

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ORDER R5-2016-0006
AMENDING WASTE DISCHARGE REQUIREMENTS
ORDER R5-2014-0120 (NPDES PERMIT NO. CA0077950)

CITY OF WOODLAND
WATER POLLUTION CONTROL FACILITY
YOLO COUNTY

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

1. On 9 October 2014, the Central Valley Water Board adopted Waste Discharge Requirements Order R5-2014-0120 (NPDES Permit), prescribing waste discharge requirements for the City of Woodland, Water Pollution Control Facility, Yolo County. For the purposes of this Order, the City of Woodland is hereafter referred to as “Discharger” and the Water Pollution Control Facility is hereafter referred to as “Facility”.
2. The Discharger owns and operates the Facility. The tertiary treatment system consists of influent screw pumps, grit removal using two bar screens and two aerated grit chambers, four oxidation ditches and four secondary clarifiers, flocculation, four cloth filters, and ultraviolet light (UV) disinfection. The Facility discharges tertiary treated effluent to Tule Canal, a water of the United States.
3. The NPDES Permit contains, in part, UV Disinfection System Operating Specifications to ensure that the UV system is operated to achieve the required pathogen removal. UV specifications in the NPDES Permit are based on the National Water Research Institute (NWRI) and American Water Works Association Research Foundation *Ultraviolet Disinfection Guidelines for Drinking Water and Water Reuse* first published in December 2000 and revised as a Third Edition dated August 2012 (NWRI Guidelines), and the design specifications of the Facility.
4. The Discharger is required to conduct spot checks of their UV disinfection system to confirm that the system is operating according to the specifications and report the findings to the State Water Resources Control Board, Division of Drinking Water (DDW). A total of thirteen spot checks were performed by the Discharger’s consultant during 2011 and 2014, and the results were submitted to DDW in the *UV Disinfection System Test Report* dated 30 April 2015. DDW found that the system underperformed in five of the thirteen tests. In a letter dated 25 June 2015, to the Central Valley Water Board Executive Officer, DDW recommended 15 criteria that should be incorporated into the Discharger’s NPDES Permit in order for the UV disinfection system to meet performance standards.
5. The Facility is currently seeking to be covered under Order No. 2014-0090-DWQ for recycled water use. The pipeline will allow for distribution of disinfected tertiary treated wastewater covered under Order No. 2014-0090-DWQ to be distributed to properties northwest of the Facility, including up to five major users, parks, and median strips along the pipeline route. Order R5-2014-0120 requires the Discharger to monitor the effluent for coliform three times per week. Title 22, section 60321 of the California Code of Regulations (CCR) requires discharges of Title 22 recycled water to be sampled at least once daily for coliform bacteria. The Discharger informed staff that the Facility does not discharge to its recycled water facilities

daily. For days that the Discharger is discharging to its recycled water facilities, total coliform organisms must be sampled a minimum of once per day.

6. Order R5-2014-0120 may be reopened and modified in accordance with the Code of Federal Regulations (CFR) at 40 CFR section 122.62.
7. Issuance of this Order is exempt from the provisions of the California Environmental Quality Act (Public Resources Code section 21000, et seq.), in accordance with CWC section 13389 and sections 15061(b)(3) and 15321 (a)(2), Title 14, of the California Code of Regulations.
8. The Central Valley Water Board has notified the Discharger and interested agencies and persons of its intent to amend the Waste Discharge Requirements Order for this discharge and has provided them with an opportunity to submit their written views and recommendations.

IT IS HEREBY ORDERED THAT:

Waste Discharge Requirements Order R5-2014-0120 (NPDES No. CA0077950) is amended (as shown in items 1 through 7, below) including updates to the UV specifications and Monitoring and Reporting Program. This Order is effective upon adoption.

1. Change the Order number throughout the NPDES Permit to R5-2014-0120-01.
2. Change the words "Department of Public Health" to "Division of Drinking Water" and change the acronym "DPH" to "DDW", throughout the NPDES Permit.
3. **Ultraviolet (UV) Disinfection System Operating Specifications (section VI.C.4.b).** Modify this section as shown in underline/strikeout format below:

i. **UV Dose.** The UV disinfection system must be operated to deliver a minimum hourly average UV dose in the UV reactor shall be of 160125 millijoules per square centimeter (mJ/cm²) at all times.

ii. The following equations must be used to calculate UV dose as part of the automatic UV disinfection control system. The equations are from the State Water Board, Division of Drinking Water (DDW), formerly the California Department of Public Health, 23 July 2009, acceptance letter entitled "Revised Conditional Acceptance Of Trojan UV3000plusTM Disinfection System, Correction Factor For 2005 Bioassay".

$$\text{Dose} = (\text{CF}) * (\text{FF}) * (\text{EOLL}) * 10^{-4.63 - 0.7 * \log \text{Flow} + 2.91 * \log \text{UVT} + 1.09 * \log \text{P}}$$

And

$$\text{CF} = -0.003 * \text{UVT} + 1.075 \quad (\text{correction factor to the 2005 bioassay})$$

Where:

$$\text{Dose} = \text{Delivered UV dose per bank (mJ/cm}^2\text{);}$$

$$\text{FF} = 0.95 \text{ Fouling Factor based upon a cleaning frequency of once per day;}$$

$$\text{UVT} = \text{Percent UV transmittance at 254 nanometers (\%);}$$

$$\text{Flow} = \text{Flow rate per lamp (gallons per minute/lamp), with gpm/lamp calculated as gpm divided by the number of lamps per bank;}$$

EOLL = End of Lamp Life factor (0.91 @ 12000 hours for the Heraeus lamp);

P = percent power.

- iii. UV Transmittance (UVT). The minimum hourly average UV transmittance (at 254 nanometers) in the wastewater measured at UVS-001 shall not fall below 55 percent.
- iv. The UV lamps must be replaced after 12000 hours (or sooner as necessary) of operation to maintain a Design Lamp Output Attenuation Factor, also referred to as EOLL, of 0.91.
- v. The quartz sleeves must be clean/wiped once per day to maintain a Fouling Factor of 0.95.
- vi. On-line monitoring of flow and UVT must be provided at all times.
- vii. Flow meters and UVT monitors must be properly calibrated to ensure proper disinfection.
- viii. The duty online UVT analyzer must be inspected and calibrated by the UVT analyzer manufacturer quarterly.
- ix. The on-line UVT analyzer must be recalibrated if the reading varies from the bench-top spectrophotometer UVT reading by 2% or more. The recalibration must be conducted by a procedure recommended by the UVT analyzer manufacturer.
- x. Flow meters measuring the flow through a UV system must be verified to determine accuracy annually via checking the flow reading against other flow determination methods.
- xi. The UV system must be designed with built-in automatic reliability features that must be triggered by critical alarm set points.
- xii. Conditions triggering an alarm and startup of a redundant module of lamps include the following:
 - (a) The UV dose goes below 160 mJ/cm².
 - (b) Failure of one bank of lamps. [This may be allowed only if the 'redundant' unit would come into service automatically; otherwise, disinfection would not be adequate, and the effluent would be diverted to waste.]
- xiii. Conditions that must divert effluent to waste include the following:
 - (a) UV dose is below the minimum UV dose of 160 mJ/cm².
 - (b) UVT is below 55%.
 - (c) Complete UV channel failure, or
 - (d) Flow above the maximum flow commissioned of 5.6 mgd per channel.
- xiv. For Title 22 discharges, the Facility shall be operated in accordance with a site-specific UV Operations Plan approved by DDW, which specifies the operational limits and responses required for critical alarms. The UV Operations Plan must be approved by DDW prior to delivery of recycled water to a use site. A copy of the approved UV Operations Plan must be maintained at the Facility and be readily available to operations personnel and regulatory agencies. A quick reference UV Operations Plan must be posted at the Facility and include the following information:
 - (a) The alarm set points for flow and UVT,
 - (b) The values of flow, UV dose, and UVT when effluent must be diverted to waste,

- (c) The required frequency of verification and calibration for all meters/analyzers measuring flow and UV transmittance.
- (d) The required frequency of mechanical cleaning and equipment inspection, and
- (e) The UV lamp tracking procedures and replacement intervals.

i.xv. Substitutions of equivalent equipment will not be accepted without an adequate demonstration of equivalent disinfection performance.

- ~~ii. The lamp sleeves and cleaning system components must be visually inspected per the manufacturer's operations manual for physical wear (scoring, solarization, seal leaks, cleaning fluid levels, etc.) and to check the efficacy of the cleaning system.~~
- ~~iii. The lamp sleeves must be cleaned periodically as necessary to meet the UV dose requirements.~~
- ~~iv. Lamps must be replaced per the manufacturer's operations manual, or sooner, if there are indications the lamps are failing to provide adequate disinfection. Lamp age and lamp replacement records must be maintained.~~

4. **Table E-10. Filtration System and UV Disinfection System Monitoring Requirements (Attachment E-Monitoring and Reporting Program, Section IX.C.1.a).** Modify this table in underline/strikeout format as shown below.

Parameter	Units	Sample Type	Monitoring Location	Minimum Sampling Frequency
Flow	MGD	Meter	UVS-001	Continuous ¹
Turbidity	NTU	Meter	FIL-001	Continuous ^{1,2}
Number of UV banks in operation	Number	Observation	N/A	Continuous ¹
UV Transmittance	Percent (%)	Meter	UVS-001	Continuous ¹
UV Dose ³	mJ/cm ²	Calculated	N/A	Continuous ¹
Total Coliform Organisms	MPN/100 mL	Grab	UVS-002	<u>1/Day⁴ 3/week</u>

¹ For continuous analyzers, the Discharger shall report documented routine meter maintenance activities including date, time of day, and duration, in which the analyzer(s) is not in operation. If analyzer(s) fail to provide continuous monitoring for more than two hours and influent and/or effluent from the disinfection process is not diverted for retreatment, the Discharger shall obtain and report hourly manual and/or grab sample results. The Discharger shall not decrease power settings or reduce the number of UV lamp banks in operation while the continuous analyzers are out of service and water is being disinfected.

² Report daily average and maximum turbidity.

³ Report daily minimum hourly average UV dose and daily average UV dose. The minimum hourly average dose shall consist of lowest hourly average dose provided in any channel that had at least one bank of lamps operating during the hour interval. For channels that did not operate for the entire hour interval, the dose will be averaged based on the actual operation time.

⁴ Daily monitoring is required for all discharges to the recycled water system. When the Facility is not discharging to the recycled water system, monitoring can be reduced to 3/week.

5. **Discharge Points and Receiving Waters (Attachment F-Fact Sheet, section II.B)** Insert the following paragraph below section II.B.2, as II.B.3:

- 3. The Facility is currently seeking to be covered under Order No. 2014-0090-DWQ for recycled water use. The recycled water system includes pipeline along Gibson Avenue Farnham Avenue, and North to Kentucky Avenue to be installed by May 2016. The

pipeline will allow for distribution of disinfected tertiary treated wastewater covered under Order No. 2014-0090-DWQ to be distributed to properties northwest of the Facility, including up to five major users, parks, and median strips along the pipeline route. Upon completion of the distribution system recycled water will be available to Woodland Biomass Power Ltd. and City parks, including Klenhard Park and Pioneer Park.

6. Ultraviolet (UV) Disinfection System Operating Specifications (Attachment F-Fact Sheet, section VI.B.4.b). Modify this section in underline/strikeout format as shown below.

- a. Add the following sentence to the end of the second paragraph of section VI.B.4.b of the Fact Sheet:

The UV Disinfection System Operating Specifications (section VI.C.4.b) represent the latest recommended specifications from DDW.

- b. Modify the third paragraph of section VI.B.4.b of the Fact Sheet as shown in underline/strikeout format below:

Order R5-2009-0010 included UV operating requirements based on the NWRI Guidelines (i.e., dose of 100 mJ/400-cm² and transmittance of 55% at 254 nm). However, the design dose of the UV system is 125 mJ/400-cm², and the Discharger indicated in a 6 January 2014 ROWD addendum that they have periodically had to operate the UV system at higher dose rates than assumed in design to achieve coliform kills. In a 21 June 2012 memorandum, the Discharger's consultant indicated that operating the UV system at the design dose of 125 mJ/cm² should be adequate to meet NPDES permit requirements for disinfection, and recommended that the Discharger continue to implement operational changes to reduce the mean cell residence time (MCRT), increase cleaning of the UV system, and increase cleaning of the filters. Therefore, in lieu of the UV dose requirements of the NWRI Guidelines, ~~this Order R5-2014-0120 includes-included~~ an operating specification for a minimum hourly average UV dosage of 125 mJ/cm². Subsequently, in a letter dated 25 June 2015, from DDW to the Executive Officer, DDW recommended 15 criteria to be incorporated into the Discharger's NPDES Permit, which included increasing the minimum dose of the UV disinfection system to 160 mJ/cm². On 18 February 2016, the Central Valley Water Board adopted amended Order R5-2014-0120-01, which replaced the UV Disinfection System Operating Specifications in section VI.C.4.b of Order R5-2014-0120 with the 15 criteria recommended by DDW. If the Discharger conducts a site specific UV engineering study that demonstrates a lower UV dose meets a Title 22 equivalent virus removal, this Order may be reopened to revise the UV operating specifications accordingly.

7. Rationale for Monitoring and Reporting Requirements (Attachment F-Fact Sheet, Section VII.B.4) Modify this section in underline format as shown below.

- a. Order R5-2009-0010 required monitoring for turbidity continuously and total coliform organisms three times per week at Monitoring Location EFF-001. This amended Order, R5-2014-0120-01, retains the monitoring frequencies for turbidity, and when the Facility is not discharging to the recycled water system, the minimum sampling frequency for total coliform organisms will be retained. For discharges to the recycled water system, the monitoring requirement for total coliform organisms will be increased to once per day in accordance with CCR, Title 22, section 60321. The point of compliance is moved from Monitoring Location EFF-001 to an internal compliance point following the filtration system and prior to the UV disinfection system for turbidity (Monitoring Location FIL-001) and

following the UV disinfection system for total coliform organisms (Monitoring Location UVS-002).

Any person aggrieved by this action of the Central Valley Water Board may petition the State Water Board to review the action in accordance with CWC section 13320 and California Code of Regulations, title 23, sections 2050 and following. The State Water Board must receive the petition by 5:00 p.m., 30 days after the date that this Order becomes final, except that if the thirtieth day following the date that this Order becomes final falls on a Saturday, Sunday, or state holiday (including mandatory furlough days), the petition must be received by the State Water Board by 5:00 p.m. on the next business day. Copies of the law and regulations applicable to filing petitions may be found on the Internet at: http://www.waterboards.ca.gov/public_notices/petitions/water_quality or will be provided upon request.

I, PAMELA C. CREEDON, Executive Officer, do hereby certify the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Central Valley Region, on 18 February 2016.

Original signed by

PAMELA C. CREEDON, Executive Officer