ATTACHMENT TO RESOLUTION 2004-022

BASIN PLAN AMENDMENT: Saltwater Ammonia Objectives for Inland Surface Waters

(to be added to the Water Quality Control Board, Los Angeles Region, Chapter 3)

March 4, 2004

Amendments:

Chapter 3. Water Quality Objectives

[Insert after paragraph 4 under Ammonia subheading:]

The objectives for inland surface waters not characteristic of freshwater are based on US EPA Ambient Water Quality Criteria for Ammonia (Saltwater) - 1989. Both the one-hour average and 4-day average objectives are fixed concentrations for un-ionized ammonia, independent of pH, temperature, or salinity.

[Replace existing paragraph 5 with the following text:]

For inland surface waters not characteristic of freshwater (as determined by the procedures in paragraph 1 of the Implementation Provisions below), the four-day average concentration of un-ionized ammonia shall not exceed 0.035 mg/L and the one-hour average concentration shall not exceed 0.233 mg/L. ~~*concentrations of ammonia shall not exceed the values listed for the corresponding instream conditions in Tables 3-4 and 3-5.*~~

[Delete existing Tables 3-4 and 3-5.]

IMPLEMENTATION

Implementation Provisions for the Application of Ammonia Objectives to Inland Surface Waters in the Los Angeles Region

[Replace existing implementation provision No. 1 with the following text:]

1. Determination of Freshwater, Brackish Water or Saltwater Conditions[4]

For inland surface waters in which the salinity is equal to or less than 1 part per thousand 95% or more of the time, the applicable objectives are the freshwater objectives, based on the US EPA "1999 Update of Ambient Water Quality Criteria for Ammonia." (2) For waters in which the salinity is equal to or greater than 10 parts per thousand 95% or more of the time, the applicable objectives are a 4-day average concentration of 0.035 mg un-ionized NH_3/L and a one-hour average concentration of 0.233 mg un-ionized NH_3/L. (3) For waters in which the salinity is greater than 1 but less than 10 parts per thousand, the applicable objectives are ~~the inland surface water objectives in Tables 3-4 and 3-5.~~ the more stringent of the freshwater or saltwater objectives. (a) However, the Regional Board may by adoption of a resolution approve the use of either freshwater or saltwater objectives for an enclosed bay, wetland or estuary with findings that scientifically defensible information and data demonstrate that on a site-specific basis the biology of the water body is dominated by freshwater aquatic life and that freshwater objectives are more appropriate; or conversely, the biology of the water body is dominated by saltwater aquatic life and that saltwater objectives are more appropriate. When determining the biotic dominance of a water body, the following factors shall be considered: the nature of the conditions causing the dominance (e.g., natural vs. anthropogenic), the historical conditions of the water body, and the reversibility of the existing conditions.

[Insert after implementation provision No. 4:]

5. Translation of Objectives into Effluent Limits[6]

If the Regional Board determines that water quality based effluent limitations are necessary to control ammonia in a discharge, the permit shall contain effluent limitations for ammonia using one of the following methods:

1. *Use the following procedure based on a steady-state model:*

   Step 1: Identify the applicable water quality objectives for ammonia for the receiving water immediately downstream of the discharge.

[4] The procedure described in this section to determine which objectives should be applied is the same method employed in the California Toxics Rule (title 40, Code of Federal Regulations, § 131.38(c)(3)) .

[6] The method whereby objectives are translated to effluent limits is similar to the method contained in the "Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California" (2000). The method is also consistent with that outlined in the U.S. EPA "Technical Support Document for Water Quality-based Toxics Control (1991).

Step 2a: For each water quality objective, calculate the effluent concentration allowance (ECA) using the following steady-state mass balance model:

If a mixing zone has not been authorized by the Regional Board, or when WQO ≤ B:

ECA = WQO

If a mixing zone has been authorized by the Regional Board:[7]

ECA = WQO + D (WQO - B) when WQO > B

Where: *WQO = water quality objective (adjusted as described in Step 2b, if necessary, for temperature, pH, and salinity.)*

D = dilution credit
B = ambient background concentration

The dilution credit (D) shall be derived taking into account water body characteristics and the type of discharge (i.e. completely-mixed or incompletely-mixed with the receiving water), using established procedures in the "Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California" (2000) or other appropriate U.S. EPA approved methodologies. The resulting dilution credit must be approved by the Executive Officer.

The ambient background concentration shall be the observed maximum as determined in accordance with procedures in the "Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California" (2000) or other appropriate U.S. EPA approved methodologies. The resulting ambient background concentration must be approved by the Executive Officer.

Step 2b: In order to adjust the un-ionized saltwater ammonia objective to an ECA expressed as total ammonia, the following equation shall be used:

$$[NH_4^+]+[NH_3] = [NH_3] + [NH_3]*10 \text{ ^ } (pK_a^s + 0.0324\ (298-T) + 0.0415\ P/T - pH)$$

Where: *P = 1 atm*
T = temperature (^oK)
*pK_a^s = 0.116 * i + 9.245, the stoichiometric acid hydrolysis constant of ammonium ions in saltwater based on i*

[7] Mixing zones may be authorized on a discharge-by-discharge basis per the mixing zone provision in Chapter 4 of the Basin Plan.

i = 19.9273 S (1000-1.005109 S) $^{-1}$, the molal ionic strength of saltwater based on S
S = salinity

(Per U.S. EPA Ambient Water Quality Criteria for Ammonia (Saltwater)-1989)

~~$ECA = \frac{WQO(Qd + Qs) - (CsQs)}{Qd}$ where WQO > Cs~~

~~ECA = WQO where WQO ≤ Cs~~

~~Where WQO = water quality objective~~
~~Cs = Pollutant Concentration of Upstream (mg/L)~~
~~Qd = Flow Discharge (mgd or cfs)~~
~~Qs = Flow Upstream (mgd or cfs)~~

~~For the one-hour average objective, one of the following shall be used for the Qs term:~~

1. ~~the lowest one-day flow based on a three-year return interval (1B3) when flow records are analyzed using EPA's 1986 DFLOW procedure.[8]~~
2. ~~the lowest one-day flow based on a ten-year return interval (1Q10) when flow records are analyzed using extreme-value statistics.[9]~~
3. ~~Other appropriate critical flow condition.~~

~~For the 30-day average objective, one of the following shall be used for the Qs term:~~

1. ~~the lowest 30-day flow based on a three-year return interval (30B3) when flow records are analyzed using EPA's 1986 DFLOW procedure or~~
2. ~~the 30Q10 or the 30Q5 (lowest 30-day flow based on a ten or five-year return interval) when flow records are analyzed using extreme-value statistics.~~
3. ~~Other appropriate critical flow condition.~~

~~Effluent concentration allowances based on a critical condition of 30Q10 are protective of both the 30-day average and the 4-day average. If a 30Q5 is used, it must be demonstrated that the 7Q10 (seven-day low flow which recurs once every ten years on the average) is protective of 2.5 times the 30-day average objective, to ensure that short-term (4-day) toxicity does not occur. The more stringent (i.e. lower) of the 30Q5 or the 7Q10 shall be used.~~

[8] ~~U.S. EPA. September 1986. Technical Guidance Manual for Performing Wasteload Allocation, Book VI, Design Conditions, Chapter 1, Stream Design Flow for Steady-State Modeling, PB92-231778.~~

[9] ~~U.S. EPA. September 1986. Technical Guidance Manual for Performing Wasteload Allocation, Book VI, Design Conditions, Chapter 1, Stream Design Flow for Steady-State Modeling, PB92-231778.~~

[Insert after implementation provision No. 5:]

6. Receiving Water Compliance Determination

Per Implementation Provision No. 1, the following methods for determining compliance with proposed objectives shall be used:

If salinity sampled at a particular receiving water station indicates saline conditions (equal to or greater than 10 ppt), then saltwater objectives shall apply.

If salinity sampled at a particular receiving water station indicates freshwater conditions (equal to or less than 1 ppt), then freshwater objectives shall apply.

If salinity sampled at a particular receiving water station indicates brackish conditions (greater than 1 but less than 10 ppt), then the more stringent of the freshwater or saltwater objectives shall apply except where the Regional Board, by adoption of a resolution, approves the use of either freshwater or saltwater objectives per Implementation Provision 1(3)(a).