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Mr. Clay Rodgers, Assistant Executive Officer
Sent via email to W. Dale Harvey, Senior Water Quality Control Engineer
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TENTATIVE WASTE DISCHARGE REQUIREMENTS ORDER AND TENTATIVE TIME SCHEDULE ORDER FOR DELANO GROWERS GRAPE PRODUCTS, GRAPE JUICE PROCESSING PLANT, KERN COUNTY

This letter transmits my comments on the subject Tentative Orders. I am a resident of Fresno County and a California registered civil engineer with expertise in evaluating the effects to soil and groundwater from discharges of food processing and winery wastewater to land for treatment and disposal. I gained this expertise during the years that I worked as a Senior Water Resources Control Engineer in the Fresno Office of the Central Valley Water Board.

The Regional Board has regulated the Grape Juice Processing Plant's discharge since 1959. The current 1986 WDRs Order (86-068) authorizes a discharge to a 20-acre disposal area of 0.105 mgd of wash water and distilled water from evaporators and 0.10 mgd stillage waste. In 2005, staff revised Monitoring and Reporting Program (MRP) 86-068 to expand its monitoring of the discharge, disposal area soils, and groundwater. Groundwater data included in the tentative WDRs Order show that the decades-long discharge has polluted underlying groundwater for TDS and EC, and also apparently for iron and manganese.

The tentative WDRs Order proposes to authorize a discharge flow limit of 174 million gallons annually of grape processing wastewater to a 176-acre Land Application Area (LAA). It proposes to monitor compliance with the discharge flow limit from cumulating, over a calendar year, the daily discharge flows of two distinct waste streams. Waste Stream 01 is a low EC wastewater from evaporators that is discharged to two aerated hydraulically connected unlined ponds (Ponds 1 and 2), then to Pond 3, an aerated 65-MG-capacity single-lined surface impoundment. Waste Stream 02 is a high-strength wastewater that is treated in an onsite Wastewater Treatment Plant (WWTP) for BOD and nitrogen removal, then discharged to Pond 3, where it comingles with the low EC Waste Stream 01. The Discharger proposes to dispose of the wastewater impounded in Pond 3 by periodically discharging it via flood irrigation to crops (wheat and Sudan grass) in the 176-acre LAA after blending it at 1:1 ratio with high quality (i.e., low EC) surface water from the Friant-Kern Canal.

Effluent EC Limit and Its Point of Compliance

According to the tentative WDRs Order, the EC of the Plant's groundwater supply averages about 450 umhos/cm. Prior to blending, the EC of the discharge from Pond 3 (effluent) ranges from 1,410 to 3,300 umhos/cm, and averages about 2,440 umhos/cm, or almost 2,000 umhos/cm above source water EC. The tentative WDRs Order proposes to establish a monthly average EC limit of 1,100 umhos/cm applicable to effluent following blending to protect underlying groundwater from unreasonable

degradation from salinity. Because the Discharger is unable to immediately comply with this limit, even after blending, the tentative TSO provides several years for the Discharger to achieve compliance. First, extreme drought conditions have drastically reduced or eliminated all Friant-Kern Canal water deliveries to most water right holders this year. What if the drought continues next year, or worse, for the indefinite future? If it is Regional Board's intent to establish discharge requirements for the Plant's industrial waste, it should make these requirements applicable to the effluent discharged from Pond 3 **prior** to any dilution. Selection of this compliance point for the effluent EC limit ensures the Discharger can maintain compliance even during worst-case scenarios of insufficient or nonexistent supplemental irrigation supply.

Second, and more importantly, the Tulare Lake Basin Plan does not identify waste dilution as a designated beneficial use of valley floor surface waters. If I cannot persuade staff to change the point of compliance for the effluent EC limit to apply to the undiluted discharge from Pond 3, then I urge staff to revise the tentative WDRs Order to: (1) explain why the establishment of a EC limit for a discharge following dilution with up to 533 acre-feet of high-quality surface water annually is compliant with the California Water Code and applicable regulations and is consistent with Board plans and policies, and (2) identify other Central Valley Region WDRs for food processing wastewater discharges that establish similar effluent EC limits for a discharge following blending with a high-quality water supply.

The tentative WDRs indicate that the BOD removal achieved by the WWTP and Pond 3 storage and aeration effectively reduces the average BOD of Pond 3 discharge to about 350 mg/L. This is a major accomplishment that the Regional Board should recognize as an example of best practicable treatment or control (BPTC) that could be emulated by other Central Valley grape juice processors and wineries.

Because the Discharger has implemented BPTC for BOD removal, the Plant's industrial wastewater does not contain the "unavoidable concentrations of organic dissolved solids from the raw food product" cited in the Tulare Lake Basin Plan as a condition that may allow the Regional Board to exempt industrial food processing discharges from the Basin Plan's EC limit of source water EC plus 500 umhos/cm. From the Tulare Lake Basin Plan (Pages IV-13 to IV-14):

> An exception to this EC limit may … also be permitted for food processing industries that discharge to land and exhibit a disproportionate increase in EC of the discharge over the EC of the source water due to unavoidable concentrations of organic dissolved solids from the raw food product, provided that beneficial uses are protected. Exceptions shall be based on demonstration of best available technology and best management practices that control inorganic dissolved solids to the maximum extent feasible.

Average values for effluent TDS and FDS are approximately 1,790 mg/L and 1,250 mg/L, respectively. Finding 33 states, "With an average TDS concentration of 1,787 mg/L and an average FDS concentration of 1,247 mg/L, the discharge meets the incremental EC limit exception." This statement alone does not demonstrate that the discharge meets the Basin Plan's incremental EC limit exception. Unblended effluent EC is almost 2000 umhos/cm higher than source water EC. Because BOD removal treatment has reduced organic dissolved solids, the primary contributors to TDS in effluent is from salinity constituents in grape juice (especially potassium) and in several high salinity wastes such as boiler blowdown, regenerate from electro-dialysis and ion exchange units, and reverse osmosis retentate.

About 70% of effluent FDS is comprised of the following (average concentrations in parentheses): sodium (487 mg/L), potassium (157 mg/L), chloride (150 mg/L), and sulfate (91 mg/L). These salts comprise about 70% of the effluent FDS. The effluent also contains low concentrations of calcium (29 mg/L) and magnesium (10 mg/L), and high concentrations of bicarbonate alkalinity (1,417 mg/L) and measurable concentrations of carbonate alkalinity (24 mg/L). The tentative WDRs Order does not characterize effluent pH, but the presence of measurable carbonate alkalinity means it is very high and may exceed levels harmful to crops and microorganisms responsible for biological treatment.

While high concentrations of potassium in the discharge may be considered unavoidable from the raw product, the high concentrations of other salt constituents (and alkalinity) are presumably attributable to chemicals added to produce grape juice and concentrate. The tentative WDRs Order does not, like other WDRs Orders for food processors prepared by the Region's other two offices, identify the types and quantities of chemicals used annually by the Plant. It also does not provide any evidence that the Discharger has demonstrated "best available technology and best management practices that control inorganic dissolved solids to the maximum extent feasible" that would qualify the industrial discharge to be exempt from the Basin Plan's EC limit. In the absence of such a demonstration, the Regional Board should establish an effluent EC limit of source water EC plus 500 umhos/cm.

The effluent's high sodium concentration combined with its low calcium and magnesium concentrations means that the effluent's sodium adsorption ratio (SAR) is very high. Using data provided in the tentative WDRs, I derived an effluent SAR of 20.[i] Even after diluting with low EC canal water, I estimated a SAR of 14 for the blended discharge.[ii] Waters with SAR values exceeding 9 are unsuitable for irrigation because of sodium's deleterious affect on soil permeability.[iii] The tentative WDRs Order is mute on this fundamental problem with effluent quality and its disposal by crop irrigation. And, unlike the current MRP, the tentative MRP proposes to eliminate the requirement for soil monitoring to regularly assess the affect of the discharge to LAA soils and the potential for the discharge to adversely affect groundwater. The tentative MRP should include soil monitoring of LAA and background soils for pH, EC, sodium, and nitrogen (nitrate-nitrogen, total Kjeldahl nitrogen, Total Nitrogen). The selection of the number and locations of soil samples in the 176-acre LAA should be identified in a technical report prepared by a certified soil scientist submitted at least two months prior to the first soil sampling event.

Recommendation 1. Revise the tentative WDRs to either: (a) prescribe an average monthly effluent EC limit of source water EC plus 500 umhos/cm applicable to the discharge prior to blending with supplemental irrigation water, or (b) describe how the Discharger has demonstrated "best available technology and best management practices that control inorganic dissolved solids to the maximum extent feasible" that would allow the industrial discharge to be exempt from the Basin Plan's EC limit.

Recommendation 2. Revise the tentative WDRs Order to include a characterization of effluent SAR (unblended and blended) and, if excessive, explain why its discharge to the 176-acre LAA will not deleteriously affect soil permeability and crop viability.

Recommendation 3. Revise the tentative MRP to change the monitoring location of EFF-003 to be the direct discharge from Pond 3 (instead of at a point following any dilution with Friant-Kern Canal water) and require daily reporting of the dilution ratio.

Recommendation 4. Revise the tentative MRP to require soil monitoring as described above.

Other comments

I question how the tentative WDRs Order can find that the impoundment of Waste Stream 01 in unlined, aerated ponds is reflective of BPTC when it does not characterize the quality of this waste stream? The provision of aeration in the two unlined ponds that impound this waste suggests it contains sufficient organic matter that, without aeration, may generate objectionable odors during impoundment.

Finding 14 states, "Effluent samples collected from the Pond 2 prior to mixing with canal water are required by Monitoring and Reporting Program Number 86-068." Actually, MRP 86-068 requires monitoring of the discharge prior to its application to the disposal area and, following revision in 2005, after pH control. Did staff mean to refer to Pond 3, since this is the terminal pond prior to discharge to the LAA? Or, did the Discharger use Pond 2 to impound Waste Stream 02? Please clarify.

Discharge Specification B.9 requires the Discharger to periodically monitor solids accumulation in all ponds and remove them to maintain adequate storage capacity. How specifically does the Discharger propose to remove sludge from Pond 3 without compromising the integrity of its single liner? Does the Discharger plan to dewater sludge prior to offsite disposal? If so, how will this be done? During my years with the Regional Board, I have fielded many complaints of nuisance odors generated from the removal and dewatering of sludge from food processing wastewater surface impoundments.

Recommendation 5. Revise the tentative WDRs Order to require the Discharger to submit a solids management plan that describes the method(s) the Discharger will use for DAF solids treatment, storage, and disposal, and for pond sludge monitoring, removal, treatment (dewatering), and disposal.

Finding 6 states that stems and pomace from the grape press are shipped offsite for cattle feed or compost material, but does not mention where the stems and pomace are temporarily stored onsite prior to offsite disposal. The Google Map image on the next page shows what appears to be a large area of stained soil emanating from what could be stockpiled stems and pomace. What is the Discharger's current method(s) for stem and pomace stockpiling? The tentative WDRs Order should contain sufficient information to demonstrate that the Discharger's current method(s) of stem and pomace stockpiling are adequate to comply with Discharge Specification D.2, "No waste constituent shall be released, discharged, or placed where it will be released or discharged, in a concentration or in a mass that causes violation of the Groundwater Limitations of this Order."

Comments on tentative Monitoring and Reporting Program

Data characterizing the treatment efficiency of the WWTP is essential to demonstrate to other Central Valley dischargers regulated by the Regional Board that it is actually technically and economically feasible to treat high-strength food processing wastewater to substantially reduce BOD prior to land application. To collect this valuable data, the tentative MRP should require during the first year

following Order adoption twice monthly monitoring (in non-consecutive weeks) of WWTP influent and effluent for BOD and total Nitrogen.

The monitoring specified for discharge to the LAA (EFF-003) should be changed to make it applicable to the discharge from Pond 3 following any pH adjustment and prior to any dilution from high-quality surface water. The Discharger should also calculate and report EFF-003 sodium adsorption ratio each time it monitors general minerals.

The tentative MRP should include Total Organic Carbon and arsenic in the suite of constituents monitored quarterly in groundwater monitoring wells.

Pond freeboard should be monitored in at least 0.5-foot increments, not 1-foot increments. If pond freeboard is not really a concern, its monitoring frequency should be decreased from daily to weekly. And, if pond DO monitoring show levels are consistently above 1.0 mg/L, its frequency should also be decreased from daily to weekly.

Many Questions Concerning the Discharge

The tentative WDRs Order omits information necessary for Regional Board members and the reviewing public to assess the consistency of the proposed discharge with Board plans and policies and the potential for the proposed discharge to cause nuisance and to affect water quality. This information is especially necessary given that the Discharger's past disposal practices have polluted underlying groundwater for TDS and EC and for iron and manganese. I hope staff will answer the questions below in its response to comments, and not respond by simply stating I can find the information myself in an office file review. I encourage staff to include the information I request below in the tentative Order's findings or information sheet.

1. What are the types and annual quantities of chemicals used in the Plant's grape juice and concentrate processes?
2. When did the Discharger construct the WWTP, and what is its design flow and BOD removal?
3. Do the WWTP unit operations have adequate containment to preclude releases of waste constituents to soil in concentrations that may affect water quality or cause nuisance?
4. Does the Discharger have backup power to run the WWTP and pond aerators during power outages?
5. What is the Discharger's method(s) for pH control, where does pH control occur, and what is the pH of the monitored wastewater before and after pH control?
6. Does the 176-acre LAA include the original 20-acre disposal area?
7. Did the Discharger propose to expand its discharge area in its 2012 Report of Waste Discharge?
8. When did the Discharger initiate discharge to areas beyond its original 20-acre disposal area?
9. Does Revised MRP 86-068 apply to the original 20-acre disposal area or to all or portions of the 176-acre LAA?

10. What does soil monitoring data reveal about suitability of LAA soils for crop production?
11. What type of water right does the Discharger hold to Friant-Kern Canal water?
12. Does the Discharger have any other source of supplemental irrigation water besides Friant-Kern Canal water? If so, what is the quality of that water supply?
13. What is the screened interval of the Plant's single groundwater supply well?
14. Is the Discharger's current flood control infrastructure (e.g., berms) adequate to prevent inundation of the Plant, the WWTP, and the entire LAA during a 100-year flood event?
15. What changed in the manufacturing process to reduce effluent sulfate concentrations to levels much less than that evident in groundwater impacted by past discharges?
16. What are the average concentrations of Total Organic Carbon in groundwater monitoring wells?
17. How many people are employed at the Plant? What is the average salary of the people employed at the Plant?
18. What is the Discharger's annual contribution in taxes to the local and county governments cited in Finding 48?

I offer these recommendations in the hope that staff will revise the tentative WDRs Order accordingly, or provide justification why staff believes the recommended changes are not warranted.

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[i] SAR = [Na]/square root(½*([Ca]+[Mg]), where [Na], [Ca], and [Mg] are on concentrations expressed in milliequivalents per liter.
[ii] This value assumes negligible concentrations of Na, Ca, and Mg in surface water
[iii] http://www.lenntech.com/applications/irrigation/sar/sar-hazard-of-irrigation-water.htm