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Comments — Tentative WDR Order and NPDES permit for Shasta County Service Area No. 17, Cottonwood Wastewater Treatment Plant, Shasta County

This letter presents my comments on the subject tentative order. My comments mostly concern the Facility's discharges of municipal wastewater treatment sludge to two basins. I also request information on how the Discharger collects, manages, and disposes of storm water potentially contaminated by its contact with Facility surfaces, including its four concrete-lined sludge drying beds. Last, I question the tentative order's inclusion of effluent limitations for nitrate plus nitrite (as N) of 138 mg/L (average weekly) and 72 mg/L (average monthly).

I am a California registered civil engineer and worked 12 years in the Central Valley Regional Water Quality Control Board's Fresno office, mostly in the WDR Program. I also took the NPDES Permit Writer's course and, for a few years, also worked in the NDPES program.

The tentative order indicates that the disposal of Facility effluent is via discharge to Cottonwood Creek, "the largest undammed tributary of the Sacramento River Basin" (F-18). Its Map, Attachment B, depicts the location of the Facility and its outfall pipeline to Cottonwood Creek.

Like most Central Valley NPDES permits, the tentative order does not include a scaled Facility Site Map depicting the locations of all unit operations identified in the tentative order's Flow Schematic, Attachment C, and of all monitoring locations identified in the tentative order's Monitoring and Reporting Program (MRP). WDRs for land discharges always contain one or more facility site maps for reasons that should be obvious. A Facility Site Map is appropriate for this discharge because the Facility features sludge handling operations that, if not reflective of best practicable treatment or control, can release sludge waste constituents to soil that, if not attenuated in the vadose zone, can reach and unreasonably degrade groundwater. Unreasonably, because municipal wastewater treatment sludge handling operations can be designed constructed, operated, and maintained to not release sludge waste constituents to soil in concentrations that pose a threat to groundwater.

Recommendation 1: Please revise the tentative order to include a scaled Facility Site Map depicting the Facility property lines, locations of unit operations identified in Attachment C, monitoring locations identified in the MRP, and any and all storm water retention/disposal basins.

The Facility includes two aerated sludge storage basins. The tentative order cites the capacities of the north and south sludge storage basins as 4.3 and 0.63 acre-feet, respectively. Google Earth imagery indicates that the north and south basin areas are about 0.7 and 0.2 acre, respectively. Given the cited storage capacities, the north basin's working sludge depth is about six feet, the south basin's, about three feet. Google Earth imagery also indicates that the working sludge surface elevations in the north and south basins are 417 and 414 feet above mean sea level (amsl), respectively. These values, along with those for working depths, yield an invert elevation for both basins of 411 feet amsl.

Recommendation 2: Please revise the tentative order to provide the areas of both sludge basins, their working sludge depths, berm elevations, invert elevations, and the vertical separation distance between basin inverts and highest anticipated groundwater.

FEMA flood maps place the Facility just outside of Cottonwood Creek's regulatory floodway. Google Earth imagery shows several large ponds within the creek's regulatory floodway south of the Facility. According to Regional Board staff, these ponds are the legacy of past gravel mining operations. Google Earth imagery depicts various water elevations in these ponds ranging from 396 feet amsl in the westernmost pond, and 387 feet amsl in the easternmost pond, which is directly south of the Facility. The water surface elevation of Cottonwood Creek in the vicinity of the Facility's outfall appears to be about 394 feet amsl. Historic imagery shows these ponds consistently support algae growth. The tentative order does not disclose the existence of these ponds or identify their water source (i.e., Cottonwood Creek and/or groundwater).

In the event that these ponds are fed by groundwater, then it would appear that groundwater contains nitrogen and possibly also phosphorus in concentrations sufficient to support vigorous algae growth. The question then becomes, "What is the source of these nutrients?" The tentative order indicates that the Facility provides sewage service to about half the residents of Cottonwood. It does not disclose the type(s) of sewage collection, treatment, and disposal for the community's other half. Unless these residents are served by a different municipal sewage collection and treatment facility, then they likely rely on individual household septic tanks and leachfields for domestic wastewater treatment and disposal. The cumulative impact of hundreds of individual household septic tank / leachfield systems in a concentrated area can degrade groundwater for nitrate and other waste constituents. When nitrate-laden groundwater is exposed in gravel pit ponds, it can support vigorous algae growth, which appears to be the case in this discharge situation.

Another potential source of the biostimulatory substances in groundwater exposed in gravel pit ponds could be leachate infiltrating into soil from cracks in the asphalt and

shotcrete liners of the Facility's two sludge storage basins. Like most Central Valley NPDES permits, the tentative order does not describe Facility area soils and their permeabilities. According to UC Davis and NRCS SoilWeb,[1] Facility area soils are well drained and classified as Perkins gravelly loam. This suggests that soils underlying the sludge storage basins may have rapid percolation rates. Also, like most Central Valley NPDES permits, the tentative order does not characterize area groundwater occurrence, flow direction, and quality.

Recommendation 3: Please revise the tentative order to provide information on Facility area soils and their permeabilities, and area groundwater occurrence, flow direction, and quality.

The tentative order does not disclose the sludge basin liners' hydraulic conductivity (e.g., in terms of centimeters per second or gallons per day per acre of basin area). An axiom in the Title 27 regulatory program is that all pond liners leak. That is why this program's prescriptive standards generally require ponds to be equipped with a double liner and leachate collection system. Had the soils underlying the Facility's sludge basins also been compacted prior to liner installation or, better yet, had the basins also been equipped with a bottom liner of compacted clay, leakage of sludge leachate from cracks in the basins' asphalt and shotcrete liners could likely be reduced to levels protective of groundwater. In the absence of soil compaction or a bottom compacted clay liner, it is likely the sludge basins are a concentrated source of waste constituents that may adversely impact groundwater in threatened violation of the tentative order's section VI.C.b.i.

Recommendation 4: Please revise the tentative order to identify the year(s) when the basins were lined and disclose if soils underlying the sludge storage basins were compacted prior to liner installation. Also, identify the liners' certified design hydraulic conductivities in terms of centimeters per second or gallons per day per acre of basin area. If the Discharger's consulting professional did not provide a certification of the liners' hydraulic conductivities, please consider revising the tentative order to include a special provision requiring the Discharger to conduct a technical evaluation of the sludge basin liners to determine their hydraulic conductivities and consistency with the State Antidegradation Policy. If the evaluation determines that the basins' liners are not adequate to preclude the release of sludge leachate waste constituents to groundwater in concentrations that threaten to cause exceedances of water quality objectives, then the provision should require the Discharger to submit a proposal and time schedule to modify the basin liners to achieve and maintain consistency with the State Antidegradation Policy.

Alternatively, please revise the tentative order to include a provision requiring the Discharger to install a groundwater monitoring well network consisting of at least three wells, one upgradient and two downgradient of the sludge storage basins. Include as an attachment the WDR Program's standard information requirements for groundwater monitoring well installation reports. Require quarterly groundwater monitoring for nitrate (as N), total

[1] https://casoilresource.lawr.ucdavis.edu/gmap/

phosphorus, electrical conductivity, total dissolved solids, chloride, hardness, alkalinity, total organic carbon, and total coliform organisms. Also consider establishing a monitoring location for the gravel pit pond directly south of the Facility and require at least two years of quarterly monitoring of pond water for nitrate (as N), total phosphorus, electrical conductivity, total dissolved solids, chloride, hardness, alkalinity, and total organic carbon.

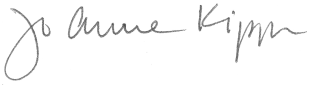
The tentative order indicates that the Discharger is not required to obtain coverage under State Water Board's Industrial Storm Water General Order. It does not appear to provide any information on Facility storm water collection, impoundment, and disposal, not even in its Flow Schematic. Given the Facility's proximity of Cottonwood Creek, the tentative order should provide some information on Facility storm water collection, management and disposal.

Recommendation 5: Please revise the tentative order to provide a description of the Discharger's collection, management, and disposal of Facility storm water.

The tentative order prescribes average monthly and average weekly effluent limitations for nitrate plus nitrite (as N) of 72 and 138 mg/L, respectively. These limitations are lower than those contained in the current order (R5-2016-0066). The tentative order explains that these limitations are included "to assure the treatment process adequately nitrifies and denitrifies the waste stream to protect the beneficial use of municipal and domestic supply" (F-47). According to eSMR data available from CIWQS, from 2020 to 2023, the concentration of nitrate plus nitrite (as N) in Facility effluent averaged 13.5 mg/L, with a standard deviation of 10 mg/L. Therefore, 95% of values for effluent nitrate plus nitrite (as N) were less than 33.6 mg/L. Yet, the tentative order's monthly average effluent limitation is over twice this value. While the proposed effluent limitations may reflect a correct application of NPDES permit writer's guidance, they appear excessively high compared to the actual concentrations of nitrate plus nitrite in Facility effluent.

Question 1: If concentrations of nitrate plus nitrite in Facility effluent are always substantially lower than computed water quality based effluent limitations, it would appear that there is no reasonable potential for the discharge to cause or contribute to an instream excursion above the water quality objective for nitrate plus nitrite. If this is the case, why continue to include limitations for these constituents?

Thank you for your time and consideration.



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