OUTLINE OF LOCAL LIMITS DEVELOPMENT

Adopted from "Guidance Manual on the Development and Implementation of Local Discharge Limitations under the Pretreatment Program"

2. IDENTIFYING SOURCES AND POLLUTANTS OF CONCERN

Activities conducted for the development of local limits consist of identifying areas of concern, gathering requisite data on the sources and pollutants of concern, and calculating local limits. During development of local limits, the POTW:

Step 1 Identifies the concerns it must address through local limits development in order to meet Federal, State and local requirements;

Step 2 Identifies the sources and pollutants which should be limited in order to address these concerns as follows:

- Characterizing industrial discharges
- Review of applicable environmental protection criteria and pollutant effects data
- Monitoring of IU discharges, POTW collection system and treatment plant.

Step 3 Calculates local limits for the identified pollutants of concern...

2.4 MONITORING OF IU DISCHARGES, COLLECTION SYSTEM, AND TREATMENT PLANT TO DETERMINE POLLUTANTS OF CONCERN

...Pollutants of concern were defined as any pollutants which might reasonably be expected to be discharged to the POTW in quantities which could pass through or interfere with the POTW, contaminate the sludge, or jeopardize POTW worker health or safety. [Some] pollutants... are potentially of concern to all POTWs [i.e.] cadmium, chromium, copper, lead, nickel and zinc..[and] unless screening... shows that they are not present in significant amounts... arsenic, cyanide, silver and mercury....

In addition... POTWs should consider the full range of priority, conventional and non-conventional pollutants...

..Two pronged approach...

....Chemical Specific Approach...

- Monitoring and Screening... monitor IU discharges and various points within the collection system as a preliminary screening to detect potential problem discharges...
- Investigative Sampling and Analyses of Problem Discharges...
- Institution of Controls... local discharge limits.. management practices... or case-by-case technology based requirements...
- Sampling of Industrial Users...accurately characterize each facility's discharge...
- Monitoring/Screening of POTW Influent/Effluent/Sludge...

- Comparison of Pollutant Concentrations with Criteria Levels...
- Sampling of Plant Influent/Effluent/Sludge to Determine the Maximum Allowable Pollutant Headworks Loadings
- Institute Controls - The allowable loading to the treatment plant should be allocated to ...users...

....Toxicity Based Approach...

- Toxicity Testing of the POTW Effluent...
- Identification of the Cause of [any] Toxicity Through Fractionation...identify the type of compound...
- Identification of Problem Discharges Through Treatability Testing of Industrial Discharges...
- Institution of Controls...
- Toxicity Testing to Confirm the Effectiveness of Controls...

3. LOCAL LIMITS DEVELOPMENT BY THE ALLOWABLE HEADWORKS LOADING METHOD

[Adopted from "Guidance Manual on the Development and Implementation of Local Discharge Limitations under the Pretreatment Program"]

3.1 GENERAL METHODOLOGY

This method allows local limits to be developed based on criteria pertaining to POTW wastewater treatment plant operations and performance, the quality of the POTW's sludge, and the water quality of the POTW's receiving stream. The derivation of these local limits is a two-step procedure, outlined below:

Step 1: Development of Maximum Allowable Headworks Loadings

Site specific treatment plant/environmental criteria pertaining to pollutant pass through, process inhibition/interference, and sludge quality are identified. The criteria used in local limits development include POTW [NJPDES] permit limits, receiving stream water quality standards/criteria, biological process threshold inhibition levels, [worker health and safety protection; and Air Pollution Control permit,] and sludge quality criteria.

A mass balance (input = output) approach [based upon sampling of influent streams, effluent and sludge of the particular POTW, when possible] is then used to convert criteria into allowable headworks loadings. This approach traces the routes of each pollutant through the treatment process, taking into account pollutant removals in upstream units. Steady state calculations for conservative pollutants (e.g., total metals) assume that the influent loading to a treatment process equals the sum of the effluent and sludge loadings out of that process. In the case of nonconservative pollutants (e.g., volatile organics, cyanide, dissolved metals), where biodegradation/volatilization and chemical degradation are significant, calculations are modified to take these losses into account. **[Sampling points are shown in diagrams near the end of this document]**.

For each pollutant, the smallest (i.e., the most stringent) of the allowable headworks loadings

derived from the above-listed criteria is selected as the pollutant's maximum allowable headworks loading. If the POTW's actual headworks loading is consistently below this maximum allowable loading, compliance with all applicable criteria for the particular pollutant is ensured...

Step 2: Allocation of Maximum Allowable Headworks Loadings

Once maximum allowable headworks loadings have been derived (in Step 1), a portion of this loading (for each pollutant) is subtracted as a safety measure to account for projected industrial loading increases, unanticipated slug loadings, and errors in measurement. Pollutant loadings from domestic/background sources are then subtracted from the allowable headworks loadings. The results of these calculations are the maximum allowable industrial loadings to be allocated to the POTW's industrial users. Local limits are derived from this allocation of allowable industrial loadings...

3.2 DEVELOPMENT OF MAXIMUM ALLOWABLE HEADWORKS LOADINGS

The first step in deriving local limits is to develop maximum allowable headworks loadings based on treatment plant/environmental criteria. These criteria can be classified as either pass through or interference criteria, as follows...:

Pass through criteria

- [NJPDES] permit limits

- water quality standards/criteria-

Sludge incinerator air emission standards

Interference criteria

- Biological treatment process inhibition data

- Sludge disposal standards/guidelines

- EP toxicity limitations

...The most stringent loading for each pollutant constitutes the pollutant's maximum allowable headworks loading, from which a local limit can be derived. ...[R]epresentative removal efficiencies... are parameters critical to the calculation of allowable headworks loadings...

3.2.1.1 Compliance with [NJPDES] Permit Limits

[NJPDES] permit limits are to be used in the derivation of local limits to prevent pollutant pass through. The following equation is used to convert a pollutant-specific concentration-based [NJPDES] permit limit into the corresponding allowable headworks loading of that pollutant.

$$L_{IN} = \frac{8.34(C_{CRIT})(Q_{POTW})}{(1-R_{POTW})}$$

Where:

L_{IN} = Allowable influent loading, lbs/d

C_{CRIT} = [NJPDES] permit limit, mg/l

Q_{POTW} = POTW flow, MGD

R_{POTW} = Removal efficiency across POTW, as a decimal

Occasionally, the POTW's [NJPDES] permit specifies whole effluent toxicity limits in conjunction with pollutant-specific concentration-based discharge limits. Effluent toxicity considerations in developing local limits are discussed...

[Note: the original document gives methodology regarding water quality standards/criteria, biological treatment process inhibition data, Sludge disposal standards/guidelines, toxicity limitations and Sludge incinerator air emission standards].

3.3.1 Building in Safety Factors

The POTW should consider allocating only a portion of the maximum allowable headworks loading for each pollutant to the POTW's current industrial and domestic users. The remaining portion of the maximum allowable headworks loading for each pollutant is held in reserve as a safety factor. This safety factor [generally between 10% and 30%] should be designed to account for and accommodate the various uncertainties inherent in the local limits development process. These uncertainties include:

- Potential future industrial growth, resulting in new and/or increased industrial discharges to the POTW.
- Potential slug loadings (e.g., as a result of chemical spills) of pollutants which might affect POTW operation/performance.
- Variability and measurement error associated with POTW design/ performance parameters used in deriving local limits (e.g., removal efficiencies, POTW flow data, domestic/background pollutant levels, etc.

The determination of an appropriate safety factor is a site-specific issue dependent upon local conditions...

3.3.2 Domestic/Background Contributions

Maximum allowable headworks loadings are allocated to total domestic/background sources and to individual industrial/commercial users during the limits setting process. For each pollutant the estimated total loading currently received at the POTW from all domestic/background sources is subtracted from the pollutant's allowable headworks loading. The resulting allowable industrial/commercial loading can then be allocated to the individual industrial users and local limits subsequently derived...

Occasionally, in deriving local limits for a particular pollutant, a POTW may find that the total domestic/background loading of that pollutant approaches or exceeds the maximum allowable headworks loading. In such an event, little or no portion of the maximum allowable headworks loading would be available to allocate to industrial users. Such a situation may be attributable in part to nondomestic facilities such as gasoline stations, radiator shops, car washes, and automobile maintenance shops, which often discharge at surprisingly high pollutant levels. These facilities are often overlooked by POTWs, owing to their small size and low discharge flows, but their discharges are controllable and should not be overlooked.

Tap water discharged to the city sewers contains background levels of certain pollutants (e.g., chloroform, copper, zinc). These pollutants sometimes originate from corroding water pipes or municipal water treatment practices and can sometimes be controlled. These background levels contribute to the POTW's total domestic pollutant loadings. In addition, household wastes, such as household pesticides, solvents, and spent oil, discarded into the city sewer will likewise contribute to the POTW's total domestic/background pollutant loadings.

When the total domestic/background loading of a pollutant exceeds the pollutant's maximum allowable headworks loading, the POTW should:

- Ensure that all significant industrial and commercial dischargers of the pollutant have been identified.
- Consider public education to reduce household discharges of used oil and hazardous wastes.
- Substitute actual sewer trunk line monitoring data for any literature data used in deriving total domestic pollutant loadings to the POTW.
- Substitute POTW removal efficiencies obtained as a result of in-plant monitoring for any literature removal efficiencies used in deriving maximum allowable headworks loadings.
- Verify applicability of POTW plant and environmental protection criteria (e.g., ensure that water quality criteria are appropriate for the stream use classification of the POTW's receiving stream).
- If the POTW's biological treatment units have never experienced inhibition/upsets, compare inhibition-based maximum allowable headworks loadings derived from literature inhibition data with the POTW's current headworks loadings. If the current headworks loadings are less stringent, but can be verified as having never inhibited or upset the POTW's treatment processes, these loadings may constitute a more appropriate local limits basis than the more stringent headworks loadings derived from literature inhibition data.

By pursuing the problem in a logical manner, the POTW should be able to develop reasonable local limits for pollutants with elevated total domestic/ background loadings.

[Formula for subtracting domestic/ background loadings: $L_{ALL} = (1 - F_S) L_{IN} - L_{DOM}$

Where: L_{ALL} = Maximum allowable industrial loading to the POTW, lbs/day

L_{IN} = Allowable influent loading, lbs/d

F_S = Safety Factor, as decimal

L_{DOM} = Domestic/background loading, lbs/d]

3.3.3 <u>Alternative Allocation Methods</u>

Once the POTW has derived the maximum allowable industrial loadings of the various pollutants, these loadings should be allocated to the POTW's industrial users. A variety of

procedures exist for conducting these loading allocations...

[Example:]

$$C_{LIM} = \frac{L_{ALL}}{(8.34)(Q_{IND})}$$

Uniform Concentration

Method Based on Total Industrial Flow:

Where:

C_{LIM} = Uniform concentration limit, mg/l

L_{ALL} = Maximum allowable industrial loading to the POTW, lbs/day

Q_{IND} = Total industrial flow, MGD

[Note: alternative allocation methods are given in the original document.]

4. LOCAL LIMITS DEVELOPMENT TO ADDRESS COLLECTION SYSTEM PROBLEMS

...SPECIFIC PROHIBITIONS

NOTE: 40 CFR 403.5(b) contains specific prohibitions including:

"...the following pollutants shall not be introduced into a POTW:

(1) Pollutants which create a fire or explosion hazard in the POTW including, but not limited to, wastestreams with a closed cup flashpoint of less than 140 degrees Fahrenheit or 60 degrees Centigrade using the test methods specified in 40 CFR 261.21.

(2) Pollutants which will cause corrosive structural damage to the POTW, but in no case Discharges with pH lower than 5.0, unless the works is specifically designed to accommodate such Discharges;

(3) Solid or viscous pollutants in amounts which will cause obstruction to the flow in the POTW resulting in Interference;

(4) Any pollutant, including oxygen demanding pollutants (BOD, etc.) released in a Discharge at a flow rate and/or pollutant concentration which will cause Interference with the POTW.

(5) Heat in amounts which will inhibit biological activity in the POTW resulting in Interference, but in no case heat in such quantities that the temperature at the POTW Treatment Plant exceeds40°C (104°F) unless the Approval Authority, upon request of the POTW, approves alternate temperature limits.

(6) Petroleum oil, nonbiodegradable cutting oil, or products of mineral oil origin in amounts that will cause interference or passthrough;

(7) Pollutants which result in the presence of toxic gases, vapors, or fumes within the POTW in a quality that may cause acute worker health and safety problems;

(8) Any trucked or hauled pollutants, except at discharge points designated by the POTW. "

Specific Limitations must be developed pursuant to 40 CFR 403.5(c) as follows

(1) Each POTW developing a POTW Pretreatment Program pursuant to §403.8 shall develop and enforce specific limits to implement the prohibitions listed in paragraphs (a)(1) and (b) of this section.

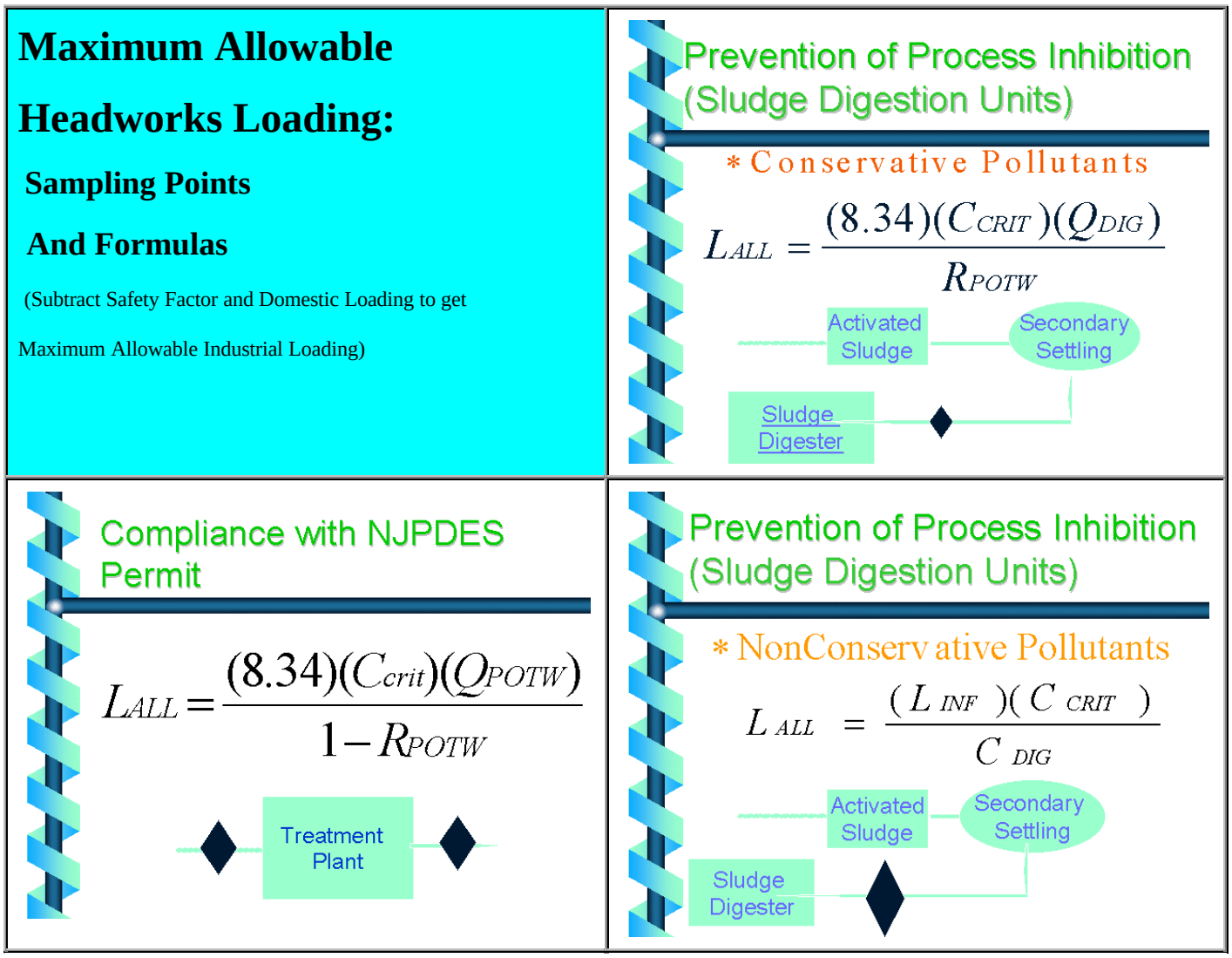
Each POTW with an approved pretreatment program shall continue to develop these limits as necessary and effectively enforce such limits.

(2) All other POTW's shall, in cases where pollutants contributed by User(s) result in Interference or Pass-Through, and such violation is likely to recur, develop and enforce specific effluent limits for Industrial User(s), and all other users, as appropriate, which, together with appropriate changes in the POTW Treatment Plant's facilities or operation, are necessary to ensure renewed and continued compliance with the POTW's NPDES permit or sludge use or disposal practices. "

The Guidance Manual on the Development and Implementation of Local Discharge Limitations under the Pretreatment Program (December 1987, USEPA Office of Water Enforcement) contains other useful information and recommendations to prevent problems with ...Fire and Explosion... Corrosion... Flow Obstruction...and temperature...and to protect worker health and safety.

5. INDUSTRIAL USER MANAGEMENT PRACTICES... [omitted from excerpt]

SAMPLING LOCATIONS:



Prevention of Process Inhibition (Secondary Treatment Units)

$$L_{ALL} = \frac{(8.34)(C_{CRIT})(Q_{POTW})}{1 - R_{PRIM}}$$

- Primary Clarifier
- Activated Sludge

Protection of Sludge Quality

* Conservative Pollutants

$$L_{ALL} = \frac{(8.34)(C_{SLCRIT})(PS)(Q_{SLDG})}{R_{POTW}}$$

- Activated Sludge
- Secondary Settling
- Sludge Digester

Prevention of Process Inhibition (Tertiary Treatment Units)

$$L_{ALL} = \frac{(8.34)(C_{CRIT})(Q_{POTW})}{1 - R_{SEC}}$$

- Primary Treatment
- Secondary Treatment
- Tertiary Treatment

Protection of Sludge Quality

* NonConservative Pollutants

$$L_{ALL} = \frac{(L_{INF})(C_{SLCRIT})}{C_{SLDG}}$$

- Activated Sludge
- Secondary Settling
- Sludge Digester