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.

**Table F-4. Salinity Water Quality Criteria/Objectives**

| Parameter | Agricultural WQ Goal[1] | Secondary MCL[3] | Effluent | |
|---|---|---|---|---|
| | | | Avg | Max |
| EC (µmhos/cm) | Varies[2] | 900, 1600, 2200 | 992 | 1320 |
| TDS (mg/L) | Varies[2] | 500, 1000, 1500 | 636 | 690 |
| Sulfate (mg/L) | N/A | 250, 500, 600 | 89 | 101 |
| Chloride (mg/L) | Varies[2] | 250, 500, 600 | 102 | 122 |

1 Agricultural water quality goals 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)

2 The salinity level in irrigation water that harms crop production depends on the crop type, soil type, irrigation methods, rainfall, and other factors. An EC level of 700 umhos/cm is generally considered to present no risk of salinity impacts to crops. However, many crops are grown successfully with higher salinities.

3 The secondary MCLs are stated as a recommended level, upper level, and a short-term maximum level.

i. **Chloride.** The secondary MCL for chloride is 250 mg/L, as recommended level, 500 mg/L as an upper level, and 600 mg/L as a short-term maximum. 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 water quality goal is intended to protect against adverse effects on sensitive crops when irrigated via sprinklers.

Chloride concentrations in the effluent ranged from 82 mg/L to 122 mg/L, with an average of 102 mg/L, for 18 samples collected by the Discharger. The effluent exceeds the agricultural water quality goal of 106 mg/L.

ii. **Electrical Conductivity (EC).** The secondary MCL for EC is 900 µmhos/cm as a recommended level, 1600 µmhos/cm as an upper level, and 2200 µmhos/cm as a short-term maximum. 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 water quality goal 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 area or may be grown in the future. Most other crops can tolerate higher EC concentrations without harm, however, as the salinity of the irrigation water increases, more crops are potentially harmed by the EC, or extra measures must be taken by the farmer to minimize or eliminate any harmful impacts.

The average effluent EC was 992 µmhos/cm, with a range from 647 µmhos/cm to 1320 µmhos/cm for 1095 samples. The discharge exceeds the applicable water quality objectives for EC.

The City completed a Salinity Source Control Study Phase I Report, dated 1 December 2002 and a Salinity Source Control Study Final Effectiveness Assessment Report, dated 1 March 2006, as required by NPDES Order No. 5-01-044. The City uses three sources of municipal drinking water; the North Bay Aqueduct, Lake Berryessa, and groundwater. The weighted average EC of the municipal source water since 2001 is 402 µmhos/cm. The City's studies show that the greatest contributor of salt is residential use, followed by industry and commercial facilities. The City estimates that approximately 6000 pounds/day of salt is discharged to the WWTP from residential water softeners.

To reduce salinity, the City has examined and implemented the following:

1) Public education - Public education actions included information sheets and surveys distributed to residents, meetings with water softener vendors & dentists, and presentations to community groups and high school students. After 3 years there is no statistically significant change in the salinity from residential wastewater.
2) Local Ordinance development - Local ordinance development evaluated restricting residential use of water softeners. AB 334 amends state law on water softeners and restricts local agencies from developing ordinances to eliminate water softeners without salinity requirements in its NPDES permit. The City cannot take action on a local ordinance until the Regional Water Board adopts salinity requirements.
3) Alternative Water Source - The City plans to decrease use of groundwater and increase use of Delta water for source water. Eventually, salinity would decrease. No formal actions have been taken toward this goal.
4) Source identification and Control Studies. The major discharging industries are pharmaceutical, California Medical Facility for inmates, and California State Prison. All of these industries conducted source control and process analyses to reduce salts. Additional reduction from industries is not expected.

The effluent EC has not statistically decreased since implementing the source reduction plan. The City is required to evaluate and update the implementation plan and continue efforts to reduce salinity.

iii. **Sulfate.** The secondary MCL for sulfate is 250 mg/L as recommended level, 500 mg/L as an upper level, and 600 mg/L as a short-term maximum. Sulfate concentrations in the effluent ranged from 72 mg/L to 101 mg/L, with an average of 89 mg/L, for 18 samples collected by the Discharger. The effluent does not exceed the secondary MCL recommended level of 250 mg/L.

iv. **Total Dissolved Solids (TDS).** 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 water quality goal is intended to prevent reduction in crop yield, i.e. a restriction on use of water, for salt-sensitive crops. Only the most salt sensitive crops require irrigation water of 450 mg/L or less to prevent loss of yield. Most other crops can tolerate higher TDS concentrations without harm, however, as the salinity of the irrigation water increases, more crops are potentially harmed by the TDS, or extra measures must be taken by the farmer to minimize or eliminate any harmful impacts.

The average TDS effluent concentration was 636 mg/L and a ranged from 570 mg/L to 690 mg/L for 36 samples collected by the Discharger. These concentrations exceed the applicable water quality objectives.

v. **Salinity Effluent Limitations.** TDS, chloride, sulfate, and EC are all measures of the salt content (salinity) in the water. The effluent has a reasonable potential to cause or contribute to an in-stream excursion of the recommended agricultural water quality goal for EC, TDS, and chloride. The salinity level in irrigation water that harms crop production depends on the crop type, soil type, irrigation methods, rainfall, and other factors. An EC level of 700 µmhos/cm is generally considered to present no risk of salinity impacts to crops. However, many crops are grown successfully with higher salinities. This Order requires the discharger to conduct a study that recommends site-specific numeric values for EC that provide reasonable protection for the agricultural supply use designation in Old and New Alamo Creek and Ulatis Creek. In the interim, this Order includes a performance-based effluent limitation for EC of 1,320 µmhos/cm, as a monthly average, to maintain the salinity of the discharger at current levels. Compliance with the effluent limitation for EC will adequately control chloride and TDS , therefore, no effluent limitations are included for chloride and TDS. However, monitoring is required for these constituents to ensure that EC is a satisfactory indicator parameter for salinity. The performance-based interim effluent limitation was calculated as indicated in Section IV.E.1 below. Furthermore, this Order

encourages the Discharger develop measures to reduce the salinity of its discharge with a salinity goal of water supply EC plus 500 µmhos/cm and a requirement to submit annual progress reports. Finally, this Order requires that the Discharger update and implement its pollution prevention plan for salinity in accordance with CWC section 13263.3(d)(3).

q. **Settleable Solids.** For inland surface waters, the Basin Plan states that "[w]ater shall not contain substances in concentrations that result in the deposition of material that causes nuisance or adversely affects beneficial uses." This Order contains average monthly and average daily effluent limitations for settleable solids.

Because the amount of settleable solids is measured in terms of volume per volume without a mass component, it is impracticable to calculate mass limitations for inclusion in this Order. A daily maximum effluent limitation for settleable solids is included in the Order, in lieu of a weekly average, to ensure that the treatment works operate in accordance with design capabilities.

r. **Total Trihalomethanes (THMs).** Information submitted by the Discharger indicates that the effluent contains THMs, including chloroform. The Basin Plan contains the narrative "chemical constituent" objective that requires, at a minimum, that waters with a designated MUN use not exceed California MCLs. In addition, the chemical constituent objective prohibits chemical constituents in concentrations that adversely affect beneficial uses. The California primary MCL for total THMs is 100 µg/L. The USEPA primary MCL for total THMs is 80 µg/L, which was effective on January 1, 2002 for surface water systems that serve more than 10,000 people. Pursuant to the Safe Drinking Water Act, DHS must revise the current total THMs MCL in Title 22, CCR to be as low or lower than the USEPA MCL. Total THMs include bromoform, dichlorobromomethane, chloroform, and chlorodibromomethane. The Cal/EPA Office of Environmental Health Hazard Assessment (OEHHA) has published the Toxicity Criteria Database, which contains cancer potency factors for chemicals, including chloroform, that have been used as a basis for regulatory actions by the regional boards, departments, and offices within Cal/EPA. This cancer potency factor is equivalent to a chloroform concentration in drinking water of 1.1 µg/L (ppb) at the 1-in-a-million cancer risk level with an average daily consumption of two liters of drinking water over a 70-year lifetime.

MUN is a designated beneficial use of New Alamo and Ulatis Creeks. However, there are no known active drinking water intakes in Old Alamo, New Alamo and Ultais Creeks for several miles downstream of the discharge, and chloroform is a non-conservative pollutant. Therefore, to protect the MUN use of the receiving waters, the Regional Water Board finds that, in this specific circumstance, application of the USEPA MCL for total THMs for the effluent is appropriate, as long as the receiving water does not exceed the OEHHA cancer potency factor's equivalent receiving water concentration at a reasonable distance from the outfall. Although chloroform can be volatized, traces are found 12 miles below

the discharge at the abandoned Vallejo Pumping Station in Cache Slough, once the drinking water supply for the City of Vallejo, at levels of 2.4 µg/L according to a draft August 2007 report titled, *Technical Memorandum No. 4 Water Quality Characteristics of Alamo Creek, Ulatis Creek and Cache Slough*. Typically, in NPDES permits, the OEHHA public health goal is not used to base effluent limitations when there are no active drinking water intakes in the vicinity of the discharge, because chloroform is a volatile organic constituent that will degrade in the environment. If there are no intakes near the discharge, the MCL for total THMs is used with receiving water monitoring for chloroform to determine if the constituent is degrading in the environment before reaching any drinking water intakes.

The MEC for total THMs was 113 µg/L, based on 36 samples. Chloroform samples collected over the same period contained a maximum concentration of 79 µg/L and an average concentration of 45 µg/L. Therefore, total THMs in the discharge have a reasonable potential to cause or contribute to an in-stream excursion above the USEPA primary MCL for total THMs. No chloroform has been detected in the background receiving water (New Alamo Creek). The lowest detection level of the receiving water chloroform concentrations at RSW-003 is <0.5 µg/L; therefore, some assimilative capacity for chloroform is available. The minimum available dilution credit of 1.1 was used in developing of the WQBEL for total THMs for the protection of the applicable MUN use at New Alamo Creek, resulting in a WQBEL of 167 µg/L as an average annual effluent limitation for total THMs. However, the Regional Water Board finds that based on Facility performance, the Discharger can reliably meet a more stringent performance-based effluent limit. Therefore, granting of the dilution credit could allocate an unnecessarily large portion of the receiving water's assimilative capacity for human health water quality criteria and could violate the Antidegradation Policy. For this reason, a performance-based effluent limitation is included in this order that is calculated in the same way that interim limits are calculated (see Section IV.E.1 below). A maximum daily effluent limitation for total THMs of 122 µg/L is included in this Order.

s. **Toxicity.** See Section IV.C.5. of the Fact Sheet regarding whole effluent toxicity.

**4. WQBEL Calculations**

a. Effluent limitations for CTR constituents cyanide, chlorodibromomethane, and dichlorobromomethane were calculated in accordance with section 1.4 of the SIP. Effluent limitations for non-CTR constituents ammonia, trihalomethanes, and nitrate, were also calculated following the same procedures as prescribed in the SIP. The following paragraphs describe the methodology used for calculating effluent limitations. Effluent limitations for organochlorine pesticides and chlorine residual were calculated equal to the applicable water quality objectives.

b. **Effluent Limitation Calculations.** In calculating maximum effluent limitations, the effluent concentration allowance (ECA) is calculated as follows:

$$ECA_{acute} = CMC + D(CMC - B)$$
$$ECA_{chronic} = CCC + D(CCC - B)$$

For the human health, agriculture, or other long-term criterion/objective, the ECA is calculated as follows:

$$ECA_{HH} = HH + D(HH - B)$$

where:

$ECA_{acute}$ = effluent concentration allowance for acute (one-hour average) toxicity criterion

$ECA_{chronic}$ = effluent concentration allowance for chronic (four-day average) toxicity criterion

$ECA_{HH}$ = effluent concentration allowance for human health, agriculture, or other long-term criterion/objective

CMC = criteria maximum concentration (one-hour average)

CCC = criteria continuous concentration (four-day average, unless otherwise noted)

HH = human health, agriculture, or other long-term criterion/objective

D = dilution credit

B = maximum receiving water concentration

Acute and chronic toxicity ECAs were then converted to equivalent long-term averages (LTA) using statistical multipliers and the lowest is used. Additional statistical multipliers were then used to calculate the maximum daily effluent limitation (MDEL) and the average monthly effluent limitation (AMEL).

AMELs are set equal to the Human health ECAs and a statistical multiplier is used to calculate the MDEL.

$$AMEL = mult_{AMEL}\left[\min\left(\underbrace{M_A ECA_{acute}}_{LTA_{acute}}, M_C ECA_{chronic}\right)\right]$$
$$MDEL = mult_{MDEL}\left[\min\left(M_A ECA_{acute}, \underbrace{M_C ECA_{chronic}}_{LTA_{chronic}}\right)\right]$$
$$MDEL_{HH} = \left(\frac{mult_{MDEL}}{mult_{AMEL}}\right) AMEL_{HH}$$

where: $mult_{AMEL}$ = statistical multiplier converting minimum LTA to AMEL
$mult_{MDEL}$ = statistical multiplier converting minimum LTA to MDEL
$M_A$ = statistical multiplier converting CMC to LTA
$M_C$ = statistical multiplier converting CCC to LTA

Water quality-based effluent limitations were calculated for CTR constituents: cyanide, chlorodibromomethane, dichlorobromomethane, as shown in Table F-5. The calculations for the WQBELs for ammonia are shown in Table F-6.

**Table F-5. WQBEL calculations for CTR constituents**

| Description | Cyanide | | Chlorodibromomethane | Dichlorobromomethane |
|---|---|---|---|---|
| **Effluent Concentrations** | | | | |
| Sample Dates - Begin | Dec-05 | | Dec-05 | Dec-05 |
| Sample Dates - End | Nov-07 | | Nov-07 | Nov-07 |
| At least 80% of data ND? | No | | No | No |
| Sample Count | 37 | | 36 | 36 |
| MEC (µg/l) | 17 | | 14 | 43 |
| Mean (µg/l) | 6.30 | | 3.9 | 17.4 |
| Std. Deviation (µg/l) | 4.4 | | 2.6 | 6.0 |
| Coeff of Variation (CV) (µg/l) | 0.69 | | 0.67 | 0.34 |
| **Background Concentrations** | | | | |
| Sample Dates - Begin | None | | Jan 2004 | Jan 2004 |
| Sample Dates - End | None | | Jul-07 | Jul-07 |
| Sample Count | 0 | | 25 | 25 |
| Max Background (µg/l) | None | | 0.5 | 0.5 |
| Avg Background (µg/l) | None | | 0.5 | 0.5 |
| **Criteria** | acute | chronic | HH(w+org) | HH(w+org) |
| NTR/CTR Criteria (µg/l) | 22 | 5.2 | 0.41 | 0.56 |
| Basin Plan Objective (µg/l) | N/A | N/A | N/A | N/A |
| Translator | 1.000 | 1.000 | N/A | N/A |
| Criteria (µg/l, total recoverable) | 22 | 5.2 | 0.41 | 0.56 |
| **Effluent Limit Calculations** | | | | |
| Dilution Credit | 0 | 0 | 0[7] | 1.1 |
| ECA[1](µg/l) | 22 | 5.2 | 0.41 | 0.626 |
| $\sigma^2$ | 0.40 | | 0.37 | 0.11 |
| $\sigma_4^2$ | 0.12 | | 0.11 | 0.03 |
| ECA Multiplier [2] | 0.282 | 0.481 | N/A | N/A |
| Long-Term Average (LTA) | 6.2 | 2.5 | N/A | N/A |
| AMEL Multiplier [3][4] | 6 | 1.65 | 1.62 | 1.31 |
| **AMEL** | 6 | **4.1** | **0.41** | **0.63** |
| MDEL Multiplier [5] | 6 | 3.55 | 3.14 | 2.06 |
| **MDEL** | 6 | **8.9** | **0.86** | **0.99** |

(1) ECA calculated per Section 1.4.B, Step 2 of SIP. This allows for the consideration of dilution.
(2) Acute and Chronic ECA Multipliers calculated at 99th percentile per Section 1.4.B, Step 3 of SIP.
(3) Assumes sampling frequency n is equal or less than 4.
(4) The probability basis for AMEL is 95th percentile per Section 1.4.B, Step 5 of SIP
(5) The probability basis for MDEL is 99th percentile per Section 1.4.B, Step 5 of SIP
(6) Not applicable as chronic criterion LTA is more stringent
(7) No assimilative capacity = no dilution

## Table F-6. WQBEL calculations for Ammonia

| | Acute | Chronic (30-day) | Chronic (4-day) |
|---|---|---|---|
| Criteria (mg/L) [1] | 3.20 | 2.56 | 6.40 |
| Dilution Credit | No Dilution | No Dilution | No Dilution |
| ECA[3] | 3.20 | 2.56 | 6.40 |
| ECA Multiplier | 0.23 | 0.70 | 0.41 |
| LTA | 0.72 | 1.78 | 2.61 |
| AMEL Multiplier (95$^{th}$%) | 1.4 | [2] | [2] |
| AMEL (mg/L)[4][5] | 1.3 | [2] | [2] |
| MDEL Multiplier (99$^{th}$%) | 4.4 | [2] | [2] |
| MDEL (mg/L)[6] | 3.2 | [2] | [2] |

(1) USEPA Ambient Water Quality Criteria
(2) Limitations based on acute LTA [Acute LTA < Chronic (30-day) LTA < Chronic (4-day)]
(3) ECA calculated per Section 1.4.B, Step 2 of SIP. This allows for the consideration of dilution.
(4) Assumes sampling frequency n is equal or less than 4.
(5) The probability basis for AMEL is 95th percentile per Section 1.4.B, Step 5 of SIP
(6) The probability basis for MDEL is 99th percentile per Section 1.4.B, Step 5 of SIP

## Summary of Water Quality-based Effluent Limitations Discharge Point 001

### Table F-7. Summary of Water Quality-based Effluent Limitations

| Parameter | Units | Effluent Limitations | | | | |
|---|---|---|---|---|---|---|
| | | Average Monthly | Average Weekly | Maximum Daily | Instantaneous Minimum | Instantaneous Maximum |
| Ammonia (as N) (total recoverable) | mg/L | 1.3 | -- | 3.2 | -- | -- |
| | lbs/day | 163 | -- | 400 | -- | -- |
| Cyanide (total recoverable) | µg/L | 4.1 | -- | 8.9 | -- | -- |
| Chlorodibromomethane | µg/L | 0.41 | -- | 0.86 | -- | -- |
| Total Trihalomethanes[2] | µg/L | 167[3] | -- | -- | -- | -- |
| Dichlorobromomethane | µg/L | 0.63 | -- | 0.99 | -- | -- |
| Nitrate (as N) (total recoverable) | mg/L | 17 | -- | -- | -- | -- |
| Turbidity[4] 1 May – 31 October | NTU | -- | -- | 2 | -- | 10 |
| Total Coliform 1 May – 31 October | MPN/100mL | -- | 2.2[5] | 23[6] | -- | 240 |
| Total Coliform 1 November – 30 April | MPN/100mL | 23[7] | -- | -- | -- | 240 |
| Acute Toxicity[8] | % Survival | | | | | |

1 Based upon a design treatment capacity of 15 mgd) ADWF
2 The total of bromoform, chloroform, dichlorobromomethane and chlorodibromomethane.
3 Annual average. More stringent performance-based effluent limitation included in this Order.

4 Effluent turbidity shall not exceed 2 NTU, as a daily average; 5 NTU, more than 5% of the time within a 24-hour period, and 10 NTU at any time. No turbidity effluent limits from 1 November – 30 April.

5 Expressed as a 7-day median.

6 Not to be exceeded more than one time in any 30-day period.

7 Expressed as a 30-day median.

8 Survival of aquatic organisms in 96-hour bioassays of undiluted waste shall be no less than 70%, minimum for any one bioassay; and 90%, median for any three consecutive bioassays.

## 5. Whole Effluent Toxicity (WET)

For compliance with the Basin Plan's narrative toxicity objective, this Order requires the Discharger to conduct whole effluent toxicity testing for acute and chronic toxicity, as specified in the Monitoring and Reporting Program (Attachment E, Section V.). This Order also contains effluent limitations for acute toxicity and requires the Discharger to implement best management practices to investigate the causes of, and identify corrective actions to reduce or eliminate effluent toxicity.

a. **Acute Aquatic Toxicity.** The Basin Plan contains a narrative toxicity objective that states, "*All waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life.*" (Basin Plan at III-8.00). The Basin Plan also states that, "*...effluent limits based upon acute biotoxicity tests of effluents will be prescribed where appropriate...*". USEPA Region 9 provided guidance for the development of acute toxicity effluent limitations in the absence of numeric water quality objectives for toxicity in its document titled "Guidance for NPDES Permit Issuance", dated February 1994. In section B.2. "Toxicity Requirements" (pgs. 14-15) it states that, "*In the absence of specific numeric water quality objectives for acute and chronic toxicity, the narrative criterion 'no toxics in toxic amounts' applies. Achievement of the narrative criterion, as applied herein, means that ambient waters shall not demonstrate for acute toxicity: 1) less than 90% survival, 50% of the time, based on the monthly median, or 2) less than 70% survival, 10% of the time, based on any monthly median. For chronic toxicity, ambient waters shall not demonstrate a test result of greater than 1 TUc.*" Accordingly effluent limitations for acute toxicity have been included in this Order as follows:

> **Acute Toxicity.** Survival of aquatic organisms in 96-hour bioassays of undiluted waste shall be no less than:
>
> | | |
> |---|---|
> | Minimum for any one bioassays ---------- | 70% |
> | Median for any three or more consecutive bioassays --------- | 90% |

b. **Chronic Aquatic Toxicity.** Based on quarterly whole effluent chronic toxicity testing performed by the Discharger from January 2004 through July 2007, the discharge has reasonable potential to cause or contribute to an to an in-stream excursion above of the Basin Plan's narrative toxicity objective.

No dilution has been granted for the chronic condition. Therefore, chronic toxicity testing results exceeding 1 chronic toxicity unit (TUc) demonstrates the discharge has a reasonable potential to cause or contribute to an exceedance of the Basin Plan's narrative toxicity objective.

Numeric chronic WET effluent limitations have not been included in this order. The SIP contains implementation gaps regarding the appropriate form and implementation of chronic toxicity limits. This has resulted in the petitioning of a NPDES permit in the Los Angeles Region[2] that contained numeric chronic toxicity effluent limitations. To address the petition, the State Water Board adopted WQO 2003-012 directing its staff to revise the toxicity control provisions in the SIP. The State Water Board states the following in WQO 2003-012, *"In reviewing this petition and receiving comments from numerous interested persons on the propriety of including numeric effluent limitations for chronic toxicity in NPDES permits for publicly-owned treatment works that discharge to inland waters, we have determined that this issue should be considered in a regulatory setting, in order to allow for full public discussion and deliberation. We intend to modify the SIP to specifically address the issue. We anticipate that review will occur within the next year. We therefore decline to make a determination here regarding the propriety of the final numeric effluent limitations for chronic toxicity contained in these permits."* The process to revise the SIP is currently underway. Proposed changes include clarifying the appropriate form of effluent toxicity limits in NPDES permits and general expansion and standardization of toxicity control implementation related to the NPDES permitting process. Since the toxicity control provisions in the SIP are under revision it is infeasible to develop numeric effluent limitations for chronic toxicity. Therefore, this Order requires that the Discharger meet best management practices for compliance with the Basin Plan's narrative toxicity objective, as allowed under 40 CFR 122.44(k).

To ensure compliance with the Basin Plan's narrative toxicity objective, the Discharger is required to conduct chronic whole effluent toxicity testing, as specified in the Monitoring and Reporting Program (Attachment E, Section V.). Furthermore, Special Provisions VI.C.2.a. of this Order requires the Discharger to investigate the causes of, and identify and implement corrective actions to reduce or eliminate effluent toxicity. If the discharge demonstrates a pattern of toxicity exceeding the numeric toxicity monitoring trigger, the Discharger is required to initiate a Toxicity Reduction Evaluation (TRE), in accordance with an approved TRE work plan. The numeric toxicity monitoring trigger is not an effluent limitation, it is the toxicity threshold at which the Discharger is required to

[2] In the Matter of the Review of Own Motion of Waste Discharge Requirements Order Nos. R4-2002-0121 [NPDES No. CA0054011] and R4-2002-0123 [NPDES NO. CA0055119] and Time Schedule Order Nos. R4-2002-0122 and R4-2002-0124 for Los Coyotes and Long Beach Wastewater Reclamation Plants Issued by the California Regional Water Quality Control Board, Los Angeles Region SWRCB/OCC FILES A-1496 AND 1496(a)

perform accelerated chronic toxicity monitoring, as well as, the threshold to initiate a TRE if a pattern of effluent toxicity has been demonstrated.

## D. Final Effluent Limitations

### 1. Mass-based Effluent Limitations.

Title 40 CFR 122.45(f)(1) requires effluent limitations be expressed in terms of mass, with some exceptions, and 40 CFR 122.45(f)(2) allows pollutants that are limited in terms of mass to additionally be limited in terms of other units of measurement. This Order includes effluent limitations expressed in terms of mass and concentration. In addition, pursuant to the exceptions to mass limitations provided in 40 CFR 122.45(f)(1), some effluent limitations are not expressed in terms of mass, such as pH and temperature, and when the applicable standards are expressed in terms of concentration (e.g. CTR criteria and MCLs) and mass limitations are not necessary to protect the beneficial uses of the receiving water.

Mass-based effluent limitations were calculated based upon the permitted average dry weather flow allowed in Section IV.A.1.g of the Limitations and Discharge Requirements.

### 2. Averaging Periods for Effluent Limitations.

Title 40 CFR 122.45 (d) requires average weekly and average monthly discharge limitations for publicly owned treatment works (POTWs) unless impracticable. However, for toxic pollutants and pollutant parameters in water quality permitting, the US EPA recommends the use of a maximum daily effluent limitation in lieu of average weekly effluent limitations for two reasons. "*First, the basis for the 7-day average for POTWs derives from the secondary treatment requirements. This basis is not related to the need for assuring achievement of water quality standards. Second, a 7-day average, which could comprise up to seven or more daily samples, could average out peak toxic concentrations and therefore the discharge's potential for causing acute toxic effects would be missed.*" (TSD, pg. 96) This Order utilizes maximum daily effluent limitations in lieu of average weekly effluent limitations for ammonia, cyanide, chlorodibromomethane, and dichlorobromomethane, and a 1-hr average and 4-day average for chlorine residual as recommended by the TSD for the achievement of water quality standards and for the protection of the beneficial uses of the receiving stream. Furthermore, for BOD, TSS, pH, coliform, and turbidity, weekly average effluent limitations have been replaced or supplemented with effluent limitations utilizing shorter averaging periods. The rationale for using shorter averaging periods for these constituents is discussed in Attachment F, Section IV.C.3, above.

### 3. Satisfaction of Anti-Backsliding Requirements.

Some effluent limitations and monitoring requirements in this Order are not as stringent as the previous Order. As discussed below this relaxation is consistent with the anti-backsliding requirements of the CWA and federal regulations.

**Dissolved Oxygen (DO) and Biochemical Oxygen Demand (BOD).** Order No. 5-01-044 established WQBELs for DO and BOD, which were more stringent than technology based requirements and equivalent to tertiary treatment because of the need to comply with receiving water limitations for DO protective of the COLD beneficial use in Old Alamo Creek. A Basin Plan amendment was subsequently adopted removing the beneficial uses of COLD and MUN from Old Alamo Creek. This change in beneficial uses changed the applicable DO receiving water limitation and thus removed the need for such stringent limitations of BOD and the need for an effluent limitation for DO since the Discharger also demonstrated that it can comply with the new applicable receiving water DO objective.

**Copper, Antimony, and Arsenic.** Order No. 5-01-044 established effluent limitations for copper, antimony, and arsenic. The facility has gone through an expansion and a new treatment plant has been in operation since December 2005. Review of monthly monitoring data from 2004 thru 2007 shows that the effluent does not have reasonable potential to cause or contribute to an exceedance of the water quality objectives for copper, antimony, and arsenic. These previous effluent limitations are not included in this Order based on new information.

**Chloroform.** Order No. 5-01-44 required effluent limitation for chloroform based on the National Ambient Water Quality Criteria for water and fish consumption (5.7 µg/L). However, a typographical error was made in the permit with the effluent limit stated as 0.57 µg/L, rather than 5.7 µg/L. USEPA has reserved the National Ambient Water Quality Criteria for water and fish for chloroform and is developing new criteria. Until criteria are developed specifically for chloroform, the federal MCL for total trihalomethanes (chloroform, bromoform, dichlorobromomethane and chlorodibromomethane) will be used to calculate the WQBEL for totlal trihalomethanes, which is an average annual effluent limitation of 167 µg/L, using the minimum available dilution credit of 1.1:1. However, since the Facility is capable of meeting a more stringent performance-based effluent limitation for Total THMs, this Order includes a MDEL of 122 µg/L, to ensure compliance with antidegradation provisions of 40 CFR 131.12 and State Water Board Resolution 68-16.

**Dichlorobromomethane and Chlorodibromomethane.** The MUN designation for Old Alamo has been removed and the City has since completed a dilution evaluation for compliance in New Alamo Creek. Based on the Discharger's dilution study, the minimum dilution in New Alamo Creek at the confluence with Old Alamo Creek is 1.1:1. This dilution credit has been used when calculating the new effluent limitation for dichlorobromomethane and chlorodibromomethane, which has resulted in less stringent effluent limitations.

**Oil and Grease.** Monitoring data since March 2001 has consistently shown results of non-detect for Oil and Grease. Based on the consistent non-detect results no effluent limit for Oil and Grease is required and the monitoring frequency for Oil and Grease has been reduced from a weekly basis to a monthly basis.

**Thallium Monitoring Requirements.** The previous Order required that thallium be monitored on a monthly basis. The monitoring requirement for thallium has been removed from this Order, because thalium in the effluent does not have reasonable potential to cause or contribute to an exceedance of the water quality objective for thalium.

These changes have been made based on new information and are consistent with the antibacksliding regulations. The changes are also consistent with the antidegradation provisions of 40 CFR 131.12 and State Water Resources Control Board Resolution 68-16. Any impact on existing water quality will be insignificant.

4. **Satisfaction of Antidegradation Policy**

Section 131.12 requires that the state water quality standards include an antidegradation policy consistent with the federal policy. The State Water Board established California's antidegradation policy in State Water Board Resolution No. 68-16. Resolution No. 68-16 incorporates the federal antidegradation policy where the federal policy applies under federal law. Resolution No. 68-16 requires that existing water quality be maintained unless degradation is justified based on specific findings. The Regional Water Board's Basin Plan implements, and incorporates by reference, both the State and federal antidegradation policies.

**Surface Water.** This Order does not allow for an increase in flow or mass of pollutants to the receiving water. Therefore, a complete antidegradation analysis is not necessary. The Order requires compliance with applicable federal technology-based standards and with water quality-based effluent limits (WQBELs) where the discharge could have the reasonable potential to cause or contribute to an exceedance of water quality standards.

This Order includes effluent limitations that will require Title 22 tertiary treatment or equivalent to achieve compliance, which is a high level of treatment that is considered best practicable treatment or control (BPTC) for most constituents in the wastewater and will result in attaining water quality standards applicable to the discharge. The Order includes less stringent effluent limitations for some constituents. However, as discussed in detail in Section IV.D.3., above, the new limitations are fully protective of the beneficial uses of the receiving water and are in compliance with federal anti-backsliding regulations.

**Groundwater.** Groundwater limitations are based on water quality objectives contained in the Basin Plan and are a required part of this Order. The Basin Plan designates all groundwater, including the shallow groundwater in the vicinity of the

Facility, to have the beneficial uses of MUN, AGR, IND and PRO. The Discharger utilizes a lined aerated lagoon for storage of stabilized solids from the anaerobic digesters and a lined filtrate storage pond for storage of all the water removed from the biosolids by the belt presses. The Facility's impact to groundwater quality was one of the issues associated with the previous Order and the State Water Board's subsequent water quality Order No. 2002-0015. As part of its order, the State Water Board stated that "*...without more information on well location and some explanations of the changes in nitrate-N, TDS, and pH concentrations...*" it was "*...unable to draw meaningful conclusions from the monitoring data.*" As a result of the uncertainty, the State Water Board remanded the issue back to the Regional Water Board for further clarification and to give the Discharger the opportunity to respond. The Discharger in response to this directive, hired the services of Luhdorff & Scalmanini to conduct a shallow groundwater quality investigation. Based on the results of the investigation, submitted as part of the Report of Waste Discharge, it appears that groundwater was minimally impacted due to the facility's operation and that operational changes, like decommissioning of old storage ponds and the lining of any new storage ponds, have resulted in a steady decline in impact. However, the groundwater is also influenced by Old Alamo Creek where the discharge is located. An August 2005 shallow groundwater evaluation by Luhdorff and Scalmanini concluded Old Alamo Creek influences groundwater quality. Groundwater monitoring wells #3 and #5 show nitrate concentrations above the primary MCL of 10 mg/l since 2002. The report indicates the rising nitrate concentrations in monitoring well #3 are the result of temporary mobilization of soil nitrate from nearby construction excavation work and most recent data shows a decrease in nitrate concentration. The nitrate concentrations may also be the result of nitrifying the wastewater and increasing nitrate concentration in the effluent. Regardless, the nitrate concentrations are above both water quality objectives and background groundwater monitoring wells. Therefore, the City must immediately and definitely determine if the nitrate in the groundwater is the result its actions or inactions. Best Practical Treatment Control (BPTC) will be required if the increased groundwater nitrate concentrations are due to the City.

Appropriate groundwater limitations have been included in this order at the water quality objective for protection of the MUN and AGR beneficial uses of groundwater.

The permitted surface water and groundwater discharges are consistent with the antidegradation provisions of 40 CFR 131.12 and State Water Board Resolution 68-16. Compliance with the requirements of this Order will result in the use of best practicable treatment or control of the discharge. The impact on existing water quality will be insignificant.

## Summary of Final Effluent Limitations
## Discharge Point 001

### Table F-8. Summary of Final Effluent Limitations

| Parameter | Units | Effluent Limitations | | | | |
|---|---|---|---|---|---|---|
| | | Average Monthly | Average Weekly | Maximum Daily | Instantaneous Minimum | Instantaneous Maximum |
| BOD 5-day 20°C<br>1 May – 31 October | mg/L | 10 | 15 | 20 | -- | -- |
| | lbs/day[1] | 1252 | 1878 | 2504 | -- | -- |
| Total Suspended Solids<br>1 May – 31 October | mg/L | 10 | 15 | 20 | -- | -- |
| | lbs/day[1] | 1252 | 1878 | 2504 | -- | -- |
| BOD 5-day 20°C<br>1 November – 30 April | mg/L | 20 | 25 | 30 | -- | -- |
| | lbs/day[1] | 2504 | 3129 | 3755 | -- | -- |
| Total Suspended Solids<br>1 November – 30 April | mg/L | 30 | 45 | 50 | -- | -- |
| | lbs/day[1] | 3755 | 5633 | 6259 | -- | -- |
| Turbidity[4]<br>1 May – 31 October | NTU | -- | -- | 2 | -- | 10 |
| Total Coliform<br>1 May – 31 October | MPN/100mL | -- | 2.2[5] | 23[6] | -- | 240 |
| Total Coliform<br>1 November – 30 April | MPN/100mL | 23[7] | -- | -- | -- | 240 |
| Settleable Solids | ml/L | 0.1 | -- | 0.2 | -- | -- |
| pH | std units | -- | -- | -- | 6.5 | 8.5 |
| Ammonia (as N)<br>(total recoverable) | mg/L | 1.3 | -- | 3.2 | -- | -- |
| | lbs/day[1] | 163 | -- | 400 | -- | -- |
| Cyanide<br>(total recoverable) | µg/L | 4.1 | -- | 8.9 | -- | -- |
| Chlorodibromomethane | µg/L | 0.41 | -- | 0.86 | -- | -- |
| Total Trihalomethanes[3] | µg/L | -- | -- | 122 | -- | -- |
| Dichlorobromomethane | µg/L | 0.63 | -- | 0.99 | -- | -- |
| Nitrate (as N)<br>(total recoverable) | mg/L | 17 | -- | -- | -- | -- |
| Acute Toxicity[8] | % Survival | | | | | |

1 Based upon a design treatment capacity of 15 mgd (ADWF).
2 Non Detect
3 Total Trihalomethanes include chlorodibromomethane, bromoform, dichlorobromomethane and chloroform.
4 Effluent turbidity shall not exceed 2 NTU, as a daily average; 5 NTU, more than 5% of the time within a 24-hour period, and 10 NTU at any time. No turbidity effluent limits from 1 November – 30 April.
5 Expressed as a 7-day median.
6 Not to be exceeded more than one time in any 30-day period.
7 Expressed as a 30-day median.
8 Survival of aquatic organisms in 96-hour bioassays of undiluted waste shall be no less than 70%, minimum for any one bioassay; and 90%, median for any three consecutive bioassays.

## E. Interim Effluent Limitations

1. The SIP, section 2.2.1, requires that if a compliance schedule is granted for a CTR or NTR constituent, the Regional Water Board shall establish interim requirements and dates for their achievement in the NPDES permit. The interim limitations must be based on current treatment plant performance or existing permit limitations, whichever is more stringent. The State Water Board has held that the SIP may be used as guidance for non-CTR constituents. Therefore, the SIP requirement for interim effluent limitations has been applied to both CTR and non-CTR constituents in this Order.

   The interim limitations for cyanide, chlorodibromomethane, and dichlorobromomethane, and the final effluent limitations for total trihalomethanes, in this Order are based on the current treatment plant performance. In developing the performance-based effluent limitations, where there are ten sampling data points or more, sampling and laboratory variability is accounted for by establishing interim limits that are based on normally distributed data where 99.9% of the data points will lie within 3.3 standard deviations of the mean (*Basic Statistical Methods for Engineers and Scientists, Kennedy and Neville, Harper and Row*). Therefore, the performance-based effluent limitations in this Order are established as the mean plus 3.3 standard deviations of the available data. However if the MEC is greater than this calculated interim limitation then the MEC becomes the applicable performance-based effluent limitation.

   When there are less than ten sampling data points available, the *Technical Support Document for Water Quality- Based Toxics Control* ((EPA/505/2-90-001), TSD) recommends a coefficient of variation of 0.6 be utilized as representative of wastewater effluent sampling. The TSD recognizes that a minimum of ten data points is necessary to conduct a valid statistical analysis. The multipliers contained in Table 5-2 of the TSD are used to determine a maximum daily limitation based on a long-term average objective. In this case, the long-term average objective is to maintain, at a minimum, the current plant performance level. Therefore, when there are less than ten sampling points for a constituent, performance-based effluent limitations are based on 3.11 times the maximum observed effluent concentration to obtain the daily maximum performance-based effluent limitation (TSD, Table 5-2).

   The Regional Water Board finds that the Discharger can undertake source control and treatment plant measures to maintain compliance with the interim limitations included in this Order. Interim limitations are established when compliance with effluent limitations cannot be achieved by the existing discharge. Discharge of constituents in concentrations in excess of the final effluent limitations, but in compliance with the interim effluent limitations, can significantly degrade water quality and adversely affect the beneficial uses of the receiving stream on a long-term basis. The interim limitations, however, establish an enforceable ceiling concentration until compliance with the effluent limitation can be achieved.

   Table 6 summarizes the calculations of the interim effluent limitations for cyanide, chlorodibromomethane, and dichlorobromomethane:

**Table F-9. Interim Effluent Limitation Calculation Summary**

| Parameter | Units | MEC | Mean | Std. Dev. | # of Samples | Calculated Interim Limitation | Interim Limitation |
|---|---|---|---|---|---|---|---|
| Cyanide | µg/L | 17 | 6.3 | 4.4 | 37 | 21 | 21 |
| Chlorodibromomethane | µg/L | 14 | 3.9 | 2.6 | 36 | 12 | 14 |
| Dichlorobromomethane | µg/L | 43 | 16.7 | 5.8 | 36 | 27 | 43 |
| Electrical Conductivity | µmhos/cm | 1320 | 992 | 57 | 1095 | 1180 | 1320 |

2. **BOD, TSS, Turbidity, and Total Coliform Organisms.** The establishment of tertiary limitations was previously required for this discharge; however, this requirement was stayed in State Water Board WQO 2002-0015, therefore, a schedule for compliance with the tertiary treatment requirements is included in this Order. This Order provides interim effluent limitations for BOD, TSS, and total coliform based on the existing effluent limitations required by Order No. 5-01-044, which the Discharger is currently capable of meeting. Full compliance with the final effluent limitations for BOD, TSS, total coliform, and turbidity are not required by this Order until 1 May 2015.

## V. RATIONALE FOR RECEIVING WATER LIMITATIONS

Basin Plan water quality objectives to protect the beneficial uses of surface water and groundwater include numeric objectives and narrative objectives, including objectives for chemical constituents, toxicity, and tastes and odors. The toxicity objective requires that surface water and groundwater be maintained free of toxic substances in concentrations that produce detrimental physiological responses in humans, plants, animals, or aquatic life. The chemical constituent objective requires that surface water and groundwater shall not contain chemical constituents in concentrations that adversely affect any beneficial use or that exceed the maximum contaminant levels (MCLs) in Title 22, CCR. The tastes and odors objective states that surface water and groundwater shall not contain taste- or odor-producing substances in concentrations that cause nuisance or adversely affect beneficial uses. The Basin Plan requires the application of the most stringent objective necessary to ensure that surface water and groundwater do not contain chemical constituents, toxic substances, radionuclides, or taste and odor producing substances in concentrations that adversely affect domestic drinking water supply, agricultural supply, or any other beneficial use.

### A. Surface Water

1. CWA section 303(a-c), requires states to adopt water quality standards, including criteria where they are necessary to protect beneficial uses. The Regional Water Board adopted water quality criteria as water quality objectives in the Basin Plan. The Basin Plan states that "*[t]he numerical and narrative water quality objectives*

*define the least stringent standards that the Regional Board will apply to regional waters in order to protect the beneficial uses.*" The Basin Plan includes numeric and narrative water quality objectives for various beneficial uses and water bodies. This Order contains Receiving Surface Water Limitations based on the Basin Plan numerical and narrative water quality objectives for biostimulatory substances, chemical constituents, color, dissolved oxygen, floating material, oil and grease, pH, pesticides, radioactivity, salinity, sediment, settleable material, suspended material, tastes and odors, temperature, toxicity, turbidity, and electrical conductivity.

Numeric Basin Plan objectives for bacteria, dissolved oxygen, pH, temperature, and turbidity are applicable to this discharge and have been incorporated as Receiving Surface Water Limitations. Rational for these numeric receiving surface water limitations are as follows:

a. ***Bacteria.** The Basin Plan includes a water quality objective that "*[I]n water designated for contact recreation (REC-1), the fecal coliform concentration based on a minimum of not less than five samples for any 30-day period shall not exceed a geometric mean of 200/100 ml, nor shall more than ten percent of the total number of samples taken during any 30-day period exceed 400/100 ml.*" Numeric Receiving Water Limitations for bacteria are included in this Order and are based on the Basin Plan objective.

b. ***Biostimulatory Substances**. The Basin Plan includes a water quality objective that "*[W]ater shall not contain biostimulatory substances which promote aquatic growths in concentrations that cause nuisance or adversely affect beneficial uses."* Receiving Water Limitations for biostimulatory substances are included in this Order and are based on the Basin Plan objective.

c. ***Color**. The Basin Plan includes a water quality objective that "*[W]ater shall be free of discoloration that causes nuisance or adversely affects beneficial uses."* Receiving Water Limitations for color are included in this Order and are based on the Basin Plan objective.

d. ***Chemical Constituents.** The Basin Plan includes a water quality objective that *"[W]aters shall not contain chemical constituents in concentrations that adversely affect beneficial uses."* Receiving Water Limitations for chemical constituents are included in this Order and are based on the Basin Plan objective.

e. ***Dissolved Oxygen.** The Old Alamo Creek has been designated as having the beneficial use of warm freshwater aquatic habitat (WARM). For water bodies found outside the legal boundaries of the Delta and designated as having WARM as a beneficial use, the Basin Plan includes a water quality objective of maintaining a minimum of 5.0 mg/L of dissolved oxygen. Since the beneficial use of WARM applies to Old Alamo Creek, a receiving water limitation of 5.0 mg/L for dissolved oxygen is included in this Order applicable to Old Alamo Creek.

The New Alamo Creek has been designated as having the beneficial use of cold freshwater aquatic habitat (COLD). For water bodies found outside the legal boundaries of the Delta and designated as having COLD as a beneficial use, the Basin Plan includes a water quality objective of maintaining a minimum of 7.0 mg/L of dissolved oxygen. Since the beneficial use of COLD applies to New Alamo Creek, a receiving water limitation of 7.0 mg/L for dissolved oxygen is included in this Order.

For surface water bodies outside of the Delta, the Basin Plan includes the water quality objective that "*...the monthly median of the mean daily dissolved oxygen (DO) concentration shall not fall below 85 percent of saturation in the main water mass, and the 95 percentile concentration shall not fall below 75 percent of saturation.*" This objective was included as a receiving water limitation in this Order.

f. ***Floating Material**. The Basin Plan includes a water quality objective that *"[W]ater shall not contain floating material in amounts that cause nuisance or adversely affect beneficial uses."* Receiving Water Limitations for floating material are included in this Order and are based on the Basin Plan objective.

g. ***Oil and Grease**. The Basin Plan includes a water quality objective that *"[W]aters shall not contain oils, greases, waxes, or other materials in concentrations that cause nuisance, result in a visible film or coating on the surface of the water or on objects in the water, or otherwise adversely affect beneficial uses."* Receiving Water Limitations for oil and grease are included in this Order and are based on the Basin Plan objective.

h. ***pH.** The Basin Plan includes water quality objective that *"[T]he pH shall not be depressed below 6.5 nor raised above 8.5. Changes in normal ambient pH levels shall not exceed 0.5 in fresh waters with designated COLD or WARM beneficial uses"* This Order includes receiving water limitations for both pH range and pH change for New Alamo Creek but only pH range for Old Alamo Creek because due to site specific conditions of Old Alamo Creek (no upstream natural background water), a pH change would not be appropriate.

The Basin Plan allows an appropriate averaging period for pH change in the receiving stream (New Alamo Creek). Since there is no technical information available that indicates that aquatic organisms are adversely affected by shifts in pH within the 6.5 to 8.5 range, an averaging period is considered appropriate and an annual averaging period for determining compliance with the 0.5 receiving water pH limitation is included in this Order.

i. ***Pesticides**. The Basin Plan includes a water quality objective for pesticides beginning on page III-6.00. Receiving Water Limitations for pesticides are included in this Order and are based on the Basin Plan objective.

j. ***Radioactivity.** The Basin Plan includes a water quality objective that *"[R]adionuclides shall not be present in concentrations that are harmful to human, plant, animal or aquatic life nor that result in the accumulation of radionuclides in the food web to an extent that presents a hazard to human, plant, animal or aquatic life."* The Basin Plan states further that *"[A]t a minimum, waters designated for use as domestic or municipal supply (MUN) shall not contain concentrations of radionuclides in excess of the maximum contaminant levels (MCLs) specified in Table 4 (MCL Radioactivity) of Section 64443 of Title 22 of the California Code of Regulations…"* Receiving Water Limitations for radioactivity are included in this Order and are based on the Basin Plan objective.

k. ***Sediment.** The Basin Plan includes a water quality objective that *"[T]he suspended sediment load and suspended sediment discharge rate of surface waters shall not be altered in such a manner as to cause nuisance or adversely affect beneficial uses"* Receiving Water Limitations for suspended sediments are included in this Order and are based on the Basin Plan objective.

l. ***Settleable Material.** The Basin Plan includes a water quality objective that *"[W]aters shall not contain substances in concentrations that result in the deposition of material that causes nuisance or adversely affects beneficial uses."* Receiving Water Limitations for settleable material are included in this Order and are based on the Basin Plan objective.

m. ***Suspended Material.** The Basin Plan includes a water quality objective that *"[W]aters shall not contain suspended material in concentrations that cause nuisance or adversely affect beneficial uses."* Receiving Water Limitations for suspended material are included in this Order and are based on the Basin Plan objective.

n. ***Taste and Odors.** The Basin Plan includes a water quality objective that *"[W]ater shall not contain taste- or odor-producing substances in concentrations that impart undesirable tastes or odors to domestic or municipal water supplies or to fish flesh or other edible products of aquatic origin, or that cause nuisance, or otherwise adversely affect beneficial uses."* Receiving Water Limitations for taste- or odor-producing substances are included in this Order and are based on the Basin Plan objective.

o. ***Temperature.** Old Alamo Creek has designated the beneficial use WARM. New Alamo Creek has the beneficial uses of both COLD and WARM. The Basin Plan includes the objective that "[a]*t no time or place shall the temperature of COLD or WARM intrastate waters be increased more than 5°F above natural receiving water temperature.*" The 2006 "Characterization of Water Body and Reach-specific Seasonal Temperature Regimes Within the Alamo Creek Watershed and Recommended Temperature Limitations for the City of Vacaville's Easterly Wastewater Treatment Plant" reported adult Fall-run Chinook salmon occasionally stray into New Alamo Creek. The adult salmon are

constrained by physical barriers from continuing up-stream and the lack of suitable habitat precludes successful spawning and reproduction in the lower reaches. The study recommended seasonal temperatures that are protective of adult salmon. Thus for New Alamo Creek, this Order includes receiving water limitation based on the Basin Plan objective and additional proposed seasonal receiving water temperature limitations based on the temperature study conducted by the Discharger, which was approved by National Marine Fisheries Services on 20 November2006, to be protective of New Alamo Creek beneficial uses of COLD and MIGR.

p. ***Toxicity**. The Basin Plan includes a water quality objective that *"[A]ll waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life."* Receiving Water Limitations for toxicity are included in this Order and are based on the Basin Plan objective.

q. ***Turbidity.** The Basin Plan includes a water quality objective that "*[I]ncreases in turbidity attributable to controllable water quality factors shall not exceed the following limits:*

- *Where natural turbidity is between 0 and 5 Nephelometric Turbidity Units (NTUs), increases shall not exceed 1 NTU.*
- *Where natural turbidity is between 5 and 50 NTUs, increases shall not exceed 20 percent.*
- *Where natural turbidity is between 50 and 100 NTUs, increases shall not exceed 10 NTUs.*
- *Where natural turbidity is greater than 100 NTUs, increases shall not exceed 10 percent."*

A numeric Receiving Water Limitation for turbidity is included in this Order but only for New Alamo Creek and is based on the Basin Plan objective for turbidity. Due to site-specific conditions at Old Alamo Creek (no upstream natural background water), a turbidity receiving water limitation is not appropriate.

## B. Groundwater

1. The Discharger utilizes a lined aerated lagoon for storage of stabilized solids from the anaerobic digesters and a lined filtrate storage pond for storage of the filtrate removed from the biosolids by the belt presses. Although these facilities are lined, they have the potential to impact groundwater. Furthermore, an August 2005 shallow groundwater evaluation by Luhdorff and Scalmanini concluded Old Alamo Creek influences groundwater quality. The 2005 report states, "*Treated effluent wastewater is discharged to Old Alamo Creek and flows eastward along the northern facility boundary. The creek was identified as a major source of groundwater recharge and contributor to near-surface groundwater levels in the area*

*(Investigation of Shallow Groundwater, Elmira Project Final Report, August 1988 [LSCE, 1988]). The EWWTP's wastewater effluent discharge constitutes the greatest flow component of the creek;*" The Discharger has been collecting quarterly groundwater samples in accordance with the previous Order. A summary of the groundwater data from May 2006 – October 2007 (7 samples) is provided below in Table F-10.

**Table F-10. Shallow Groundwater Monitoring**

| Groundwater Monitoring Well | Fecal Coliform (MPN/100 mL) | pH (Std Units) Min – Max | TDS (mg/L) Min – Max (Avg) | Nitrate as N (mg/L) Min – Max (Avg) | Depth to GW (ft) Min – Max (Avg) |
|---|---|---|---|---|---|
| MW-1 | <2 | 7.1-7.4 | 482-578 (526) | 1.9-3.7 (2.7) | 8.8-13.6 (11.4) |
| MW-2 | <2 | 7.2-7.4 | 570-616 (594) | 0.3-0.7 (0.55) | 11.4-15.4 (13.4) |
| MW-3 | <2 | 7.0-7.3 | 968-1090 (1033) | 8.0-15.7 (12.0) | 11.2-14.6 (13.2) |
| MW-4 | <2 | 7.4-7.7 | 576-606 (590) | 5.1-8.3 (6.3) | 2.8-5.8 (5.0) |
| MW-5 | <2 | 7.3-7.6 | 862-1030 (972) | 7.2-10.1 (9.1) | 3.6-8.9 (7.6) |

2. The beneficial uses of the underlying ground water are municipal and domestic supply, industrial service supply, industrial process supply, and agricultural supply.

3. Basin Plan water quality objectives include narrative objectives for chemical constituents, tastes and odors, and toxicity of groundwater. The toxicity objective requires that groundwater be maintained free of toxic substances in concentrations that produce detrimental physiological responses in humans, plants, animals, or aquatic life. The chemical constituent objective states groundwater shall not contain chemical constituents in concentrations that adversely affect any beneficial use. The tastes and odors objective prohibits taste- or odor-producing substances in concentrations that cause nuisance or adversely affect beneficial uses. The Basin Plan also establishes numerical water quality objectives for chemical constituents and radioactivity in groundwaters designated as municipal supply. These include, at a minimum, compliance with MCLs in Title 22 of the CCR. The bacteria objective prohibits coliform organisms at or above 2.2 MPN/100 ml. The Basin Plan requires the application of the most stringent objective necessary to ensure that waters do not contain chemical constituents, toxic substances, radionuclides, taste- or odor-producing substances, or bacteria in concentrations that adversely affect municipal or domestic supply, agricultural supply, industrial supply or some other beneficial use.

4. Total dissolved solids, which were found to be present in the wastewater at an average concentration of 623 mg/L, have the potential to degrade groundwater quality at this site because there is little ability for attenuation in the shallow permeable vadose zone beneath this facility. According to Ayers and Westcot, dissolved solids can cause yield or vegetative growth reductions of sensitive crops if present in excess of 450 mg/L in irrigation water, thereby impairing agricultural use of the water resource. The applicable water quality objective to protect the agricultural use from discharges of total dissolved solids is the narrative Chemical