REGION VIII

TECHNICALLY-BASED LOCAL LIMITS DEVELOPMENT STRATEGY

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REGION VIII

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I. BACKGROUND

The Federal categorical pretreatment standards, which are applicable to some classes of industries, establish technology based minimum requirements which those industries have to meet prior to discharging into publicly owned treatment works (POTWs). These categorical standards do not address problems which may result from industrial discharges into a specific wastewater treatment facility. Publicly Owned Treatment Works (POTWs) are responsible for limiting, where necessary, the character and volume of pollutants being discharged into their wastewater treatment system in order to protect the treatment facility against Pass Through and Interference, receiving water quality, worker health and safety, and improve opportunities for beneficial use of sludge. POTWs control the discharge of toxic pollutants to their wastewater treatment facilities through the development and implementation of local limits.

The General Pretreatment Regulations (40 CFR Part 403) require that each POTW with a pretreatment program develop and enforce local limits which will establish the maximum loading of pollutants that can be accepted by their treatment facilities. These limits were developed initially by POTWs in Region VIII as a prerequisite to pretreatment program approval. It is important that POTWs reassess their local limits to ensure that they adequately protect the environment from any adverse effects related to non-domestic discharges into each specific treatment facility. This is also a requirement of the regulations published in the Federal Register October 17, 1988, (FR 40612; 40 CFR 403.8(f)(6). "The POTW shall develop local limits as required in "403.5(c)(1), or demonstrate that they are not necessary").

Legal Authority Citations

- 40 CFR 403.2: Objectives of the General Pretreatment Regulations are to prevent Pass Through, Interference, and improve opportunities to recycle and reclaim wastewater and sludges.
- 40 CFR 403.5(c): Each POTW shall continue to develop local limits as necessary and effectively enforce these limits.
- 40 CFR 403.5(d): Local Limits shall be Pretreatment Standards for the purposes of the CWA.
- 40 CFR 403.8(f)(1)(iii)(E): Permits must contain effluent limits based on applicable categorical standards, local limits, and State and local law.
- 40 CFR 403.8(f)(1)(v): Carry out inspections and monitoring, independent of the IUs, to determine compliance with applicable Pretreatment Standards and Requirements.
- 40 CFR 403.8(f)(2)(v): Randomly sample and analyze the effluent from industrial users in order to identify non-compliance. Inspect and sample the effluent from each SIU at least once a year.

ABBREVIATIONS

Ag Silver
As Arsenic
Avg Average

BCF Bioconcentration Factor

BETX Benzene, Ethylbenzene, Toluene, Xylene

Cd Cadmium

Cr (tot) Chromium (total)
Cr (III) Chromium - trivalent
Cr (VI) Chromium - hexavalent

Cu Copper
Dry Wt. Dry Weight
Hg Mercury

Human Health # From EPA Water Quality Criteria: Water & Fish

Consumption Criteria

La Maximum headworks loading for Water Quality acute
Lad Maximum headworks loading for Anaerobic Digestion
Las Maximum headworks loading for Activated sludge
Lc Maximum headworks loading for Water Quality chronic

Ln Maximum headworks loading for NPDES permit
Lsd Maximum headworks loading for Sludge disposal

lbs/Day pounds per day

MAHL Maximum Allowable Headworks Load
MAIL Maximum Allowable Industrial Load

MAX Maximum

MCL Maximum Contaminant Level for Drinking Water

MDL Method Detection Limit
MGD Million Gallons per day
mg/Kg milligrams per Kilogram
mg/l milligrams per liter

Mo Molybdenum
number
ND Not Detected

NPDES National Pollutant Discharge Elimination System

Ni Nickel % Percent

POTW Publicly Owned Treatment Works

Pb Lead Q Flow Receiving

REM EFF Removal Efficiency

Se Selenium

SIU Significant Industrial User

Stream A-1E3 One-day average once-in-three year low flow - acute Stream C-30E3 30-day average once-in-three year low flow - chronic

Strgnt Stringent Trtmnt Treatment

w/ with

WTP Waste Treatment Plant (HP)
WWTP Wastewater Treatment Plant

Zn Zinc

II. INTRODUCTION

In order to establish or revise technically based local limits POTWs must use the best available technical information to identify pollutants of concern and the maximum loading that can be accepted by each treatment facility. This guidance will point out specific items and areas that should be considered in working through the process to arrive at technically-based local limits.

The purpose of this Guidance is to elaborate on the "Guidance Manual on the Development of Local Discharge Limitations Under the Pretreatment Program" and clarify what Region VIII will require, as a minimum, from POTWs developing revised or new technically based local limits. This Strategy approaches the local limits development as a series of steps and the remaining sections will be structured as steps.

Conceptually, the maximum daily loading of a pollutant that can be accepted is shown in Figure 1 on the next page. The "pie" is the maximum quantity (pounds per day) of a pollutant or the Maximum Allowable Headworks Load (MAHL) that may enter a POTW. There are generally four different places that a POTW will have to allocate pollutant loading as shown in Figure 1. Some POTWs may also allocate loading to other sources (e.g. commercial users who discharge silver, hospitals and dental offices for mercury, septage haulers, etc.).

STEP #1 - PRELIMINARY DATA COLLECTION

The first step towards developing technically based local limits is to identify what information is needed from your State Water Quality office and the permittee's POTW records. At a minimum the following information (Appendix 7) should be compiled:

NOTE: If you use the Region VIII Local Limits Spreadsheet (see Appendix 9) much of this information is already contained in the spreadsheet and need not be submitted independently. See Appendix 7 for required items.

- 1. Receiving Stream Identification and Characterization.
 - * Aquatic Life Uses
 - * Low flow of the stream to protect the beneficial uses and narrative standard
 - * All state numerical water quality standards that apply to the receiving water
 - * Upstream receiving water hardness (mg/l) for metals calculations
 - * Pre-existing background (upstream) levels of pollutants
- 2. Specific numeric chemical limitations in NPDES permit for effluent discharge quality and sludge (based on existing disposal option).
- 3. Historical analyses on influent, effluent, and/or sludge collected over the past three (3) years.
- 4. Data on plant treatment design and highest monthly average flow information.
- 5. It is important that local limits will ensure that no toxic pollutants in toxic amounts be discharged. Therefore, in order to protect against in-stream toxicity, the EPA Water quality Criteria dated May 1, 1986, (Gold Book. EPA 440/5-86-001 or latest revision thereof) values should be used for those pollutants of concern for which a State water quality standard or criteria for human health

protection does not exist. The identification of pollutants of concern is discussed in Step #3.

Appendix 7 is provided for your use in the compilation of needed information.

- 6. Pretreatment programs are usually associated with the control of toxic pollutants. However, it is important to note that the most common documented industry-related cause of POTW permit effluent violations is the discharge of excessive conventional pollutants (BOD, TSS, O&G, etc.). Therefore, the inclusion of conventional pollutants in the local limits process is strongly recommended, if acceptable headworks loadings have not previously been determined.
- 7. A summary of all Significant Industrial User (SIU) sampling data collected over the last twelve months. The flow data shall be used to calculate the highest monthly average discharge during that twelve month period. Additional SIU data can be used, up to three years old, if the POTW ensures all data is representative of current industrial activities.

STEP #2 - DEVELOPMENT OF A SAMPLING PLAN

To verify that the interpretation of this guidance is as intended and to attempt to minimize the time and funds spent on sampling,

analyses, and development of the technically based local limits, a sampling plan may be informally submitted to EPA. The plan will outline how the permittee will collect and analyze data to determine the appropriate local limits for their program. The sampling plan should include at a minimum the following:

- ! Identification of sampling locations (e.g. influent, effluent, sludge, domestic/commercial).
- ! Parameters to be sampled for at each sampling location.

- ! Sample type for each parameter (grab, composite, time-proportioned, flow proportioned).
- ! Identification of containers, preservatives, holding times, and shipping/storage procedures for all parameters.
- ! Identification of analytical methods required for the analysis of each parameter.
- ! Date and number of samples to be collected at each sampling location.
- ! Designation of POTW unit process hydraulic detention times between the sampling of each sampling location to take into account detention time through the wastewater treatment facility. For example, if the detention time through the plant is 24 hours, the effluent sample should be collected 24 hours after the influent sample.
- ! Identification of data to be recorded for each sample. [date, time, initials of sampler, preservation, location, sample type, wastewater flow etc.]. Include a sample chain of custody form.

If a review of the plan by EPA is desired, the plan should be submitted thirty (30) days prior to the start of the data collection.

Setting technically based local limits is an on-going process that must be reviewed periodically. For this reason the sampling plan should include guidelines for updating and reviewing local limits after they have been established. This will include periodic sampling of influent, effluent and sludge, as well as monitoring of non-domestic users. Periodic sampling will be specified in the POTW NPDES permit.

STEP #3 - INITIAL INFLUENT SCAN/DETERMINING POLLUTANTS OF CONCERN

A. Influent Scan

The next step in developing technically based local limits is to gather an adequate data base. We would expect that, at a minimum, one influent pollutant scan be performed at each treatment facility to determine those pollutants being contributed to the system (see below). NOTE: The sample should be taken prior to any return streams at the POTW. The sample should be collected on a normal workday, e.g. Monday-Friday. More than one sample is recommended to characterize the pollutants in the wastewater when variability of influent quality is known or suspected.

The type of pollutant scans to be performed must include the following:

- * Chemicals listed in 40 CFR 122, Appendix D, Table II (Organic Toxic Pollutants), Table III (Metals, Cyanide, Phenol).
- * Any compounds identified in Table V as being a constituent of any industrial discharge or suspected of being present.
- * Any other additional toxic pollutants designated in your State Water Quality Standards and/or NPDES permit.
- * Molybdenum (total), Chromium (III), Chromium (VI)

The initial influent pollutant scan must have been performed within twelve (12) prior to the local limits submission to the Approval Authority. If more than one pollutant scan was made during the previous twelve (12) months, all scans must be looked at individually to identify pollutants of concern (DO NOT average the data to make this determination). All pollutant analyses must be performed in accordance with methods specified in 40 CFR Part 136 (see Appendices 1 and 3).

B. Identifying Pollutants of Concern

Once the initial influent sample is analyzed you must evaluate the data to determine pollutants of concern. Pollutants of concern are the pollutants that must be carried through the complete local limits evaluation (sampling and data evaluation). This does not mean that you will ultimately develop a local limit for all these pollutants. Pollutants of concern are identified as any chemical compounds falling into the following categories:

- Arsenic, cadmium, total chromium, chromium (VI), chromium (III), copper, lead, mercury, molybdenum, nickel, selenium, silver, and zinc;
- 2. Any contaminants listed in your State Water Quality Standards for your receiving water or are listed in your NPDES permit that were detected;
- 3. Any contaminant determined to be present at equal to, or greater than, 0.1 mg/l;
- 4. Any contaminant specified in 40 CFR 122 Appendix D, Tables II or V that was analyzed and it's concentration equal to or greater than 0.05 mg/l;
- 5. Any contaminant that:
 - a. is present at 0.01 mg/l or greater (above the method detection limit if MDL is >0.01 mg/l)

and

- b. a BCF of 300 or greater (Appendix 4).
- 6. Any pollutant designated by the POTW Pretreatment Program and/or Approval Authority.

If you identify pollutants of concern other than those listed in B.1-6. above, it is advisable to provide a list of these to the Approval Authority prior to proceeding. There are a number of compounds that may show up and may be attributed to breakdown products of caffeine, tannins, etc. In addition, the Approval Authority does not intend for Control Authority to invest money in sampling and analysis for compounds that have no criteria on which to base local limits unless there is an identified concern associated with the pollutant. In cases where there is an identified concern it may be necessary to

develop site specific criteria on which to base local limits, if no other criteria are available. Prior to eliminating a compound identified as a pollutant of concern based on the above criteria, the Control Authority must have approval from the Approval Authority.

The initial influent scan is designed to minimize the cost of subsequent analyses on influent, effluent, and sludge. It is advisable to compile a list of all compounds identified as pollutants of concern and provide it to your laboratory for subsequent sampling and analyses during the local limits development process.

STEP #4 - SAMPLING PROGRAM FOR POLLUTANTS OF CONCERN

Now that you have identified the pollutants of concern in your influent, the next step is further sampling for these specific pollutants to determine actual pollutant loadings at the plant. This sampling will provide the necessary site specific data needed to calculate the maximum amount of each pollutant of concern that can be safely accepted at the headworks (the All water samples must be collected and analyzed in accordance with the methods specified by 40 CFR Part 136 (see Appendix 2). Analysis of sludge must be completed in accordance with 40 CFR Section 503.8. Sampling and analysis of sludge for pollutants of concern not addressed in 40 CFR Section 503.8 must be completed in accordance with the latest edition of, "Biosolids Management Handbook for Small to Medium Size POTWs - Regions VIII & X". At a minimum, at least six (6) monthly influent, effluent, sludge and domestic/commercial samples must be used for determining the maximum allowable headworks loadings. When sampling for these wastestreams the hydraulic detention time for processing waste water should be considered (plant detention time and time of passage through the collection system). The purpose is to try to sample the influent and then the effluent and be sampling approximately the same event. Influent sampling should be prior to recirculating flows.

Several POTWs have used fewer sludge samples because operations result in detention times for sludge that exceed the one month intervals for sampling. The POTW must provide

an explanation for using fewer than six analyses to obtain average data for sludge quality. In most cases, current sludge monitoring should provide sufficient data. However, at a minimum, the previous six analyses for sludge must be used for the calculation and the analyses must have been performed within the previous eighteen (18) months. The sludge analysis must be reported in mg/kg dry weight.

The results from the six analyses are averaged for each pollutant. If a pollutant is found below the detection limit this may be averaged-in at half the detection limit or the POTW might want to consider a more conservative approach by using the detection limit. Whichever method is chosen, a written justification should be presented.

The domestic/commercial contributors are broadly defined as those discharges not being controlled by the pretreatment program in question. The General Pretreatment Regulations (40 CFR Part 403) apply to discharges of non-domestic wastewater from indirect users. The term "commercial" would refer to businesses that are not classified as SIUs but which may discharge wastewater to the sewerage system. These non-SIUs files SIC codes with the IRS that are descriptive of their businesses. The term "domestic" generally refers to discharges from residential users on a sewerage system.

All domestic/commercial samples <u>must</u> be collected and analyzed in accordance with the methods specified by 40 CFR Part 136. Sampling the domestic/commercial flow may be accomplished by isolating and sampling an area of the collection system known to only receive domestic waste and commercial waste (no industrial

inputs). The intent of the domestic/commercial sampling is to obtain data on the pollutants of concern which is representative of the total domestic/commercial contribution to the POTW. Caution must be used in selecting a domestic/commercial sampling point.

For example, an area of the collection system that contains photo finishers, medical offices, labs, etc. may not be representative of the total domestic/commercial contribution.

When using more than one sampling location to determine the domestic/commercial contributions the Control Authority will have to determine how much of the total domestic/commercial flow is represented by each sampling location and flow weight the total domestic/commercial loading contribution. Instances of relatively high pollutant loadings from domestic/commercial areas should be investigated to identify the source(s) contributing to the elevated loadings. The Control Authority may determine that it is necessary to control the source(s), if non-domestic in origin, through a permit or if residential, through public education.

The POTW should consult the EPA guidance document "Supplemental Manual on the Development and Implementation of Local Discharge Limitations Under the Pretreatment Program - Residential and Commercial Toxic Pollutant Loadings and POTW Removal Efficiency Estimation", May 1991. This guidance document will provide examples of typical pollutant loads for various domestic and commercial wastewaters at a variety of POTWs.

NOTE:

The domestic/commercial samples represent those discharges that you are not currently controlling or permitting. You cannot include pollutant loadings from non-SIU sources in your industrial (SIU) loadings calculations unless you are controlling these discharges for flow and pollutant concentrations. The inclusion of non-SIU loadings in the industrial loading calculations must be evaluated on a pollutant by pollutant basis and documented. For example, if you are controlling a commercial discharge for silver, but not for any of the other pollutants of concern, you may document their inclusion in the industrial loadings data for silver only.

Many POTWs do not have specific analytical data for all pollutants of concern for all industrial users. Region 8 would recommend that the POTW have the IU monitor at least once per year for all of the pollutants of concern as identifed in the latest local limits evaluation. This generally includes only the metals. Without some minimum baseline of information, the POTW may find it difficult to develop a current total headworks loading for its industrial

users for all pollutants of concern.

The POTW must use its actual removal efficiency whenever available. Actual POTW data is always preferable to literature data. Literature data is useful where a removal efficiency cannot be accurately calculated, e.g. below detection limits, inadequate sample size, etc.

Special Case: Lagoons

If a POTW has a lagoon treatment system, the influent monitoring data must be collected as stated above. If the detention time is greater than 48 hours the effluent may be collected as 4 grabs collected at equal time intervals over a 24-hour period and composited according to flow. Depending on the sludge management practices, facilities with lagoon systems may not be required to collect sludge data and/or evaluate local limits based on sludge criteria. However, sludge evaluations may not be eliminated from the local limits process. The POTW must evaluate local limits based upon what sludge disposal option the POTW anticipates it will choose at such time as sludge is disposed.

Special Case: Accelerated Requirements

Accelerated sampling is reserved for facilities which the Approval Authority has determined to be in critical need of technically based local limits. In other words they are likely under an enforcement order. In this case, in lieu of monthly data, the Approval Authority may accept the analysis of six

consecutive days of 24-hour influent and effluent flow proportioned composite samples. Some pollutants require grab sampling (See Appendix 1). The six consecutive day samples consist of taking a flow proportioned sample every day over a 24-hour period for six days. The permittee is still required to use all chemical data gathered over the preceding years during the local limits development. Additionally, one sludge sample and analysis performed during the same sampling period will be required.

Special Case: Domestic-Only Plants

The required data will have to be gathered for each of your treatment facilities. If there are multiple treatment plants covered under one pretreatment program, i.e. City of Houston has 39 major POTWs covered by one program, and one or more of these receive only domestic wastewater (no industrial or commercial contributions) the POTW should notify the Approval Authority for quidance on the number of samples required for local limits development after collecting an initial influent scan on each plant. Prior to this notification the POTW should compile a list of any non-residential customers on the system and all historic chemical data collected on the influent, effluent and sludge for the suspected "domesticonly" treatment works. Should local limits development not be required because of the solely domestic sewage inflow, the POTW shall, prior to accepting any industrial user into the exempted system, notify the Approval Authority and evaluate for local limits.

STEP #5 - COMPILING NEEDED INFORMATION

The next step in local limit development is compiling information which will be used to determine the maximum allowable plant loading of each pollutant of concern. All of the data requested in Appendix 7 should be compiled before proceeding. Make sure you have all the information before trying to complete the local limits analysis.

HANDLING DATA MEASURED AT BELOW DETECTION LIMIT

Many programs will find that one or more pollutant measurements will result in a Below Detection Limit (BDL)

result. The POTW must make a decision on how best to handle these values. There are several areas that BDL values may require interpretation. These are:

- 1. Individual influent or effluent raw data;
- Measurements for the domestic/commercial contribution;
- Measurements of in-stream (receiving water) contributions; and
- 4. Sludge analyses.

The POTW is required to make assumptions on this data. The assumptions must be rational and consistent. Some guidance is as follows:

1. Individual Influent or Effluent Raw Data

Most POTWs, when individual measurements come back as BDL, choose to use one-half (1/2) the MDL for influent sample results and one-forth (1/4) the MDL for effluent sample results. This is performed on the raw data prior to averaging the data. The influent and effluent sampling is used to calculate removal efficiencies in the development of local limits. Therefore, the removal efficiencies should be reviewed to ensure that they are reasonable expectations based upon the POTW. The Local Limits Spreadsheet contains columns where MDL assumptions Additional sampling on unit processes at can be noted. the POTW can be made and the total removal through the plant determined by summing the removals in each of the unit processess.

2. BDL for the Domestic/Commercial Contribution
The BDL data for domestic/commercial data can be very influential in how some Maximum Allowable Industrial Loads (MAILs) are derived. Where the controlling criterion for a pollutant is stringent (e.g. mercury) the POTW needs to clearly evaluate what assumptions are made. Using 1/2 or even 1/4 of the MDL could result in the total allocation for a pollutant to be given to the domestic/commercial users. The POTW shall not "throw out" data solely because it is below detection. The POTW must document the basis of its assumption on data handling for all pollutants that are BDL (e.g. did it

average the data as 1/8 MDL, did it average the BDL values as 0, etc.).

3. BDL values for Receiving Water

As with the domestic/commercial contribution, the BDL data for the receiving water can be very influential in how some MAILs are derived. Where the controlling criterion for a pollutant is stringent (e.g. mercury) the POTW needs to clearly evaluate what assumptions to make. Region VIII has provided guidance on the issue of receiving water quality data:

- A. Only use data that you know or are reasonably certain is accurate;
- B. If the data shows BDL, assume zero (0).

4. BDL Sludge Data

Sludge data that comes back as "less than" should be reported at the 1/2 the MDL. The sludge data is only used to screen the values against existing sludge disposal limits and to provide an estimate of the POTW removal efficiency based on the sludge concentration and POTW flows. (Note: the removal efficiency is generally calculated from the influent and effluent samples because of the large quantity of monitoring data required to calculate removal efficiencies from sludge data.)

STEP #6 - TECHNICALLY-BASED LOCAL LIMITS CALCULATION

You have now completed the data collection portion of the local limits development process. The calculation of local limits may now begin. The December, 1987, "Guidance Manual on the Development and Implementation of Local Discharge Limitations Under the Pretreatment Program" (Guidance Manual) provides guidance on calculating technically based local limits. Appendix I of the Guidance Manual contains a local limits derivation example. The local limits derived by the following process are maximum daily loadings (sludge may be an exception in certain cases; see Step 6, Section 7 below).

1. FLOWS

Where a state has not established flow for acute and chronic protection in their water quality standards the following flows to be used are:

Aquatic Life - acute protection: 1 Q 10 (One day stream low-flow that recurs every 10 years.)

Chronic protection: 7 Q 10 (7 day stream low-flow that recurs every 10 years).

2. HARDNESS

If hardness is <25 mg/l then use 25 mg/l If hardness is >400 mg/l then use 400 mg/l

If hardness is equal to or greater than 25 and equal to or less than 400 use the actual value.

Example Metals Criteria Calculation (see also Table 1)

Cadmium; Receiving water hardness = 300 mg/l as CaCO₃; Calculate chronic criteria:

```
Water Quality, Chronic (ug/l) = e^{[(0.7852(ln(hardness)))-3.490]}

= e^{[(0.7852(ln(300)))-3.490]}

= e^{[(0.7852*5.6348)-3.490]}

= e^{[4.4244-3.490]}

= e^{[0.93]}

= 2.55 ug/l Cadmium
```

TABLE 1 METALS CRITERIA

For metals the following formulas should be used where the state has not established EPA approved water quality standards:

	Acute	Chronic
Pollutant	Criteria (ug/l)	Criteria (ug/l)
Arsenic	no criteria	no criteria
Cadmium 3.490]	e ^[(1.128(ln(hardness)))-3.828]	e ^{[(0.7852(ln(hardness)))-}
Chromium (total)	no criteria	no criteria
Chromium(III) e[(0.819(ln(hardness)))+1.561]	e ^[(0.819(ln(hardness)))+3.688]	
Chromium(VI)	16 ug/l	11 ug/l
Copper 1.465]	e ^[(0.9422(ln(hardness)))-1.464]	e ^{[(0.8545ln(hardness)))-}
Lead 4.705]	e ^[(1.273(ln(hardness)))-1.460]	e ^{[(1.273(ln(hardness)))-}
Mercury	2.4 ug/l	0.012 ug/l
Nickel e ^[(0.846(ln(hardness)))+1.1645]	e ^[(0.846(ln(hardness)))+3.3612]	

Selenium 20 ug/l 5 ug/l

Silver $e^{\left[(1.72(\ln(\text{hardness})))-6.52\right]} \qquad \qquad \text{no criteria}$ available

Zinc $e^{[(0.8473(\ln(\text{hardness})))+0.8604]}$

NOTE: All values are in ug/l.

3. NPDES PERMIT CRITERIA

 $(8.34)(C_{CRIT})(Q_{POTW})$

 $L_{IN} =$

 $(1-R_{POTW})$

where: L_{IN} = Allowable headworks loading based on NPDES permit,

lbs/day

 C_{CRIT} = NPDES permit limit, mg/L

 Q_{POTW} = Highest monthly average POTW flow for past 12 months, MGD

 R_{POTW} = Removal efficiency across WWTP (USE DECIMAL)

4. WATER QUALITY CRITERIA

Water quality criteria represent in-stream concentrations that may not be exceeded in the receiving stream. For metals, hardness correction is often needed (Table 1). The following formulas are used for calculating maximum headworks loadings based on water quality criteria:

For chronic limits:

(8.34) [$C_{CWQ}(Q_{STR} + Q_{POTW}) - (C_{STR}Q_{STR})$]

 $L_{\text{IN/C}}$ =

 $(1-R_{POTW})$

where: $L_{\text{IN/C}}$ = Allowable headworks loading based on chronic toxicity

standard, lbs/day

 C_{CWQ} = Chronic water quality standard, mg/L

 Q_{STR} = Receiving steam flow, MGD (USE STREAM FLOW THAT IS

CONSISTENT WITH WHAT YOUR STATE WOULD USE FOR CHRONIC CRITERIA) For example, some states specify a 30E3 for

chronic.

 Q_{POTW} = Highest monthly average POTW flow for past 12 months,

MGD

 C_{STR} = Background (upstream) pollutant concentration in

receiving stream, mg/L

 R_{POTW} = Removal efficiency across POTW (USE DECIMAL)

For acute limits:

where: $L_{\text{IN/A}}$ = Allowable headworks loading based on acute toxicity standard, lbs/day

 C_{AWO} = Acute water quality standard, mg/L

 ${\sf Q}_{\sf STR}$ = Receiving steam flow, MGD (USE STREAM FLOW THAT IS CONSISTENT WITH WHAT YOUR STATE WOULD USE FOR ACUTE CRITERIA) For example, some states specify a 1E3 for

 Q_{POTW} = Monthly average POTW flow for past 12 months, MGD C_{STR} = Background (upstream) pollutant concentration in

receiving stream, mg/L

 R_{POTW} = Removal efficiency across WWTP (USE DECIMAL)

5. MCLs FOR DRINKING WATER PROTECTION

For POTWs that discharge to drinking water supplies or the receiving waters are classified for public or domestic water supplies, the POTW must ensure that its discharge will not result in the exceedence of an MCL in a downstream drinking water supply. Standards that the POTW should consider include the following pollutants (Note that you should use the **FINAL MCL** criteria that takes into account the removal efficiency across a Water Treatment Plant):

			FINAL
		Removal ^(C)	MCL
Pollutant	MCL (mg/1)	Efficiency	(mg/1)
Arsenic	0.05	55%	0.09
Cadmium	0.005	55%	0.011
Chromium (Total)	0.10	41%	0.17
Mercury	0.002	42%	0.003
Selenium	0.05	56%	0.11
Copper	1.3 ^(B)	56%	2.95
Lead	0.015 ^(B)	64%	0.042
Silver	0.1(A)	14%	0.12
Zinc	$5 \text{ mg/l}^{(A)}$	34%	7.58

- (A) These are secondary MCLs
- (B) Action levels

(C) - calculated from the EPA Treatability Database. n=11 for As, n=46 for Cd, n=26 for Cr, n=34 for Cu, n=17 for Hg, n=3 for Se, n=32 for Zn, n=41 for Pb, and n=1 for Aq.

There are also other MCLs and Secondary MCLs that the POTW may wish to consider for pollutants not listed above. Contact your state drinking water program.

6. PROCESS INHIBITION

The inclusion of process inhibition criteria in the local limits development process is optional unless inhibition was identified as a problem in the past and/or is currently a problem. For specific formulas related to inhibition refer to pages 3-8 through 3-10 of the EPA Guidance Manual. Please note that corrections to this manual need to be made as follows:

Page 3-44, Table 3-2:

Lead: 0.1 should be 1.0 mg/l (see 1st 2 columns of data).

Zinc: 0.08 should be 0.3 mg/l (see 1st 2 columns of data).

Page 3-47, Table 3-4:

Zinc: 0.08 should be 0.3 mg/l (see 1st 2 columns of data).

7. SLUDGE QUALITY

Applicable sludge criteria will vary depending on a facilities sludge disposal practices. However, Region VIII encourages all facilities to use the values in Tables 1 and 3 of 40 CFR Part 503.13 for the development of local limits (see Appendix 6). Table 1 sludge criteria are instantaneous maximum limits and Table 3 criteria are monthly average limitations. Therefore, local limits established on the basis of Table 1 should be daily maximum limitations. Local limits established based on Table 3 may be daily maximum limitations or monthly average limitations. Designating a local limit based on Table

3 as a daily maximum would be the more conservative approach. One of the objectives

of the Pretreatment Regulations is to improve opportunities to recycle and reclaim municipal sludges. The use of Table 1 and 3 values will promote this objective. If other sludge criteria are chosen for the basis of local limits, it is important to evaluate the basis of the limit (i.e. monthly average, daily maximum) to determine how the resulting local limit will be applied to industries.

Note:

The adoption of a monthly average local limit does not relieve a facility from establishing a daily maximum local limit for the same pollutant. After a monthly average limitation is established based on sludge criteria it is necessary to establish a daily maximum limitation based on the most stringent criteria. The most stringent criteria for a daily maximum may or may not be sludge.

Note: The 40 CFR 503, Tables 2, 3, and 4 standard for Molybdenum has been withdrawn. The Table 1 Molybdenum

standard remains in effect. See Appendix 6.

Note: Values for Chromium and Selenium may be modified based on a court action dated November 15, 1994. This Strategy will be updated as appropriate.

There are two formulas for the calculation of maximum allowable headworks loadings based on sludge criteria. The first formula is only necessary, if the sludge criteria to be evaluated is a cumulative application rate (CAR). The formula converts the CAR criteria to a limit in mg/kg dry sludge which is to be used in the second formula which calculates the maximum allowable headworks loading. The units for the following formulas may not match the units of the limitations listed in the federal sludge regulations (40 CFR Part 503). Refer to Appendix 6 for a summary of the sludge criteria contained in 40 CFR Part 503. The units for the sludge criteria were converted where necessary to use the following formulas.

For cumulative application rate criteria:

(CAR)(SA)

 $C_{LIM(C)} =$

 $(SL)(Q_{SLDG})(PS/100)(3046)$

where:

 $C_{\text{LIM}(C)}$ = Sludge use disposal limit based on cumulative application rate limit, mg/kg dry sludge

CAR = Cumulative application rate, lbs/acre over the

site life

SA = Site area, acres *

SL = Site life, years (100 years is minimum)

 Q_{SLDG} = Sludge flow to disposal

PS = Percent solids of sludge to disposal

* Site Area = (annual production (tons) / agronomic rate (tons/acre))

There may be more than one sludge criteria that applies to a respective pollutant. If this is the case, the most stringent criteria in mg/kg dry weight must be used in the next equation which calculates the maximum allowable headworks loading based on sludge. The CAR formula may not be necessary in all cases. For example, if the Table 3 sludge criteria in 40 CFR Part 503.13 are used they would be plugged directly into the following sludge criteria equation and the CAR formula would not be needed.

For calculation of maximum allowable headworks loading:

 $(8.34)(C_{SLCRIT})(PS/100)(Q_{SLDG})$

 $L_{IN} =$

 R_{POTW}

where:

 L_{IN} = Allowable headworks loading, lbs/day

 C_{SLCRIT} = Sludge use disposal criterion, mg/kg dry sludge

PS = Percent solids of sludge to disposal

 ${
m Q_{SLDG}}$ = Sludge flow to disposal, MGD ${
m R_{POTW}}$ = Removal efficiency across WWTP

Each pollutant of concern must be evaluated for all applicable criteria in Step 6. This will result in several values for allowable headworks loadings. The maximum allowable headworks loading is defined as the most stringent allowable headworks loading for each pollutant of concern. Daily allowable

headworks loadings must be determined for all pollutants of concern. Facilities may choose to determine monthly allowable headworks loadings in addition to daily maximums. In general, if the criteria used to evaluate allowable headworks loadings are based on monthly average limitations a facility has the option to establish monthly average local limits.

8. WORKER SAFETY AND FUME TOXICITY

Establishment of Local Limits for Organics

Local limits for organics may be established using the same procedures as for metals and other non-organic pollutants. In addition to the evaluation of water quality, sludge, and inhibition, worker health and safety must be evaluated. EPA <u>Guidance to Protect POTW Workers from Toxic and Reactive Gases and Vapors</u>, June 1992 contains detailed information on the evaluation of worker health and safety.

Any pollutant concentration in the wastewater treatment plant collection system which exceeds the respective screening level, listed in Table B-1 the <u>Guidance to Protect POTW</u>

<u>Workers from Toxic and Reactive Gases and Vapors</u>, June 1992), has the potential to cause adverse effects on worker health and safety. This Table is also included in Appendix 5 of this document. Therefore, pollutant concentrations in the collection system that are near or above the screening levels must be controlled.

All areas of the collection system that are suspected of receiving discharges of organic pollutants that may approach the screening levels should be evaluated on the basis of protecting worker health and safety. If there are no suspected areas in the collection system then the pollutant concentration in the total influent must be compared to the screening criteria.

9. BTEX LOCAL LIMITS

The POTW may establish local limits for BTEX on a variety of criteria including fume toxicity, aquatic life protection, etc. An additional alternative exists for the POTW. This includes establishing technically-based limits for BTEX based on treatment technology. Information on this may be found in the EPA publication "Model NPDES Permit for Discharges Resulting from the Cleanup of Gasoline Released from Underground Storage Tanks", June, 1989. Two sets of effluent limits are provided:

Benzene: 5 ug/l and BTEX: 100 ug/l

AND

Benzene: 50 ug/l and BTEX: 750 ug/l

Both sets of these limits are achievable by current technology. The overall technology assumed approximately 15 mg/l of dissolved product is treated to a removal efficiency of 99.5% (commercially available stripper unit). The second set of effluent limits assumes a smaller business may purchase equipment that achieves 95% removal. Most local pretreatment programs have opted to select the second set of technology-based effluent limits for BTEX.

10. SAFETY AND EXPANSION FACTORS

Maximum allowable industrial loadings are calculated by applying a safety/growth factor to the maximum allowable headworks loading and subtracting the domestic/commercial contributions to the headworks. The formula is as follows:

 $L_{ALL} = (1-SF)L_{MAHL} - L_{DOM}$

where: L_{ALL} = Maximum allowable industrial loading,

lbs/day

SF = Safety/growth factor, decimal

 L_{MAHL} = Maximum allowable headworks loading

 L_{DOM} = Domestic/commercial wastewater pollutant loading, lbs/day

Region 8 requires a safety factor of at least fifteen (15) percent. Further, where communities are still experiencing growth or are underdeveloped, it may be necessary to add a growth factor of at least ten (10) percent to the safety factor. The safety/growth factors provided above are minimum values. These values may be increased at the POTWs option should the POTW desire to reserve future pollutant loadings for new industrial users and/or growth.

When calculating local limits you may either hand calculate the limits or use the Region VIII Local Limits Spreadsheet (see Appendix 9). Use of PRELIM (the computer program) is not encouraged. For those programs that choose to use PRELIM, it is further required that a hand calculation of one limit be submitted demonstrating step by step how the limits were developed for each pollutant. This one pollutant should be present in the influent and effluent at a quantifiable level (PRELIM is not appropriate for conventional pollutants).

STEP #7 - DETERMINING IF A POC SHOULD HAVE A LOCAL LIMIT

The POTW has now carried all Pollutants Of Concern (POC) through the local limits process. This does not mean that local limits must be developed for all POCs. The requirements are as follows:

REQUIRED

LOCAL LIMITS:

Arsenic Cadmium

Chromium (total or III)

Chromium (VI)

Copper
Lead
Mercury
Molybdenum
Nickel
Selenium
Silver

Any contaminant that is present at 0.01 mg/l or greater (above method detection limit if MDL is >0.01 mg/l) and has a BCF of 300 or greater.

Any POCs, that based on current loadings, are within 25% of a loading established for the various screening criteria (water quality, sludge, etc.) prior to applying a safety/expansion factor.

Development of local limits for the pollutants specified above makes greatest use of the resources allocated for the sampling and analysis during the local limits study. Because pretreatment programs are only required to include local limits expected to be present in significant industrial user permits the development and adoption of all local limits provides the POTW with the maximum flexibility. Where a POTW fails to adopt local limits and later needs to develop a

limit, the POTW will be required to redo its local limits study for that pollutant. Because of the time required to collect and analyze the data, as well as, get approval for the new local limit, an industrial user may be delayed in its attempts to discharge to the POTW until such limits are inplace.

STEP #8 - ALLOCATION OF POLLUTANT LOADINGS TO INDUSTRY

The allocation of maximum allowable industrial loadings (MAILs) is a local decision. However, the procedure by which this will be accomplished needs to ensure that the maximum allowable headworks loadings (MAHLs) will not be exceeded at any time. Therefore, a clear description of these procedures will need to be submitted with your local limit development package. Refer to pages 3-30 through 3-37 of the Guidance for discussion on several options available for the allocation of pollutant loadings to industry. There is no requirement that industrial users be given the total available industrial loadings.

Note: The Approval Authority must only ensure that the industrial limits are based on a technical rationale and protect against Pass Through and Interference and the specific prohibitions listed in 40 CFR 403.5 are protected.

When a POTW allocates pollutants on a uniform concentration basis, the ordinance will contain listed concentrations for each pollutant of concern. When non-uniform methods of allocation are used, e.g. mass-based or IU specific, the POTW must adopt the maximum allowable industrial loading (e.g. lbs/day) for each pollutant of concern into its ordinance.

The following information must be submitted with the local limits modification request regardless of which allocation procedure is used.

A description of the allocation method employed;

For non-uniform methods of allocation (includes mass allocation situations, where certain industrial flows may not be included for a pollutant in the calculations, etc:), the POTW must include

- a listing of each industrial user and the mass of each pollutant of concern that will be allocated to each user.
- A description of the tracking/methodology to be used to demonstrate that maximum allowable industrial loadings are not exceeded.

This information will be public noticed with the ordinance submittal and will become part of the approved program upon approval by EPA or the State as appropriate.

If the POTW is using the non-uniform method of allocation for a pollutant primarily because of problems with high domestic/commercial discharges, the POTW should immediately implement a program to identify and control other sources of the pollutant.

ALLOCATION OF MAILS AND PERMITTING

Definitions

Concentration-based Local Limits These are shown in mg/L and are based on the industrial flow and MAIL. These are called concentration based local limits.

Mass-based Local Limits These are shown in lbs/day and are the total maximum daily loads (MAILs) that can be discharged by permitted Significant Industrial Users. These are called Maximum Allowable Industrial Loads (MAILs).

Should the POTW choose to adopt MAILs for local limits in the ordinance, rather than concentration based local limits, the ordinance language would appear similar to the following:

EXAMPLE

The following local limitations are established to prevent Pass Through and Interference, receiving water quality and protect sludge quality.

Pollutant	Daily Maximum Allowable Industrial Load (lbs/day)
TOTTACATIC	Industrial Load (155/day)
Arsenic	xxxx
Cadmium	xxxx
Chromium	xxxx
Chromium (VI)	xxxx
Copper	xxxx
Lead	xxxx
Mercury	xxxx
Molybdenum	xxxx
Nickel	xxxx
Selenium	xxxx
Silver	xxxx
Zinc	xxxx

These Maximum Daily Industrial Loadings shall be allocated through Significant Industrial User permits and the total loading to all permitted industrial users shall not exceed the limits shown. All industrial users shall monitor and report daily flows as required by the industrial user permit.

2. When it comes to permitting the industrial users there are basically $\underline{\mathsf{two}}$ options for how you may structure the IU permits.

OPTION 1 - EXAMPLE

Pollutant*	Daily Maximum	Sampling Frequency	Sample Type
Cadmium	xxx lbs/dav	1/3 months	Composite

Chromium	xxx lbs/day	1/3 months	Composite
Chromium (VI)	xxx lbs/day	1/3 months	Grab
Lead	xxx lbs/day	1/3 months	Composite
Silver	xxx lbs/day	1/3 months	Composite
Zinc	xxx lbs/day	1 per month	Composite
рН	>5.0	daily	Grab/Continuous
Flow	xxx abq	daily	n/a

* - All metals are as total metals concentrations unless otherwise designated.

This would require that the IU measure and report the pollutants listed above. The IU and/or the City would take the monitoring data (mg/l) from the lab report and using the flow data calculate the loading as follows:

lab analysis (mg/L) x flow (MGD) x 8.34 = Daily Load (lbs/day)

The calculated daily load is compared to the permit limit.

OPTION 2

Another option for the industrial user permit, the City may take the loadings shown in OPTION 1 and using the permitted daily maximum IU flows, calculate a permit limit for each pollutant in mg/l using the following calculation:

```
\label{eq:permitted} permitted load (lbs/day) / flow(mgd) / 8.34 = concentration-based \\ local limit (mg/l)
```

		Sampling	Sample
Pollutant*	Daily Maximum	Frequency	Type
Cadmium	xxx mg/L	1/3 months	Composite
Chromium	xxx mg/L	1/3 months	Composite
Chromium (VI)	xxx mg/L	1/3 months	Grab
Lead	xxx mg/L	1/3 months	Composite
Silver	xxx mg/L	1/3 months	Composite
Zinc	xxx mg/L	1 per month	Composite
рН	>5.0	daily	Grab/Continuous
Flow	xxx gpd	daily	n/a

* - All metals are as total metals concentrations unless otherwise designated.

In this case, the loadings for the IU were converted to daily maximum mg/l, allowing a direct comparison of the analysis results to permit limits. In this example, the IU is still required to collect flow data and meet a permit limit for flow.

STEP #9 - LOCAL LIMITS APPROVAL REQUEST PACKAGE

The POTW must submit to the Approval Authority sufficient information to allow a determination of the adequacy of data collection and analysis. At a minimum, the following information must be submitted:

- 1. The information requested in Appendix 7.
- 2. A simple (1 page) schematic showing the POTW layout including all treatment units, narrative designations of the treatment processes, sampling locations for influent, effluent and sludge.
- 3. Initial Influent scan (copies of original data sheets) and other data used to identify the pollutants of concern.
- 4. A statement that the POTW has all chain of custody information on-file and that the records will be maintained on-file as long as the current local limits are in effect.

- 5. An explanation must be included concerning why a limit was not developed for any pollutant of concern identified in Step 3.
- 6. An explanation must be included of any decisions made that may deviate from this Strategy.
- 7. Supply an explanation for all abbreviations used on data sheets and in calculations.
- 8. The calculated local limits
- 9. The items listed above must be submitted to the Approval Authority (i.e. EPA or NPDES delegated State) by the authorized signatory official for the POTW.
- 10. Other data as requested by the Approval Authority.

STEP #10 - MODIFICATION OF ORDINANCE/RULES

Developing new local limits or revising existing limits where the local limits become less stringent or protective is a substantial modification (403.18(b) and (c)) and must be approved by EPA. The general process is as follows:

- 1. Approval Authority receives your local limits submittal and draft ordinance.
- 2. Approval Authority notifies you whether the package is approvable.
- 3. You develop and formally submit the following:
 - * a modified ordinance which include the local limits (effective upon EPA approval). SEE APPENDIX 8.
 - * a description of the process to be used to update any orders/permits to include the revised local limits
 - * a timeline for implementing the revised local limits
- 4. The Approval Authority shall public notice the request for approval of the submission and provide a thirty (30) day public comment period.
- 5. Within ninety (90) days of the public notice, the Approval Authority shall approve or deny the submission. If approved, the new local limits are effective on this date.
- 6. The Approval Authority shall public notice the approval or denial of the submission in the same newspaper as the original public notice. The public notice shall contain a statement that this approval constitutes a minor modification of the NPDES permit.

NOTE: To clarify the difference between substantial and non-substantial modifications refer to 40 CFR Sections 403.18, 403.8, and 403.11 for the details. The public notification is not generally required for non-substantial modifications but submittals must be made to the Approval Authority prior to

adoption and implementation by the POTW.

As you begin to reassess your local limits, we suggest that you discuss your plans with the Approval Authority to avoid any misunderstandings and to ensure that what you submit will be approvable. In addition, where your current Ordinance contains limits on pollutants that are not considered pollutants of concern, the POTW should consider whether the continued inclusion of the pollutants is necessary in the Ordinance. If a POTW removes any of the pollutants from its Ordinance, a justification must be provided for each pollutant. The justification must be supported by the local limits revision.

APPENDIX 1

SAMPLING CONSIDERATIONS

When sampling the influent, grab samples, must be used for pH, cyanide, total phenols, oil and grease, sulfide, volatile organics and Chromium (VI). For all other pollutants, 24-hour composite samples must be obtained through flow-proportional composite sampling techniques. For parameters requiring grab samples, collect at least four grab samples during a 24 hour period (workday) and composite the samples in the lab prior to analysis, as appropriate.

NOTES on Chromium:

PARAMETER	ANALYTICAL METHOD	COLLECTION CONTAINER	PRESERVATIVE	HOLDING TIME	SAMPLE TYPE
Total Chromium	40 CFR 136.3	POLY/GLASS	acid <ph 2<="" td=""><td>6 mo</td><td>Composite</td></ph>	6 mo	Composite
Chromium (VI)	40 CFR 136.3	POLY/GLASS	4 deg C	24 hr	Grab
Chromium (III)	BY CALCULATI	ON N/A	N/A	N/A	N/A

When collecting samples for total and hexavalent chromium the samples must be representative of the POTW influent/effluent and sludge. The 24 hour holding time indicates that the sample must be processed within 24 hours of collection of the last portion (grab) of the sample. This requires prearrangements to be made with most contract labs.

Local limits for Chromium must protect against adverse effects due to Chromium (VI) and Chromium (III). Region VIII Pretreatment recommends setting local limits for Total Chromium using the CR(III) criteria and a separate local limit for Chromium (VI) OR setting the local limit for Total Chromium using the Chromium (IV) criteria.

When sampling for the various types of contaminants the pretreatment personnel must talk to the analytical lab to ensure that appropriate analytical methods are used that achieve the required detection limits as specified in 40 CFR Part 136. One method that is recommended is to ensure that the lab certified as to the quality of its work (See Appendix 2). Selected methods and detection limits are summarized in Appendix 3. All data collection and analyses will have to be performed in accordance with the procedures established in 40 CFR Part 136 and of such quality as to be legally defensible. Failure to meet the method detection limits will result in the POTW being required to resample and analyze the initial influent scan. Chain-of-custody receipts for all samples must be kept on file by the Control Authority.

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APPENDIX 2

SAMPLE CERTIFICATION STATEMENT

"I certify that these analyses and resulting report(s) were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly analyze all samples and accurately report the results. I further certify that all analyses were performed in accordance with methods approved for wastewater under the latest revision to 40 CFR Part 136. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for analyzing the wastewater samples and generating the report(s), the analyses, report, and information submitted is, to the best of my knowledge and belief, true, accurate, and complete. "

Signature Title Date

Name of Laboratory:

Address of Laboratory:

This Certification Signed by (Type Name):

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APPENDIX 3

DETECTION LIMITS AND METHOD NUMBERS

SEE NOTES AT END OF THIS TABLE!!!

		ug/L		ug/L
	ANALYTICAL	DET.	ANALYTICAL	DET.
POLLUTANT	METHOD	LIMIT	METHOD	LIMIT
acrolein	624x	nr	603	0.7
acrylonitrile	624x	nr	603	0.5
benzene	624	4.4	602	0.2
bromoform	624	4.7	601	0.2
carbon tetrachloride	624	2.8	601	0.12
chlorobenzene	624	6	601	0.25
chlorodibromomethane	624	3.1	601	0.09

chloroethane 2-chloroethylvinyl ether chloroform	624 624 624	nr nr 1.6	601 601 601	0.52 0.13 0.05
dichlorobromomethane 1,1-dichloroethane 1,2-dichloroethane 1,1-dichloroethylene 1,2-dichloropropane	624 624 624 624 624	2.2 4.7 2.8 2.8 6	601 601 601 601	0.1 0.07 0.03 0.13 0.04
1,3-dichloropropylene(Cis) 1,3-dichloropropylene(Trans) ethylbenzene methyl bromide methyl chloride	624 624 624 624	5 nr 7.2 nr	601 602 601 601	0.34 0.2 0.2 1.18 0.08
methylene chloride 1,1,2,2-tetrachloroethane tetrachloroethylene toluene 1,2-trans-dichloroethylene	624 624 624 624 624	2.8 6.9 4.1 6 1.6	601 601 601 602 601	0.25 0.03 0.03 0.2
1,1,1-trichloroethane 1,1,2-trichloroethane trichloroethylene vinyl chloride	624 624 624 624	3.8 5 1.9 nr	601 601 601	0.03 0.02 0.12 0.18
2-chlorophenol 2,4-dichlorophenol 2,4-dimethylphenol 4,6-dinitro-o-cresol 2,4-dinitrophenol	625 625 625 625 625	3.3 2.7 2.7 24 42	604 604 604 604	0.31 0.39 0.32 16 13
2-nitrophenol 4-nitrophenol p-chloro-m-cresol pentachlorophenol phenol 2,4,6-trichlorophenol	625 625 625 625 625 625	3.6 2.4 3 3.6 1.5 2.7	604 604 604 604 604	0.45 2.8 0.36 7.4 0.14 0.64

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APPENDIX 3 (continued)

DETECTION LIMITS AND METHOD NUMBERS

		ug/L		ug/L
	ANALYTICAL	DET.	ANALYTICAL	DET.
POLLUTANT	METHOD	LIMIT	METHOD	LIMIT

a gananh+hana	605	1 0	610	1 0
acenaphthene	625	1.9	610	1.8
acenaphthylene	625	3.5	610	2.3
anthracene	625	1.9	610	0.66
benzidine	625	44		
benzo(a)anthracene	625	7.8	610	0.013
benzo(a)pyrene	625	2.5	610	0.023
3,4-benzofluoranthene	625	2.5	610	0.018
benzo(ghi)perylene	625	4.1	610	0.076
benzo(k)fluoranthene	625	2.5	610	0.017
bis(2-chloroethoxy)methane	625	5.3	611	0.5
DID (I direction), mediane	023	3.3	011	0.3
bis(2-chloroethyl)ether	625	5.7	611	0.3
bis(2-chloroisopropyl)ether	625	5.7	611	0.8
bis (2-ethylhexyl)phthalate	625	2.5	606	2
4-bromophenyl phenyl ether	625	1.9	611	2.3
butylbenzyl phthalate	625	2.5	606	0.34
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1				
2-chloronaphthalene	625	1.9	612	0.94
4-chlorophenyl phenyl ether	625	4.2	611	3.9
chrysene	625	2.5	610	0.15
dibenzo(a,h)anthracene	625	2.5	610	0.03
1,2-dichlorobenzene	624	nr	625	1.9
1,3-dichlorobenzene	624	nr	625	1.9
1,4-dichlorobenzene	624	nr	625	4.4
3,3'-dichlorobenzidine	625	16.5	605	0.13
diethyl phthalate	625	1.9	606	0.49
dimethyl phthalate	625	1.6	606	0.29
di-n-butyl phthalate	625	2.5	606	0.36
2,4-dinitrotoluene	625	5.7	609-EC	0.02
2,6-dinitrotoluene	625	1.9	609-EC	0.01
di-n-octyl phthalate	625	2.5	606	3
1,2-diphenylhydrazine				
(as azobenzene)	625	20		
fluroranthene	625	2.2	610	0.21
fluorene	625	1.9	610	0.21
hexachlorobenzene	625	1.9	612	0.05
hexachlorobutadiene	625	0.9	612	0.34
hexachlorocyclopentadiene	625	nr	612	0.4
	020		Ü 1 2	J. 1
hexachloroethane	625	1.6	612	0.03
indeno(1,2,3-cd)pyrene	625	3.7	610	0.043
isophorone	625	2.2	609-EC	15.7
napthalene	625	1.6	610	1.8
nitrobenzene	625	1.9	609-EC	13.7

APPENDIX 3 (continued)

DETECTION LIMITS AND METHOD NUMBERS

POLLUTANT	ANALYTICAL METHOD	ug/L DET. LIMIT	ANALYTICAL METHOD	ug/L DET. LIMIT
N-nitrosodimethylamine	625	nr	607	0.15
N-nitrosodi-n-propylamine	625	nr	607	0.46
N-nitrosodiphenylamine	625	1.9	607	0.81
phenanthrene	625	5.4	610	0.64
pyrene	625	1.9	610	0.27
1,2,4-trichlorobenzene	625	1.9	612	0.05
aldrin	625	1.9	608	0.004
alpha-BHC	625	nr	608	0.003
beta-BHC	625	4.2	608	0
gamma-BHC	625	nr	608	0
delta-BHC	625	3.1	608	0.009
chlordane	625	nr	608	0.014
4,4'-DDT	625	4.7	608	0.012
4,4'-DDE	625	5.6	608	0.004
4,4'-DDD	625	2.8	608	0.011
dieldrin	625	2.5	608	0.002
alpha-endosulfan	625	a	608	0.014
beta-endosulfan	625	b	608	0.004
endosulfan sulfate	625	5.6	608	0.066
endrin	625	nr	608	0.006
endrin aldehyde	625	nr	608	0.023
heptachlor	625	1.9	608	0.003
heptachlor epoxide	625	2.2	608	0.083
PCB-1242	625	nr	608	0.065
PCB-1254	625	36	608	nr
PCB-1221	625	30	608	nr
PCB-1232	625	nr	608	nr
PCB-1248	625	nr	608	nr
PCB-1260	625	nr	608	nr
PCB-1016	625	nr	608	nr
toxaphene	625	nr	608	0.24
Antimony, Total	204.1	200	204.2	3
Arsenic, Total	206.3	2	206.2	1
Beryllium, Total	210.1	5	210.2	0.2
Cadmium, Total	213.1	5	213.2	0.1

Chromium (III)	218.1	50	218.2	1
Chromium (VI)	218.4	5		
Copper, Total	220.1	20	220.2	1
Lead, Total	239.1	100	239.2	1
Mercury, Total	245.1	0.2		
Nickel, Total	249.1	40	249.2	1

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APPENDIX 3 (continued)

DETECTION LIMITS AND METHOD NUMBERS

		ug/L		ug/L
	ANALYTICAL	DET.	ANALYTICAL	DET.
POLLUTANT	METHOD	LIMIT	METHOD	LIMIT
Selenium, Total	270.3	2	270.2	2
•		_		-
Silver, Total	272.1	10	272.2	0.2
Thallium, Total	279.1	100	279.2	100
Zinc, Total	289.1	5	289.2	0.05
Cyanide, Total	335.3	5		
Aluminum (pH 6.5-9)	202.2	3	202.1	100
Ammonia	350.3	50	350.2	30
Chloride	325.3	nr	325.1	1000
Chlorine (TRC)	330.5	200	330.3	100
2,3,7,8-TCDD - Dioxin	HRMS	0.00001	613	0.002

NOTE: Matrix-related problems have been addressed in the EPA Guidance Document: Guidance on Evaluation, Resolution, and Documentation of Analytical Problems Associated with Compliance Monitoring, EPA 821-B-93-001, June, 1993.

Other test methods have been approved for use under 40 CFR 136. This includes the ICAP method for many of the metals (Method #200.7). Please refer to 40 CFR 136 for all approved methods.

Analysis of sludge for metals requires use of SW846

methods, using Method 3050 for digestion.

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APPENDIX 4

BIOCONCENTRATION FACTORS

BIOCONCENTRATION FACTOR POLLUTANT acrolein 215 acrylonitrile 30 benzene 5.2 3.75 bromoform carbon tetrachloride 18.75 chlorobenzene 10.3 chlorodibromomethane 3.75

2-chloroethylvinyl ether	0.557
chloroform	3.75
dichlorobromomethane	3.75
1,2-dichloroethane	1.2
1,1-dichloroethylene	5.6
1,2-dichloropropane	4.11
1,3-dichloropropylene(Cis)	1.91
1,3-dichloropropylene(Trans)	1.91
ethylbenzene	37.5
methyl bromide	3.75
methyl chloride	3.75
methylene chloride	0.9
1,1,2,2-tetrachloroethane	5
tetrachloroethylene	30.6
toluene	10.7
1,2-trans-dichloroethylene	1.58
1,1,1-trichloroethane	5.6
1,1,2-trichloroethane	4.5
trichloroethylene	10.6
vinyl chloride	1.17

2-chlorophenol	134
2,4-dichlorophenol	40.7
2,4-dimethylphenol	93.8
4,6-dinitro-o-cresol	5.5
2,4-dinitrophenol	1.5
2-nitrophenol	2.33
4-nitrophenol	3.31
pentachlorophenol	11

Page 4-1 APPENDIX 4 (continued)

BIOCONCENTRATION FACTORS

POLLUTANT FACTOR phenol 1.4 2,4,6-trichlorophenol 150 acenaphthene 242 acenaphthylene 30 anthracene 30

benzidine	87.5
benzo(a)anthracene	30
benzo(a)pyrene	30
3,4-benzofluoranthene	30
benzo(ghi)perylene	30
benzo(k)fluoranthene	30
bis(2-chloroethoxy)methane	0.64
bis(2-chloroethyl)ether	6.9
bis(2-chloroisopropyl)ether	2.47
bis (2-ethylhexyl)phthalate	130
4-bromophenyl phenyl ether	1640
butylbenzyl phthalate	414
2-chloronaphthalene	202
4-chlorophenyl phenyl ether	1200
chrysene	30
dibenzo(a,h)anthracene	30
1,2-dichlorobenzene	55.6
1,3-dichlorobenzene	55.6
1,4-dichlorobenzene	55.6

3,3'-dichlorobenzidine	312
diethyl phthalate	73
dimethyl phthalate	36
di-n-butyl phthalate	89
2,4-dinitrotoluene	3.8
1,2-diphenylhydrazine	24.9
(as azobenzene)	

Page 4-2 APPENDIX 4 (continued)

BIOCONCENTRATION FACTORS

POLLUTANT FACTOR fluroranthene 1150 fluorene 30 hexachlorobenzene 8690 hexachlorobutadiene 2.78

hexachlorocyclopentadiene	4.34
hexachloroethane	86.9
indeno(1,2,3-cd)pyrene	30
isophorone	4.38
napthalene	10.5
nitrobenzene	2.89
N-nitrosodimethylamine	0.026
N-nitrosodi-n-propylamine	1.13
N-nitrosodiphenylamine	136
phenanthrene	30
pyrene	30
1,2,4-trichlorobenzene	114
aldrin	4670
alpha-BHC	130
beta-BHC	130
gamma-BHC	130
delta-BHC	130
chlordane	14100
4,4'-DDT	53600

4,4'-DDE	53600
4,4'-DDD	53600
dieldrin	4670
alpha-endosulfan	270
beta-endosulfan	270
endosulfan sulfate	270
endrin	3970
endrin aldehyde	3970
heptachlor	11200
heptachlor epoxide	11200
PCB-1242	31200
PCB-1254	31200

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APPENDIX 4 (continued)

BIOCONCENTRATION FACTORS

BIOCONCENTRATION

POLLUTANT FACTOR

	PCB-1221	31200
	PCB-1232	31200
	PCB-1248	31200
	PCB-1260	31200
	PCB-1016	31200
	toxaphene	13100
	Antimony, Total	1
	Arsenic, Total	44
	Beryllium, Total	19
	Cadmium, Total	64
	Chromium (III)	16
	Chromium (VI)	16
	Copper, Total	36
	Lead, Total	49
9000	Mercury, Total	5500, 3760,
2000		
	Nickel, Total	47
	Selenium, Total	6
	Silver, Total	0.5
	Thallium, Total	119
	Zinc, Total	47

Cyanide, Total	1.0
2,3,7,8-TCDD - Dioxin	5000

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APPENDIX 5

DISCHARGE SCREENING LEVELS BASED UPON GAS/VAPOR TOXICITY

	Screening Level
Pollutant	mg/l
Acrylonitrile	1.19
Aldrin	0.38
Benzene	0.14
Bis(2-chloromethyl)ether	0.0005

Bromoform	0.24
Bromomethane	0.002
Carbon Disulfide	0.06
Carbon Tetrachloride	0.03
Chlordane	1.27
Chlorobenzene	2.31
Chloroethane	0.42
Chloroform	0.41
Chloromethane	0.07
1,2-Dichlorobenzene	3.75
1,4-Dichlorobenzene	3.55
Dichlorodifluoromethane	0.04
1,1-Dichloroethane	4.58
trans-1,2-Dichloroethylene	0.28
1,2-Dichloropropane	3.62
1,3-Dichloropropene	0.08
Dieldrin	13.0
Diethyl phthalate	107
4,6-Dinitro-o-cresol	10.78
Dinitrotoluene	7.21

Endrin	4.9
Ethyl Benzene	1.59
Ethylene Dichloride	1.05
Formaldehyde	0.06
Heptachlor	0.003
Hexachloro-1,3-butadiene	0.0002
Hexachloroethane	0.093
Hexachlorocyclopentadiene	658
Methyl Chloride	0.06
Methyl Ethyl Ketone	249
Methylene Chloride	2.06

Page 5-1 APPENDIX 5 (continued)

DISCHARGE SCREENING LEVELS BASED UPON GAS/VAPOR TOXICITY

	Screening	Level
Pollutant	mg/l	
Naphthalene	2.65	
Nitrobenzene	9.41	

Pentachlorophenol	4.37
Phenol	1024
1,1,2,2-Tetrachloroethane	0.44
Tetrachloroethylene	0.53
Toluene	1.36
Toxaphene	0.003
1,2,4-Trichlorobenzene	0.39
1,1,1-Trichloroethane	1.55
1,1,2-Trichloroethane	1.15
Trichloroethylene	0.71
Trichlorofluoromethane	1.23
Vinyl Chloride	0.0003
Vinylidene Chloride	0.003
Aroclor 1242	0.01
Aroclor 1254	0.005

Page 5-2 APPENDIX 6

SUMMARY OF SLUDGE CRITERIA FROM 40 CFR PART 503

The table numbers shown below correspond to the table numbers in $40\ \text{CFR}$ Part 503.

Table 1

Pollutant Ceiling Concentrations

	mg/kg
 Pollutant	dry weight
Arsenic	75
Cadmium	85
Chromium (total)	3000
Copper	4300
Lead	840

Mercury	57
Molybdenum	75
Nickel	420
Selenium	100
Zinc	7500

Table 2

Cumulative Pollutant Loading Rates

Pollutant	Kg/Ha	lbs/acre		
Arsenic	41	36		
Cadmium	39	35		
Chromium (total)	3000	2670		
Copper	1500	1335		
Lead	300	267		
Mercury	17	15		
Molybdenum	Use Table 1	Use Table 1		
Nickel	420	374		
Selenium	100	89		
Zinc	2800	2492		

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APPENDIX 6 (continued)

SUMMARY OF SLUDGE CRITERIA FROM 40 CFR PART 503

Table 3

Pollutant Concentrations

mg/kg dry weight Pollutant Arsenic 41 Cadmium 39 Chromium (total) 1200 1500 Copper 300 Lead Mercury 17 Molybdenum (75)* Nickel 420 Selenium 36 Zinc 2800

Table 4

Annual Pollutant Loading Rates

	Pollutant	Kg/Ha/365 days	lbs/acre/365
<u>days</u>			
	Arsenic	2	1.78
	Cadmium	1.9	1.69
	Chromium (total)	150	133.50
	Copper	75	66.75
	Lead	15	13.35
	Mercury	0.85	0.76
	Molybdenum	Use Table 1	Use Table 1
	Nickel	21	18.69
	Selenium	5	4.45
	Zinc	140	124.60

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APPENDIX 6 (continued)

SUMMARY OF SLUDGE CRITERIA FROM

^{* -} Molybdenum value for Table 3 has been removed. The 75~mg/kg reflects the Table 1 number.

40 CFR PART 503

The limits in Table 6 shall be met if disposal unit does not have a liner and leachate collection system and depends on the distance from the unit to the property line. There are no limits if the disposal unit has a liner and leachate collection system.

 $\frac{\text{Table 6}}{\text{Active Sewage Sludge Unit without a Liner}}$ and Leachate Collection System

mg/kg

Pollutant	dry weight
Arsenic	73
Chromium (total)	600
Nickel	420

The above applied when the active sewage sludge unit is 150 meters or more from the property line of the disposal site. If less than 150 meters, the following limits apply for Arsenic, Chromium, and Nickel:

Table 7

	Arsenic	Chromium	Nickel
Distance	mg/kg	mg/kg	mg/kg
(meters)	Dry Weight	Dry Weight	Dry

Weig	ht			
<u> J</u>	0 to 25	30	200	210
	25 to 50	34	220	240
	50 to 75	39	260	270
	75 to 100	46	300	320
	100 to 125	53	360	390
	125 to 150	62	450	420

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APPENDIX 7

SUMMARY INFORMATION FOR LOCAL LIMITS SUBMITTAL

Note on Appendix 7: If you use the Region VIII Local Limits Spreadsheet, you are required to submit only Pages 7-1 and 7-2. The other information will be contained in the tables from the Local Limits Spreadsheet.

GENERAL INFORMATION

Flow SLUDGE DIGESTION INFORMATION Data (MGD) % SOLIDS TO DISPOSAL PERCENT POTW HIGHEST MONTHLY AVERAGE SLUDGE FLOW TO DISPOSAL SIU HIGHEST MGD MONTHLY AVERAGE DOMESTIC TOTAL SLUDGE FLOW TO DIGESTER MGD REC. WATER ACUTE REC. WATER CHRONIC DIGESTION ANAEROBIC UNIT OPERATIONS DESCRIPTION AEROBIC PRIMARY OTHER TYPE OF DISPOSAL SECONDARY LAND APPLY: FOOD TERTIARY LAND APPLY: NON-FOOD EFFLUENT DISCHARGED TO: MONOFILL (CHECK ALL THAT APPLY) LANDFILL STREAM DISTRIBUTION/MARKET LAKE SURFACE DISPOSAL GROUNDWATER OTHER: REUSE \mathbf{r} EVAPORATION RECEIVING STREAM INFORMATION WETLAND AQUATIC LIFE USE CLASS(ES): OTHER (SPECIFY) HARDNESS OF RECEIVING WATER USED FOR METALS DESIGNATED USES: CALCULATIONS (MG/L)

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TABLE OF ANALYTICAL METHODS AND DETECTION LIMITS

Detection Analytical Limit Reported Method Parameter Used mg/lArsenic

Cadmium

Chromium (total)

Chromium (III)

Chromium (IV)

Copper

Lead

Mercury

Molybdenum

Nickel

Selenium

Silver

Zinc



CRITERIA SUMMARY

	NPDES	Water	Water	Sludge	Human			
	Permit	Quality	Quality	Disposal	Health #			
	Limit	Acute	Chronic	Criteria	for BCFs	MCLs		
Parameter	mg/1	mg/l	mg/l	mg/Kg	>300	mg/1	mg/l	mg/l

Arsenic

Cadmium

Chromium (total)

Chromium (III)

Chromium (IV)

Copper

Lead

Mercury

Molybdenum

Nickel

Selenium

Silver

Zinc

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SIGNIFICANT INDUSTRIAL USERS

		AVERA SIU	AGE SIU	EFFLUENT SIU	POL SIU	LUTANT SIU	CONCEN SIU	TRATION SIU	S IN SIU	mg/l SIU
SIU Parameter	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10
Arsenic										

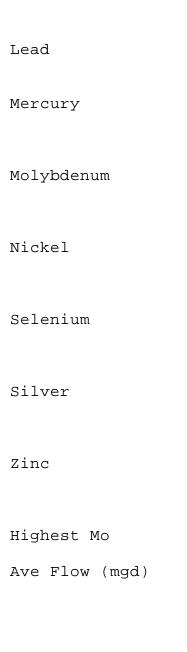
Cadmium

Chromium(total)

Chromium (III)

Chromium (IV)

Copper



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POTW MONITORING DATA

	Average	Average		Domestic/	Sludge to	Primar	y Second	. Total
	POTW	POTW	Receiving	Commercial	Disposal	Trtmnt	Trtmnt	Plant
Removal	Influe	ent Effl	uent Wate	r Backgr	ound m	g/Kg	Removal	Removal
Parameter	mg/l	mg/l	mg/l	mg/l	Dry Wt.	%	%	%

Arsenic

Cadmium

Chromium-T

Cr(III)

Chromium
Copper
Lead
Mercury
Molybdenum
Nickel
Selenium
Silver

Page 7-5

	MAX	KIMUM	UM ALLOWABLE		HEADWORKS		(LBS/DAY)	
		Water	Water		Human			
	NPDES	Quality	y Quality	Sludge	to Health	for MCLs		
Parameter	Permit	Acute	Chronic	Disposal	BCFs >300	mg/l	mg/l	mg/l
Arsenic								

Cadmium

Chromium-T

Chromium
(III)
Chromium
(IV)
Copper

Lead

Mercury

Molybdenum

Nickel

Selenium

Silver

Zinc

ATTACH ADDITIONAL PAGES AS NEEDED

Page 7-6

				Most		Max	
	Most	Safety/	' Strgnt	#	Allowabl	_e	
	Stringent	Expansion	w/ Safety	Domestic	Industrial		
	Criteria	Factor	Factor	Loading	Loading	Proposed	
Parameter	lbs/day	%	lbs/day	lbs/day	lbs/day	Local Limits	
Arsenic							mg/l
Cadmium							mg/l
Chromium-T							
Chromium (III)							mg/l

Chromium	
(IV)	mg/l
Copper	mg/l
Lead	mg/l
Mercury	mg/1
Molybdenum	mg/l
Nickel	mg/1
Selenium	mg/1
Silver	mg/l
Zinc	mg/l

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APPENDIX 9

LOCAL LIMITS DEVELOPMENT SPREADSHEET

[MARCH 25, 1994] [OCTOBER 20, 1994] July 23, 1996

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