

February 8, 2008

Consulting Engineers

Dale Harvey
Regional Water Quality Control Board
Central Valley Region
Fresno Branch Office
1685 "E" Street
Fresno, CA 93706-2007

Principals
Steven L. Beck
David R. Bennett
Charles G. Bunker
Robert W. Emerick
Fred J. Fahlen
Jack A. Harbour
Jeffrey R. Hauser
D. Todd Kotey
Gerry O. LaBudde
Richard E. Stowell

**RE: CITY OF MERCED
COMMENTS TO TENTATIVE PERMIT, ORDER NO. CA0079219**

Dear Mr. Harvey,

Please accept these comments and proposed changes to the Tentative Permit for the City of Merced Wastewater Treatment Facility (WWTF). It is our understanding that these comments are consistent with Regional Board staff regulatory intent. Thus, upon modification to reflect these comments, the City intends for this permit to be considered as part of the consent agenda.

1. Section IIB, Page 5, Paragraph 1, Sentence 1: Modify sentence to read "The Discharger owns and operates the WWTF, providing"
2. Section IIB, Page 5, Paragraph A and Attachment F, Section IIE, page 5: Please remove the reference to the production of Class A sludge. The City would like to retain the flexibility of applying Class B sludge to the Land Application Area or disposing of sludge to a municipal landfill.
3. Section IIIE, Page 11: The City requests the allowance to release storm runoff water from the land application area, provided it occurs at least 30 days after the most recent application and incorporation of biosolids and there is no ponded recycled water on the site.
4. Section IVA1e, Page 13: The units for the aluminum effluent limitation should be $\mu\text{g/L}$, not mg/L .
5. Section IVA1f, Page 13: The limitation should reference iron, not aluminum, and be set at $300 \mu\text{g/L}$, not 200mg/L . $300 \mu\text{g/L}$ is the iron secondary MCL.
6. Section IVE3, Page 19: The Chromium limitation is not listed in the 503 regulations. Please remove the chromium limitation or cite its source.

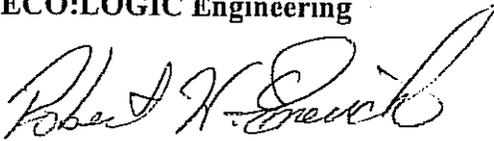
7. Section IVE3, Page 19: The 503 regulations allow for average concentrations of selenium at 100 mg/kg. Please revise the monthly average biosolids concentrations for selenium to 100 mg/kg (currently listed at 36 mg/kg) or cite the source of the 36 mg/kg limitation.
8. Section VIC2c, page 31: The City requests that the workplan be due six months from adoption of the order, and subsequent deadlines be listed as "per workplan." We do not currently know the duration of study acceptable to the Department of Fish and Game or other wildlife agencies. Note that the currently listed study workplan submission deadline of 1 January 2008 has already passed.
9. Attachment A, page A-1: Insert a definition for "Monthly Average Dry Weather Discharge." We suggest "The peak monthly average of daily influent flows that occur during the calendar months of May through October. This value is calculated as the sum of all daily influent flows during each calendar month divided by the total number of days during the calendar month."
10. Attachment C.2 – Solids Flow Diagram, Attachment C, page 3. Please replace the Solids Flow Diagram with the version attached to this letter. The City would like the ability to further dewater sludge for Class B purposes or landfill disposal without necessarily constructing the active solar driers (e.g., greenhouses). The City will use lined facilities to dewater sludge within the 5-year time-schedule allowed by the Order.

In addition, we are enclosing a paper copy of the tentative permit that highlights grammar and/or spelling errors.

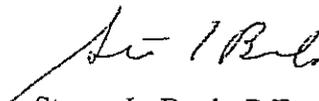
Please feel free to contact Robert Emerick (ECO:LOGIC Engineering) at 916-773-8100 should you have questions regarding any of these proposed changes to the tentative order.

Sincerely,

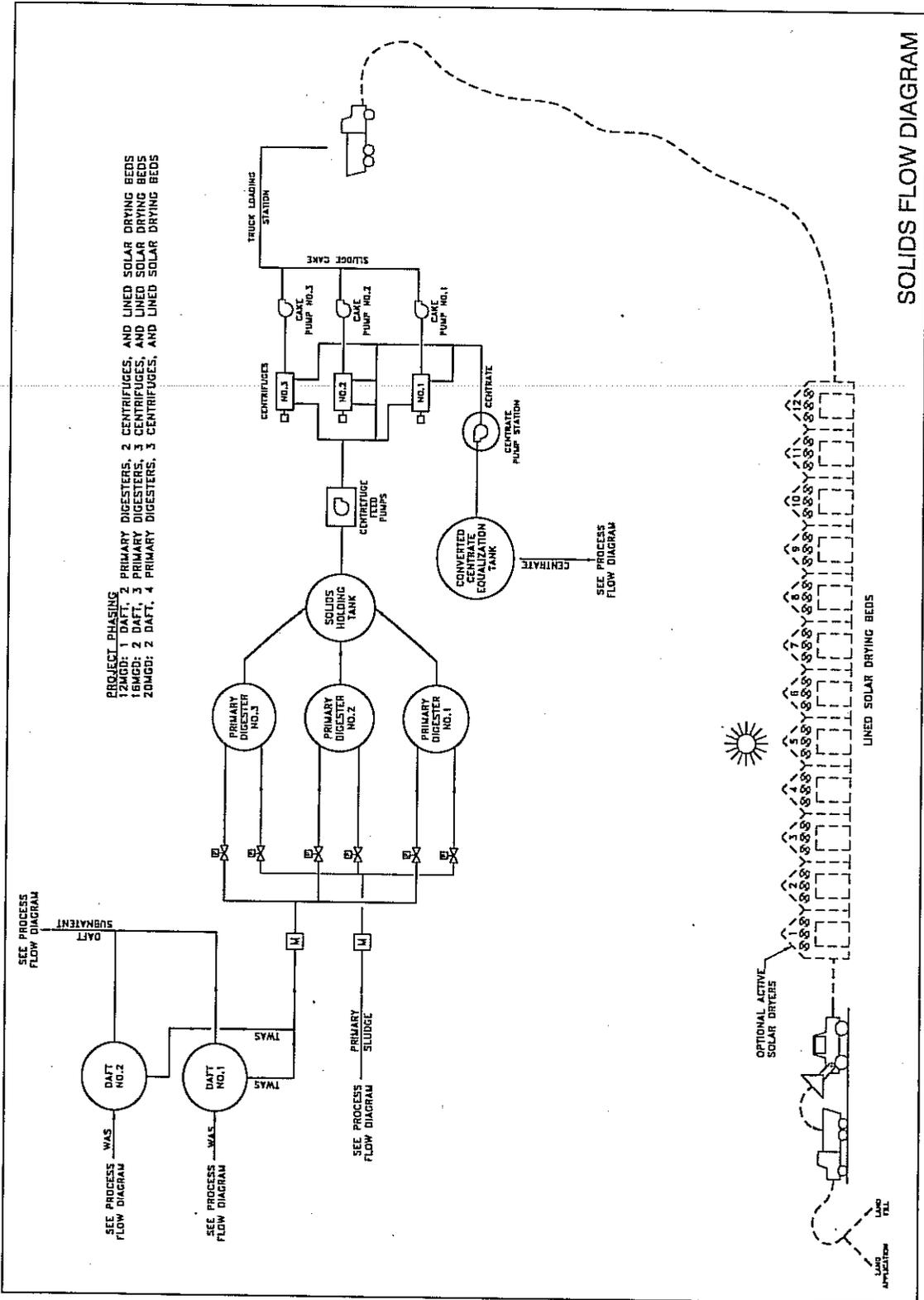
ECO:LOGIC Engineering



Robert W. Emerick, Ph.D., P.E.
Principal



Steven L. Beck, P.E.
Principal



I. FACILITY INFORMATION

The following Discharger is subject to waste discharge requirements as set forth in this Order:

Table 4. Facility Information

Discharger	City of Merced
Name of Facility	Merced Wastewater Treatment Facility
Facility Address	1776 Grogan Avenue
	Merced, CA 95340
	Merced County
Facility Contact, Title, and Phone	Humberto Molina, Public Works Manager, 209-385-6892
Mailing Address	SAME
Type of Facility	POTW
Facility Design Flow	11.5 mgd (initial secondary), 12 mgd (first tertiary expansion), 16 mgd (second tertiary expansion), 20 mgd (third tertiary expansion)

II. FINDINGS

The California Regional Water Quality Control Board, Central Valley Region (hereinafter Regional Water Board), finds:

A. Background. The City of Merced (hereinafter Discharger) is currently discharging pursuant to Waste Discharge Requirements (WDRs) Order No. 5-00-246 and National Pollutant Discharge Elimination System (NPDES) Permit No. CA0079219. The Discharger submitted a Report of Waste Discharge, dated April 2005. The RWD applied for a NPDES permit renewal and upgrades and expansion in phases of the Merced Wastewater Treatment Facility (hereinafter WWTF or Facility) from a discharge of 10 mgd of secondary effluent to 20 ~~10~~ mgd of tertiary effluent. The application was deemed complete in May 2005.

The City used to discharge industrial food processing wastewater and biosolids to its 580-acre industrial wastewater treatment facility under WDRs Order No. 97-034. The City now proposes to recycle effluent and biosolids on the same land for the production of fiber, fodder, and seed crops. The land will be referred to herein as called the land application area.

The Discharger developed a pretreatment program in conformance with 40 CFR 403 that the Regional Water Board approved on 28 March 1983.

For the purposes of this Order, references to the "discharger" or "permittee" in applicable federal and state laws, regulations, plans, or policy are held to be equivalent to references to the Discharger herein.

and operates the

B. Facility Description. The Discharger owns ^{and operates the} WWTF ^{providing} sewerage service to the City of Merced. The WWTF consists of headworks, a septage receiving area, two primary clarifiers, three activated sludge basins with three internal separate anoxic denitrification basins, three secondary clarifiers, and chlorination and dechlorination units and the Land Application Area and Wildlife Management Area, which are described in more detail below. Sludge is thickened, anaerobically digested, and then dried in six unlined sludge-drying beds. Due to recent aeration improvements and incorporation of the Symbio™ process (nitrification/denitrification), the Facility now can process a dry weather monthly average flow of 11.5 mgd.

The RWD proposes expansion of and improvements to the WWTF in three phases.

- A. In Phase 1, the City will construct a tertiary pump station, a flocculation basin with coagulant feed, filters, a UV disinfection unit, and an effluent reaeration unit. The City will also install ~~active solar driers to produce Class A sludge.~~ These improvements will result in a monthly average dry weather tertiary treatment capacity of 12 mgd. ^{lined}
- B. In Phase 2, the City will construct new headworks and influent pump station with fine screens and grit removal, a storm water retention basin with overflow to the WWTF emergency storage basins, a third primary clarifier, a fourth activated sludge basin, a third sludge digester, a solids holding tank, and additional active solar driers. These improvements will result in a monthly average dry weather tertiary treatment capacity of 16 mgd.
- C. In Phase 3, the City will construct a fourth primary clarifier, a fifth activated sludge basin, and a fifth secondary clarifier. These improvements will result in a monthly average dry weather tertiary treatment capacity of 20 mgd.

The City routes effluent from the WWTF into a 1.6 mile unlined ditch before discharge at Discharge Point 001 (see table on cover page) to Hartley Slough, a water of the United States and a tributary to San Joaquin River. The Discharger proposes to construct a new pipeline directly to Hartley Slough and discharge at Discharge Point 002. The City also discharges at Discharge Point 003 to its Merced Wildlife Management Area (WMA) which is managed by California Department of Fish and Game and where effluent is recycled to provide wetland and water fowl habitat, and the City recycles effluent at Discharge Point 004 to its land application area (LAA).

Attachment B is a map of the Facility area. A WWTF diagrammatic layout of all phases is depicted in Attachment C.

C. Legal Authorities. This Order is issued pursuant to section 402 of the federal Clean Water Act (CWA) and implementing regulations adopted by the U.S. Environmental Protection Agency (USEPA) and Chapter 5.5, Division 7 of the California Water Code (CWC)(commencing with section 13370). It shall serve as a NPDES permit for point source discharges from this Facility to surface waters. This Order also serves as WDRs

- S. **Notification of Interested Parties.** The Regional Water Board has notified the Discharger and interested agencies and persons of its intent to prescribe Waste Discharge Requirements for the discharge and has provided them with an opportunity to submit their written comments and recommendations. Details of notification are provided in the Fact Sheet of this Order.
- T. **Consideration of Public Comment.** The Regional Water Board, in a public hearing, heard and considered all comments pertaining to the discharge. Details of the public hearing are provided in the Fact Sheet of this Order.

III. DISCHARGE PROHIBITIONS

- A. Discharge of pollutants or wastes at locations or in a manner substantially different from that described in the Findings is prohibited.
- B. The by-pass or overflow of wastes to surface waters is prohibited, except as allowed by federal Standard Provisions I.G. and I.H. (Attachment D).
- C. Creation of a nuisance or pollution as defined in Section 13050 of the CWC is prohibited.
- D. Discharge of waste classified as "hazardous," as defined in Section 2521(a) of Title 23, CCR, Section 2510 et seq., or of waste classified as "designated," as defined in CWC Section 13173, is prohibited.
- E. Discharge of wastes ^{or} tailwater, or field runoff water from the Land Application Area to surface waters or surface water drainage courses is prohibited, except if caused in association with the flooding described in Fact Sheet Section II and at least 30 days after the most recent application and incorporation of biosolids. *Release of stormwater is acceptable provided there is at least 30 days after the most recent application*
- F. Discharge of oil or residuary products of petroleum is prohibited except as specifically authorized herein.
- G. Discharge of biosolids to the Land Application Area that do not meet Class A or Class B criteria as defined in 40 CFR 503 is prohibited.
- H. Discharge of biosolids to the Land Application Area with concentrations greater than the following is prohibited:

<u>Pollutant</u>	<u>Concentration (mg/kg¹)</u>
Arsenic	75
Cadmium	85
Copper	4300 ²
Lead	840
Mercury	57 ²
Molybdenum	75

application and incorporation of biosolids.

³ Based on a design monthly average dry weather flow of 20.0 MGD (see Provision IV.C.2).

⁴ These final limits shall expire upon the determination of the Executive Officer (Provision No. VI.C.2.d.)

- b. **Average Dry Weather Flow:** The monthly average dry weather discharge flow shall not exceed 11.5 million gallons per day, 12.0 million gallons per day, 16.0 million gallons per day, or 20.0 million gallons per day, depending on certification (see Provision VI.C.2.a.).
- c. **Electrical Conductivity.** The annual average effluent EC shall not exceed 500 umhos/cm plus that of the source water, or 1000 umhos/cm, which ever is less.
- d. **pH.** The effluent shall not exhibit a pH of less than 6.5 standard units or greater than 8.5 standard units.
- e. **Aluminum.** The annual average effluent total aluminum concentration shall not exceed ~~200 mg/L~~ *450 µg/L*.
- f. **Iron.** The annual average effluent total ^{iron} ~~aluminum~~ concentration shall not exceed ~~200 mg/L~~ *300 µg/L*.
- g. **Turbidity:** Effective upon the completion of the expansion to 12 mgd (see Provision IV.C.2.a), effluent turbidity shall not exceed the following:
 - i. 2 NTU as a daily average;
 - ii. 5 NTU more than 5 percent of the time within a 24-hour period; and
 - iii. 10 NTU at any time.
- h. **Total Coliform Organisms:** Effluent total coliform organism concentrations shall not exceed the following:
 - i. 2.2 MPN/100 mL as a seven-day median
 - ii. 23 MPN/100 mL more than once in any 30-day period; and
 - iii. 240 MPN/100 mL at any time.
- i. **Percent Removal:** The average monthly percent removal of BOD 5-day 20°C and total suspended solids shall not be less than 90 percent.
- j. **Acute Whole Effluent Toxicity:** Survival of aquatic organisms in 96-hour bioassays of undiluted waste shall be no less than:
 - i. 70% for any one bioassay; and
 - ii. 90% for the median of any three consecutive bioassays.
- k. **Total Residual Chlorine:** Effluent total residual chlorine shall not exceed:
 - i. 0.01 mg/L, as a 4-day average; and
 - ii. 0.02 mg/L, as a 1-hour average.

water shall not occur except through an air-gap separation or, if approved by the DPH, a reduced pressure principle backflow device.

E. Biosolids Discharge Specifications ^{LAA} ~~LAA~~ Discharge Point 004.

Biosolids is defined herein as sewage sludge that has been treated and tested and shown to be capable of being beneficially and legally used as a soil amendment for agriculture, silviculture, horticulture, and land reclamation activities as specified under 40 CFR Part 503.

1. Biosolids shall not be applied at rates that, in combination with other discharges, would cause excess nitrogen or metals to leach to groundwater.
2. Biosolids shall not be stored in the LAA.
3. The cumulative loading for pollutants at each biosolids application site shall not exceed the following:

<u>Pollutant</u>	Cumulative Loadings:	
	<u>kilograms per hectare</u>	<u>pounds per acre¹</u>
Arsenic	41	37
Cadmium	39	35
Chromium	3000	2676
Copper	1500	1338
Lead	300	268
Mercury	17	15
Nickel	420	375
Selenium	100	89
<u>Zinc</u>	2800	2498

¹ Dry Weight Basis

NOT IN 503

or, alternatively, the concentration of each pollutant in the biosolids shall not exceed the following:

<u>Pollutant</u>	<u>Monthly Average Concentrations (mg/kg¹)</u>
Arsenic	41
Cadmium	39
Copper	1500
Lead	300
Mercury	17
Nickel	420
Selenium	36 100
<u>Zinc</u>	2800

¹ Dry-Weight Basis

- d. Pesticide concentrations to exceed those allowable by applicable antidegradation policies (see State Water Board Resolution No. 68-16 and 40 CFR §131.12.).
- e. Pesticide concentrations to exceed the lowest levels technically and economically achievable.
- f. Pesticides to be present in concentration in excess of the maximum contaminant levels set forth in California Code of Regulations, Title 22, Division 4, Chapter 15.
- g. Thiobencarb to be present in excess of 1.0 µg/L.

10. Radioactivity:

- a. Radionuclides to 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.
- b. Radionuclides to be present in excess of the maximum contaminant levels specified in Table 4 (MCL Radioactivity) of Section 64443 of Title 22 of the California Code of Regulations.

11. Suspended Sediments. The suspended sediment load and suspended sediment discharge rate of surface waters to be altered in such a manner as to cause nuisance or adversely affect beneficial uses.

12. Settleable Material. Substances to be present in concentrations that result in the deposition of material that causes nuisance or adversely affects beneficial uses.

13. Suspended Material. Suspended material to be present in concentrations that cause nuisance or adversely affect beneficial uses.

14. Taste and Odors. Taste- or odor-producing substances to be present in concentrations that impart undesirable tastes or odors to fish flesh or other edible products of aquatic origin, or that cause nuisance, or otherwise adversely affect beneficial uses.

15. Temperature. The natural temperature to be increased by more than 5°F.

16. Toxicity. Toxic substances to be present, individually or in combination, in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life.

17. Turbidity. The turbidity to increase as follows:

- a. More than 1 Nephelometric Turbidity Unit (NTU) where natural turbidity is between 0 and 5 NTUs.
- b. More than 20 percent where natural turbidity is between 5 and 50 NTUs.
- c. More than 10 NTU where natural turbidity is between 50 and 100 NTUs.
- d. More than 10 percent where natural turbidity is greater than 100 NTUs.

CTR constituents as outlined in Section 2.3 and 2.4 of the *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California*, adopted 2 March 2000 by the State Water Resources Control Board. All peaks identified by analytical methods shall be reported.

3. The Discharger shall establish an electronic system for operator notification for all continuous recording device alarms. For existing continuous monitoring systems, the electronic notification system shall be installed **within six months of adoption** of this permit. For systems installed following permit adoption, the notification system shall be installed simultaneously

C. Special Provisions

1. Reopener Provisions

- a. This Order may be reopened for modification, or revocation and reissuance, as a result of the detection of a reportable priority pollutant generated by special conditions included in this Order. These special conditions may be, but are not limited to, fish tissue sampling, whole effluent toxicity, monitoring requirements on internal waste stream(s), and monitoring for surrogate parameters. Additional requirements may be included in this Order as a result of the special condition monitoring data.
- b. This Order may be reopened to address conditions that necessitate a major modification of a permit. These conditions are described in 40 CFR 122.62, and include:
 - i. If new or amended applicable water quality standards are promulgated or approved pursuant to Section 303 of the CWA, or amendments thereto, this permit may be reopened and modified in accordance with the new or amended standards.
 - ii. When new information, that was not available at the time of permit issuance, would have justified different permit conditions at the time of issuance.
- c. **Mercury.** If mercury is found to be causing toxicity based on acute or chronic toxicity test results, or if a TMDL program is adopted, this Order may be reopened and limitations imposed.
- d. **Aluminum.** This Order may be reopened to consider the results of a water effects ratio study to develop a site-specific objective and revised aluminum limits.
- e. **Temperature.** This Order may be reopened to consider the results of a temperature study to develop a site-specific temperature ceiling criteria for Hartley Slough.

weeks) using the species that exhibited toxicity. The following protocol shall be used for accelerated monitoring and TRE initiation:

- a) If the results of four (4) consecutive accelerated monitoring tests do not exceed the monitoring trigger, the Discharger may cease accelerated monitoring and resume regular chronic toxicity monitoring. However, notwithstanding the accelerated monitoring results, if there is adequate evidence of a pattern of effluent toxicity, the Executive Officer may require that the Discharger initiate a TRE.
 - b) If the source(s) of the toxicity is easily identified (i.e. temporary plant upset), the Discharger shall make necessary corrections to the facility and shall continue accelerated monitoring until four (4) consecutive accelerated tests do not exceed the monitoring trigger. Upon confirmation that the effluent toxicity has been removed, the Discharger may cease accelerated monitoring and resume regular chronic toxicity monitoring.
 - c) If the result of any accelerated toxicity test exceeds the monitoring trigger, the Discharger shall cease accelerated monitoring and initiate a TRE to investigate the cause(s) of, and identify corrective actions to reduce or eliminate effluent toxicity. Within thirty (30) days of notification by the laboratory of the test results exceeding the monitoring trigger during accelerated monitoring, the Discharger shall submit a TRE Action Plan to the Regional Water Board including, at minimum:
 - i. Specific actions the Discharger will take to investigate and identify the cause(s) of toxicity, including TRE WET monitoring schedule;
 - ii. Specific actions the Discharger will take to mitigate the impact of the discharge and prevent the recurrence of toxicity; and
 - iii. A schedule for these actions.
- c. **Temperature Study.** The Discharger shall comply with the following time schedule to conduct a study to determine protective temperature limitations for the discharge to Hartley Slough (Discharge Point 001 and 002).

<u>Task</u>	<u>Compliance Date</u>
i. Submit Work Plan and Time Schedule	1 January 2008 <i>Six months from Order adoption.</i>
ii. Begin Study	1 July 2008
iii. Complete Study	30 June 2010 <i>per workplan</i>
iv. Submit Study Report	31 December 2011 <i>per workplan</i>

The Discharger shall submit to the Regional Water Board on or before each compliance due date, the specified document or a written report detailing compliance or noncompliance with the specific date and task. If noncompliance is reported, the Discharger shall state the reasons for

VII. COMPLIANCE DETERMINATION

Compliance with the effluent limitations contained in section IV of this Order will be determined as specified below:

- A. **BOD and TSS Effluent Limitations.** Compliance with the final effluent limitations for BOD and TSS required in sections <subsection> shall be ascertained by 24-hour composite samples. Compliance with effluent limitations <subsection> for percent removal shall be calculated using the arithmetic mean of 20°C BOD (5-day) and total suspended solids in effluent samples collected over a monthly period as a percentage of the arithmetic mean of the values for influent samples collected at approximately the same times during the same period.
- B. **Aluminum Effluent Limitations.** Compliance with the final effluent limitations for aluminum can be demonstrated using either total or acid-soluble (inductively coupled plasma/atomic emission spectrometry or inductively coupled plasma/mass spectrometry) analysis methods, as supported by US EPA's Ambient Water Quality Criteria for Aluminum document (EPA 440/5-86-008), or other standard methods that exclude aluminum silicate particles as approved by the Executive Officer.
- C. **Average Daily Discharge Flow Effluent Limitations.** The Average Daily Discharge Flow represents the daily average flow when groundwater is at or near normal and runoff is not occurring. Compliance with the Average Daily Discharge Flow effluent limitations will be measured at times when groundwater is at or near normal and runoff is not occurring.
- D. **Total Coliform Organisms Effluent Limitations (Effluent Limitations Sections IV.A.1.g, IV.A.3.c, IV.B.1.e, and IV.C.1.b.).** For each day that an effluent sample is collected and analyzed for total coliform organisms, the 7-day median shall be determined by calculating the median concentration of total coliform bacteria in the effluent utilizing the bacteriological results of the last seven days for which analyses have been completed. If the 7-day median of total coliform organisms exceeds a most probable number (MPN) of 2.2 per 100 milliliters, the Discharger will be considered out of compliance for that parameter for that 1 day only within the reporting period.
- E. **Total Residual Chlorine Effluent Limitations.** Continuous monitoring analyzers for chlorine residual or for dechlorination agent residual in the effluent are appropriate methods for compliance determination. A positive residual dechlorination agent in the effluent indicates that chlorine is not present in the discharge, which demonstrates compliance with the effluent limitations. This type of monitoring can also be used to prove that some chlorine residual exceedances are false positives. Continuous monitoring data showing either a positive dechlorination agent residual or a chlorine residual at or below the prescribed limit are sufficient to show compliance with the total residual chlorine effluent limitations, as long as the instruments are maintained and calibrated in accordance with the manufacturer's recommendations.

Any excursion above the 1-hour average or 4-day average total residual chlorine

ATTACHMENT A – DEFINITIONS

Arithmetic Mean (μ), also called the average, is the sum of measured values divided by the number of samples. For ambient water concentrations, the arithmetic mean is calculated as follows:

Arithmetic mean = $\mu = \Sigma x / n$ where: Σx is the sum of the measured ambient water concentrations, and n is the number of samples.

Average Monthly Effluent Limitation (AMEL): the highest allowable average of daily discharges over a calendar month, calculated as the sum of all daily discharges measured during a calendar month divided by the number of daily discharges measured during that month.

Average Weekly Effluent Limitation (AWEL): the highest allowable average of daily discharges over a calendar week (Sunday through Saturday), calculated as the sum of all daily discharges measured during a calendar week divided by the number of daily discharges measured during that week.

Best Practicable Treatment or Control (BPTC): BPTC is a requirement of State Water Resources Control Board Resolution 68-16 – “Statement of Policy with Respect to Maintaining High Quality of Waters in California” (referred to as the “Antidegradation Policy”). BPTC is the treatment or control of a discharge necessary to assure that, “(a) a pollution or nuisance will not occur and (b) the highest water quality consistent with maximum benefit to the people of the State will be maintained.” Pollution is defined in CWC Section 13050(I). In general, an exceedance of a water quality objective in the Basin Plan constitutes “pollution”.

Bioaccumulative pollutants are those substances taken up by an organism from its surrounding medium through gill membranes, epithelial tissue, or from food and subsequently concentrated and retained in the body of the organism.

Carcinogenic pollutants are substances that are known to cause cancer in living organisms.

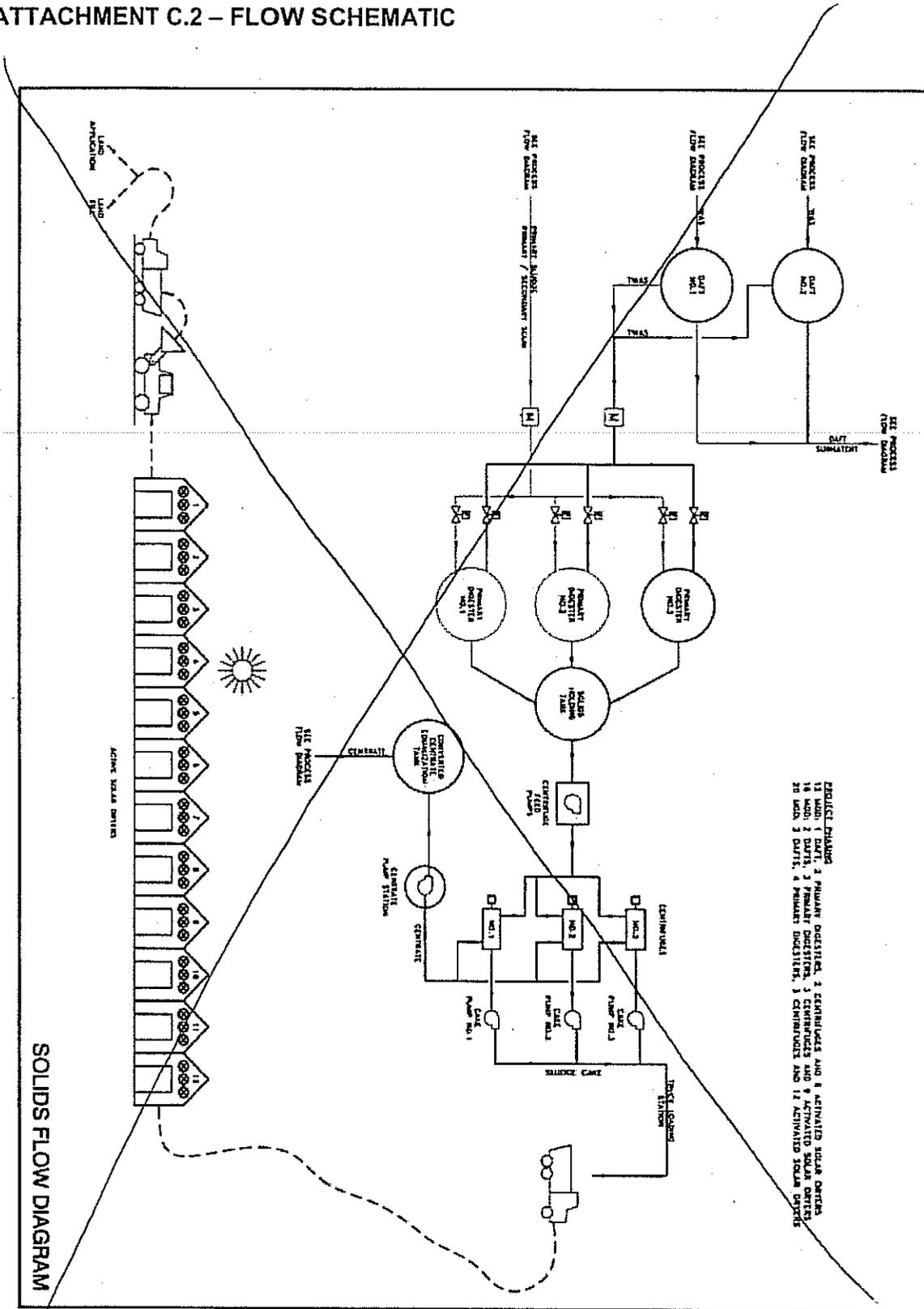
Coefficient of Variation (CV) is a measure of the data variability and is calculated as the estimated standard deviation divided by the arithmetic mean of the observed values.

Daily Discharge: Daily Discharge is defined as either: (1) the total mass of the constituent discharged over the calendar day (12:00 am through 11:59 pm) or any 24-hour period that reasonably represents a calendar day for purposes of sampling (as specified in the permit), for a constituent with limitations expressed in units of mass or; (2) the unweighted arithmetic mean measurement of the constituent over the day for a constituent with limitations expressed in other units of measurement (e.g., concentration).

Monthly Average Dry Weather Discharge: The peak monthly average of daily influent flows that occur during the calendar months of May through October. This value is calculated as the sum of all daily influent flows during each calendar month divided by the total number of days during the calendar month.

Attachment A – Definitions 1 A-1

ATTACHMENT C.2 – FLOW SCHEMATIC



II. MONITORING LOCATIONS

The Discharger shall establish the following monitoring locations to demonstrate compliance with the effluent limitations, discharge specifications, and other requirements in this Order:

Table E-1. Monitoring Station Locations

Discharge Point Name	Monitoring Location Name	Monitoring Location Description
--	M-INF	Influent Pump Station; 37° 15' 16.7" N, 120° 31' 24.5" W
	M-001	After disinfection
--	R-001U	Upstream of the backwater condition in Miles Creek but not to exceed ¾ mile upstream from its confluence with Hartley Slough
--	R-001D1	Upstream of the backwater condition in Hartley Slough but not to exceed ¾ mile upstream from the confluence with Miles Creek
--	R-001D2	Not to exceed 1000 feet downstream from the confluence with Miles Creek
Hartley Slough	R-002	Discharge point into Hartley Slough
--	R-002U	Upstream of the discharge into Hartley Slough, not to exceed ¾ mile
--	R-002D	Downstream of the discharge into Hartley Slough, not to exceed ¾ mile
Merced Wildlife Management Area	WMA-003	Discharge to the Merced Wildlife Management Area; 37° 14' 13" N, 120° 31' 24" W
Land Application Area	LAA-004	Land Application Area; 37° 14' 41" N, 120° 31' 22" W
--	B-001	Biosolids
--	S-001	Water Supply
--	T-001	Pretreatment

III. INFLUENT MONITORING REQUIREMENTS

M-INF

A. Monitoring Location <Monitoring Location Name>

1. The Discharger shall monitor influent at M-INF as follows:

Table E-2. Influent Monitoring

Parameter	Units	Sample Type	Minimum Sampling Frequency
Flow	mgd	Meter	Continuous
Settleable Solids	ml/L	Grab	Daily
Electrical Conductivity	umhos/cm	Grab	Daily
pH	standard units	Grab	Daily

- a. Identification of the application area(s), including a map clearly showing each field or site covered by the post-application report.
- b. Total volume (cubic yards) and weight (dry tons) of biosolids applied.
- c. Metric tons of wet sludge per hectare and metric tons of dry sludge per hectare applied.
- d. Kilograms per hectare of metals and nitrogen applied (nitrogen from both municipal wastewater effluent shall be included in the reported total nitrogen applied).
- e. Cumulative application of heavy metals at the site, reported in kg/ha. This shall be the sum of metals from newly applied sludge and from all previously applied sludge. Show calculations used to obtain results.

3. LAA ANNUAL REPORT

The Discharger shall submit an LAA Annual Report that contains the following information:

- a. The Discharger shall provide the following informatin for the LAA.

Parameter	Units
Quantity of Biosolids Applied	dry tons
Maximum Biosolids Application Rate	kg/acre/year
Volume of Wastewater Applied	acre-feet
Maximum Recycled Water Application Rate	acre-feet/year
Total Nitrogen Loading ¹	lbs/acre/year
Plant Available Nitrogen	lbs/acre/year
Residual Nitrogen	lbs/acre
Crop(s) planted	name
Crop (yield) yield	tons/acre
Results of plant tissue testing for Molybdenum	mg/kg
Results of plant tissue testing for Copper	mg/kg
Results of plant tissue testing for Selenium	mg/kg

- b. The Discharger shall provide the following pollutant loading rate information for arsenic, cadmium, copper, lead, mercury, molybdenum, ~~nickel~~, selenium, and zinc.

nickel

 - i. Cumulative Loadings from Previous Years(kg/ha)
 - ii. Loadings this Year (kg/ha)
 - iii. Background Soils Concentration (kg/ha) (6 inch depth)
 - iv. Cummulative Metal Load to Date (kg/ha)
 - v. Percent Cumulative Limit to Date (%)

X. REPORTING REQUIREMENTS

A. General Monitoring and Reporting Requirements

1. Upon written request of the Regional Water Board, the Discharger shall submit a summary monitoring report. The report shall contain both tabular and graphical summaries of the monitoring data obtained during the previous year(s).
2. **Compliance Time Schedules.** For compliance time schedules included in the Order, the Discharger shall submit to the Regional Water Board, on or before each compliance due date, the specified document or a written report detailing compliance or noncompliance with the specific date and task. If noncompliance is reported, the Discharger shall state the reasons for noncompliance and include an estimate of the date when the Discharger will be in compliance. The Discharger shall notify the Regional Water Board by letter when it returns to compliance with the compliance time schedule.
3. The Discharger shall report to the Regional Water Board any toxic chemical release data it reports to the State Emergency Response Commission within 15 days of reporting the data to the Commission pursuant to section 313 of the "Emergency Planning and Community Right to Know Act of 1986.
4. **Reporting Protocols.** The Discharger shall report with each sample result the applicable Reporting Level (RL) and the current Method Detection Limit (MDL), as determined by the procedure in Part 136.

The Discharger shall report the results of analytical determinations for the presence of chemical constituents in a sample using the following reporting protocols:

- a. Sample results greater than or equal to the RL shall be reported as measured by the laboratory (i.e., the measured chemical concentration in the sample).
- b. Sample results less than the RL, but greater than or equal to the laboratory's MDL, shall be reported as "Detected, but Not Quantified," or DNQ. The estimated chemical concentration of the sample shall also be reported.

For the purposes of data collection, the laboratory shall write the estimated chemical concentration next to DNQ as well as the words "Estimated Concentration" (may be shortened to "Est. Conc."). The laboratory may, if such information is available, include numerical estimates of the data quality for the reported result. Numerical estimates of data quality may be percent accuracy (\pm a percentage of the reported value), numerical ranges (low to high), or any other means considered appropriate by the laboratory.

- c. Sample results less than the laboratory's MDL shall be reported as "Not Detected," or ND.

3. All discharge monitoring results must be reported on the official USEPA pre-printed DMR forms (EPA Form 3320-1). Forms that are self-generated cannot be accepted unless they follow the exact same format as EPA form 3320-1.

D. Other Reports

1. **Progress Reports.** As specified in the time schedules in Special Provisions VI, progress reports shall be submitted in accordance with the following reporting requirements. At minimum, the progress reports shall include a discussion of the status of final compliance, whether the Discharger is on schedule to meet the final compliance date, and the remaining tasks to meet the final compliance date.

Table E-11. Reporting Requirements for Special Provisions Progress Reports

Special Provision	Reporting Requirements
WWTF Expansion (VI.C.2.a.)	1 February, annually
Temperature Study (VI.C.2.c.)	1 February, annually
Elimination of Reasonable Potential Study (VI.C.2.d.)	1 February, annually
Land Use and Groundwater Limitation Study (VI.C.2.e.)	1 February, annually
Use Attainability Analysis Study (VI.C.2.h.)	1 February, annually
Compliance Schedules for Final Effluent Limitations for Cyanide, Dibromochloromethane, and Dichlorobromomethane, and Discharge Specification for Cyanide (VI.C.7.a.)	1 February, annually
Compliance Schedules for Nitrate + Nitrate Nitrite (VI.C.7.b.)	1 February, annually
Compliance Schedule for Biosolids/Sludge Handling Modifications (VI.C.7.c.)	1 February, annually
Compliance Schedule for Tertiary Treatment (VI.C.7.d.)	1 February, annually
Compliance Schedule for Aluminum and Iron (VI.C.7.e.)	1 February, annually.

2. Within **60 days** of permit adoption, the Discharger shall submit a report outlining minimum levels, method detection limits, and analytical methods for approval, with a goal to achieve detection levels below applicable water quality criteria. At a minimum, the Discharger shall comply with the monitoring requirements for CTR constituents as outlined in Section 2.3 and 2.4 of the *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California*, adopted 2 March 2000 by the State Water Resources Control Board. All peaks identified by analytical methods shall be reported.

3. **Annual Operations Report.** By **30 January** of each year, the Discharger shall submit a written report to the Executive Officer containing the following:

3. Cease discharge of digester supernatant to land (i.e., to the WWTF's sludge-drying beds) no later than 30 June 2003.
4. Implement modifications necessary to comply with Receiving Water Limitation E.8 (pH) by 1 November 2002, or complete a study, subject to scientific peer review, suitable to support a Basin Plan amendment (BPA) for specific surface water quality objectives pH in the Hartley Slough, Miles Creek and Owens Creek watershed 1 September 2003.

The City complied with CDO Items 1 through 3 listed above. To comply with Item No. 4, the City began participation in the Basin Plan Advisory Committee on turbidity and pH. The Regional Water Board adopted at its October 2007 meeting a Basin Plan amendment that, once approved by the State Water Board and the U.S. Environmental Protection Agency (USEPA) and implemented, will remove the pH change criteria and moot the City's receiving water pH compliance issues. Given the City has complied with the components of CDO No. R5-00-247, rescission of the CDO by separate Order is appropriate.

The City has generally complied with the effluent limitations of WDRs Order No. R5-00-246. As described in more detail below, the effluent dominated and often backwater conditions associated with Hartley Slough have resulted in apparent receiving water violations for pH change, temperature change, and turbidity. To date, the discharge has not been shown to be the cause of these apparent violations.

E. Planned Changes

The Discharger proposes upgrades and expansion of the WWTF over the course of this permit in three phases:

1. In Phase 1, the City will construct a tertiary pump station, a flocculation basin with coagulant feed, filters, a UV disinfection unit, and an effluent reaeration unit. These improvements will result in a design monthly average dry weather flow capacity of 12 mgd with a tertiary level of treatment. The City anticipates completing these improvements by ~~December 2009~~ *October 2010*

As part of the Phase 1 expansion, the City will also construct a third sludge digester, a solids holding tank, and active solar driers to produce a Class ~~A~~ *B* sludge. The City plans to complete these solids handling improvements during the term of this Order.

2. In Phase 2, the City will construct a new headworks and influent pump station with fine screens and grit removal, a storm water retention basin with overflow to the emergency storage basins, a third primary clarifier, and a fourth activated sludge basin. These improvements will result in a design average dry weather flow capacity of 16 mgd with a tertiary level of treatment.

October 2007 (with Approved Amendments), The Sacramento River Basin and the San Joaquin River Basin, (hereinafter Basin Plan). The EIR indicates that the City will implement cooling if necessary to comply with the Basin Plan water quality objectives, thereby reducing the impact to a less than significant level.

Additionally, this Order includes receiving water limits and monitoring for temperature change consistent with the water quality objectives in the Basin Plan. The Order provides the Discharger the opportunity to evaluate appropriate averaging periods and ceiling limitations for temperature to protect WARM uses of Hartley Slough.

LAA

Discharge to Land (WMA and ~~LAA~~)

Under the proposed project, discharges to the WMA and LAA will remain largely unchanged except that the recycled water will be of much better quality due to the proposed increase in the level of treatment from secondary to tertiary and the implementation of denitrification. Appropriately, the EIR does not identify any impacts associated with the discharge of tertiary treated effluent to the WMA or LAA as potentially significant.

As the responsible agency for water quality in the Central Valley under CEQA, this Regional Water Board reviewed the EIR and determined the following:

- Generally, under CWC Section 13389, the action to adopt an NPDES permit is exempt from the provisions of CEQA, Public Resources Code Sections 21100-21177. Nonetheless, the project as approved by the City and regulated by this Order will not have a significant impact on water quality in Hartley Slough.
- The discharge to land approved by the City of Merced will not have a significant environmental impact on water quality.

Overall, the project proposed by the City will not have a significant effect on water quality. This Order imposes enforceable requirements, including monitoring of effluent quality and receiving waters, to ensure this is the case.

C. State and Federal Regulations, Policies, and Plans

1. **Water Quality Control Plans.** The Basin Plan designates beneficial uses, establishes water quality objectives, and contains implementation programs and policies to achieve those objectives for all waters addressed through the plan. The Basin Plan at page II-2.00 states that the "...beneficial uses of any specifically identified water body generally apply to its tributary streams."

The federal Clean Water Act (CWA) section 101(a)(2), states: "it is the national goal that wherever attainable, an interim goal of water quality which provides for the protection and propagation of fish, shellfish, and wildlife, and for recreation in and on the water be achieved by July 1, 1983." Federal Regulations developed to

- nitrate
- k. **Nitrite and Nitrate.** To control ammonia toxicity, the WWTF is operated in nitrification mode. The MEC for nitrate as nitrogen of 54 mg/L was from a sample collected in January 2007. Title 22 CCR, Table 64431-A, includes a primary MCL of 10 ug/L for the sum of nitrate and nitrite, measured as nitrogen. The discharge from the WWTF has a reasonable potential to cause or contribute to an in-stream excursion above water quality standards for ammonia, nitrite, and nitrate. Effluent Limitations for ~~nitrite~~ and nitrate plus nitrite are included in this Order to assure the treatment process adequately nitrifies and denitrifies the waste stream to protect the beneficial use of municipal and domestic supply. This Order includes limitations for the sum of nitrite and nitrate.
- limits
- l. **Oil and Grease.** The existing permit includes monthly average and daily maximum effluent limitations of 10 mg/L and 15 mg/L, respectively, for oil and grease. The basis for these ~~limits~~ is unclear. From August 2004 through August 2007, the Discharger sampled its effluent weekly for oil and grease (161 results). The MEC was 6.9 mg/L and the average was 1.32 mg/L. During the same period, the Discharger has not caused an exceedence of the receiving water limits for oil and grease in Hartley Slough. Based on this, there is no reasonable potential for oil and grease to cause an exceedence of a water quality objective for oil and grease in Hartley Slough. Oil and grease limitations are not necessary and have been removed from this permit. Compliance with antibacksliding requirements is addressed in Fact Sheet Section VI.D.4.
- m. **Pathogens.** As mentioned, beneficial uses of Hartley Slough include REC-1 and unrestricted AGR. To protect identified beneficial uses from infectious agents (pathogens), the wastewater must be adequately treated. The principal pathogens that may be present in raw sewage may be classified into three broad groups: bacteria, parasites, and viruses. Treatment, consisting of chemical coagulation, sedimentation, and filtration, removes approximately 99.5% of pathogens. Disinfection of the tertiary effluent ensures greater removal.

Title 22 requires that for sprinkler irrigation of food crops recycled water must be adequately disinfected, oxidized, coagulated, clarified, and filtered, and that the effluent total coliform levels not exceed 2.2 MPN/100 mL as a 7-day median, not exceed 23 MPN/100 mL in more than one sample in any 30-day period, and never exceed 240 MPN/100 mL. It defines this as "disinfected tertiary treatment," and adds that this is the level required as the supply of non-restricted recreational impoundments. A non-restricted recreational impoundment is defined as "...an impoundment of recycled water, in which no limitations are imposed on body-contact water recreational activities."

It is not necessary to be exact in quantifying pathogens in this circumstance as they are living and mobile, multiply exponentially and are impractical to quantify exactly or regulate by weekly average limitations. Tests for detection and enumeration of indicator organisms are used in place of tests for pathogens. The accepted general indicator for pathogenic bacteria is coliform bacteria, which has been authenticated as a reliable standard. Test results allow prediction of

coliform organism populations as a most probable number and limitations typically are specified in terms of daily maximum and a 7-day median. Hence, a total coliform population of 2.2 MPN/100 mL, in the opinion of the DPH, ensures the risk of disease from pathogenic bacteria is at an acceptable level for any of the identified direct uses.

Filtration treatment technology can consistently produce an effluent that does not exceed 2 nephelometric turbidity units (NTU) as a daily average and more than 5.0 NTU 5% of the time within a 24-hour period.

To ensure that other pathogen groups are successfully reduced requires a high degree of filtration as well as the disinfection level described above. Filtration ensures a higher quality effluent by removing finer organic material, and it increases the effectiveness and reliability of the disinfection process. The performance standard for effective filtration is measured in turbidity. ~~Fertiary A~~ D) Disinfected tertiary effluent that achieves this turbidity and the total coliform density previously described ensures that the risk of disease from all pathogen groups is at an acceptable level for any of the identified direct uses.

Title 22 only applies to direct reuse. In indirect use situations where human exposure is or will be similar, it is reasonable to conclude that the health risk will be acceptable if the treatment process and results are the same as, or comparable to, what Title 22 requires for the same exposure in direct reuse. The receiving water is used for irrigation of agricultural land and for contact recreation purposes (i.e., unrestricted). Disinfected tertiary treatment is also recommended in DPH's "*Uniform Guidelines for the Disinfection of Wastewater*" for surface water discharges under conditions similar to Hartley Slough (e.g., limited dilution, REC-1 and ready access to the watercourse). As these indirect uses are similar to the direct uses where Title 22 specifies a minimum of "disinfected tertiary treatment," the Regional Water Board concludes that "disinfected tertiary treatment" is appropriate for Discharge Points 001 and 002. The method of treatment is not prescribed by this Order, but the Order does specify that wastewater must be treated using a process and to a level the same as or equivalent to that of Title 22. Monitoring turbidity allows immediate detection of filter failure that enables rapid corrective action. Coliform testing requires several hours or days to identify high coliform concentrations. To ensure the WWTF achieves appropriate disinfected tertiary treatment, this Order contains effluent limitations reflecting a tertiary level of treatment and disinfection, or fail-safe equivalent, and associated monitoring for Discharges 001 and 002 compliance. In accordance with CWC Section 13241, the Regional Water Board has considered the following:

- i. The past, present and probable future beneficial uses of Hartley Slough and downstream water bodies include MUN, AGR, PRO, REC-1, REC-2, WARM, MIGR, SPWN, and WILD.
- ii. The environmental characteristics of the hydrographic unit, including the quality of the available water, will be improved by the requirement to provide disinfected tertiary treatment for this wastewater discharge. Disinfected

- n. There shall be no cross-connections between potable water supply piping and piping containing recycled water. Supplementing recycled water with potable water shall not occur except through an air-gap separation or, if approved by the DPH, a reduced pressure principle backflow device.
- o. A 50-foot buffer zone shall be maintained between effluent disposal areas and all property boundaries.

H. Satisfaction of Antidegradation Policy

1. Surface Water

The Discharger submitted an entitled *City of Merced, Report of Waste Discharge, Antidegradation Analysis*, on 10 January 2008 that examines whether the proposed project will lower the water quality in the receiving water bodies, whether the increased discharge is protective of the beneficial uses of the receiving waters, and whether lowering of the water quality, if any, in the receiving water is consistent with maximum benefit to the people of the State. Based on the Analysis, Discharger monitoring and information in the record, the following conclusions can be made:

- Hartley Slough is an effluent dominated waterbody. During a large part of the year, water quality is primarily determined by the presence of the existing discharge. Thus, baseline water quality is the quality of the WWTF secondary effluent.
- State policy encourages ~~recycling~~ ^{recycling} of wastewater and recycling of wastewater is of benefit to the people of the State. The wastewater discharged to Hartley Slough is recycled by downstream farmers for AGR, provides water for WARM and WILD and is designated as REC-1. These uses would not be possible year-round without the discharge.
- The proposed project will increase the authorized discharge flow from 10 mgd to 11.5 mgd of secondary treated wastewater, and eventually increase up to 20 mgd of tertiary treated wastewater.
- The effluent contains 43 priority and non-priority pollutants at detectable concentrations.
- The proposed WWTF upgrades (filtration, UV disinfection, denitrification, and effluent re-aeration) will implement BPTC.
- Following the upgrades:
 - The receiving water quality with respect to concentration will either improve or remain the same.
 - The receiving water conditions, as measured by the dissolved oxygen concentration, pH, temperature, turbidity and toxicity will improve or remain the same.
 - ~~Generally~~, mass loads will improve or remain the same after the implementation of filtration.

Based on the above, the proposed modifications to the discharge to Hartley Slough will not lower receiving water quality below the existing baseline and will not impact

any beneficial uses of the receiving water. The project will provide additional high quality water that can be used beneficially downstream of the WWTF. The project is consistent with State and federal antidegradation policies.

2. Land Discharge

The proposed project includes WWTF upgrades that represent BPTC. Sludge treatment units will be modified to eliminate the migration of leachate to groundwater. Recycled water applied to the WMA and LAA will be denitrified.

Application of denitrified recycled water to the WMA and LAA will not result in exceedences of groundwater water quality objectives and the ability to recycle the wastewater in a water short area is of maximum benefit to the people of the State.

The total discharge flow to the WMA and LAA is not expected to increase and in many respects the effluent ~~quality~~ will improve. Given these facts, the proposed discharge is consistent with State Water Board Resolution 68-16.

quality

V. RATIONALE FOR RECEIVING WATER LIMITATIONS

Basin Plan specifies water quality objectives to protect the beneficial uses of surface water and groundwater, including numeric and narrative objectives, 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 beneficial uses.

A. Surface Water

This Order contains Receiving Surface Water Limitations, as summarized below, based on the Basin Plan water quality objectives

- a. **Ammonia.** The Basin Plan states that, "[w]aters shall not contain un-ionized ammonia in amounts which adversely affect beneficial uses. In no case shall the discharge of wastes cause concentrations of un-ionized ammonia (NH_3) to exceed 0.025 mg/l (as N) in receiving waters."
- b. **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."
- c. **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."

- n. **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."*
- o. **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."*
- p. **Temperature.** The Hartley Slough has the beneficial use of 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."* This Order includes a receiving water limitation based on this objective. The Order also provides the Discharger the opportunity to provide evidence of appropriate averaging periods for the incremental change limit and appropriate ceiling temperatures.
- q. **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."*
- r. **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."*

space →

B. Groundwater

- 1 Basin Plan water quality objective for toxicity 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 establishes numerical water quality objectives for chemical constituents and radioactivity in groundwaters designated as municipal supply.

Figure F-3
WET Accelerated Monitoring Flow Chart

