Staff Report - Attachment A

Regional Water Quality Control Board, Central Valley Region
Board Meeting - 3/4 August 2006
Item #16 – City of Tracy Wastewater Treatment Plant
Consideration of revised NPDES Permit and Time Schedule Order

Proposed Salinity Controls
8 December 2005 Tentative Permit

The Regional Water Quality Control Board, Central Valley Region, (Regional Water Board) has a number of options available for consideration with regards to the control of salinity for the City of Tracy discharge. Two tentative NPDES Permits have been circulated for public review and comment - the current tentative permit issued 26 May 2006, and a tentative permit issued on 8 December 2005. The approaches for salinity regulation in these two tentative Permits are quite different. The Regional Water Board could adopt either approach or any logical outgrowth of these options. Although, if the approach to salinity regulation is changed significantly from the noticed options, it may be appropriate to develop and circulate a new tentative Permit for future consideration and adoption with respect to the regulation of salinity.

The December 2005 tentative permit concluded that there is no assimilative capacity for salt in the receiving water and that there is a reasonable potential to cause or contribute to an exceedance of a water quality standard. The receiving water has the designated beneficial use of irrigated agriculture and salinity can reduce crop yield. The tentative permit proposed an effluent limit of 700 umhos/cm monthly average electrical conductivity (EC). The proposed EC effluent limit would implement the narrative chemical constituents water quality objective in the Basin Plan, which states, in part, that "*waters shall not contain chemical constituents in concentrations that adversely affect beneficial uses*". The Basin Plan sets forth the methodology for implementing narrative water quality objectives, including consideration of relevant numerical criteria and guidelines developed by other agencies and organizations. With respect to salinity, the United Nations has published *Water Quality for Agriculture, Food and Agriculture Organization of the United Nations—Irrigation and Drainage Paper No. 29, Rev. 1 (R.S. Ayers and D.W. Westcot, Rome, 1985)*, which evaluates the impacts of salinity levels on crop tolerance and yield reduction, and establishes water quality goals that are protective of the agricultural uses. Using this guidance, the 700 µmhos/cm EC agricultural goal is intended to prevent reduction in crop yield, i.e. a restriction on use of water, for salt-sensitive crops.

A proposed Time Schedule Order (TSO) was issued with the December 2005 tentative permit that provided a compliance time schedule for compliance with the final effluent limitations for EC and included an interim performance-based effluent limitation for EC. Full compliance with the final effluent limitations was required within 5-years of adoption of the permit.

The May 2006 tentative permit proposed an interim limit that represents the current performance of the facility with respect to salinity. The May 2006 tentative permit does not propose a final effluent limitation, but includes a reopener to include a final limit at the conclusion of the required studies. The facility intends to expand its discharge flow in two stages – first an intermediate expansion from 9 million gallons per day (mgd) to 10.8 mgd and then a full expansion from 10.8 mgd to 16 mgd. The two tentative NPDES permits contain similar requirements with regards to effluent salinity for the expansion of the discharge. Each tentative permit requires full compliance with an EC effluent limitation that is protective of the agricultural beneficial uses of the receiving stream prior to allowing the discharge to expand to 16 mgd. Each tentative permit allowed the intermediate increase in discharge flow prior to full compliance with the EC limitations that are protective of the agricultural beneficial uses.

Discussed below are the sections of the December 2005 tentative permit relevant to salinity that might be considered by the Regional Water Board at the 4 August 2006 Regional Water Board hearing.

1. **Final Effluent Limitations.** The December 2005 tentative permit contained Final Effluent Limitations IV.A.1.a, which reads, in part, as follows:

Parameter	Units	Effluent Limitations				
		Average Monthly	Average Weekly	Maximum Daily	Instantaneous Minimum	Instantaneous Maximum
Electrical Conductivity @ 25° C	µmhos/cm	700	--	--	--	--

2. **Rationale for Final Effluent Limitations.** The December 2005 tentative permit provided rationale for setting final effluent limitations for EC in the Fact Sheet, Attachment F, Section IV.C.2.x., which reads as follows:

   "x. Salinity. *The discharge contains total dissolved solids (TDS), chloride, sulfate, and electrical conductivity (EC). These are water quality parameters that are indicative of the salinity of the water. Their presence in water can be growth limiting to certain agricultural crops and can affect the taste of water for human consumption. There are no USEPA water quality criteria for the protection of aquatic organisms for these constituents. The Basin Plan contains a chemical constituent objective that incorporates state MCLs, contains a narrative objective, and contains numeric water quality objectives for EC, TDS, Sulfate, and Chloride (See Table F-4).*

Table F-4
Salinity Water Quality Criteria/Objectives

Parameter	Agricultural WQ Goal	Secondary MCL	Basin Plan (D-1641)	Effluent	
				Avg	Max
EC (µmhos/cm)	*700*	*900*	*700 (1 Apr – 31 Aug) 1000*	*1753*	*2410*
TDS (mg/L)	*450*	*500*	*N/A*	*1019*	*2060*
Sulfate (mg/L)	*N/A*	*250*	*N/A*	*246*	*350*
Chloride (mg/L)	*106*	*250*	*N/A*	*286*	*340*

<u>Total Dissolved Solids (TDS).</u> The secondary MCL for TDS is 500 mg/L as a recommended level, 1000 mg/L as an upper level, and 1500 mg/L as a short-term maximum. The recommended agricultural water quality goal for TDS, that would apply the narrative chemical constituent objective, is 450 mg/L as a long-term average based on Water Quality for Agriculture, Food and Agriculture Organization of the United Nations—Irrigation and Drainage Paper No. 29, Rev. 1 (R.S. Ayers and D.W. Westcot, Rome, 1985). Water Quality for Agriculture evaluates the impacts of salinity levels on crop tolerance and yield reduction, and establishes water quality goals that are protective of the agricultural uses. The 450 mg/L limit is intended to prevent reduction in crop yield, i.e. a restriction on use of water, for salt-sensitive crops.

The average TDS effluent concentration was 1019 mg/L and a ranged from 765 mg/L to 2060 mg/L for 218 samples collected by the Discharger from July 1998 through December 2004. These concentrations exceed the applicable water quality objectives. The background receiving water TDS ranged from 280 mg/L to 650 mg/L, with an average of 473 mg/L in 12 sampling events performed by the Discharger from January 2002 through December 2002. These data indicate the receiving water frequently exceeds water quality objectives and lacks assimilative capacity for TDS.

<u>Chloride.</u> The secondary MCL for chloride is 250 mg/L. The recommended agricultural water quality goal for chloride, that would apply the narrative chemical constituent objective, is 106 mg/L as a long-term average based on Water Quality for Agriculture, Food and Agriculture Organization of the United Nations—Irrigation and Drainage Paper No. 29, Rev. 1 (R.S. Ayers and D.W. Westcot, Rome, 1985). The 106 mg/L limit is intended to protect against adverse effects on sensitive crops when irrigated via sprinklers.

Chloride concentrations in the effluent ranged from 230-340 mg/L, with an average of 286 mg/L based on 21 samples collected by the Discharger between December 1996 and May 2003. Background concentrations in Old River ranged from 57-160 mg/L, with an average of 119 mg/L based on results from 12 samples collected by the Discharger between January 2002 and December 2002. Both the receiving water and the effluent exceed the agricultural use limit of 106 mg/L applying the narrative chemical constituents objective.

Sulfate. The secondary MCL for sulfate is 250 mg/L. Sulfate concentrations in the effluent ranged from 160-350 mg/L, with an average of 246 mg/L based on 21 samples collected by the Discharger between December 1996 and May 2003. Background concentrations in Old River ranged from 4-160 mg/L, with an average of 110 mg/L based on results from 12 samples collected by the Discharger between January 2002 and December 2002. The effluent exceeded the water quality objective of 250 mg/L on 8 of 21 occasions based on the chemical constituents objective.

Electrical Conductivity (EC). The Basin Plan contains site-specific water quality objectives for electrical conductivity for the South Delta of 700 µmhos/cm (from 1 April to 31 August) and 1000 µmhos/cm (from 1 September to 31 March) based on a 30-day running average. State Water Board Decision 1641 (D-1641) (water rights) requires that the 1000 µmhos/cm objective be met year round until April 1, 2005 at which time the seasonal objectives will be effective. The recommended secondary California maximum contaminant level (MCL) for EC is 900 µmhos/cm and the agricultural water quality goal, that would apply the narrative chemical constituents objective, is 700 µmhos/cm as a long-term average based on Water Quality for Agriculture, Food and Agriculture Organization of the United Nations—Irrigation and Drainage Paper No. 29, Rev. 1 (R.S. Ayers and D.W. Westcot, Rome, 1985). The 700 µmhos/cm agricultural limit is intended to prevent reduction in crop yield, i.e. a restriction on use of water, for salt-sensitive crops, such as beans, carrots, turnips, and strawberries. These crops are either currently grown in the South Delta or may be grown in the future.

A review of the Discharger's monitoring reports from July 1998 through December 2004 shows an average effluent EC of 1753 µmhos/cm, with a range from
1008 µmhos/cm to 2410 µmhos/cm for 305 samples. These levels exceed the applicable objectives. The background receiving water EC averaged 640 µmhos/cm in 277 sampling events collected by the Discharger from July 1998 through November 2003. These data show that the receiving water frequently has no assimilative capacity for EC. Therefore, there is reasonable potential to exceed the water quality

objectives for EC based on both the effluent and the receiving water data. An AMEL for EC of 700 µmhos/cm is included in this Order implementing the Basin Plan narrative chemical constituents objective based on the agricultural water quality goal, the South Delta Basin Plan site-specific water quality objective for EC, and D-1641.

TDS, chloride, sulfate, and EC are all measures of, or are related to, the salt content of the water. Compliance with the effluent limitations for EC, which implements the Basin Plan narrative chemical constituents objective based on the agricultural water quality goal, will generally ensure compliance with the TDS, chloride, and sulfate water quality objectives; therefore, no limitations are included for TDS, chloride, and sulfate.

Based on the sample results in the effluent, the limitations appear to put the Discharger in immediate non-compliance with the Basin Plan narrative chemical constituents objective for EC. New or modified control measures may be necessary in order to comply with the effluent limitations, and the new or modified control measures cannot be designed, installed and put into operation within 30 calendar days. Furthermore, the effluent limitations for EC are new regulatory requirements within this permit, which becomes applicable to the waste discharge with the adoption of this Order, which was adopted after July 1, 2000. Therefore, a compliance time schedule for compliance with the EC effluent limitations are established in TSO No. R5-2006-____ in accordance with CWC section 13300, that requires preparation of a pollution prevention plan in compliance with CWC section 13263.3."