

City of Pinole

Pinole/Hercules WPCP Project

Technical Memorandum 02

Waste Discharge Requirements

March 1, 2013

PRELIMINARY
FOR REVIEW ONLY



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TM 02 - WASTE DISCHARGE REQUIREMENTS

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Executive Summary

Purpose

The purpose of this technical memorandum (TM) is to summarize the conditions in the Pinole/Hercules Water Pollution Control Plant's (WPCP) renewed National Pollutant Discharge Elimination System (NPDES) permit and to identify potential future regulations.

Background

The WPCP treats wastewater collected from the City of Pinole and the City of Hercules. The WPCP's secondary treatment system has a permitted capacity of 10.3 million gallons per day (mgd). During the wet weather season, influent flows can exceed 10.3 mgd due to infiltration and inflow in the collection system. Influent flows that exceed 10.3 mgd bypass secondary treatment and are blended with secondary effluent prior to disinfection and discharge to San Pablo Bay. Two outfalls are currently used for discharge of treated effluent. The WPCP is permitted to discharge up to 10.5 mgd to the Rodeo Sanitary District's outfall (Deep Water Outfall). Higher flows are discharged to the Emergency Outfall located directly west of the WPCP site.

In August 2012 the WPCP was issued a renewed NPDES permit. Provisions in the renewed permit that are drivers for the upgrades at the WPCP are as follows:

- ◆ Provide secondary treatment for average dry weather flows (ADWF) equal to 4.06 mgd.
- ◆ Eliminate blending of peak wet weather flows (PWWF) and provide secondary treatment for PWWF up to 20 mgd.
- ◆ Limit discharge to the Emergency Outfall to times when flows are greater than 14.6 mgd.

The permit requires upgrades at the plant be constructed and operational by June 1, 2017.

The scope of the preliminary design effort does not include the existing anaerobic digesters, which provide stabilization of solids for beneficial reuse. Therefore this TM does not address an evaluation of permit conditions and future regulations for the beneficial reuse of biosolids.

Conclusions

Effluent limitations in the current permit for conventional pollutants remain the same as in the previous permit. Total ammonia is a new constituent in the permit. At this time the effluent limit is higher than the influent ammonia concentration and therefore the treatment upgrades are not required to address ammonia removal. At a minimum, the upgrades need to address the following to meet special provisions in the permit:

- ◆ Secondary treatment for flows up to 20 mgd (elimination of blending)
- ◆ Conveyance of treated effluent flows up to 14.6 mgd to the Deep Water Outfall

Based on ongoing studies by the Regional Water Quality Control Board (RWQCB), near term future regulations may include more stringent ammonia limits for San Francisco Bay dischargers. Based on the analysis presented in TM 8, it is recommended that the secondary treatment upgrades incorporate ammonia and nitrogen removal now to minimize construction costs in the future and to minimize annual operating costs now.

Based on the analysis presented in TM 14, it is recommended that improvements to the existing Effluent Pump Station and Outfall Pipeline be performed so that up to 13.9 mgd can be discharged to the Deep Water Outfall. This was determined to be the maximum flow at maximum sea water elevation that the existing Outfall Pipeline and Effluent Pump Station can convey to the Deep Water Outfall. Due to the pressure rating of the Outfall Pipeline, 14.6 mgd can not be delivered to the Deep Water Outfall. It is recommended that WPCP Staff initiate discussions with the RWQCB to initiate use of the Emergency Outfall at flows greater than 13.9 mgd versus 14.6 mgd (refer to TM 14 for additional details).

The WPCP upgrades should at a minimum be compatible with the following to accommodate potential future regulations:

- ◆ UV disinfection/advanced oxidation
- ◆ Tertiary filtration
- ◆ Further restricted use of the Emergency Outfall

Introduction

The Pinole/Hercules Water Pollution Control Plant (WPCP) collects and treats wastewater from City of Pinole and the City of Hercules. The WPCP is regulated by National Pollutant Discharge Elimination System (NPDES) No. CA0037796. A renewed permit was adopted by the RWQCB on August 8, 2012 and became effective on October 1, 2012. This TM provides an

overview of key provisions in the new permit. The components of this TM include the following:

- ◆ Overview of permit conditions
- ◆ Special provisions in the permit
- ◆ Potential future regulations
- ◆ Regulatory drivers for the project

Permit Conditions

Effluent Limitations

Table 2-1 provides the final effluent limitations at compliance point EFF-001/EFF-001B. The two monitoring locations are defined as (1) downstream of dechlorination, and (2) prior to discharge and/or blending with Rodeo Sanitary District’s treated effluent.

Table 2-1. Conventional, Non-Conventional, and Toxic Pollutant Effluent Limitations

Parameter	Units	Effluent Limitations				
		Average Monthly	Average Weekly	Maximum Day	Instantaneous Minimum	Instantaneous Maximum
Carbonaceous Biochemical Oxygen Demand (5-Day @ 20°C) (CBOD)	mg/L	25	40	---	---	---
Total Suspended Solids (TSS)	mg/L	30	45	---	---	---
Oil and Grease	mg/L	10	---	20	---	---
pH	s.u.	---	---	---	6.0	9.0
Chlorine, Total Residual	mg/L	---	---	---	---	0.0
Enterococcus Bacteria	MPN/100 mL	35 ^a	---	---	---	---
Total Coliform Bacteria	MPN/100 mL	240 ^b	---	---	---	10,000 ^c
Copper ^{d,e}	µg/L	58	---	120	---	---
Cyanide ^d	µg/L	20	---	43	---	---
Dioxin-TEQ ^d	µg/L	1.4 x 10 ⁻⁸	---	2.8 x 10 ⁻⁸	---	---
Total Ammonia, as N ^d	mg/L	110	---	180	---	---

- a Defined as the geometric mean of samples collected in the calendar month
 - b Defined as the median value of at least five samples collected in the calendar month
 - c No sample shall exceed this value.
 - d Average concentration of all samples collected during the averaging period
 - e Expressed as total recoverable copper
- mg/L milligrams per liter
 µg/L micrograms per liter
 s.u. standard units
 MPN/100 mL most probable number per 100 milliliter

In addition to the limits included in Table 2-1, the WPCP needs to provide at least 85 percent carbonaceous biochemical oxygen demand (cBOD) and total suspended solids (TSS) removal (relative to influent wastewater). Acute and chronic toxicity monitoring is also required for dechlorinated effluent. The discharge shall not contain chronic toxicity at a level that can cause or contribute to toxicity in receiving water. Undiluted effluent shall demonstrate the following survival rates for acute toxicity organisms:

- ◆ 90 percent for an 11 sample median value.
- ◆ 70 percent for an 11 sample 90th percentile value.

The discharge permit does not contain limits for disinfection by-products (DBPs) and reasonable potential was not found for DBPs. Reasonable potential was found for copper, cyanide, total ammonia, and dioxin – TEQ, which is the basis for these constituents having the effluent limits presented in Table 2-1.

Special Provisions

Blending Elimination

Currently, the WPCP is permitted to provide secondary treatment for average dry weather flows up to 3.5 mgd and peak wet weather flows (PWWF) up to 10.3 mgd. When influent flows are greater than 10.3 mgd, secondary treatment is bypassed. The bypassed flow is blended with secondary effluent prior to disinfection and discharge to San Pablo Bay.

Under the August 8, 2012 NPDES permit, the WPCP is required to provide secondary treatment for average dry weather flows up to 4.06 mgd, and PWWF up to 20 mgd. The upgrades to the secondary system are to be constructed by November 1, 2016 and operational by June 1, 2017 (Table 2-2).

Table 2-2. Compliance Schedule for Blending Elimination and Emergency Outfall Use¹

Task	Due Date
Complete Final Design of Plant Upgrades <i>(capacity increase to secondary treatment and effluent conveyance system)</i>	March 1, 2014
Start Construction of Plant Upgrades	September 1, 2014
Complete Construction of Plant Upgrades	November 1, 2016
Plant Upgrades Are Operational	June 1, 2017

1. Tasks previously completed are not included in table.

Emergency Outfall Use

Treated effluent is pumped and discharged to San Pablo Bay via the Deep Water Outfall. The current permitted capacity of the effluent pump station and conveyance pipeline is 10.5 mgd. Flows greater than 10.5 mgd are discharged by gravity to the Emergency Outfall, which is located to the west of the WPCP site.

Under the August 8, 2012 NPDES permit, use of the Emergency Outfall is to be reduced and used for flows in excess of 14.6 mgd. Therefore, the capacity of the effluent pump station and conveyance pipeline to the Deep Water Outfall needs to be increased to 14.6 mgd. Upgrades to the effluent pump station and conveyance pipeline need to be operational by June 1, 2017.

Copper and Cyanide Action Plans

The San Francisco Bay Basin Plan includes water quality objectives for copper and cyanide to protect the beneficial uses of the estuary. The reasonable potential analysis (RPA) determined reasonable potential for copper and cyanide to be present in treated effluent at concentrations higher than the established water quality objectives.

The WPCP's renewed permit requires that copper and cyanide action plans be developed. The following items are to be prepared by the compliance schedule in the permit:

- ◆ Review of Potential Copper/Cyanide Sources.
- ◆ Implementation of Copper/Cyanide Control Program.
- ◆ Implementation of Additional Copper/Cyanide Control Measures.
- ◆ Report of Copper/Cyanide Control Program Status.

The copper control program has one additional item (Reduce Copper Pollutant Impact Uncertainties) that the WPCP has already prepared and submitted to the RWQCB.

Potential Future Regulations

There is a possibility that future water quality standards may be promulgated and applied such that the resulting effluent limits are not achievable without additional treatment processes. Possible future regulatory items include, but are not limited to the following:

- ◆ Ammonia: The San Francisco Bay estuary has been recognized as a nutrient-enriched estuary. As a result of nutrients, significant increases in phytoplankton biomass and small declines in dissolved oxygen concentration have been observed in areas of San Francisco Bay Estuary. California RWQCB, San Francisco Bay Region issued an order under Water Code Section 13267 on March 2, 2012 in order to develop nutrient water quality objectives. The order requires select municipal wastewater dischargers (including the WPCP) to monitor and report nutrient (nitrogen and phosphorous) concentration and mass loading in their wastewater discharges in the San Francisco Bay Region. As a result of the evaluation of data collected by this order, the RWQCB may require the municipal wastewater dischargers to address nutrient removal (e.g., ammonia, nitrate and/or phosphorous), and to develop total mass daily limits (TMDLs) or other regulatory strategies to control/reduce nutrient loading to San Francisco Bay estuary.

- ◆ Disinfection By-Products (DBPs): Effluent limits were not included in the current permit because DBPs in the effluent do not exceed San Francisco Bay Basin Plan water quality objectives. DBP water quality objectives are not expected to be modified in the near term for deep water dischargers. However, in the long term this is likely to change and the WPCP upgrades should consider the conversion to ultraviolet (UV) disinfection now or in the future.
- ◆ Complex trace organic compounds (N-nitrosodimethylamine (NDMA), pharmaceuticals, and related compounds): Trace organics and pharmaceutical compounds were not included or considered in the development of the current permit. However, future permits may result in the application of limitations for these parameters. The timeline for such limits is unclear but additional treatment (e.g., advanced oxidation) could be necessary to meet such limits in the future.
- ◆ Tertiary filtration: Tertiary filtration could be necessary in the future to meet effluent limits and/or as a pretreatment step prior to advanced treatment. The WPCP upgrades should consider the potential need for tertiary filtration and should provide flexibility to accommodate filtration in the future.
- ◆ Emergency Outfall use: The WPCP's new permit does not prohibit use of the Emergency Outfall for flows greater than 14.6 mgd. The Emergency Outfall is a shallow outfall and its future use could be further restricted. The WPCP upgrades should consider the potential for further restrictions to Emergency Outfall use.

Water Recycling Criteria

The WPCP does not currently produce Title 22 recycled water and there are no current plans to deliver recycled water offsite. Treated effluent is reused within the plant for normal in-plant uses (e.g., pump seal water). Water recycling water quality objectives vary based on end use. Given the location of the WPCP and potential users in the area, unrestricted reuse would be most applicable. Unrestricted reuse would require filtration and the treated effluent would need to meet the following requirements:

- ◆ Filter Effluent (for Granular/Cloth Media filtration):
 - ▲ Daily average turbidity of 2 Nephelometric turbidity units (NTU) is required.
 - ▲ Turbidity shall not be 5 NTU for more than 5 percent of the time within a 24-hour period.
 - ▲ Turbidity shall not to exceed 10 NTU at any time.
- ◆ Disinfection (chlorine):
 - ▲ Total coliform of 2.2 most probable number per 100 milliliters (MPN/100mL) in the last 7 days.
 - ▲ Total coliform of 23 MPN/100 mL in no more than one sample in any 30-day period.

- ▲ 240 MPN/100 mL in no samples.

The upgrades at the WPCP should consider the potential for future recycled water production.

Regulatory Drivers for Project

The following regulatory requirements are drivers for the upgrades at the WPCP:

- ◆ Blending Elimination: Peak wet weather flows (PWWF) up to 20 mgd will receive secondary treatment, which is almost twice the current permitted peak wet weather capacity of the secondary system.
- ◆ Minimize Emergency Outfall Use: Discharge to the Emergency Outfall will be reduced and discharge to the Deep Water Outfall will be increased. The conveyance capacity to the Deep Water Outfall needs to be increased to 14.6 mgd (current permitted capacity is 10.5 mgd).

Recommendations

Effluent limitations in the current permit for conventional pollutants remain the same as the previous permit. Total ammonia is a new constituent in the permit; however, at this time the effluent limit is higher than the influent ammonia concentration and therefore the treatment upgrades do not have to address ammonia removal. Based on ongoing studies by the RWQCB, near term future regulations may include more stringent ammonia limits for Bay dischargers. At a minimum, the secondary treatment upgrades should ensure that ammonia removal can be accommodated in the future. Based on the analysis presented in TM 8, it is recommended that construction of ammonia removal facilities be considered now to minimize construction costs in the future. Secondary treatment will need to be provided for flows up to 20 mgd.

The WPCP upgrades will need to upgrade conveyance facilities to the Deep Water Outfall to enable discharge of up to 14.6 mgd to the Deep Water Outfall. Based on the analysis presented in TM 14, it is recommended that improvements to the existing Effluent Pump Station and Outfall Pipeline be performed and that the WPCP initiate discussions with the RWQCB to modify Emergency Outfall use to instances when flows exceed 13.9 mgd.

It is recommended that the WPCP upgrades are compatible with the following to accommodate potential future regulations and/or recycled water production:

- ◆ UV disinfection/advanced oxidation.
- ◆ Tertiary filtration.
- ◆ Further restricted use of the Emergency Outfall.