

US EPA ARCHIVE DOCUMENT

U. S. Environmental Protection Agency  
Region 9  
75 Hawthorne Street  
San Francisco, CA 94105-3901

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**ADDENDUM TO FACT SHEET  
Commonwealth Utilities Corporation (CUC)  
Sadog Tasi Wastewater Treatment Plant (WWTP)  
NPDES Permit No. MP0020010**

In accordance with a limited mixing zone approval recently proposed by CNMI Division of Environmental Quality (DEQ), EPA has determined that revisions to certain effluent limitations originally proposed in the December 2007 draft permit are necessary. This addendum to fact sheet sets forth the revised discharge limitations for the pollutant parameters that are not granted in the mixing zone approval. The revisions are also consistent with a DEQ water quality certification authorized under Section 401 of Clean Water Act.

Reasonable Potential Analysis

The reasonable potential evaluation for Sadog Tasi WWTP remains unchanged. The proposed permit includes the reasonable potential used in the previous 2001 permit for the effluent discharge to exceed or have the reasonable potential to exceed applicable CNMI water quality criteria. Therefore, water quality-based effluent limitations (WQBELs) included in the draft permit are: acute toxicity, enterococci, total residual chlorine, nitrate-nitrogen, total nitrogen, orthophosphate, pH, total phosphorus, unionized ammonia, copper, silver, nickel and zinc.

When the draft permit was public noticed on December 14, 2007, all of the above water quality-based effluent limitations with the exception of total residual chlorine (TRC) were calculated incorporating the initial dilution although mixing zones for the discharge of pollutants had not yet been granted by CNMI DEQ.

Mixing Zone Approval

On June 2, 2008, DEQ granted approval for mixing zones for all of the above WQBELs except for toxic pollutants and TRC. Therefore, in accordance with the mixing zone approval, toxic pollutants such as copper, silver, nickel, zinc and TRC are not eligible for mixing zone and must be met at the end-of-pipe. New WQBELs have been calculated for toxic pollutants in accordance with the statistical procedure set forth in EPA's *Technical Support Document for Water Quality-Based Toxics Control* (EPA/505/2-90-001, March 1991; TSD). The WQBEL for TRC in the 2007 fact sheet did not incorporate the mixing zone.

Mixing zones may only be established for enterococci, nitrate-nitrogen, total nitrogen, orthophosphate, pH, total phosphorus and unionized ammonia; and their effluent limits in the draft permit remained unchanged.

Revised WQBEL Calculations for TRC

The WQBEL calculations for TRC in the 2007 fact sheet did not incorporate the mixing zone and remain unchanged.

Revised WQBEL Calculations for Toxic Metals

As the mixing zone for copper, silver, nickel and zinc is not authorized by CNMI DEQ, then acute, chronic, and human health wasteload allocations are calculated using the following modified steady-state mass balance equation:

$$C_e = C_r = WLA$$

“C<sub>r</sub>” is the water quality criterion (in mg/l, µg/l, or TU).

Sample Step-by-Step Calculations for Copper

- (1) Using the September 2004 CNMI WQS incorporating EPA’s 2004 National recommended water quality criteria for copper (EPA-822-H-04-001), the saltwater acute criterion (C<sub>r acute</sub>) is 4.8 µg/l, the saltwater chronic criterion (C<sub>r chronic</sub>) is 3.1 µg/l, and the human health (organisms only) criterion (C<sub>r human</sub>) is 1,300 µg/l.

$$\text{Acute } C_e = 4.8 \text{ } \mu\text{g/l} = \text{acute WLA}$$

$$\text{Chronic } C_e = 3.1 \text{ } \mu\text{g/l} = \text{chronic WLA}$$

- (2) Following TSD Table 5-1 for acute water quality criteria protecting aquatic life, a value of 0.321 is used as the statistical multiplier for back-calculating the acute long-term average (LTA) when the acute wasteload allocation is established at the 99<sup>th</sup> percentile occurrence probability. EPA estimates that the coefficient of variation (CV) of the pollutant in the effluent is 0.6.

$$\begin{aligned} \text{Acute LTA} &= \text{acute WLA} \times \text{acute WLA multiplier factor} \\ &= 4.8 \text{ H } 0.321 \\ &= 1.54 \text{ } \mu\text{g/l} \end{aligned}$$

- (3) Following TSD Table 5-2 for chronic water quality criteria protecting aquatic life, a value of 0.527 is used as the statistical multiplier for back-calculating the chronic long-term average when the chronic wasteload allocation is established at the 99<sup>th</sup> percentile occurrence probability and EPA estimates that the CV of the pollutant in the effluent is 0.6:

$$\begin{aligned} \text{Chronic LTA} &= \text{chronic WLA} \times \text{chronic WLA multiplier factor} \\ &= 3.1 \times 0.527 \\ &= 1.63 \text{ } \mu\text{g/l} \end{aligned}$$

- (4) Following TSD Section 5.4.4 for human health water quality criteria, the human health wasteload allocation is established as the human health long-term average:

$$\begin{aligned} \text{Human health LTA} &= \text{human health WLA} \\ &= 1,300 \mu\text{g/l} \end{aligned}$$

- (5) Following TSD Section 5.4, the lowest of the acute, chronic or human health long-term average is selected and used to calculate maximum daily and average monthly water quality-based effluent limits:

$$\begin{aligned} \text{Minimum LTA} &= \text{Acute LTA} \\ &= 1.54 \mu\text{g/l} \end{aligned}$$

- (6) If the minimum long-term average is based on a water quality criterion protecting aquatic life, then the statistical procedure outlined in TSD Table 5-2 is used to calculate maximum daily and average monthly WQBELs. In this procedure, EPA estimates that the CV of pollutants in the effluent is 0.6 and chooses the statistical multiplier factor of 3.11 to calculate a maximum daily water quality-based effluent limit established at the 99<sup>th</sup> percentile occurrence probability:

$$\begin{aligned} \text{Max daily WQBEL} &= \text{minimum LTA} \times \text{LTA multiplier factor} \\ &= 1.54 \text{ H } 3.11 \\ &= \mathbf{4.8 \mu\text{g/l for copper}} \end{aligned}$$

- (7) Continuing with this procedure, EPA estimates that the CV of pollutants in the effluent is 0.6, assumes that the minimum number of effluent samples per month is four, and chooses the statistical multiplier factor of “1.55” to calculate an average monthly water quality based effluent limit established at the 95<sup>th</sup> percentile occurrence probability:

$$\begin{aligned} \text{Avg month WQBEL} &= \text{minimum LTA} \times \text{LTA multiplier factor} \\ &= 1.54 \text{ H } 1.55 \\ &= \mathbf{2.4 \mu\text{g/l for copper}} \end{aligned}$$

Repeat Calculations for Silver, Nickel And Zinc

		<u>Silver</u>
Acute C <sub>e</sub>	=	1.9 μg/l or acute WLA
Chronic C <sub>e</sub>	=	n/a or chronic WLA
Human C <sub>e</sub>	=	n/a
Acute LTA	=	acute WLA × acute WLA multiplier factor
	=	1.9 H 0.321
	=	0.61 μg/l
	=	Minimum LTA
Maximum daily WQBEL	=	minimum LTA × LTA multiplier factor
	=	0.61 H 3.11
	=	<b>1.9 μg/l for Silver</b>
Average monthly WQBEL	=	minimum LTA × LTA multiplier factor
	=	0.61 H 1.55
	=	<b>0.9 μg/l for Silver</b>

<u>Nickel</u>	
Acute C <sub>e</sub>	= 74 µg/l or acute WLA
Chronic C <sub>e</sub>	= 8.2 µg/l or chronic WLA
Human C <sub>e</sub>	= 4,600 µg/l
Acute LTA	= acute WLA × <i>acute WLA multiplier factor</i>
	= 74 H 0.321
	= 23.8 µg/l
Chronic LTA	= chronic WLA × <i>chronic WLA multiplier factor</i>
	= 8.2 × 0.527
	= 4.32 µg/l => Minimum LTA
Maximum daily QBEL	= minimum LTA × <i>LTA multiplier factor</i>
	= 4.32 H 3.11
	= <b>13.4 µg/l for Nickel</b>
Average monthly QBEL	= minimum LTA × <i>LTA multiplier factor</i>
	= 4.32 H 1.55
	= <b>6.7 µg/l for Nickel</b>

<u>Zinc</u>	
Acute C <sub>e</sub>	= 90 µg/l or acute WLA
Chronic C <sub>e</sub>	= 81 µg/l or chronic WLA
Human C <sub>e</sub>	= 26,000 µg/l
Chronic LTA	= chronic WLA × <i>chronic WLA multiplier factor</i>
	= 81 × 0.527
	= 42.7 µg/l
Acute LTA	= acute WLA × <i>acute WLA multiplier factor</i>
	= 90 H 0.321
	= 28.9 µg/l => Minimum LTA
Maximum daily QBEL	= Minimum LTA × <i>LTA multiplier factor</i>
	= 28.9 H 3.11
	= <b>90 µg/l for Zinc</b>
Average monthly QBEL	= Minimum LTA × <i>LTA multiplier factor</i>
	= 28.9 H 1.55
	= <b>45 µg/l for Zinc</b>

Administrative Order

Because the Sadog Tasi WWTP discharge of secondary treated wastewater is not expected to fully comply with water quality based effluent limitations in the final permit, USEPA Region 9 will be issuing an administrative order which will include: (1) a schedule of activities to ensure that the discharge will come into compliance with WQS during this permit term; and (2) interim discharge limitations based on current wastewater treatment plant performance.