

# Kennedy/Jenks Consultants

## Engineers & Scientists

303 Second Street, Suite 300 South  
San Francisco, California 94107  
415-243-2150  
FAX: 415-896-0999

18 February 2014

Ms. Katie Carpenter  
Engineering Geologist  
Central Valley Region  
California Regional Water Quality Control Board  
1685 E Street  
Fresno, CA 93706

Subject: Tentative Waste Discharge Requirements Comments  
O'Neill Beverages Company (Reedley Winery)  
K/J 1065007\*09

Dear Ms. Carpenter:

This letter is submitted by Kennedy/Jenks Consultants (Kennedy/Jenks) on behalf of O'Neill Vintners and Distillers (O'Neill) for the Reedley Winery in response to the Tentative Waste Discharge Requirements (WDR) that were issued for public comment on 17 January 2014. Comments on specific items of the Tentative WDR are provided below.

While the Tentative WDR and accompanying documents are generally manageable for O'Neill, the biochemical oxygen demand (BOD) loading limit of 100 pounds per acre per day (lbs/ac/day) is lower than necessary to protect the environment and would likely be problematic for continuous compliance. As explained in more detail below, several studies that have been conducted in the Central Valley support the conclusion that a rate of 300 lbs/ac/day would be protective. Therefore, we are requesting a modification to the loading rate to allow O'Neill more flexibility in operations while maintaining environmental protection.

O'Neill would also like to notify the California Regional Water Quality Control Board, Central Valley Region (CVRWQCB) that it is in the process of purchasing approximately 62 acres of additional agricultural land (Assessor Parcel Numbers 363-061-53, 363-061-19 and 363-061-22). The additional land purchase demonstrates O'Neill's commitment to improving Land Application Area (LAA) management and will help with long term compliance with the WDR.

Presented below are details to support higher BOD loading rates, followed by proposed changes to the Tentative WDR.

### **Literature Support for Higher BOD Loading Rates**

**BOD loading rates for land application.** Pollution Abatement in the Fruit and Vegetable Industry (EPA, 1977) cites BOD loading rates in the range of 36 to 600 lb/ac/day to prevent nuisance, but indicates that acceptable loading rates may be even higher under certain circumstances.

**Groundwater Protection.** Both the Wine Institute and California League of Food Processors (CLFP) have addressed the correlation between loading rates and groundwater protection for California soils, groundwater and climate conditions.

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- Field studies of land application of stillage process water and winery process water were conducted by the Wine Institute in 2002 and 2003 (Kennedy/Jenks 2004. Land Application of Winery Stillage and Non-Stillage Process Water: Study Results and Proposed Guidelines). Spreading basin loadings with either stillage process water or winery process water were applied to instrumented test plots in both 2002 and 2003. Between 6 and 11 process water applications were applied between September and December in each year. The loadings ranged from 143 to 734 lb/Ac/day for the non-stillage plot; stillage plot loadings ranged between 3 and 867 lb/Ac/day. The attached Table 1 summarizes BOD loading and removal for four study plots.

BOD concentrations were measured in water samples collected from lysimeters at 1 foot and 5 feet below ground surface. This dataset shows that most of the BOD was removed in the surface foot of soil where aerobic conditions favor microbial oxidation. Between 66 and 79 percent of applied BOD concentration was removed in the surface foot of soil. At 5 feet, between 80 and nearly 100 percent of BOD concentration was removed. The last column of the table shows that, in terms of load (lb/Ac), BOD was reduced by between 89 and nearly 100 percent in the percolate at 5 feet.

These study results indicate that careful management of land application of stillage and non-stillage process water can result in treatment of BOD for both late summer and late fall application conditions. These Wine Institute studies are relevant to land application practices at the O'Neill site because they were conducted on similar coarse textured soils under Central Valley climatic conditions.

- The CLFP's 2007 Manual of Good Practice for Land Application of Food Processing/Rinse Water proposes risk categories associated with particular BOD loading rates as follows:

Risk Category	BOD loading (lb/Ac/day) <sup>(a)</sup>	Groundwater Depth (ft BGS)	Management Practices
1 - low	< 50	> 5	For all wastewater land application sites, good uniformity of wastewater application is required. At these low loading rates, potential impacts are indistinguishable from conventional farming operations.
2	< 100	> 5	At these low to moderate BOD loading rates, there is minimal risk of groundwater impact when uniformly distributed wastewater loadings are applied.
3	> 100	> 2, < 5	When BOD loadings are greater than 100 lb/Ac/day or groundwater is within 5 feet of ground surface, wastewater land application must be carefully managed. A detailed plan is needed to guide applications, maintain resting periods between applications, and incorporate additional site or soil monitoring.

**Note:**

- Loading rates may be increased 50% when sprinkler irrigation is used and decreased when soil properties are less than optimum.

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These CLFP risk categories are based on the assumption that best management practices would be employed to prevent odors and reducing conditions. Typical best management practices include ensuring even distribution of wastewater and waste constituents on each LAA, applying water at rates consistent with the needs of the crop, and allowing adequate resting time between wastewater applications to ensure consistently aerobic conditions within the soil column. The Manual of Good Practice provides science-based guidance for BOD loading rates. Some recent WDRs have found that use of the CLFP guidelines and recommended application protocols, are considered a best management practice to prevent groundwater degradation due to reduced metals.

The CLFP Manual of Good Practice recommends allowing a 50% increase in the BOD loading rates in cases where sprinkler irrigation is used, but recommends that additional safety factors be used for sites with heavy and/or compacted soils. For sprinkler irrigation, land application loadings can be applied in smaller amounts than are possible with surface irrigation or spreading basin applications. Small applications are beneficial for BOD treatment because aerobic conditions in soil can be maintained almost continuously. The resting periods required for spreading basin applications are not necessary for the smaller irrigation amounts that can be applied using sprinklers.

### **Projected BOD Loading Rates**

As cited in Finding 28 of the Tentative WDR, the Report of Waste Discharge estimates future cycle BOD loading rates of 160 to 190 lbs/ac/day. It is noted that the cited BOD loading rates are average daily BOD loading rates based on monthly irrigation amounts and process water quality. The cycle BOD loading rates are expected to be higher than the average daily loading rates. Based on the literature support presented above, a cycle BOD loading rate of 300 lbs/ac/day is acceptable with careful management, and we believe that rate will be manageable for the O'Neill facility.

### **Proposed changes to Tentative Waste Discharge Requirements**

#### **New Finding 28 (note that the following language is proposed as a new finding to support higher BOD loading rates)**

Both the Wine Institute and California League of Food Processors (CLFP) have addressed the correlation between BOD cycle loading rates and groundwater protection for California soils, groundwater and climate conditions.

Field studies of land application of stillage process water and winery process water were conducted by the Wine Institute in 2002 and 2003 (Kennedy/Jenks 2004. Land Application of Winery Stillage and Non-Stillage Process Water: Study Results and Proposed Guidelines). A number of BOD loadings were applied for each field plot and each year. Lysimeter water sample measurements at 1-foot and 5-foot depths showed that most of the BOD was removed in the surface foot of soil where aerobic conditions favor microbial oxidation. Between 66 and 79 percent of applied BOD concentration was removed in the surface foot of soil. At 5 feet, between 80 and nearly 100 percent of BOD concentration was removed. In terms of load (lb/Ac), BOD loading was reduced by 89 and nearly 100 percent in the percolate at 5 feet. These study

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results indicate that careful management of land application of stillage and non-stillage process water can result in treatment of BOD for both late summer and late fall application conditions.

The soils and climate in the Stillage test site are comparable to the O'Neill site and representative of Central Valley and are therefore appropriate for comparison.

**New Finding 29 (note that the following language is proposed as a new finding to support higher BOD loading rates)**

The California League of Food Processors' Manual of Good Practice for Land Application of Food Processing/Rinse Water proposes risk categories associated with particular BOD loading rate ranges as follows:

- a. Risk Category 1: (less than 50 lbs/ac/day; depth to groundwater greater than 5 feet)  
Indistinguishable from good farming operations with good distribution important.
- b. Risk Category 2: (less than 100 lbs/ac/day; depth to groundwater greater than 5 feet)  
Minimal risk of unreasonable groundwater degradation with good distribution more important.
- c. Risk Category 3: (greater than 100 lbs/ac/day; depth to groundwater greater than 2 feet)  
Requires detailed planning and good operation with good distribution very important to prevent unreasonable degradation, as well as use of oxygen transfer design equations that consider site-specific application cycles and soil properties and special monitoring.

The Manual of Good Practice recommends allowing a 50 percent increase in the BOD loading rates in cases where sprinkler irrigation is used, but recommends that additional safety factors be used for sites with heavy and/or compacted soils. These risk categories were based on the assumption that best management practices would be employed to prevent odors and reducing conditions. Typical best management practices include ensuring even distribution of wastewater and waste constituents on each LAA, applying water at rates consistent with the needs of the crop, and allowing adequate resting time between wastewater applications to ensure consistently aerobic conditions within the soil column.

**Findings 62a, 62c, 63d**

For each finding, modify the reference to a BOD loading rate of 100 lbs/ac/day to 300 lbs/ac/day. Also, based on the use of sprinkler irrigation, remove reference to minimum 3-day resting period.

**Land Application Area Specification 2**

The ~~eyele~~ average BOD loading rate to the land application areas shall not exceed 300 lbs/acre/day, ~~with a minimum 3-day resting period between applications,~~ or alternatively, an appropriate loading rate and resting period combination justified as part of the studies required by CDO R5-2014-XXXX.

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**Information Sheet and Cease and Desist Order**

Modify references to BOD cycle loading rate of 100 lbs/ac/day to 300 lbs/ac/day and remove reference to minimum 3-day resting period.

We appreciate your consideration of our comments and request for modification of the Tentative WDR. If you have any questions regarding our comments, please contact me at 415-243-2524 or Matt Towers of O'Neill at (559) 638-3544.

Very truly yours,

KENNEDY/JENKS CONSULTANTS



Robert S. Chrobak, P.E.  
Project Manager

cc: Dale Harvey, CVRWQCB  
Matthew S. Towers, O'Neill

**Table 1: Wine Institute Field Study Results**

Year	Average BOD <sup>(a)</sup> Loading			1-foot Lysimeter <sup>(e)</sup> BOD	5-foot Lysimeter <sup>(f)</sup> BOD		Percentage BOD Removal		
	mg/l <sup>(b)</sup>	lb/Ac <sup>(c)</sup>	Range in lb/Ac/d <sup>(d)</sup>	mg/l	mg/l	lb/Ac	1-foot (mg/l)	5-foot (mg/l)	5-ft percolate load (lb/Ac)
<b>Non-Stillage plots</b>									
2002	2,250	12,640	143 - 553	758	461	1,387	66%	80%	89%
2003	3,050	38,580	286 - 734	-- <sup>(g)</sup>	1.1	7	--	100%	100%
<b>Stillage plots</b>									
2002	5,210	25,420	3 - 885	1,093	551	2,281	79%	89%	91%
2003	8,020	28,450	248 - 867	--	543	1,996	--	93%	93%

**Notes:**

- (a) BOD = biochemical oxygen demand  
(b) mg/l = milligrams per liter  
(c) lb/Ac = pounds per acre for the 3 to 4 month test period.  
(d) lb/Ac/d = pounds per acre per day for the application cycle.  
(e) Results of measurements collected at a lysimeter installed one foot below ground in the test plots.  
(f) Results of measurements from three lysimeters installed five feet below ground in each test plot.  
(g) Data not available at 1-foot location in 2003.