2.7	0.824553112		-	-
	2.7	0.824553112		-	-
	2.7	0.824553112		-	-
	2.7	0.824553112		-	-
	2.7	0.824553112		-	-

(Qpotw) POTW's average flow in MGD (from Table 2(b), cell B34).
(Qsldg) Average sludge flow to disposal in dry metric tons per day (from Table 2(b), cell E34).
(Cslcrit) Applicable sludge standard in mg/kg dry sludge (exceptional quality standard for land application or user entered).
(Rpotw) Removal efficiency across POTW as a percent (from Table 3, column E).
(AHLlas) Allowable headworks pollutant loading to the POTW in pounds per day based on land application sludge disposal (lbs/day - calculated).
AhLlas = (0.0022 * Cslcrit * Qsldg) / (Rpotw/100)
0.0022 Unit conversion factor

Yellow River WRF with Biosolids Land Applied Calculations

TABLE 16 - Comparison of Allowable Headworks Loadings Based on Sludge Disposal

Pollutant	AHL (LAND APPL.) (lbs/day)	AHL (INCINERATION) (lbs/day)	Hauled Waste Concentration to Sludge Processing (mg/l) (Chws)	Hauled Waste Flow to Sludge Processing (MGD) (Qhws)	Hauled Waste Loading to Sludge Processing (lbs/day) (Lhws)	Allowable Headworks Loading (SLUDGE) (lbs/d)
Arsenic	0.1653	-	-	0	0.0000	0.1653
Cadmium	0.1664	-	-	0	0.0000	0.1664
Chromium	-	-	-	0	0.0000	-
Copper	3.8355	-	-	0	0.0000	3.8355
Cyanide	-	-	-	0	0.0000	-
Lead	0.8921	-	-	0	0.0000	0.8921
Mercury	0.0514	-	-	0	0.0000	0.0514
Molybdenum	0.2973	-	-	0	0.0000	0.2973
Nickel	1.8140	-	-	0	0.0000	1.8140
Selenium	1.7705	-	-	0	0.0000	1.7705
Silver	-	-	-	0	0.0000	-
Zinc	9.7675	-	417.5	0	0.0000	9.7675
Ammonia	-	-	-	0	0.0000	-
BOD5	-	-	-	0	0.0000	-
TSS	-	-	-	0	0.0000	-
Phosphorus (T)	-	-	-	0	0.0000	-
TKN	-	-	-	0	0.0000	-
Beryllium	-	-	-	0	0.0000	-
Chloroform	-	-	-	0	0.0000	-
1,2-Dichlorobenzene	-	-	-	0	0.0000	-
1,4-Dichlorobenzene	-	-	-	0	0.0000	-
Methylene Chloride	-	-	-	0	0.0000	-
Phenol	-	-	-	0	0.0000	-
Bis(2-ethylhexyl)phthalate	-	-	-	0	0.0000	-
Toluene	-	-	-	0	0.0000	-
COD	-	-	-	0	0.0000	-
	-	-	-	0	0.0000	-
	-	-	-	0	0.0000	-
	-	-	-	0	0.0000	-
	-	-	-	0	0.0000	-
	-	-	-	0	0.0000	-
	-	-	-	0	0.0000	-
	-	-	-	0	0.0000	-
	-	-	-	0	0.0000	-
	-	-	-	0	0.0000	-
	-	-	-	0	0.0000	-
	-	-	-	0	0.0000	-

AHL (LAND APPL.) = Allowable Headworks Loading based on land application sludge disposal from Table 14, column F.
AHL (INCINERATION) = Allowable Headworks Loading based on incineration sludge disposal from Table 15, column L.
(Chws) Average concentration for a particular pollutant in mg/l for hauled waste discharged to the sludge processing units (from 'Monitoring Data' worksheet, row 43).
(Qhws) Average flow in MGD for hauled waste discharged to the sludge processing units (from Table 2(b), cell L34).
(Lhws) Average loading to the POTW for a particular pollutant in pounds per day for hauled waste discharged to the sludge processing units (calculated).
Lhws = 8.34 * Chws * Qhws
Allowable Headworks (SLUDGE) Lowest value for each pollutant from column B and C minus the hauled waste loading discharged to sludge processing (Lhws).

Yellow River WRF with Biosolids Land Applied Calculations

TABLE 17 - Comparison of Allowable Headworks Loadings

Pollutant	AHL (WATER QUALITY) (lbs/day)	AHL (INHIBITION) (lbs/d)	AHL (SLUDGE) (lbs/d)	Design Loading (lbs/d)	Maximum Allowable Headworks Loading (MAHL - lbs/d)
Arsenic	-	2.2518	0.1653	-	0.1653
Cadmium	-	22.5180	0.1664	-	0.1664
Chromium	-	5.6295	-	-	5.6295
Copper	-	10.8086	3.8355	-	3.8355
Cyanide	-	2.2518	-	-	2.2518
Lead	-	11.2590	0.8921	-	0.8921
Mercury	-	2.2518	0.0514	-	0.0514
Molybdenum	-	-	0.2973	-	0.2973
Nickel	-	5.6295	1.8140	-	1.8140
Selenium	-	-	1.7705	-	1.7705
Silver	-	-	-	-	-
Zinc	-	11.2590	9.7675	-	9.7675
Ammonia	-	10808.6400	-	841	841.0000
BOD5	-	-	-	5479	5479.0000
TSS	-	-	-	6386	6386.0000
Phosphorus (T)	-	-	-	160	160.0000
TKN	-	-	-	1216	1216.0000
Beryllium	-	-	-		-
Chloroform	-	225.1800	-	-	225.1800
1,2-Dichlorobenzene	-	112.5900	-	-	112.5900
1,4-Dichlorobenzene	-	112.5900	-	-	112.5900
Methylene Chloride	-	-	-	-	-
Phenol	-	90.0720	-	-	90.0720
Bis(2-ethylhexyl)phthalate	-	-	-	-	-
Toluene	-	4503.6000	-	-	4503.6000
COD	-	-	-	14,814	14814.0000
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-

AHL (WATER QUALITY) = Allowable Headworks Loading based on protection of water quality from Table 7, column F.
AHL (INHIBITION) = Allowable Headworks Loading based on prevention of inhibition from Table 13, column K.
AHL (SLUDGE) = Allowable Headworks Loading based on protection of sludge quality from Table 16, column G.
Design Loading of POTW treatment plant (user entered).
MAHL Maximum allowable headworks loading is the lowest value for each pollutant from columns B through E.

Yellow River WRF with Biosolids Land Applied Calculations

TABLE 18 - Calculation of Local Limit

Pollutant	Maximum Allowable Headworks (MAHL - lbs/d)	Safety Factor (%) (SF)	Growth Allowance (%) (GA)	Nonindustrial Concentration (mg/l) (Cback)	Nonindustrial Flow (MGD) (Qback)	Nonindustrial Loading (lbs/day) (Lback)	Hauled Waste to Influent Concentration (mg/l) (Chwi)	Hauled Waste to Influent Flow (MGD) (Qhwi)	Hauled Waste to Influent Loading (lbs/day) (Lhwi)	Allowable Industrial Loading (MAIL - lbs/day)	Calculated Local Limit (mg/l) (Cind)	Basis of Limitation	Human Health Calculation	Industrial Contributory Flow (MGD)
Arsenic	0.1653	10	15	0.0007	2.659	0.0163	-	0	0.0000	0.1077	0.315	Sludge	-	0.041
Cadmium	0.1664	10	15	0.00003	2.659	0.0006	-	0	0.0000	0.1241	0.363	Sludge	-	0.041
Chromium	5.630	10	15	0.00092	2.659	0.0204	-	0	0.0000	4.2017	12.29	Inhibition	-	0.041
Copper	3.835	10	15	0.02087	2.659	0.4627	-	0	0.0000	2.4138	7.059	Sludge	-	0.041
Cyanide	2.252	10	15	0.0020	2.072	0.0346	-	0	0.0000	1.6543	0.316	Inhibition	1.1	0.628
Lead	0.8921	10	15	0.00018	2.055	0.0031	-	0	0.0000	0.6660	0.124	Sludge	-	0.645
Mercury	0.05140	10	15	0.000025	2.683	0.0006	-	0	0.0000	0.0380	0.268	Sludge	-	0.017
Molybdenum	0.2973	10	15	0.00029	1.963	0.0047	-	0	0.0000	0.2183	0.0355	Sludge	-	0.737
Nickel	1.814	10	15	0.00032	2.055	0.0054	-	0	0.0000	1.3551	0.252	Sludge	-	0.645
Selenium	1.770	10	15	0.00026	2.072	0.0045	-	0	0.0000	1.3234	0.253	Sludge	-	0.628
Silver	-	10	15	0.000044	2.683	0.0010	-	0	0.0000	-	-	-	-	0.017
Zinc	9.768	10	15	0.1049	2.659	2.3259	-	0	0.0000	4.9998	14.62	Sludge	-	0.041
Ammonia	841	**0**	10	25.0	2.676	558	-	0	0.0000	199	994	Design	-	0.024
BOD5	5479	**0**	**9.5**	220	2.676	4910	-	0	0.0000	49	243	Design	-	0.024
TSS	6386	**0**	15	220	2.676	4910	-	0	0.0000	518	2589	Design	-	0.024
Phosphorus (T)	160	**0**	15	4.7	2.676	104	-	0	0.0000	32	160	Design	-	0.024
TKN	1216	**0**	10	40.0	2.676	893	-	0	0.0000	202	1008	Design	-	0.024
Beryllium	-	10	15	-	2.7	0.0000	-	0	0.0000	-	-	-	-	0
Chloroform	225	10	15	0.00447	2.096	0.0781	-	0	0.0000	168.8	33.5	Inhibition	**0.060**	0.604
1,2-Dichlorobenzene	113	10	15	0.00061	2.7	0.0138	-	0	0.0000	84.4	-	Inhibition	-	0
1,4-Dichlorobenzene	113	10	15	0.00101	2.7	0.0228	-	0	0.0000	84.4	-	Inhibition	**5.7**	0
Methylene Chloride	-	10	15	0.00028	2.7	0.0064	-	0	0.0000	-	-	-	0.83	0
Phenol	90	10	15	0.00858	2.7	0.1931	-	0	0.0000	67.4	-	Inhibition	1186	0
Bis(2-ethylhexyl)phthalate	-	10	15	0.03108	2.7	0.6997	-	0	0.0000	-	-	-	7233	0
Toluene	4504	10	15	0.00021	2.7	0.0048	-	0	0.0000	3378	-	Inhibition	**1.4**	0
COD	14814	**0**	15	500	2.676	11159	-	0	0.0000	1433	7159	Design	-	0.024
	-			-	1.946	0.0000	-	0	0.0000	-	-	-		
	-			-	1.946	0.0000	-	0	0.0000	-	-	-		
	-			-	1.946	0.0000	-	0	0.0000	-	-	-		
	-			-	1.946	0.0000	-	0	0.0000	-	-	-		
	-			-	1.946	0.0000	-	0	0.0000	-	-	-		
	-			-	1.946	0.0000	-	0	0.0000	-	-	-		
	-			-	1.946	0.0000	-	0	0.0000	-	-	-		
	-			-	1.946	0.0000	-	0	0.0000	-	-	-		
	-			-	1.946	0.0000	-	0	0.0000	-	-	-		
	-			-	1.946	0.0000	-	0	0.0000	-	-	-		
	-			-	1.946	0.0000	-	0	0.0000	-	-	-		

(MAHL)	Maximum allowable headworks loading (from Table 17, column F).
(SF)	Safety factor as a percent (user entered).
(GA)	Growth allowance as a percent (user entered).
(Cback)	Average nonindustrial background concentration for a particular pollutant in mg/l (from 'Monitoring Data' worksheet row 43 or user entered).
(Qback)	Average nonindustrial background flow in MGD (calculated).
Qback =	Qpotw - Qind - Qhwi (values from Table 2(b), cells B34, C34, and K34)
(Lback)	Average nonindustrial background loading to the POTW for a particular pollutant in pounds per day (calculated).
Lback =	8.34 * Cback * Qback
8.34	Unit conversion factor
(Chwi)	Average concentration for a particular pollutant in mg/l for hauled waste discharged at the POTW influent (from 'Monitoring Data' worksheet, row 43).
(Qhwi)	Average flow in MGD for hauled waste discharged at the POTW influent (from Table 2(b), cell K34).
(Lhwi)	Average loading to the POTW for a particular pollutant in pounds per day for hauled waste discharged at the POTW influent (calculated).
Lhwi =	8.34 * Chwi * Qhwi
(MAIL)	Maximum Allowable Industrial Load (calculated).
MAIL =	MAHL - (MAHL * SF/100) - (MAHL * GA/100) - Lback - Lhwi
(Cind)	Industrial allowable local limit for a given pollutant in mg/l (calculated).
Cind =	MAIL/(8.34 * Qind)
(Qind)	Average discharge flow of Industrial Users to be regulated through the local limits in MGD (from Table 2(b), cell C34).
Basis of Limitation	An identification of the lowest allowable headworks loading from Table 17 columns B through D.
	Red Bold in column C or D indicates a safety factor or growth allowance of less than 10%.

Yellow River WRF with Biosolids Land Applied Calculations

TABLE 20 - Comparison of Allowable Headworks Loadings And Current Influent Loadings

Pollutant	Maximum Allowable Headworks Loading (MAHL - lbs/d)	Average Influent Loading (Linav - lbs/day)	Average Percent Loaded (%)	Maximum Influent Loading (Linmax - lbs/d)	Maximum Percent Loaded (%)
Arsenic	0.1653	-	-	-	-
Cadmium	0.1664	0.0006	0.3533	0.0021	1.2548
Chromium	5.6295	0.0243	0.4309	0.0455	0.8080
Copper	3.8355	0.6440	16.7911	1.2655	32.9951
Cyanide	2.2518	-	-	-	-
Lead	0.8921	0.0091	1.0240	0.0281	3.1551
Mercury	0.0514	0.0005	1.0640	0.0011	2.1906
Molybdenum	0.2973	0.0141	4.7289	0.0835	28.1028
Nickel	1.8140	0.0141	0.7749	0.0754	4.1585
Selenium	1.7705	0.0078	0.4433	0.0259	1.4626
Silver	-	0.0010	-	0.0029	-
Zinc	9.7675	2.0736	21.2293	2.4319	24.8982
Ammonia	841.0000	692.2677	**82.3148**	781.3746	92.9102
BOD5	5479.0000	3644.6991	66.5212	4593.6720	83.8414
TSS	6386.0000	4111.1434	64.3774	5989.7880	93.7956
Phosphorus (T)	160.0000	98.6610	61.6631	108.9871	68.1170
TKN	1216.0000	818.6901	67.3265	943.5042	77.5908
Beryllium	-	-	-	-	-
Chloroform	225.1800	0.0489	0.0217	0.0766	0.0340
1,2-Dichlorobenzene	112.5900	0.0027	0.0024	0.0027	0.0024
1,4-Dichlorobenzene	112.5900	0.0038	0.0034	0.0038	0.0034
Methylene Chloride	-	0.0038	-	0.0038	-
Phenol	90.0720	0.0259	0.0288	0.0259	0.0288
Bis(2-ethylhexyl)phthalate	-	0.0709	-	0.0709	-
Toluene	4503.6000	0.0036	0.0001	0.0036	0.0001
COD	14814.0000	9856.4503	**66.5347**	12452.4540	**84.0587**
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-

(MAHL)	Maximum Allowable Headworks Loading (from Table 17 column B).
(Linav)	Average influent loading from 'Monitoring Data' worksheet row 47.
Average Percent Loaded =	(Linav)/(MAHL)*100
(Linmax)	Maximum Influent Concentration converted to a loading using the POTW flow (from Table 2(b), cell B34).
Linmax =	8.34 * (Cinmax) * (Qpotw)
(Cinmax)	Maximum Influent Concentration (from 'Monitoring Data' worksheet row 44)
(Qpotw)	POTW's average flow in MGD (from Table 2(b), cell B34).
8.34	Unit conversion factor
Maximum Percent Loaded =	(Linmax)/(MAHL)*100

Green bold indicates that the average percent loaded is greater than 60% or the maximum percent loaded is greater than 80% for all pollutants except for Ammonia, BOD, TSS, Phosphorus, and Nitrogen where the MAHL for these pollutants is based on the design loading.
Where the MAHL for Ammonia, BOD, TSS, Phosphorus, and Nitrogen is based on the design loading, **green bold** indicates that the average percent loaded is greater than 80%.
Red bold indicates that the percent loaded (average or maximum) is greater than 100%.

Appendix B.4 – ASE WRF with Biosolids Land Application Calculations

ASE WRF with Biosolids Land Applied Calculations

Table 1 - Unit Operations (X if present)

Activated Sludge Present?	Trickling Filter Present?	Nitrification Present?	Anaerobic Digestion Present?	Sludge Incineration Present?
X		X		

Placing an "X" in the cell under a treament unit will activate the inhibition calclations for that unit or the sludge incineration calculations.

TABLE 2a - Stream Flow Partial Mix Factors

Q7-10 Stream Flow (MGD) (Q7-10)	Harmonic Mean Stream Flow (MGD) (Qhm)	Drinking Water Intake Stream Flow (MGD) (Qdw)	Chronic Partial Mix Factor (PMFc)	Acute Partial Mix Factor (PMFa)	Cancer Risk Level Partial Mix Factor (PMFcrl)

(Q7-10) 7-day, 10-year low flow for receiving stream in MGD (user entered).
(Qhm) Harmonic mean flow for receiving stream in MGD (user entered).
(Qdw) Flow for receiving stream at nearest downstream drinking water intake (user entered).
(PMFa) Partial mix factor for acute water quality standards (user entered).
(PMFc) Partial mix factor for chronic water quality standards (user entered).
(PMFcrl) Partial mix factor for cancer risk level water quality standards (user entered).

TABLE 2b - POTW and Receiving Stream Data

POTW Flow (MGD) (Qpotw)	IU Flow (MGD) (Qind)	Sludge Flow to Digester (MGD) (Qdig)	Sludge Flow to Disposal (MTD) (Qsldg)	Stream Flow for Chronic WQS (MGD) (Qstr1)	Stream Flow for Acute WQS (MGD) (Qstr2)	Stream Flow for Threshold Human Health WQS (MGD) (Qstr3)	Stream Flow for Carcinogen Human Health WQS (MGD) (Qstr4)	Receiving Stream Hardness (mg/l) (H)	Hauled Waste Flow to Influent (MGD) (Qhwi)	Hauled Waste Flow to Sludge Processing (MGD) (Qhws)	Sludge Flow to Incineration (MTD) (Qinc)
0.9	0.7		0.27	0.07	0.05	11.43	11.43	14.7			

(Qpotw) POTW's average flow in MGD (user entered).
(Qind) Average discharge flow of Industrial Users to be regulated through the local limits in MGD (user entered).
(Qdig) Average sludge flow to digester in MGD (user entered).
(Qsldg) Average sludge flow to disposal in dry metric tons per day (user entered).
(Qstr1) Receiving stream (upstream) flow used with chronic water quality standards in MGD (calculated).
Qstr1 = Q7-10 * PMFc (data from Table 2(a), cells B17 and E17); if cell E17 is blank, PMFc assumed to be 1.
(Qstr2) Receiving stream (upstream) flow used with acute water quality standards in MGD (calculated).
Qstr2 = Q7-10 * PMFa (data from Table 2(a), cells B17 and F17); if cell F17 is blank, PMFa assumed to be 1.
(Qstr3) Receiving stream (upstream) flow used with threshold human health water quality standards in MGD (from Table 2(a), cell B17).
(Qstr4) Receiving stream (upstream) flow used with carcinogen human health water quality standards in MGD (calculated).
Qstr4 = Qhm * PMFcrl (data from Table 2(a), cells C17 and G17); if cell G17 is blank, PMFcrl assumed to be 1; if cell C17 is blank, formula below is used:
or Qstr4 = PMFcrl * 7.43 * $(Q7\text{-}10)^{0.874}$ (data from Table 2(a), cell G17 and B17)
(H) Receiving stream hardness in mg/l (user entered).
(Qhwi) Hauled waste flow discharged at the influent of the treatment plant in MGD (user entered).
(Qhws) Hauled waste flow discharged directly to the sludge processing units in MGD (user entered).
(Qinc) Average sludge flow to incineration in dry metric tons per day (user entered).

ASE WRF with Biosolids Land Applied Calculations

TABLE 3 - Allowable Headworks Loadings Based on NPDES Effluent Limits

	LOCAL LIMITS CALCULATION DATA				MAXIMUM LOADING	
Pollutant	POTW Flow (MGD) (Qpotw)	NPDES Limit (mg/l) (Ccrit)	Select Removal Efficiency (from list)	Removal Efficiency (%) (Rpotw)	Allowable Headworks Loading (lbs/day) (AHLnpdes)	User Entered Removal Efficiency (%)
Arsenic	0.9		Default (activated sludge)	45.00	-	
Cadmium	0.9		Default (activated sludge)	67.00	-	
Chromium	0.9		Default (activated sludge)	82.00	-	
Copper	0.9		Default (activated sludge)	86.00	-	
Cyanide	0.9		Default (activated sludge)	69.00	-	
Lead	0.9		Default (activated sludge)	61.00	-	
Mercury	0.9		Default (activated sludge)	60.00	-	
Molybdenum	0.9		Default (activated sludge)	50.00	-	
Nickel	0.9		Default (activated sludge)	42.00	-	
Selenium	0.9		Default (activated sludge)	50.00	-	
Silver	0.9		Default (activated sludge)	75.00	-	
Zinc	0.9		Default (activated sludge)	79.00	-	
Ammonia	0.9		Influent/Effluent	-	-	
BOD5	0.9		Influent/Effluent	-	-	
TSS	0.9		Influent/Effluent	-	-	
Phosphorus (T)	0.9		Influent/Effluent	-	-	
TKN	0.9		Influent/Effluent	-	-	
Beryllium	0.9		User Entered	-	-	
Chloroform	0.9		User Entered	0.67	-	0.67
1,2-Dichlorobenzene	0.9		User Entered	0.00	-	
1,4-Dichlorobenzene	0.9		User Entered	0.00	-	
Methylene Chloride	0.9		User Entered	0.62	-	0.62
Phenol	0.9		User Entered	0.90	-	0.9
Bis(2-ethylhexyl)phthalate	0.9		User Entered	0.72	-	0.72
Toluene	0.9		User Entered	0.93	-	0.93
COD	0.9		Influent/Effluent	-	-	
	0.9		Influent/Effluent	-	-	
	0.9		Influent/Effluent	-	-	
	0.9		Influent/Effluent	-	-	
	0.9		Influent/Effluent	-	-	
	0.9		Influent/Effluent	-	-	
	0.9		Influent/Effluent	-	-	
	0.9		Influent/Effluent	-	-	
	0.9		Influent/Effluent	-	-	
	0.9		Influent/Effluent	-	-	
	0.9		Influent/Effluent	-	-	
	0.9		Influent/Effluent	-	-	

(Qpotw)	POTW's average flow in MGD (from Table 2(b), cell B34).
(Ccrit)	NPDES permit limit or calculated WQBEL for a particular pollutant in mg/l (user entered)
Select Removal Efficiency	Select removal efficiency for column E from drop down list.
(Rpotw)	Removal efficiency across POTW as percent (Inf/Eff Removal (row 48), Inf/Sldg Removal (row 49), or Daily Removal (row 43) from 'Monitoring Data' worksheet, EPA default for specified treatment process, or user entered (column G)).
(AHLnpdes)	Allowable headworks pollutant loading to the POTW in pounds per day based on NPDES permit limits (lbs/day - calculated).
AHLnpdes =	(8.34 * Ccrit * Qpotw) / (1-Rpotw/100)
8.34	Unit conversion factor

ASE WRF with Biosolids Land Applied Calculations

TABLE 4 - Allowable Headworks Loadings Based on Chronic Water Quality Standards

	LOCAL LIMITS CALCULATION DATA					MAXIMUM LOADING
Pollutant	POTW Flow (MGD) (Qpotw)	Receiving Stream Flow (MGD) (Qstr1)	Receiving Stream Concentration (mg/l) (Cstr)	Chronic WQS (mg/l) (Ccrit)	Removal Efficiency (%) (Rpotw)	Allowable Headworks Loading (lbs/day) (AHLcwq)
Arsenic	0.9	0.07		0.31115	45.00	4.5816
Cadmium	0.9	0.07		0.00063	67.00	0.0154
Chromium	0.9	0.07		0.07909	82.00	3.5587
Copper	0.9	0.07		0.00561	86.00	0.3248
Cyanide	0.9	0.07		0.00520	69.00	0.1358
Lead	0.9	0.07		0.00180	61.00	0.0374
Mercury	0.9	0.07		0.000012	60.00	0.0002
Molybdenum	0.9	0.07			50.00	-
Nickel	0.9	0.07		0.02821	42.00	0.3938
Selenium	0.9	0.07		0.005	50.00	0.0810
Silver	0.9	0.07			75.00	-
Zinc	0.9	0.07		0.09336	79.00	3.6004
Ammonia	0.9	0.07			-	-
BOD5	0.9	0.07			-	-
TSS	0.9	0.07			-	-
Phosphorus (T)	0.9	0.07			-	-
TKN	0.9	0.07			-	-
Beryllium	0.9	0.07			-	-
Chloroform	0.9	0.07			0.67	-
1,2-Dichlorobenzene	0.9	0.07			0.00	-
1,4-Dichlorobenzene	0.9	0.07			0.00	-
Methylene Chloride	0.9	0.07			0.62	-
Phenol	0.9	0.07		0.3	0.90	2.4517
Bis(2-ethylhexyl)phthalate	0.9	0.07			0.72	-
Toluene	0.9	0.07			0.93	-
COD	0.9	0.07			-	-
	0.9	0.07			-	-
	0.9	0.07			-	-
	0.9	0.07			-	-
	0.9	0.07			-	-
	0.9	0.07			-	-
	0.9	0.07			-	-
	0.9	0.07			-	-
	0.9	0.07			-	-
	0.9	0.07			-	-
	0.9	0.07			-	-
	0.9	0.07			-	-

(Qpotw) POTW's average flow in MGD (from Table 2(b), cell B34).
(Qstr1) Receiving stream (upstream) flow used with chronic water quality standards in MGD (from Table 2(b), cell F34).
(Cstr) Receiving stream background concentration in mg/l (user entered)
(Ccrit) State chronic water quality standard for a particular pollutant in mg/l.
(Rpotw) Removal efficiency across POTW as percent (from Table 3, column E).
(AHLcwq) Allowable headworks pollutant loading to the POTW in pounds per day based on chronic water quality standards (lbs/day - calculated).
AHLcwq = 8.34 * (Ccrit * (Qstr1 + Qpotw) - (Cstr * Qstr1)) / (1-Rpotw/100)
8.34 Unit conversion factor

ASE WRF with Biosolids Land Applied Calculations

TABLE 5 - Allowable Headworks Loadings Based on Acute Water Quality Standards

	LOCAL LIMITS CALCULATION DATA					MAXIMUM LOADING
Pollutant	POTW Flow (MGD) (Qpotw)	Receiving Stream Flow (MGD) (Qstr2)	Receiving Stream Concentration (mg/l) (Cstr)	Acute WQS (mg/l) (Ccrit)	Removal Efficiency (%) (Rpotw)	Allowable Headworks Loading (lbs/day) (AHLawq)
Arsenic	0.9	0.05	0	0.70526	45.00	10.1085
Cadmium	0.9	0.05	0	0.00111	67.00	0.0264
Chromium	0.9	0.05	0	0.60805	82.00	26.6296
Copper	0.9	0.05	0	0.00712	86.00	0.4010
Cyanide	0.9	0.05	0	0.02200	69.00	0.5594
Lead	0.9	0.05	0	0.04620	61.00	0.9338
Mercury	0.9	0.05	0	0.00140	60.00	0.0276
Molybdenum	0.9	0.05	0		50.00	-
Nickel	0.9	0.05	0	0.25395	42.00	3.4516
Selenium	0.9	0.05	0		50.00	-
Silver	0.9	0.05	0		75.00	-
Zinc	0.9	0.05	0	0.09260	79.00	3.4761
Ammonia	0.9	0.05	0		-	-
BOD5	0.9	0.05	0		-	-
TSS	0.9	0.05	0		-	-
Phosphorus (T)	0.9	0.05	0		-	-
TKN	0.9	0.05	0		-	-
Beryllium	0.9	0.05	0		-	-
Chloroform	0.9	0.05	0		0.67	-
1,2-Dichlorobenzene	0.9	0.05	0		0.00	-
1,4-Dichlorobenzene	0.9	0.05	0		0.00	-
Methylene Chloride	0.9	0.05	0		0.62	-
Phenol	0.9	0.05	0		0.90	-
Bis(2-ethylhexyl)phthalate	0.9	0.05	0		0.72	-
Toluene	0.9	0.05	0		0.93	-
COD	0.9	0.05	0		-	-
	0.9	0.05	0		-	-
	0.9	0.05	0		-	-
	0.9	0.05	0		-	-
	0.9	0.05	0		-	-
	0.9	0.05	0		-	-
	0.9	0.05	0		-	-
	0.9	0.05	0		-	-
	0.9	0.05	0		-	-
	0.9	0.05	0		-	-
	0.9	0.05	0		-	-
	0.9	0.05	0		-	-

(Qpotw) POTW's average flow in MGD (from Table 2(b), cell B34).
(Qstr2) Receiving stream (upstream) flow used with acute water quality standards in MGD (from Table 2(b), cell G34).
(Cstr) Receiving stream background concentration in mg/l (from Table 4, column D).
(Ccrit) State acute water quality standard for a particular pollutant in mg/l.
(Rpotw) Removal efficiency across POTW as percent (from Table 3, column E).
(AHLawq) Allowable headworks pollutant loading to the POTW in pounds per day based on acute water quality standards (lbs/day - calculated).
AHLawq = 8.34 * (Ccrit * (Qstr2 + Qpotw) - (Cstr * Qstr2)) / (1-Rpotw/100)
8.34 Unit conversion factor

ASE WRF with Biosolids Land Applied Calculations

TABLE 6 - Allowable Headworks Loadings Based on Human Health Water Quality Standards

	LOCAL LIMITS CALCULATION DATA						MAXIMUM LOADING
Pollutant	POTW Flow (MGD) (Qpotw)	Receiving Stream Flow (MGD) (Qstr3 Qstr4 or Qdw)	Receiving Stream Concentration (mg/l) (Cstr)	Human Health WQS (mg/l) (Ccrit)	Select Basis of Standard (from list)	Removal Efficiency (%) (Rpotw)	Allowable Headworks Loading (lbs/day) (AHLhhwq)
Arsenic	0.9	11.43	0	0.05	Threshold Human Health	45.00	9.3516
Cadmium	0.9	-	0			67.00	-
Chromium	0.9	-	0			82.00	-
Copper	0.9	-	0			86.00	-
Cyanide	0.9	-	0			69.00	-
Lead	0.9	-	0			61.00	-
Mercury	0.9	-	0			60.00	-
Molybdenum	0.9	-	0			50.00	-
Nickel	0.9	-	0			42.00	-
Selenium	0.9	-	0			50.00	-
Silver	0.9	-	0			75.00	-
Zinc	0.9	-	0			79.00	-
Ammonia	0.9	-	0			-	-
BOD5	0.9	-	0			-	-
TSS	0.9	-	0			-	-
Phosphorus (T)	0.9	-	0			-	-
TKN	0.9	-	0			-	-
Beryllium	0.9	-	0			-	-
Chloroform	0.9	11.43	0	0.47	Threshold Human Health	0.67	48.6737
1,2-Dichlorobenzene	0.9	11.43	0	1.3	Threshold Human Health	0.00	133.7274
1,4-Dichlorobenzene	0.9	11.43	0	0.19	Threshold Human Health	0.00	19.5448
Methylene Chloride	0.9	11.43	0	0.59	Threshold Human Health	0.62	61.0703
Phenol	0.9	11.43	0	857	Threshold Human Health	0.90	88957.8349
Bis(2-ethylhexyl)phthalate	0.9	11.43	0	0.0022	Threshold Human Health	0.72	0.2279
Toluene	0.9	11.43	0	5.98	Threshold Human Health	0.93	620.9206
COD	0.9	-	0			-	-
	0.9	-	0			-	-
	0.9	-	0			-	-
	0.9	-	0			-	-
	0.9	-	0			-	-
	0.9	-	0			-	-
	0.9	-	0			-	-
	0.9	-	0			-	-
	0.9	-	0			-	-
	0.9	-	0			-	-
	0.9	-	0			-	-
	0.9	-	0			-	-

(Qpotw)	POTW's average flow in MGD (from Table 2(b), cell B34).
(Qstr3)	Receiving stream (upstream) flow used with threshold human health water quality standards in MGD (from Table 2(b), cell H34).
(Qstr4)	Receiving stream (upstream) flow used with cancer risk level human health water quality standards in MGD (from Table 2(b), cell I36).
(Qdw)	Receiving stream (upstream) flow used with water quality standards based on drinking water supply in MGD (from Table 2(a), cell D17).
(Cstr)	Receiving stream background concentration in mg/l (from Table 4, column D).
(Ccrit)	State human health water quality standard for a particular pollutant in mg/l.
Select Basis of Standard	Select the basis of the standard listed in column E from drop down list. Selection of basis of the standard will determine which flow is entered in column C (Qstr3, Qstr4, or Qdw).
(Rpotw)	Removal efficiency across POTW as percent (from Table 3, column E).
(AHLhhwq)	Allowable headworks pollutant loading to the POTW in pounds per day based on human health water quality standards (lbs/day - calculated).
AHLhhwq =	8.34 * (Ccrit * (Q + Qpotw) - (Cstr * Q)) / (1-Rpotw/100); where Q is Qstr3, Qstr4, or Qdw
8.34	Unit conversion factor

ASE WRF with Biosolids Land Applied Calculations

TABLE 7 - Comparison of Allowable Headworks Loadings Based on Water Quality

Pollutant	AHL (NPDES) (lbs/day)	AHL (CHRONIC) (lbs/day)	AHL (ACUTE) (lbs/day)	AHL (HUMAN HEALTH) (lbs/day)	AHL (WATER QUALITY) (lbs/day)
Arsenic	-	4.5816	10.1085	9.3516	4.5816
Cadmium	-	0.0154	0.0264	-	0.0154
Chromium	-	3.5587	26.6296	-	3.5587
Copper	-	0.3248	0.4010	-	0.3248
Cyanide	-	0.1358	0.5594	-	0.1358
Lead	-	0.0374	0.9338	-	0.0374
Mercury	-	0.0002	0.0276	-	0.0002
Molybdenum	-	-	-	-	-
Nickel	-	0.3938	3.4516	-	0.3938
Selenium	-	0.0810	-	-	0.0810
Silver	-	-	-	-	-
Zinc	-	3.6004	3.4761	-	3.4761
Ammonia	-	-	-	-	-
BOD5	-	-	-	-	-
TSS	-	-	-	-	-
Phosphorus (T)	-	-	-	-	-
TKN	-	-	-	-	-
Beryllium	-	-	-	-	-
Chloroform	-	-	-	48.6737	48.6737
1,2-Dichlorobenzene	-	-	-	133.7274	133.7274
1,4-Dichlorobenzene	-	-	-	19.5448	19.5448
Methylene Chloride	-	-	-	61.0703	61.0703
Phenol	-	2.4517	-	88957.8349	2.4517
Bis(2-ethylhexyl)phthalate	-	-	-	0.2279	0.2279
Toluene	-	-	-	620.9206	620.9206
COD	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-

AHL (NPDES) = Allowable headworks loading based on NPDES limits, from Table 3, column F.
AHL (CHRONIC) = Allowable headworks loading based on chronic water quality criteria, from Table 4, column G.
AHL (ACUTE) = Allowable headworks loading based on acute water quality criteria, from Table 5, column G.
AHL (HUMAN HEALTH) = Allowable headworks loading based on human health water quality criteria, from Table 6, column H.
AHL (WATER QUALITY) = Allowable headworks loading based on water quality; lowest value from columns B through E for each pollutant.

ASE WRF with Biosolids Land Applied Calculations

TABLE 8 - Allowable Headworks Loadings Based on Activated Sludge Inhibition Level

	LOCAL LIMITS CALCULATIONS DATA				MAXIMUM LOADING	
Pollutant	POTW Flow (MGD) (Qpotw)	Activated Sludge Inhibition Level (mg/l) (Ccrit)	Select Removal Efficiency (from list)	Removal Efficiency (%) (Rprim)	Allowable Headworks Loading (lbs/day) (AHLasi)	User Entered Removal Efficiency (%)
Arsenic	0.9	0.1	User Entered	0.00	0.7506	
Cadmium	0.9	1	User Entered	0.00	7.5060	
Chromium	0.9	1	User Entered	0.00	7.5060	
Copper	0.9	1	User Entered	0.00	7.5060	
Cyanide	0.9	0.1	User Entered	0.00	0.7506	
Lead	0.9	1	User Entered	0.00	7.5060	
Mercury	0.9	0.1	User Entered	0.00	0.7506	
Molybdenum	0.9		User Entered	-	-	
Nickel	0.9	1	User Entered	0.00	7.5060	
Selenium	0.9		User Entered	-	-	
Silver	0.9		User Entered	-	-	
Zinc	0.9	0.5	User Entered	0.00	3.7530	
Ammonia	0.9	480	User Entered	0.00	3602.8800	
BOD5	0.9		User Entered	-	-	
TSS	0.9		User Entered	-	-	
Phosphorus (T)	0.9		User Entered	-	-	
TKN	0.9		User Entered	-	-	
Beryllium	0.9		User Entered	-	-	
Chloroform	0.9		User Entered	-	-	
1,2-Dichlorobenzene	0.9	5	User Entered	0.00	37.5300	
1,4-Dichlorobenzene	0.9	5	User Entered	0.00	37.5300	
Methylene Chloride	0.9		User Entered	-	-	
Phenol	0.9	50	User Entered	0.00	375.3000	
Bis(2-ethylhexyl)phthalate	0.9		User Entered	-	-	
Toluene	0.9	200	User Entered	0.00	1501.2000	
COD	0.9		User Entered	-	-	
	0.9		User Entered	-	-	
	0.9		User Entered	-	-	
	0.9		User Entered	-	-	
	0.9		User Entered	-	-	
	0.9		User Entered	-	-	
	0.9		User Entered	-	-	
	0.9		User Entered	-	-	
	0.9		User Entered	-	-	
	0.9		User Entered	-	-	
	0.9		User Entered	-	-	
	0.9		User Entered	-	-	

(Qpotw)	POTW's average flow in MGD (from Table 2(b), cell B34).
(Ccrit)	Activated sludge threshold inhibition level, mg/l (EPA default or user entered).
Select Removal Efficiency	Select removal efficiency for column E from drop down list.
(Rprim)	Removal efficiency prior to activated sludge treatment unit as percent (Prior to Act Sl ('Inhibition Removals' worksheet row 48), EPA default, or user entered).
(AHLasi)	Allowable headworks pollutant loading to the POTW in pounds per day based on inhibition of activated sludge units (lbs/day - calculated).
AHLasi =	8.34 * (Ccrit * Qpotw) / (1-Rprim/100)
8.34	Unit conversion factor

ASE WRF with Biosolids Land Applied Calculations

TABLE 10 - Allowable Headworks Loadings Based on Nitrification Inhibition Level

	LOCAL LIMITS CALCULATIONS DATA				MAXIMUM LOADING	
Pollutant	POTW Flow (MGD) (Qpotw)	Nitrification Inhibition Level (mg/l) (Ccrit)	Select Removal Efficiency (from list)	Removal Efficiency (%) (Rsec)	Allowable Headworks Loading (lbs/day) (AHLni)	User Entered Removal Efficiency (%)
Arsenic	0.9	1.5	User Entered	0.00	11.2590	
Cadmium	0.9	5.2	User Entered	0.00	39.0312	
Chromium	0.9	0.25	User Entered	0.00	1.8765	
Copper	0.9	0.05	User Entered	0.00	0.3753	
Cyanide	0.9	0.34	User Entered	0.00	2.5520	
Lead	0.9	0.5	User Entered	0.00	3.7530	
Mercury	0.9		User Entered	-	-	
Molybdenum	0.9		User Entered	-	-	
Nickel	0.9	0.25	User Entered	0.00	1.8765	
Selenium	0.9		User Entered	-	-	
Silver	0.9		User Entered		-	
Zinc	0.9	0.5	User Entered	0.00	3.7530	
Ammonia	0.9		User Entered	-	-	
BOD5	0.9		User Entered	-	-	
TSS	0.9		User Entered	-	-	
Phosphorus (T)	0.9		User Entered	-	-	
TKN	0.9		User Entered	-	-	
Beryllium	0.9		User Entered	-	-	
Chloroform	0.9	10	User Entered	0.00	75.0600	
1,2-Dichlorobenzene	0.9		User Entered	-	-	
1,4-Dichlorobenzene	0.9		User Entered	-	-	
Methylene Chloride	0.9		User Entered	-	-	
Phenol	0.9	4	User Entered	0.00	30.0240	
Bis(2-ethylhexyl)phthalate	0.9		User Entered	-	-	
Toluene	0.9		User Entered	-	-	
COD	0.9		User Entered	-	-	
	0.9		User Entered	-	-	
	0.9		User Entered	-	-	
	0.9		User Entered	-	-	
	0.9		User Entered	-	-	
	0.9		User Entered	-	-	
	0.9		User Entered	-	-	
	0.9		User Entered	-	-	
	0.9		User Entered	-	-	
	0.9		User Entered	-	-	
	0.9		User Entered	-	-	
	0.9		User Entered	-	-	

(Qpotw)	POTW's average flow in MGD (from Table 2(b), cell B34).
(Ccrit)	Nitrification threshold inhibition level, mg/l (EPA default or user entered).
Select Removal Efficiency	Select removal efficiency for column E from drop down list.
(Rsec)	Removal efficiency prior to nitrification treatment unit as percent (Prior to Nitrif ('Inhibition Removals' worksheet row 50), Prior to Act Sl (row 48), Prior to Trick Fil (row 49), EPA default, or user entered).
(AHLni)	Allowable headworks pollutant loading to the POTW in pounds per day based on inhibition of nitrification units (lbs/day - calculated).
AHLni =	(8.34 * Ccrit * Qpotw) / (1-Rsec/100)
8.34	Unit conversion factor

ASE WRF with Biosolids Land Applied Calculations

TABLE 13 - Comparison of Allowable Headworks Loadings Based on Inhibition

	Yes	No
Has the POTW Experienced Inhibition or Construction Within the Data Time Frame?		x

Pollutant	AHL (ACT. SLUDGE) (lbs/day)	AHL (TRICK. FILTER) (lbs/day)	AHL (NITRIF) (lbs/day)	AHL (DIG. - CONSERV.) (lbs/day)	AHL (DIG. - NON-CONS.) (lbs/day)	Most Stringent (INHIBITION) (lbs/day)	Monitoring Data Maximum Influent Concentration (Cmaxin - mg/l)	Other Maximum Influent Concentration (Cmaxino - mg/l)	Maximum Influent Loading (Lmaxin - lbs/d)	AHL (INHIBITION) (lbs/d)
Arsenic	0.7506	-	11.2590	-	-	0.7506	-		-	0.7506
Cadmium	7.5060	-	39.0312	-	-	7.5060	-		-	7.5060
Chromium	7.5060	-	1.8765	-	-	1.8765	0.00202		0.0152	1.8765
Copper	7.5060	-	0.3753	-	-	0.3753	-		-	0.3753
Cyanide	0.7506	-	2.5520	-	-	0.7506	-		-	0.7506
Lead	7.5060	-	3.7530	-	-	3.7530	-		-	3.7530
Mercury	0.7506	-	-	-	-	0.7506	-		-	0.7506
Molybdenum	-	-	-	-	-	-	-		-	-
Nickel	7.5060	-	1.8765	-	-	1.8765	-		-	1.8765
Selenium	-	-	-	-	-	-	-		-	-
Silver	-	-	-	-	-	-	-		-	-
Zinc	3.7530	-	3.7530	-	-	3.7530	-		-	3.7530
Ammonia	3602.8800	-	-	-	-	3602.8800	-		-	3602.8800
BOD5	-	-	-	-	-	-	-		-	-
TSS	-	-	-	-	-	-	-		-	-
Phosphorus (T)	-	-	-	-	-	-	-		-	-
TKN	-	-	-	-	-	-	-		-	-
Beryllium	-	-	-	-	-	-	-		-	-
Chloroform	-	-	75.0600	-	-	75.0600	-		-	75.0600
1,2-Dichlorobenzene	37.5300	-	-	-	-	37.5300	-		-	37.5300
1,4-Dichlorobenzene	37.5300	-	-	-	-	37.5300	0.00012		0.0009	37.5300
Methylene Chloride	-	-	-	-	-	-	0.00017		0.0013	-
Phenol	375.3000	-	30.0240	-	-	30.0240	0.00017		0.0013	30.0240
Bis(2-ethylhexyl)phthalate	-	-	-	-	-	-	0.00115		0.0086	-
Toluene	1501.2000	-	-	-	-	1501.2000	0.00315		0.0236	1501.2000
COD	-	-	-	-	-	-	0.00016		0.0012	-
	-	-	-	-	-	-	-		-	-
	-	-	-	-	-	-	-		-	-
	-	-	-	-	-	-	-		-	-
	-	-	-	-	-	-	-		-	-
	-	-	-	-	-	-	-		-	-
	-	-	-	-	-	-	-		-	-
	-	-	-	-	-	-	-		-	-
	-	-	-	-	-	-	-		-	-
	-	-	-	-	-	-	-		-	-
	-	-	-	-	-	-	-		-	-
	-	-	-	-	-	-	-		-	-

AHL (ACT. SLUDGE) =	Allowable Headworks Loading based on inhibition of the activated sludge treatment units from Table 8, column F.
AHL (TRICK. FILTER) =	Allowable Headworks Loading based on inhibition of the trickling filter treatment units from Table 9, column F.
AHL (NITRIF.) =	Allowable Headworks Loading based on inhibition of the nitrification treatment units from Table 10, column F.
AHL (DIG. - CONSERV.) =	Allowable Headworks Loading based on inhibition of the anaerobic digester treatment units for conservative pollutants from Table 11 column F.
AHL (DIG. - NON-CONS.) =	Allowable Headworks Loading based on inhibition of the anaerobic digester treatment units for non-conservative pollutants from Table 12, column G.
Most Stringent (INHIBITION)	Lowest value for each pollutant from columns B through F.
(Cmaxin)	Maximum Influent Concentration (from 'Monitoring Data' worksheet, row 44).
(Cmaxino)	Maximum Influent Concentration observed at treatment plant but not listed (or eliminated from) 'Monitoring Data' worksheet (user entered).
(Lmaxin)	Maximum Influent Loading (calculated).
Lmaxin =	8.34 * Cmaxin * Qpotw; where Cmaxin is the greater of Cmaxin and Cmaxino.
8.34	Unit conversion factor
(Qpotw)	POTW's average flow in MGD (from Table 2(b), cell B34).
AHL (INHIBITION) =	Highest value for each pollutant from column G or J.
	Red Bold in column K indicates that the allowable headworks loading is based on the maximum influent loading.

ASE WRF with Biosolids Land Applied Calculations

TABLE 14 - Allowable Headworks Loadings Based on Land Application Sludge Disposal

	LOCAL LIMITS CALCULATIONS DATA				MAXIMUM LOADING
Pollutant	POTW Flow (MGD) (Qpotw)	Sludge Flow to Disposal (MTD) (Qsldg)	Land Application Standard (mg/kg) (Cslcrit)	Removal Efficiency (%) (Rpotw)	Allowable Headworks Loading (lbs/day) (AHLlas)
Arsenic	0.9	0.27	41	45.00	0.0541
Cadmium	0.9	0.27	39	67.00	0.0346
Chromium	0.9	0.27		82.00	-
Copper	0.9	0.27	1500	86.00	1.0360
Cyanide	0.9	0.27		69.00	-
Lead	0.9	0.27	300	61.00	0.2921
Mercury	0.9	0.27	17	60.00	0.0168
Molybdenum	0.9	0.27	75	50.00	0.0891
Nickel	0.9	0.27	420	42.00	0.5940
Selenium	0.9	0.27	100	50.00	0.1188
Silver	0.9	0.27		75.00	-
Zinc	0.9	0.27	2800	79.00	2.1053
Ammonia	0.9	0.27		-	-
BOD5	0.9	0.27		-	-
TSS	0.9	0.27		-	-
Phosphorus (T)	0.9	0.27		-	-
TKN	0.9	0.27		-	-
Beryllium	0.9	0.27		-	-
Chloroform	0.9	0.27		0.67	-
1,2-Dichlorobenzene	0.9	0.27		0.00	-
1,4-Dichlorobenzene	0.9	0.27		0.00	-
Methylene Chloride	0.9	0.27		0.62	-
Phenol	0.9	0.27		0.90	-
Bis(2-ethylhexyl)phthalate	0.9	0.27		0.72	-
Toluene	0.9	0.27		0.93	-
COD	0.9	0.27		-	-
	0.9	0.27		-	-
	0.9	0.27		-	-
	0.9	0.27		-	-
	0.9	0.27		-	-
	0.9	0.27		-	-
	0.9	0.27		-	-
	0.9	0.27		-	-
	0.9	0.27		-	-
	0.9	0.27		-	-
	0.9	0.27		-	-
	0.9	0.27		-	-

(Qpotw) POTW's average flow in MGD (from Table 2(b), cell B34).
(Qsldg) Average sludge flow to disposal in dry metric tons per day (from Table 2(b), cell E34).
(Cslcrit) Applicable sludge standard in mg/kg dry sludge (exceptional quality standard for land application or user entered).
(Rpotw) Removal efficiency across POTW as a percent (from Table 3, column E).
(AHLlas) Allowable headworks pollutant loading to the POTW in pounds per day based on land application sludge disposal (lbs/day - calculated).
AhLlas = (0.0022 * Cslcrit * Qsldg) / (Rpotw/100)
0.0022 Unit conversion factor

ASE WRF with Biosolids Land Applied Calculations

TABLE 16 - Comparison of Allowable Headworks LoadingsBased on Sludge Disposal

Pollutant	AHL (LAND APPL.) (lbs/day)	AHL (INCINERATION) (lbs/day)	Hauled Waste Concentration to Sludge Processing (mg/l) (Chws)	Hauled Waste Flow to Sludge Processing (MGD) (Qhws)	Hauled Waste Loading to Sludge Processing (lbs/day) (Lhws)	Allowable Headworks Loading (SLUDGE) (lbs/d)
Arsenic	0.0541	-	-	0	0.0000	0.0541
Cadmium	0.0346	-	-	0	0.0000	0.0346
Chromium	-	-	-	0	0.0000	-
Copper	1.0360	-	-	0	0.0000	1.0360
Cyanide	-	-	-	0	0.0000	-
Lead	0.2921	-	-	0	0.0000	0.2921
Mercury	0.0168	-	-	0	0.0000	0.0168
Molybdenum	0.0891	-	-	0	0.0000	0.0891
Nickel	0.5940	-	-	0	0.0000	0.5940
Selenium	0.1188	-	-	0	0.0000	0.1188
Silver	-	-	-	0	0.0000	-
Zinc	2.1053	-	-	0	0.0000	2.1053
Ammonia	-	-	-	0	0.0000	-
BOD5	-	-	-	0	0.0000	-
TSS	-	-	-	0	0.0000	-
Phosphorus (T)	-	-	-	0	0.0000	-
TKN	-	-	-	0	0.0000	-
Beryllium	-	-	-	0	0.0000	-
Chloroform	-	-	-	0	0.0000	-
1,2-Dichlorobenzene	-	-	-	0	0.0000	-
1,4-Dichlorobenzene	-	-	-	0	0.0000	-
Methylene Chloride	-	-	-	0	0.0000	-
Phenol	-	-	-	0	0.0000	-
Bis(2-ethylhexyl)phthalate	-	-	-	0	0.0000	-
Toluene	-	-	-	0	0.0000	-
COD	-	-	-	0	0.0000	-
	-	-	-	0	0.0000	-
	-	-	-	0	0.0000	-
	-	-	-	0	0.0000	-
	-	-	-	0	0.0000	-
	-	-	-	0	0.0000	-
	-	-	-	0	0.0000	-
	-	-	-	0	0.0000	-
	-	-	-	0	0.0000	-
	-	-	-	0	0.0000	-
	-	-	-	0	0.0000	-
	-	-	-	0	0.0000	-

AHL (LAND APPL.) = Allowable Headworks Loading based on land application sludge disposal from Table 14, column F.
AHL (INCINERATION) = Allowable Headworks Loading based on incineration sludge disposal from Table 15, column L.
(Chws) Average concentration for a particular pollutant in mg/l for hauled waste discharged to the sludge processing units (from 'Monitoring Data' worksheet, row 43).
(Qhws) Average flow in MGD for hauled waste discharged to the sludge processing units (from Table 2(b), cell L34).
(Lhws) Average loading to the POTW for a particular pollutant in pounds per day for hauled waste discharged to the sludge processing units (calculated).
Lhws = 8.34 * Chws * Qhws
Allowable Headworks (SLUDGE) Lowest value for each pollutant from column B and C minus the hauled waste loading discharged to sludge processing (Lhws).

ASE WRF with Biosolids Land Applied Calculations

TABLE 17 - Comparison of Allowable Headworks Loadings

Pollutant	AHL (WATER QUALITY) (lbs/day)	AHL (INHIBITION) (lbs/d)	AHL (SLUDGE) (lbs/d)	Design Loading (lbs/d)	Maximum Allowable Headworks Loading (MAHL - lbs/d)
Arsenic	4.5816	0.7506		-	0.7506
Cadmium	0.0154	7.5060	0.0346	-	0.0154
Chromium	3.5587	1.8765		-	1.8765
Copper	0.3248	0.3753		-	0.3248
Cyanide	0.1358	0.7506		-	0.1358
Lead	0.0374	3.7530	0.2921	-	0.0374
Mercury	0.0002	0.7506	0.0168	-	0.0002
Molybdenum	-	-	0.0891	-	0.0891
Nickel	0.3938	1.8765	0.5940	-	0.3938
Selenium	0.0810	-	0.1188	-	0.0810
Silver	-	-	-	-	-
Zinc	3.4761	3.7530		-	3.4761
Ammonia	-	3602.8800		367.5	367.5000
BOD5	-	-		3002	3002.0000
TSS	-	-		3524	3524.0000
Phosphorus (T)	-	-		78	78.0000
TKN	-	-		588	588.0000
Beryllium	-	-	-	-	-
Chloroform	48.6737	75.0600	-	-	48.6737
1,2-Dichlorobenzene	133.7274	37.5300	-	-	37.5300
1,4-Dichlorobenzene	19.5448	37.5300	-	-	19.5448
Methylene Chloride	61.0703	-	-	-	61.0703
Phenol	2.4517	30.0240	-	-	2.4517
Bis(2-ethylhexyl)phthalate	0.2279	-	-	-	0.2279
Toluene	620.9206	1501.2000	-	-	620.9206
COD	-	-	-	8,105	8105.4000
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-

AHL (WATER QUALITY) = Allowable Headworks Loading based on protection of water quality from Table 7, column F.
AHL (INHIBITION) = Allowable Headworks Loading based on prevention of inhibition from Table 13, column K.
AHL (SLUDGE) = Allowable Headworks Loading based on protection of sludge quality from Table 16, column G.
Design Loading of POTW treatment plant (user entered).
MAHL Maximum allowable headworks loading is the lowest value for each pollutant from columns B through E.

ASE WRF with Biosolids Land Applied Calculations

TABLE 18 - Calculation of Local Limit

Pollutant	Maximum Allowable Headworks (MAHL - lbs/d)	Safety Factor (%) (SF)	Growth Allowance (%) (GA)	Nonindustrial Concentration (mg/l) (Cback)	Nonindustrial Flow (MGD) (Qback)	Nonindustrial Loading (lbs/day) (Lback)	Hauled Waste to Influent Concentration (mg/l) (Chwi)	Hauled Waste to Influent Flow (MGD) (Qhwi)	Hauled Waste to Influent Loading (lbs/day) (Lhwi)	Allowable Industrial Loading (MAIL - lbs/day)	Calculated Local Limit (mg/l) (Cind)	Basis of Limitation	Human Health Concentration	Industrial Contributory Flow (MGD)
Arsenic	0.7506	10	15	0.0007	0.9	0.00552	-	0	0.0000	0.5574	-	Inhibition	-	0
Cadmium	0.0154	10	15	0.00003	0.9	0.000216	-	0	0.0000	0.0114	-	Water Quality	-	0
Chromium	1.8765	10	15	0.00092	0.9	0.00691	-	0	0.0000	1.4005	-	Inhibition	-	0
Copper	0.3248	10	15	0.02087	0.9	0.15663	-	0	0.0000	0.0869	-	Water Quality	-	0
Cyanide	0.1358	10	15	0.0020	0.296	0.00494	-	0	0.0000	0.0969	0.0192	Water Quality	1.1	0.604
Lead	0.0374	10	15	0.00018	0.296	0.0004530	-	0	0.0000	0.0276	0.00548	Water Quality	-	0.604
Mercury	0.0002	10	**0**	0.000025	0.9	0.0001877	-	0	0.0000	0.00003	-	Water Quality	-	0
Molybdenum	0.0891	10	15	0.00029	0.187	0.000444	-	0	0.0000	0.0664	0.0112	Sludge	-	0.713
Nickel	0.3938	10	15	0.00032	0.296	0.000782	-	0	0.0000	0.2946	0.0585	Water Quality	-	0.604
Selenium	0.0810	10	15	0.00026	0.296	0.000641	-	0	0.0000	0.0601	0.0119	Water Quality	-	0.604
Silver	-	10	15	0.000044	0.9	0.000328	-	0	0.0000	-	-	-	-	0
Zinc	3.4761	10	15	0.1049	0.9	0.787254	-	0	0.0000	1.8199	-	Water Quality	-	0
Ammonia	367.5000	10	15	25.0	0.9	187.6500	-	0	0.0000	87.9750	-	Design	-	0
BOD5	3002.0000	10	15	220	0.9	1651.3200	-	0	0.0000	600.180	-	Design	-	0
TSS	3524.0000	10	15	220	0.9	1651.3200	-	0	0.0000	991.6800	-	Design	-	0
Phosphorus (T)	78.0000	10	15	4.7	0.9	34.9905	-	0	0.0000	23.5095	-	Design	-	0
TKN	588.0000	10	15	40.0	0.9	300.2400	-	0	0.0000	140.7600	-	Design	-	0
Beryllium	-			-	0.9	0.0000	-	0	0.0000	-	-	-	-	0
Chloroform	48.6737	10	15	0.00447	0.296	0.0110	-	0	0.0000	36.4943	7.2447	Water Quality	0.060	0.604
1,2-Dichlorobenzene	37.5300	10	15	0.00061	0.9	0.0046	-	0	0.0000	28.1429	-	Inhibition	-	0
1,4-Dichlorobenzene	19.5448	10	15	0.00101	0.9	0.0076	-	0	0.0000	14.6510	-	Water Quality	5.7	0
Methylene Chloride	61.0703	10	15	0.00028	0.9	0.0021	-	0	0.0000	45.8006	-	Water Quality	0.83	0
Phenol	2.4517	10	15	0.00858	0.9	0.0644	-	0	0.0000	1.7744	-	Water Quality	1186	0
Bis(2-ethylhexyl)phthalate	0.2279	10	**0**	0.03108	0.9	0.23325	-	0	0.0000	-0.0281	-	Water Quality	7233	0
Toluene	620.9206	10	15	0.00021	0.9	0.0016	-	0	0.0000	465.6888	-	Water Quality	1.4	0
COD	8105.4000	10	15	500	0.9	3753.0000	-	0	0.0000	2326.0500	-	Design		0
	-			-	0.2	0.0000	-	0	0.0000	-	-	-		
	-			-	0.2	0.0000	-	0	0.0000	-	-	-		
	-			-	0.2	0.0000	-	0	0.0000	-	-	-		
	-			-	0.2	0.0000	-	0	0.0000	-	-	-		
	-			-	0.2	0.0000	-	0	0.0000	-	-	-		
	-			-	0.2	0.0000	-	0	0.0000	-	-	-		
	-			-	0.2	0.0000	-	0	0.0000	-	-	-		
	-			-	0.2	0.0000	-	0	0.0000	-	-	-		
	-			-	0.2	0.0000	-	0	0.0000	-	-	-		
	-			-	0.2	0.0000	-	0	0.0000	-	-	-		
	-			-	0.2	0.0000	-	0	0.0000	-	-	-		

(MAHL)	Maximum allowable headworks loading (from Table 17, column F).
(SF)	Safety factor as a percent (user entered).
(GA)	Growth allowance as a percent (user entered).
(Cback)	Average nonindustrial background concentration for a particular pollutant in mg/l (from 'Monitoring Data' worksheet row 43 or user entered).
(Qback)	Average nonindustrial background flow in MGD (calculated).
Qback =	Qpotw - Qind - Qhwi (values from Table 2(b), cells B34, C34, and K34)
(Lback)	Average nonindustrial background loading to the POTW for a particular pollutant in pounds per day (calculated).
Lback =	8.34 * Cback * Qback
8.34	Unit conversion factor
(Chwi)	Average concentration for a particular pollutant in mg/l for hauled waste discharged at the POTW influent (from 'Monitoring Data' worksheet, row 43).
(Qhwi)	Average flow in MGD for hauled waste discharged at the POTW influent (from Table 2(b), cell K34).
(Lhwi)	Average loading to the POTW for a particular pollutant in pounds per day for hauled waste discharged at the POTW influent (calculated).
Lhwi =	8.34 * Chwi * Qhwi
(MAIL)	Maximum Allowable Industrial Load (calculated).
MAIL =	MAHL - (MAHL * SF/100) - (MAHL * GA/100) - Lback - Lhwi
(Cind)	Industrial allowable local limit for a given pollutant in mg/l (calculated).
Cind =	MAIL/(8.34 * Qind)
(Qind)	Average discharge flow of Industrial Users to be regulated through the local limits in MGD (from Table 2(b), cell C34).
Basis of Limitation	An identification of the lowest allowable headworks loading from Table 17 columns B through D.
	Red Bold in column C or D indicates a safety factor or growth allowance of less than 10%.

ASE WRF with Biosolids Land Applied Calculations

TABLE 20 - Comparison of Allowable Headworks Loadings And Current Influent Loadings

Pollutant	Maximum Allowable Headworks Loading (MAHL - lbs/d)	Average Influent Loading (Linav - lbs/day)	Average Percent Loaded (%)	Maximum Influent Loading (Linmax - lbs/d)	Maximum Percent Loaded (%)
Arsenic	0.7506	-	-	-	-
Cadmium	0.0154	0.0002	1.2692	0.0007	4.5079
Chromium	1.8765	0.0081	0.4309	0.0152	0.8080
Copper	0.3248	0.2147	**66.1017**	0.4218	**129.8921**
Cyanide	0.1358	-	-	-	-
Lead	0.0374	0.0030	8.1457	0.0094	25.0966
Mercury	0.00024	0.00018	**75.0285**	0.00038	**154.4704**
Molybdenum	0.0891	0.0047	5.2591	0.0278	31.2539
Nickel	0.3938	0.0047	1.1898	0.0251	6.3845
Selenium	0.0810	0.0026	3.2306	0.0086	10.6585
Silver	-	0.0003	-	0.0010	-
Zinc	3.4761	0.6912	19.8839	0.8106	23.3203
Ammonia	367.5000	230.7559	62.7907	260.4582	70.8730
BOD5	3002.0000	1214.8997	40.4697	1531.2240	51.0068
TSS	3524.0000	1370.3811	38.8871	1996.5960	56.6571
Phosphorus (T)	78.0000	32.8870	42.1628	36.3290	46.5757
TKN	588.0000	272.8967	46.4110	314.5014	53.4866
Beryllium	-	-	-	-	-
Chloroform	48.6737	0.0163	0.0335	0.0255	0.0524
1,2-Dichlorobenzene	37.5300	0.0009	0.0024	0.0009	0.0024
1,4-Dichlorobenzene	19.5448	0.0013	0.0065	0.0013	0.0065
Methylene Chloride	61.0703	0.0013	0.0021	0.0013	0.0021
Phenol	2.4517	0.0086	0.3521	0.0086	0.3521
Bis(2-ethylhexyl)phthalate	0.2279	0.0236	10.3724	0.0236	10.3724
Toluene	620.9206	0.0012	0.0002	0.0012	0.0002
COD	8105.4000	3285.4834	40.5345	4150.8180	51.2105
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-
	-	-	-	-	-

(MAHL) Maximum Allowable Headworks Loading (from Table 17 column B).
(Linav) Average influent loading from 'Monitoring Data' worksheet row 47.
Average Percent Loaded = (Linav)/(MAHL)*100
(Linmax) Maximum Influent Concentration converted to a loading using the POTW flow (from Table 2(b), cell B34).
Linmax = 8.34 * (Cinmax) * (Qpotw)
(Cinmax) Maximum Influent Concentration (from 'Monitoring Data' worksheet row 44)
(Qpotw) POTW's average flow in MGD (from Table 2(b), cell B34).
8.34 Unit conversion factor
Maximum Percent Loaded = (Linmax)/(MAHL)*100
Green bold indicates that the average percent loaded is greater than 60% or the maximum percent loaded is greater than 80% for all pollutants except for Ammonia, BOD, TSS, Phosphorus, and Nitrogen where the MAHL for these pollutants is based on the design loading.
Where the MAHL for Ammonia, BOD, TSS, Phosphorus, and Nitrogen is based on the design loading, **green bold** indicates that the average percent loaded is greater than 80%.
Red bold indicates that the percent loaded (average or maximum) is greater than 100%.

Appendix C. Calculation of In-stream Metals Criteria

Site-Specific Instream Criteria Calculations

Calculations of Freshwater Metals Criteria

For metals which are hardness-dependent, the site-specific dissolved criterion is first calculated using hardness in Table C-1.

TABLE C-1
WWTP Discharge and Receiving Stream Data
Technically-Based Local Limits for Industrial Users

Parameter	ASE WRF
WWTP Discharge	
WRF Effluent Flow[a], mgd	0.9
Permit Effluent Flow[b], mgd	1.25
Permit Effluent TSS Limit[b], mg/L	20
Receiving Stream	
1Q10[c], mgd	0.04522
7Q10[d], mgd	0.07106
Average Annual Flow, mgd	11.43
Hardness, mg/L as CaCO3	14.7
Upstream TSS, mg/L (assumed)	10.0
Calculated Instream TSS[e], mg/L	19.46

[a]The estimated flow at the time of commissioning.
[b]GAEPD Wasteload Allocation, 2017.
[c]1-day, 10-year minimum flow, used to establish "chronic" criteria.
[d]7-day, 10-year minimum flow, used to establish "acute" criteria.
[e]Instream TSS = (Upstream TSS * 7Q10 + Permit Effluent TSS * Permit Effluent Flow) / (7Q10 + Permit Effluent Flow)

The instream criteria are summarized in Table C-2. Source: Rule 391-3-6-.03 of the Rules and Regulations of the State of Georgia, dated 2020.

TABLE C-2
Instream Dissolved Criterion for EPA toxic priority pollutants at acute (1Q10) and chronic (7Q10) conditions as per Georgia Rules Chapter 391
Technically-Based Local Limits for Industrial Users

Parameter	Concentration (μg/L)	
	Acute	Chronic
Arsenic	340 [1]	150 [1]
Cadmium	0.94 [1,3]	0.43 [1,3]
Chromium III	320 [1,3]	42 [1,3]
Chromium IV	16 [1]	11 [1]
Copper	7 [1,2*,3]	5 [1,2*,3]
Lead	30 [1,3]	1.2 [1,2*,3]
Mercury	1.4	0.012 [2]
Nickel	260 [1,3]	29 [1,3]
Selenium	--	5
Silver	-- [4]	-- [4]
Zinc	65 [1,3]	65 [1,3]
Lindane	0.95	

[1]The instream criterion is expressed in terms of the dissolved fraction in the water column. Conversion factors used to calculate the dissolve criteria are found in the EPA document - Natural Recommended Water Quality Criteria.

[2]The instream criterion is lower than the GAEPD laboratory detection limits.

[3]The freshwater aquatic life criteria for these metals are expressed as a function of total hardness (mg/L) in a water body. Values in the table above assume a hardness of 50 mg/L $CaCO_3$. For other hardness values, the following equations from the EPA document National Recommended Water Quality Criteria - EPA 2006 should be used.

[4]Addressed in Georgia Rules, 391-3-6-.06
*Instream criterion is lower than the GAEPD laboratory detection limits.

Site-Specific Instream Criteria Calculations

The equations summarized in Table C-3 are used in determining the instream dissolved criteria identified in Table C-2 to be hardness-dependent parameters. Source: Rule 391-3-6-.03 of the Rules and Regulations of the State of Georgia, dated 2020.

TABLE C-3

Equations and Conversion Factors to Determine Freshwater Dissolved Metals Criteria That Are Hardness-Dependent.

Technically-Based Local Limits for Industrial Users

Chemical	mA	bA	mC	bC	Freshwater Conversion Factors (CF)	
					CMC (acute)	CCC (chronic)
Cadmium	0.9789	-3.866	0.7977	-3.909	1.136672-[(*ln* hardness)(0.041838)]	1.101672-[(*ln* hardness)(0.041838)]
Chromium III	0.819	3.7256	0.819	0.6848	0.316	0.86
Copper	0.9422	-1.7	0.8545	-1.702	0.96	0.96
Lead	1.273	-1.46	1.273	-4.705	1.46203-[(*ln* hardness)(0.145712)]	1.46203-[(*ln* hardness)(0.145712)]
Nickel	0.846	2.255	0.846	0.0584	0.998	0.997
Silver[a]	1.72	-6.59	—	—	0.85	—
Zinc	0.8473	0.884	0.8473	0.884	0.978	0.986

Hardness-dependent metals' criteria may be calculated from the following:

CMC (dissolved) = exp{mA [*ln* (hardness)]+ bA} (CF)

CCC (dissolved) = exp{mC [*ln* (hardness)]+ bC} (CF)

[a]Average plant effluent flow between November 2012 through October 2013

The following Table C-4 is the calculated dissolved in-stream concentrations based on stream-specific hardness and equations defined above in Table C-3.

TABLE C-4

Site-Specific Dissolved Instream Concentrations for Metals that are Hardness-Dependent

Technically-Based Local Limits for Industrial Users

Parameter	Concentration, Dissolved Instream Criteria (ug/L)	
	Acute	Chronic
Cadmium	0.298	0.169
Chromium III	118.502	15.415
Copper	2.207	1.740
Lead	7.611	0.297
Nickel	92.473	10.271
Silver	0.119	
Zinc	23.085	23.273

Table C-5 summarizes the factors used to calculate a site-specific total recoverable concentration from the dissolved criteria presented in Table C-4, using an approach consistent with GA EPD's approach in their Reasonable Potential Analyses. This is also presented in EPAs The Metals Translator: Guidance For Calculating A Total Recoverable Permit Limit From A Dissolved Criterion, dated June 1996.

TABLE C-5

Conversion Factors for Dissolved Metals for Calculating a Site-Specific Total Recoverable Concentration from Dissolved Criteria

Technically-Based Local Limits for Industrial Users

Metal	Freshwater Aquatic Life Data		Conversion Factors	
	Kpo	a	Kp	f_D
Arsenic	4.80E+05	-0.7286	55,200	0.48
Cadmium	4.00E+06	-1.1307	139,435	0.27
Chromium III	3.36E+06	-0.9304	212,264	0.19
Chromium VI	3.36E+06	-0.9304	212,264	0.19
Copper	1.04E+06	-0.7436	114,391	0.31
Lead	2.80E+06	-0.8000	260,499	0.16
Mercury	2.91E+06	-0.1360	1,943,404	0.03
Nickel	4.90E+05	-0.5719	89,724	0.36
Selenium	—	—	—	—
Silver	—	—	—	—
Zinc	1.25E+06	-0.7038	154,731	0.25

$Kp = (Kpo)(TSS)^{a}$

$fD = 1/[1+(Kp)(TSS)(10^{-6})]$

Site-Specific Instream Criteria Calculations

Table C-6 is the calculated total recoverable in-stream concentrations for metals.

TABLE C-6

Summary of Instream Criteria Concentrations.

Technically-Based Local Limits for Industrial Users

Parameter	Instream Criteria Concentrations					
	Concentration, Dissolved (ug/L)		Concentration, Total Recoverable (ug/L)		Concentration, Total Recoverable (mg/L)	
	Acute	Chronic	Acute	Chronic	Acute	Chronic
Arsenic	340	150	705	311	0.70526	0.31115
Cadmium	0.298	0.169	1.1	0.6	0.00111	0.00063
Chromium III	118.502	15.415	608	79	0.60805	0.07909
Chromium VI	16	11	82	56	0.08210	0.05644
Copper	2.207	1.740	7.1	5.6	0.00712	0.00561
Lead	7.611	0.297	46	1.8	0.04620	0.00180
Mercury			1.4	0.01200	0.00140	0.000012
Nickel	92.473	10.271	254	28	0.25395	0.02821
Selenium				5.0	0.00000	0.00500
Silver	0.119					
Zinc	23.085	23.273	93	93	0.09260	0.09336