CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ORDER R5-2012-__

WASTE DISCHARGE REQUIREMENTS

FOR

CONSTELLATION BRANDS U.S. OPERATIONS, INC. dba WOODBRIDGE WINERY
WOODBRIDGE WINERY
SAN JOAQUIN COUNTY

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

1. Constellation Brands U.S. Operations, Inc. dba Woodbridge Winery (hereafter Discharger) submitted a Report of Waste Discharge (RWD) dated 29 September 2010 to apply for revised Waste Discharge Requirements (WDRs) to regulate treatment and land application of wastewater generated at its winery facility. The Discharger submitted additional information to complete the RWD on 29 October 2011 and 22 December 2011.

2. WDRs Order 87-184, adopted by the Central Valley Water Board on 23 October 1987, prescribes requirements for the discharge. The Discharger plans to expand the winery and the WDRs are not consistent with current operational plans.

3. The facility is located at 5950 E. Woodbridge Road, Acampo in San Joaquin County. The winery and associated Land Application Areas (LAAs) comprise approximately 202 acres (Assessor's Parcel Nos. 017-090-58, 017-090-12, 017-090-50, 017-010-22, 017-340-07, and 017-340-16) in Section 31, T4N, R7E, MDB&M. The location of the facility is shown on Attachment A, which is attached hereto and is made part of this Order by reference.

4. The Discharger owns and operates the winery and is responsible for compliance with this Order. Woodbridge Winery was established in 1979 when Robert Mondavi acquired the former Cherokee Winery / Cherokee Vineyard Association, a cooperative of local grape growers founded in 1933. In December 2004 the facility was purchased by Constellation Brands U.S. Operations, Inc.

5. Current activities at the winery include receiving grapes or grape juice, crushing grapes, fermenting, blending, storing, aging, bottling, and shipping wine. The facility also receives bulk wine in tanker trucks that is blended, stored, bottled on-site, or shipped offsite via tanker trucks. Wastewater is generated during tank, barrel, piping, equipment, and other cleaning activities. Wastewater is also generated when storm water falls on tank farms and mixes with wastewater.

6. The facility is located adjacent to and north of the Mokelumne River. The property includes approximately 2,000 feet of river frontage and extends approximately 3,000 feet north from the river to E. Woodbridge Road. A site map is presented on Attachment B, which is attached hereto and is made part of this Order by reference.

7. Historically, a distillery was operated on site by a former owner. Stillage[1] was discharged to an unlined shallow pond that was located in the area south of the winery processing facility (see Attachment B). Distillation was discontinued several years prior to 1977. The pond was abandoned and the area covered with buildings and/or asphalt pavement in the 1970's. The RWD states that the Discharger never operated the still. There is no record of any remedial activities to reduce the concentration of waste constituents that may exist in soil or groundwater at the site of the stillage pond when it was closed. The area has been covered with a warehouse, thereby reducing the amount of storm water that can percolate through the former stillage pond location.

8. Wastewater at the facility generally consists of equipment wash water, cellar wash water, spent regenerant from water softening ion exchange units, cooling tower blowdown, bottling wash water, and storm water that falls on uncovered processing areas. Wastewater is treated and stored in ponds and applied to cropped land application areas (LAAs).

9. Various residual solid wastes are generated at the facility, including spent diatomaceous earth (DE) from the filtration of wine, pomace (the crushed pulp of grapes), grape stems and leaves, and screenings recovered from wastewater screens. Residual solids are hauled off-site for reuse or disposal at a permitted landfill. Reuse includes off-site composting, off-site use as livestock feed, and further processing at appropriately permitted facilities.

10. On 22 June 2007, the Central Valley Water Board adopted Cease and Desist Order (CDO) R5-2007-0082 to address groundwater degradation at the site. The CDO required further investigation of groundwater quality, LAA efficiency, wastewater treatment, and based on the technical studies, submittal of a RWD.

FACILITY CHANGES

11. The facility has expanded since the 1987 WDRs were adopted. The CDO required submittal of technical reports to investigate and improve the wastewater system. As described in a later section, much of that work has been completed. Currently, typical production at the facility involves crushing approximately 100,000 to 150,000 tons of grapes per year. Production totals for 2003 through 2009 are summarized below:

[1] Winery stillage is wastewater generated by removing alcohol from fermented grapes. It tends to be high in BOD and total nitrogen concentrations. Because water is generally heated in boilers to allow the distillation, related waste streams such as boiler feed water treatment and boiler blowdown are also generated. The related waste streams are typically high in Fixed Dissolved Solids (FDS) concentrations.

Year	Grapes Crushed (tons/year)	Bulk Wine Shipped[1] (Mgal/year)	Cases Bottled (million cases/year)	Wastewater (Mgal/year)
2003	92,000	3.3	8.8	80
2004	101,000	4.0	8.6	68
2005	152,000	4.8	8.6	77
2006	98,000	9.7	10.8	63
2007	73,000	6.6	12	58
2008	80,500	6.1	14.5	53
2009	110,000	3.7	12	52
Estimated Future	200,000	6.0	20	100

[1] Bulk wine shipped in wine tanker trucks.

As indicated in the table, the Discharger is proposing an expansion at the winery that will allow crushing 200,000 tons of grapes per year. The expansion will result in additional wastewater generation.

WASTEWATER CHARACTERIZATION

12. The Discharger has implemented water conservation practices which have reduced the ratio of wastewater gallons produced per gallon of wine, as tabulated below. Typically, reducing the volume of wastewater generated increases the concentration of waste constituents in the remaining wastewater. The Discharger has improved source control and wastewater treatment at the facility in response to increased waste constituent concentrations associated with water conservation.

Year	Wine Produced[1] (Mgal/year)	Wastewater Produced (Mgal/year)	Wastewater/Wine Ratio (gal/gal)
2003	27	80	2.91
2004	28	68	2.41
2005	30	77	2.56
2006	45	63	1.40
2007	43	58	1.36
2008	47	53	1.13
2009	36	52	1.43

[1] Total gallons of wine include bulk wine shipped and cases bottled (9 liter equivalent).

13. The 1 March 2006 *Process Water Characterization and Process Water Treatment Evaluation Report* prepared by Kennedy/Jenks provided estimated wastewater flow rates and loading rates. To characterize the wastewater, samples were collected from

discrete waste streams. Because some characterization is based on grab samples, mathematical calculations resulted in some inconsistent results. For example, some "percent of total" values exceed 100-percent. The Discharger considers the data accurate enough to characterize the wastewater components. A summary of the data is provided below.

Waste Stream	Waste Volume (Mgal/yr)	BOD Load		FDS Load		Total Nitrogen Load	
		(ton/yr)	(% of total)	(ton/yr)	(% of total)	(ton/yr)	(% of total)
Bottling	19.5	236.4	20	45.9	22	1.4	8
Water Softening	0.25	0.0	0	49.7	23	0.0	0
Refrigeration	4.76	1.3	0.1	22.3	10	1.2	7
Tank Sanitation	5.37	106.0	9	66.6	31	1.4	8
Barrel Rinsing	5.00	477.5	40	52.7	25	4.6	27
Filtering	3.06	234.1	20	31.8	15	0.4	3
Totals	50.62	1,055.2	88	269.1	126	9.0	53

After completion of this study, the Discharger improved biological treatment of the wastewater and implemented source control to reduce salinity.

WASTEWATER TREATMENT SYSTEM

14. Wastewater is collected in a gravity drain system. Because much of the facility is exposed to the elements, storm water that falls on cellar processing areas of the winery is also collected in the drain system. The collected wastewater and/or storm water is piped to the wastewater treatment system.

15. At the time the CDO was adopted in 2007, the Discharger's treatment system consisted of the so-called Lower Ponds and 87 acres of LAAs, 57 acres of which were cropped with grapes. Since that time, the Discharger has completed several facility and operation improvements, including completion of a new wastewater treatment system, construction of two new LAAs totaling 26 acres, salinity reduction, and LAA operational improvements. These changes are discussed further below. The wastewater system was constructed in three phases; Phase 1 was completed in November 2008, Phase 2 was completed in August 2009, and Phase 3 is ongoing and consists primarily of improved distribution and storage of treated wastewater.

16. The treatment system includes the following major elements. Attachment C, which is attached hereto and made part of this Order by reference, presents a flow diagram that identifies the various wastewater streams.

    a. Improved wastewater screening using a self-cleaning slotted screen removes gross solids and is designed to accommodate the peak crush flow of 1.5 mgd.

b. A new influent pump station is equipped with three 1,100 gpm non-clogging pumps. Flow rates greater than 1,100 gpm will be produced during heavy rainfall events. Such flows will be predominantly storm water, which will be diverted to the Lower Ponds.

c. Two 700,000 gallon tanks allow for hydraulic and concentration equalization and control for more uniform quality and quantity of wastewater management. A portion of the effluent from the anaerobic treatment system can be recycled back into the equalization tanks.

d. A Mobilized Film Technology (MFT) treatment system provides a high rate anaerobic process. The MFT system includes preconditioning, MFT bioreactors, biogas processing with energy capture, and a Dissolved Air Floatation (DAF) system to remove suspended solids. The MFT system is constructed above-ground.

e. Three 3.3 million gallon aeration ponds (Upper Ponds) are used to oxidize the anaerobic system effluent. The ponds are double-lined with high density polyethylene (HDPE) and have leak detection systems. The Upper Ponds are equipped with brush aerators and dissolved oxygen probes to optimize aerator operation.

f. Solids from both the anaerobic and aerobic processes will settle in the Upper Ponds. The solids will be removed as needed and disposed of by delivery to a permitted composting operation, delivery for livestock feed, or for further processing at appropriately permitted facilities. Effluent from the Upper Ponds will be further treated (on an as-needed basis) to reduce the solids content using a filtration unit to prevent clogging of the sprinkler irrigation system.

g. The Lower Ponds are used primarily for storm water detention and can also be used for treated wastewater storage. The Lower Ponds, which are unlined, provide 23 million gallons of storage capacity. The Lower Ponds are vulnerable to inundation by the Mokelumne River during 100-year flood events. The Central Valley Water Board has permitted surface water discharges from the Lower Ponds if they become inundated by flood waters under the Low Threat General Waste Discharge Requirements Order R5-2008-0081. Otherwise, surface water discharges from the lower ponds are not permitted.

h. The Discharger currently applies treated wastewater to 75 acres of LAAs. The Discharger proposes to expand the LAAs to approximately 101 acres as wastewater flows increase.

17. In addition to the wastewater system described above, the Discharger has identified potential treated wastewater reuse opportunities. All of the reuse opportunities would require installation of distribution piping and some require additional treatment before the wastewater would be of sufficient quality. The identified reuse opportunities consist of:

a. Refrigeration Cooling Tower Make-up Water

b. Winery Cleanup Water

c. Pressure Washing

d. Landscape Irrigation

The Discharger may implement some of these reuse options.

18. The quality of wastewater discharged to the LAAs has been monitored in accordance with Order 87-184. As described above, data collected before November 2008 represents untreated winery wastewater. After that time, portions of the treatment system were installed and began operation. These data indicate that the Discharger's salinity reduction efforts have not significantly reduced the concentration of FDS. However, as discussed below, potassium has a higher molecular weight than sodium, so substitution of potassium-based cleaning solutions may not be reflected in the FDS results. The annual mean wastewater characterization data are summarized below:

Annual Averages	Annual Mean Result, milligrams per liter (mg/L)								pH[1]
	BOD	Sulfate	NO_3 as N	TKN	TN	TDS	VDS	FDS	
2002	1,928	51	0.9	19	19	839	370	469	6.3
2003	5,009	73	1.0	18	19	1,022	492	530	5.2
2004	5,836	168	1.5	33	34.2	1,970	969	1,001	4.6
2005	3,830	82	0.8	40	40.7	1,079	486	593	5.0
2006	5,444	126	1.6	14	15.6	1,522	693	829	5.0
2007	4,058	264	0.8	25	25.3	2,205	1,034	1,171	5.1
2008	5,686	93	0.9	23	24	1,505	858	665	5.8
2009[2]	1,393	8	ND	44	45	1,956	907	1,049	7.2
2010[2]	53	13	36	4	40	1,580	574	1,006	8.8

[1] pH values reported as median values.
[2] Data collected after November 2008 includes partially or completely treated wastewater.

19. Wastewater flows are measured downstream of the influent pump station, downstream of the clarifier and DAF treatment equipment prior to discharge to the lower ponds, and prior to discharge to the LAAs.

a. Storm water that falls on a portion of the facility will be comingled with the wastewater. The RWD estimates 9.7 million gallons of storm water will be added in a normal rainfall year and 20.4 million gallons will be added in a 100-year, 365-day precipitation event.

b. The following table presents the average monthly flows from the facility from 2002 through 2009. The highest flow rate from the facility occurs during the crush period from August through October.

	Facility Wastewater Flow Rate (MGD)			Flow Rate to LAAs (MGD)		
Month	Monthly Average	Monthly Median	St. Dev.	Monthly Average	Monthly Median	St. Dev.
January	0.19	0.19	0.026	0.25	0.185	0.259
February	0.18	0.18	0.028	0.41	0.23	0.361
March	0.16	0.15	0.023	0.08	0.085	0.063
April	0.15	0.155	0.026	0.07	0.045	0.095
May	0.13	0.13	0.018	0.08	0.05	0.093
June	0.12	0.11	0.023	0.14	0.07	0.160
July	0.11	0.1	0.018	0.27	0.235	0.118
August	0.20	0.19	0.042	0.25	0.24	0.178
September	0.29	0.275	0.090	0.11	0.135	0.086
October	0.26	0.24	0.067	0.23	0.155	0.164
November	0.18	0.175	0.043	0.21	0.24	0.213
December	0.18	0.14	0.083	0.17	0.195	0.083

20. The Discharger uses a number of chemicals in cleaning, sanitation and wastewater treatment processes at the facility. The chemicals and quantities that are currently used at the facility are identified below. The quantity used is based on the amount of material purchased in 2009.

Chemical Name	Primary Ingredient	Use Areas	Quantity Used
T.S.P.	Sodium Phosphate	Cellar/Bottling	33,000 pounds
SaniBac	Chlorinated powder	Cellar/Bottling	3,600 pounds
Soda Ash	Sodium Carbonate	Cellar	24,500 pounds
ChemClean 440K	Potassium Hydroxide	Cellar	36,000 pounds
Citric Acid	Citric Acid	Cellar/Bottling	48,000 pounds
Zep Amine A	Quaternary Ammonium	Bottling	40 gallons
JO Circ	Liquid Chlorine	Bottling	110 gallons
Sodium Hypochlorite	Liquid Chlorine	Cellar	530 gallons
Speedy	Alkaline Cleanser	Bottling	550 gallons
Citrus Kleen	Citric Acid	Bottling	110 Gallons
KochKleen 150	Sodium Bisulfite,	Cellar	55 Gallons
KochKleen 180	Propanetricarboxylic Acid and Lactic Acid	Cellar	110 Gallons

Chemical Name	Primary Ingredient	Use Areas	Quantity Used
KochKleen 222	Sodium Hydroxide	Cellar	110 Gallons
K-Life	Potassium Chloride	Water Softening	80,460 pounds
Not Available	Magnesium Hydroxide	Treat. System	43,944 gallons
Not Available	Ammonium Polyphosphate	Treat. System	161 gallons
UAN 32	Urea Ammonium Nitrate	Treat. System	4,792 gallons
Not Available	Micronutrient	Treat. System	140 pounds

SALINITY SOURCE CONTROL

21. The Discharger has implemented the following salinity source control measures at the facility:

    a. Converted from sodium based chemicals to potassium based chemicals where possible. Potassium hydroxide is used for cleaning activities and water softening is performed with potassium chloride. Potassium is preferred because it is a plant nutrient and therefore is more readily taken up by crops than sodium.

    b. Converted use of chlorinated trisodium phosphate and chlorine bleach to trisodium phosphate.

    c. Reduced water softener regeneration cycles, thereby reducing the amount of potassium chloride used by 67 percent since 2004.

    d. Since July 2009, approximately 24,000 gallons per year of the regeneration brine from the water softeners on Bottling Line No. 1 has been captured and disposed of off-site. This represents 60% of the total ion exchange brine. The Discharger has evaluated the potential for off-site disposal of regeneration brine from the remaining water softeners, but determined that, due to their small size and remote locations throughout the facility, off-site disposal would not be cost-effective.

    e. Eliminated water softening in non-critical areas.

    f. Implemented use of ozone rather than chemical salts for sanitation in some applications.

    g. Implemented use of chlorine dioxide in washing tanks and wine processing equipment. Chlorine dioxide is a strong oxidant that is effective at low concentrations.

    h. Initiated ongoing employee education and training to improve housekeeping practices for storage and clean-up procedures.

i. Installed new wine filtration and clarification equipment to reduce both water and chemical use. Wastewater considerations have been prioritized in the evaluation process for new equipment selection.

j. Bottling Line No. 4 has been equipped with a nitrogen gas bottle rinser rather than a water rinser. Use of nitrogen gas reduces generation of waste constituents and reduces the amount of water used.

k. Conversion to compressed gas rinsing on Bottling Lines 1 & 2 is planned in 2012.

l. Optimized water softeners based on the higher water quality from production well PW-4.

m. Modified site processes to minimize cleaning activities and conserve water.

n. Implemented source control measures into an ISO-9001 certification that requires monitoring to track effectiveness.

22. The Discharger has implemented the following best management practices at the facility:

a. Implementation of Standard Operating Procedures (SOPs) for sanitation and chemical use activities. The SOPs include specified quantities of water and chemicals to be used for various activities.

b. Implementation of the Code Of Sustainable Winegrowing Practices developed by the Wine Institute and California Association of Winegrape Growers.

c. Use of designated chemical storage areas for chemicals used at the facility.

d. Development of a Spill Prevention and Response Plan for response to chemical spills. The plan includes procedures to minimize the amount of chemicals that could reach a floor drain in the event of a spill.

e. Improvement of seasonal employee training by teaming with permanent employees.

f. Minimization of cleaning needs based on need and product impact (e.g. Rinse rather than sanitize equipment if product characteristics allow).

g. Connection of multiple wine transfer lines to sanitize long sections of pipe with the same cleaning solution, which saves water and reduces chemical use.

h. Regular inspection and maintenance of equipment to replace worn or malfunctioning equipment to minimize wastewater quality impacts.

i. Use of high pressure, low volume washers for general cleaning activities.

j. Regular water and chemical use audits to identify processes with heavy usage.

k. Incorporation of source control and waste minimization into the employee training program.

23. The Discharger has not provided wastewater monitoring data or calculations to quantify the level of salinity reduction that has been achieved by the measures identified in the *Process Water Characterization Report* described above. Therefore, this Order requires that the Discharger conduct a Salinity Reduction Study to demonstrate actual salinity reduction results.

WATER BALANCE

24. A water balance was included in the RWD to demonstrate the capacity of the wastewater treatment, storage, and land application system. The water balance was based on an annual wastewater discharge of 100 Mgal, with a peak monthly flow of 21 Mgal. The water balance used the 100-year annual rainfall event and a total of 100 acres of LAAs. The water balance shows that the wastewater treatment, storage, and disposal system is adequate to support the projected flows at full build-out (i.e., 100 acres of LAAs). However, the Discharger has not completed the conveyance system and other site improvements for the new LAAs and therefore this Order contains interim flow limits based on the LAAs currently available with a provision to increase the flow limits to full capacity when the new LAA infrastructure is completed.

25. Storm water draining from roofed areas and surrounding surface areas that does not come in contact with wastewater is routed to the facility's storm water drainage system. The storm water system pipes the water to a discharge point at the Mokelumne River. Storm water that falls on processing areas is directed to the wastewater system. When combined storm water and wastewater flow rates are above 1,100 gallons per minute (gpm), the combined discharge is directed to the unlined Lower Ponds. The Discharger has obtained coverage under the NPDES Low Threat General Waste Discharge Requirements, Order R5-2008-0081 for discharges from these ponds due to flood inundation.

26. The wastewater treatment and storage ponds are not large enough to allow storage of wastewater through the winter and land application only during the growing season. During a normal rainfall year, wastewater application during the rainy season will be minimal. During the 100-year annual precipitation event the Discharger will periodically land-apply wastewater throughout the rainy season except during actual rain events or when the soil is saturated. Because of the restrictions on applying wastewater contained in this Order, the Discharger will have to carefully schedule winery activities to manage the available storage in the wastewater ponds. Climatic or LAA conditions (saturated soil, odors, etc.) may require winery process schedule changes to comply with this Order.

LAND APPLICATION AREAS

27. At full build-out, the LAAs will consist of 101 acres of cropped land. The LAAs will be double cropped using Sudan grass followed by a winter forage crop, or alfalfa, or equivalent crop. The locations of the LAAs are presented on Attachment B, and LAA acreage is tabulated below:

LAA Name	Acreage
A Block	5
A2 Block	3
C Block	3
D Block	11
E Block	12
F Block	14
H Block	27
P Block	16[1]
Q Block	10[1]
Total	**101**

[1] Blocks P and Q will be completed in the future to accommodate increased wastewater flows.

28. Treated wastewater may be applied by flood irrigation, sprinkler system, or drip irrigation. Currently, application is accomplished using flood irrigation on the vineyards and sprinkler irrigation on the cropped land. Sprinkler irrigation was used for the Crop Uptake study described below.

29. A Crop Uptake and Assimilative Capacity study was performed from 2007 through 2010 to determine crop uptake rates and determine preferred crop selection. The following determinations resulted from the study:

    a. Double cropping warm weather crops and single cropping cool season crops provided the best overall crop uptake rates.

    b. Crop uptake rates for nitrogen exceeded the wastewater-derived nitrogen application for both summer and winter crops. Winter triticale crops harvested in spring 2009 had biomass production averaging 3.6 ton/ac with 80 lbs/ac nitrogen uptake. This value is almost double the anticipated total winter nitrogen additions from process water irrigation. Depending on the crops grown, nitrogen uptake rates can exceed 350 lbs/ac/year.

    c. To maintain adequate crop health, supplemental nitrogen fertilizers may be needed. Soil sampling results for the cropping study demonstrated that, with the proposed LAA management practices, soil nitrogen decreased during the study period.

d. Crop uptake of salt ions was less than the amount of FDS applied. Uptake rates of up to 1,100 lbs/ac/year were achieved. Crop uptake of FDS has been and will continue to be less than the total FDS mass applied. This includes an estimated 165 pounds of wastewater supplied nitrogen.

30. Crops will be periodically cut and removed from the LAAs, which will remove the nitrogen, potassium, and other dissolved solids that are taken up by the plants.

31. TDS is composed of both Volatile Dissolved Solids (VDS) and FDS. The proportion of VDS to FDS in wastewater varies with the source, but 50-percent of the TDS in winery wastewater may be in the volatile form. The VDS can be biologically treated by soil microorganisms in a well-managed wastewater treatment and land application system, when wastewater is not over-applied. The forecast flow-weighted average FDS concentration of the blended wastewater, storm water and supplemental irrigation water is about 775 mg/L. Based on the anticipated average annual wastewater flow rate of 100 Mgal at full build-out, approximately 834,000 pounds/year of wastewater FDS will be applied (8,257 lbs/ac/year).

32. The Discharger has estimated the average total nitrogen concentration in wastewater to be 20 mg/L. Based on the anticipated average annual wastewater flow rate (100 Mgal), approximately 16,680 pounds/year of total nitrogen will be applied (165 lbs/ac/year). The Crop Uptake and Assimilative Capacity report indicated that for LAA acreage, doubled cropped with alfalfa, Sudan grass, and/or triticale grass, nitrogen uptake rates were determined to be approximately 360 lbs/ac/year. Therefore, proposed nitrogen loading rate is unlikely to degrade groundwater quality. Because the Crop Uptake and Assimilative Capacity did not consider potassium, which is now a key waste constituent due to sodium reduction efforts, it is appropriate to require the Discharger to develop and implement a Nutrient Management Plan that considers all macronutrients (i.e., nitrogen, phosphorus, and potassium).

33. Because treated wastewater will not provide adequate water to meet the crop demand, supplemental irrigation water will be required to maintain crop health in the summer months (generally May through September) during normal precipitation years. During 100-year return annual precipitation years, supplemental irrigation water may be required from July through September. Supplemental irrigation water will be provided by the on-site irrigation wells and Mokelumne River water (for which the Discharger has riparian rights). The agricultural irrigation wells produce water that varies in TDS concentration from 250 mg/L to 433 mg/L and averages 343 mg/L. Mokelumne River water averages approximately 60 mg/L TDS. The FDS loading that occurs from the supplemental irrigation water is in addition to that derived from wastewater. Therefore, it is appropriate to require that the Discharger maximize the use of high quality surface water for supplemental irrigation to minimize the salinity of the LAA percolate.

34. The RWD summarized a soil investigation and cropping study the Discharger performed. The investigation included collection of soil samples at various depths to assess changes in soil chemistry. The study period extended from October 2007 through January 2010 over four crop growth cycles. Soil moisture, climate, irrigation volume, irrigation water quality, crop harvest/uptake, and soil chemistry were

monitored during the study period. Key conclusions of the study were:

a. The soils at the facility were determined to be in excellent condition for agricultural use. Soils possess low salinity, slightly lower than optimum pH, and nitrogen supplies that were slightly higher than expected for cropped fields. At the end of the study, nitrogen levels had been reduced and soil pH was increasing.

b. Crop uptake of salt ions is less than the amount of FDS applied.

c. Percolation control was determined to be an effective mechanism for groundwater quality protection.

d. Careful monitoring of soil moisture content was recommended to schedule irrigation to minimize groundwater quality degradation.

RESIDUAL SOLIDS

35. Pomace and spent Diatomaceous Earth (DE) are generated in wine making processes and will be placed on storage areas constructed of concrete or asphaltic concrete and equipped with drains to collect residual liquid that leaches from the material and any storm water that falls on the pads. Liquid from the pads is discharged to the wastewater system.

    a. Approximately 17,000 to 28,000 tons of pomace will be generated annually. It is stored on the Pomace/Stem Pad before disposal at an off-site facility.

    b. Approximately 186 tons of spent DE was generated in 2009. DE is stored on the Filter Solids Pad before disposal at an off-site facility.

    c. Approximately 54.7 tons of screenings (solids in the waste streams caught by the screens) were generated in 2009 at the flex rake screen. Screened material is stored in debris bins for disposal at an off-site facility.

36. Storage of pomace and DE on bare ground after the initial drying on the Pomace/DE pad may allow storm water to mobilize residual waste constituents. Such storage is not protective of groundwater quality and is not allowed under this Order.

SITE SPECIFIC CONDITIONS

37. Land use in the vicinity of the site consists primarily of vineyards. The topography of the surrounding area is level.

38. The tops of the berms of all of the Lower Ponds (located adjacent to the Mokelumne River) are lower than the currently-defined Federal Emergency Management Agency (FEMA) 100-year flood zone. The Lower Ponds are vulnerable to inundation by the Mokelumne River at the 100-year base flood elevation. The Discharger has obtained coverage under the NPDES Low Threat General Waste Discharge Requirements, Order R5-2008-0081 to regulate discharges of waste to surface waters associated with flood inundation of the Lower Ponds.

39. Shallow soils consist of mixtures of sand, silt and clay.

40. Based on the California Department of Water Resources rainfall data, the mean annual rainfall is approximately 15.2 inches and the 100-year return annual precipitation is 31.9 inches. Evapotranspiration was estimated from a nearby California Irrigation Management Information System monitoring station at 53.4 inches per year.

41. Domestic wastewater generated at the winery is discharged to a septic system regulated by the San Joaquin County Environmental Health Department. Sludge produced in the treatment system is regularly pumped and disposed of off-site at a domestic wastewater treatment facility. Septic tank effluent is discharged to a 17,280 square foot leach field. An identically sized replacement area is permanently reserved if needed in the future.

42. The primary process water supply is obtained from groundwater production wells. Two wells (PW-1 and PW-4) produce all the facility process water under normal conditions. Well PW-4 currently produces approximately five times the amount of water produced by PW-1. The amount of water produced from the wells since 2003 is presented below:

Year	Units	PW-1	PW-4	Total
2003	Mgal/year	3.96	82.9	86.86
2004	Mgal/year	3.11	89.2	92.31
2005	Mgal/year	5.95	87.3	93.25
2006	Mgal/year	6.41	80.28	86.69
2007	Mgal/year	4.33	57.96	62.29
2008	Mgal/year	13.90	55.81	69.71
2009	Mgal/year	11.00	54.93	65.93

43. Water samples were collected from the supply wells (PW), irrigation wells (IW), and water distribution system. A summary of the average results is presented below:

Well/ Source	Average Result (mg/L, except as noted)					
	TDS	Nitrate-N	EC[1]	Sodium	Chloride	Sulfate
PW-1	184	0.8	240	13	6.1	4.2
PW-2	413	0.9	691	33	28	9.1
PW-3	266	0.9	386	19	13	6.4
PW-4	135	0.8	166	11	3.7	4.7
IW-1	345	3.8	496	30	25	17
IW-2	250	1.5	337	16	9.5	5.0
IW-3	433	4.3	634	26	18	45

Well/ Source	Average Result (mg/L, except as noted)					
	TDS	Nitrate-N	EC[1]	Sodium	Chloride	Sulfate
Dist. No. 1[2]	288	1.0	418	20	16	7.2
Dist. No. 2[2]	298	0.8	443	21	16	7.1

[1] µmhos/cm
[2] Sample obtained from facility water tap.

GROUNDWATER CONDITIONS

44. Subsurface investigations conducted between 2001 and 2009 identified shallow sediments consisting of a mixture of sand/silt and sand intervals. Investigation activities included the installation and sampling of groundwater monitoring wells MW-1 through MW-14, in addition to the evaluation of other existing on-site wells. The current groundwater monitoring well network is shown in Attachment B.

45. The depth to shallow groundwater ranges from 3.2 feet bgs near the Mokelumne River on the southern end of the facility, to 68.6 feet bgs further to the north. Groundwater consistently flows away from the Mokelumne River to the north-northwest with a decreasing component of horizontal gradient laterally away from the river. This condition makes Mokelumne River a losing stream that recharges the shallow groundwater interval.

46. Average concentrations of selected constituents from groundwater monitoring results since 2001 are presented below. The location column identifies each well's position relative to potential on-site waste constituent source areas and shallow groundwater flow direction.

Well ID	Mean Analytical Result (mg/L, except as noted)							
	EC[1]	TDS	TKN	NO3-N	SO4	Cl	Na	Location
MW-1	153	60.9	1.0	ND	1.6	1.2	7.0	UP
MW-2	367	288	0.6	0.2	28	17	11	UP
MW-3	278	138	2.3	ND	1.6	19	25	UP
MW-4	766	430	4.7	ND	1.3	37	53	DGP
MW-5	1,008	724	0.6	15	62	67	35	DGLA
MW-6	740	538	2.0	9.9	54	43	39	DGLA
MW-7	768	577	1.4	12	96	26	53	DGLA
MW-8	1,076	773	1.3	3.2	79	44	90	DGLA
MW-9	942	655	0.6	3.8	59	55	58	CGLA
MW-10	532	348	1.0	7.2	39	15	45	CGLA
MW-11	684	506	0.9	15	54	35	40	DGWLA
MW-12	157	170	0.6	1.2	4.3	7.4	10	UP
MW-13	917	585	0.2	3.8	31	57	51	DGWLA
MW-14	541	394	0.6	7.9	48	21	33	CG

[1] µmhos/cm
UP = Upgradient of facility
CG = Cross gradient of facility and Land Application Areas
DGP = Downgradient of wastewater ponds
DGLA = Downgradient of land application area
CGLA = Crossgradient of land application area
DQWLA = Downgradient of winery and land application area

47. Monitoring wells MW-1, MW-2, and MW-3 consistently have lower TDS concentrations, as compared to the other monitoring wells associated with the facility. Average TDS concentrations in MW-1, MW-2, and MW-3 are 61 mg/L, 288 mg/L, and 138 mg/L, respectively. According to the April 2006 *Groundwater Characterization Report*, TDS concentrations in the Mokelumne River generally range from 20 mg/L to 50 mg/L, with only a few concentrations reported over 60 mg/L in the data collected since 1960. Because groundwater consistently flows away from the Mokelumne River to the north/northwest, the infiltrating river water strongly affects groundwater quality at the facility, providing a continuous supply of high quality (low TDS) groundwater.

48. Determining background groundwater quality is complicated due to the close proximity of the Mokelumne River and agricultural nature of the local area. Monitoring wells MW-12 and MW-14 are considered representative of background conditions unaffected by winery activities. Well MW-12 is upgradient of the discharge areas and is approximately 1,400 feet north of the Mokelumne River; Well MW-14 is crossgradient of winery activities and is approximately 4,000 feet north of the Mokelumne River. These two monitoring wells are considered representative of ambient groundwater at varying distances from the river. The following table summarizes statistical analysis of key salinity constituents for the two background groundwater monitoring wells.

		MW-12			MW-14		
Analyte	**Units**	**Mean**	**95% UCL**	**95% UTL**	**Mean**	**95% UCL**	**95% UTL**
EC	µmhos/cm	157.4	165	201	541	560	614
TDS	mg/L	170.5	182	240	394	404	450
TKN	mg/L	<0.2	--	--	<0.2	--	--
NO3-N	mg/L	1.2	1.3	2.0	7.9	8.5	10
Sulfate	mg/L	4.3	--	--	48	--	--
Chloride	mg/L	7.4	--	--	21	--	--
Sodium	mg/L	9.6	--	--	33	--	--

UCL = Upper Confidence Limit for the mean.
UTL = Upper Threshold Limit for the data set.
-- Insufficient data set

Review of the statistical analysis presented above indicates that the downgradient water quality recharged from the Mokelumne River increases in salinity as it migrates through the aquifer, independent of the winery activities but not necessarily independent of local agricultural activities. It is expected that with longer residence times in the shallow aquifer, groundwater will become more saline.

Groundwater monitoring data obtained since 2001 indicate that the ponds and land application areas, as well as a historic former stillage pond, have caused increases in concentrations of TDS, sulfate, chloride, sodium, and nitrogen compounds in groundwater.

49. LAAs P and Q are currently not equipped with groundwater monitoring wells. Additional wells are required at LAAs P and Q when those areas are included as part of the facility wastewater treatment and discharge program.

POTENTIAL CONDUIT EVALUATION

50. Several production and irrigation wells are currently used or exist at the facility. Because these wells draw from several aquifer zones, an industrial/irrigation well survey was performed to investigate whether there is a potential for individual wells to act as vertical conduits allowing groundwater from different water-bearing intervals to mix. Four production wells (PW-1, PW-2, PW-3, and PW-4), five irrigation wells (IW-1, IW-2, IW-3, IW-4 and IW-5), and a previously undocumented well (Well X) were investigated in the survey. Well conditions were reported in a *Potential Conduit Report*, dated 30 April 2009. As a result of the investigation, IW-4 and IW-5 were destroyed in March 2009 and IW-1 was abandoned in July 2009. A summary of the available well construction information for the remaining wells is presented below:

Well	Installation Date	Borehole Depth (ft. bgs)	Casing Depth (ft. bgs)	Screened Depths (ft. bgs)	Comments
PW-1	1955	450	0 - 373	NA	No screened interval, open borehole below casing
PW-2	Unknown	120[1]	0 - 103[1]	67, 72, and 84	Pump in well prevented investigation below 113 ft. bgs.
PW-3	Unknown	337	0 - 337	60-80 100-120 164-184 208-228 291-311	Open borehole 311-337 ft. bgs. Well casing condition poor (as noted during video log).
PW-4	2001	700	0 - 500	320-440	Open borehole 500-700 ft. bgs.
Well X	Unknown	395	Unknown	Unknown	Casing collapse prevented investigation.
IW-2	Unknown	477	0 - 337	265-268	Open borehole 337-477 ft. bgs.
IW-3	Unknown	175	0 - 135	Not Applicable	Open borehole 135-175 ft. bgs.

[1] Suspected, but unconfirmed due to lack of well log or conditions encountered during video log.

51. Production wells PW-1, PW-2 and Well X are located in close proximity to each other in the north-central portion of the winery facility. An additional production well (PW-3) is located in the east-central portion of the winery facility, downgradient of a former stillage pond. Notable observations about well conditions and potential vertical conduit conditions for wastewater constituent migration are discussed below:

a. A video log of PW-2 identified that the well is cased from near surface to a depth of 103 feet bgs and that the well is uncased from 103 feet bgs to 120 feet bgs. An abandoned pump may be stuck in the well between 113 feet bgs and 120 feet bgs, which prevented further assessment of well construction and condition. Water quality data for PW-2 indicates higher TDS, EC, and other general mineral parameters, as compared to the other production wells that are screened in deeper water-bearing intervals. PW-2 is considered a potential vertical conduit due to the presence of holes in the upper 100 foot interval and because the well is uncased between 103 feet bgs and 120 feet bgs.

b. Minimal information is known about Well X, which is an unused well located approximately 11 feet from PW-1 and 16 feet from PW-2. A downhole survey of the well identified that the well casing is damaged below 55 feet bgs, which also corresponds with the approximate static water level in the well. Further investigation indicated that the total depth of the well extends to 395 feet bgs, but well completion details below the damaged interval are unknown. Because of the casing damage near the shallow groundwater interval and unknown well construction details, Well X is considered a potential vertical conduit.

c. PW-3 is located within the minimum horizontal separation distance of 100 feet to a known septic tank, and within 50 feet of a sanitary sewer line, as required by California Department of Water Resources Well Standard Bulletin 74-90. PW-3 includes five 20-foot screened intervals between 60 feet bgs and 311 feet bgs and is uncased between 311 feet bgs and 337 feet bgs. Although water quality data presented in the *Potential Conduit Report* did not indicate that PW-3 had been adversely impacted by wastewater constituents, PW-3 is considered a potential vertical conduit due to its proximity to the former stillage pond, current septic tank and sewer line, and its multiple screened intervals.

52. Production wells PW-2 and Well X both have failed casings and represent potential vertical conduits for waste constituents associated with winery operations. Production well PW-2 and Well X are in close proximity to PW-1, which is currently the primary production and drinking water supply well for the winery facility. Abandonment of PW-2 and Well X is necessary to prevent vertical migration of wastewater constituents and for the protection of the current water supply for the facility. Because PW-2 and Well X should be abandoned and/or destroyed in a manner that that will not compromise the continued use of PW-1, it is appropriate to require the Discharger evaluate well abandonment and/or destruction options and take action as appropriate.[2]

53. PW-3 is a potential vertical conduit based on its well construction. Although PW-3 is used only for backup purposes and recent water quality data indicates that it meets drinking water standards, the well is located within the minimally prescribed horizontal distances from an active septic tank and sewer line. If future water quality monitoring data show exceedance of a drinking water standard, the well should properly destroyed.

[2] For the purpose of this Order, well abandonment can include pressure-grouting or other sealing methods to prevent vertical migration of waste constituents and water within the well or filter pack between water-bearing intervals.

OTHER CONSIDERATIONS FOR FOOD PROCESSING WASTE

54. Excessive application of food processing wastewater to land application areas can create objectionable odors, soil conditions that are harmful to crops, and degradation of underlying groundwater by overloading the shallow soil profile and causing waste constituents (organic carbon, nitrate, other salts, and metals) to percolate below the root zone. Ordinarily, it is reasonable to expect some attenuation of various waste constituents that percolate below the root zone within the vadose (unsaturated) zone. Specifically, excess nitrogen can be mineralized and denitrified by soil microorganisms, organic constituents (measured as both BOD and volatile dissolved solids) can be oxidized, and some salinity species will undergo cation exchange with clay minerals, effectively immobilizing them.

    Loading of BOD should be limited to prevent nuisance conditions. The maximum BOD loading rate that can be applied to land without creating nuisance conditions can vary significantly depending on the operation of the land application system. *Pollution Abatement in the Fruit and Vegetable Industry*, published by the United States Environmental Protection Agency (US EPA Publication No. 625/3-77-0007) (hereafter *Pollution Abatement*), cites BOD loading rates in the range of 36 lbs/acre/day to 600 lbs/acre/day but indicates the loading rates can be even higher under certain conditions. Sprinklers and drip irrigation systems provide for uniform irrigation, which fosters aerobic treatment processes that are effective in consuming BOD and mineralizing nitrogen. For these types of irrigation systems, resting cycles are not necessary to ensure adequate aeration and soil drainage.

55. Acidic and/or reducing soil conditions can be detrimental to land treatment system function, and may cause groundwater degradation if the buffering capacity of the soil is exceeded. If soil pH decreases below 5 and the soil remains in a reducing state for prolonged periods, naturally occurring metals (including iron and manganese) could dissolve and degrade underlying groundwater. In practice, prolonged reducing conditions may not occur because: a) the annual cycle of lowered pH during loading with either wastewater or fertilizer is followed by pH recovery during cropping and organic matter cycling and, b) the dose and rest cycling for wastewater application either in spreading basins or using irrigation creates alternate anoxic and aerobic conditions. *Pollution Abatement* recommends that water applied to crops have a pH within 6.4 to 8.4 to protect crops. The soils and underlying groundwater are expected to adequately buffer the discharge.

BASIN PLAN AND BENEFICIAL USES

56. The *Water Quality Control Plan for the Sacramento River and San Joaquin River Basins, Fourth Edition* (hereafter Basin Plan) designates beneficial uses, establishes water quality objectives, contains implementation plans and policies for protecting waters of the basin, and incorporates by reference plans and policies adopted by the State Water Resources Control Board. Pursuant to Water Code section 13263(a), waste discharge requirements (WDRs) must implement the Basin Plan.

57. Surface water drainage is to the Mokelumne River. The facility is within the Lower Mokelumne Hydrologic Area (No. 531.20), as depicted on interagency hydrologic maps prepared by the Department of Water Resources in August 1986.

58. The beneficial uses of the Mokelumne River from Camanche Reservoir to the Sacramento/San Joaquin Delta are agricultural supply; water contact recreation; non-contact water recreation; warm freshwater habitat; cold freshwater habitat; migration of aquatic organisms; spawning, reproduction, and/or early development; and wildlife habitat.

59. The beneficial uses of underlying groundwater are municipal and domestic water supply, agricultural supply, industrial service supply, and industrial process supply.

ANTIDEGRADATION ANALYSIS

60. State Water Resources Control Board (State Board) Resolution 68-16 (the Antidegradation Policy) requires that the Central Valley Water Board, in regulating the discharge of waste, must maintain the high quality of waters of the state until it is demonstrated that any change in quality will be consistent with maximum benefit to the people of the state, will not unreasonably affect beneficial uses, and will not result in water quality less than that described in the Regional Water Board's policies (e.g., quality that exceeds water quality objectives). Resolution 68-16 also requires that waste discharged to high quality waters be required to meet WDRs that will result in the best practicable treatment or control of the discharge. Resolution 68-16 prohibits degradation of groundwater quality as it existed in 1968, or at any time thereafter that groundwater quality was better than in 1968, other than degradation that was previously authorized.

61. Groundwater conditions at the site in 1968 are unknown. Therefore, background groundwater quality is an appropriate basis for the Antidegradation analysis. As noted in the foregoing Findings, the Mokelumne River is a source of high quality groundwater recharge upgradient of the site, and shallow groundwater quality declines with increasing distance from the river. Locally, the shallow groundwater degradation may be caused by natural mineralization and/or agricultural activities. However, shallow groundwater beneath the site has apparently been degraded with TDS, sulfate, chloride, sodium, and nitrogen compounds by the long-time winery discharge, which began as early as 1933.

62. As described above, the Discharger has lined the Upper Ponds, implemented salinity source control, improved wastewater treatment, implemented water conservation measures and improved cropping practices to maximize nutrient and water uptake. However, the level of salinity reduction achieved with source control to date is not known. Therefore, it is appropriate for this Order to require that the Discharger provide a quantitative determination of the level of salinity reduction achieved for each of the contributing waste streams.

63. According to the RWD, the facility generates an economic benefit on the local, state, and national economies. The estimated overall total benefit is approximately $218.1

million per year. Based on the following, allowing some level of groundwater degradation of groundwater is in the best interest of the people of the State:

a. The winery currently employs approximately 285 employees year-round, plus an additional 112 part time employees. Future expansion may add an additional 30 year-round positions.

b. The associated Lodi Distribution Center, where finished goods are stored and distributed, supports an additional 44 employees year-round and 12 part time employees.

c. Wages and benefits for the 453 employees was $21.6 million dollars in 2010.

d. Approximately $58 million was spent purchasing grapes from independent wine grape growers. The purchase represented approximately 11 percent of the grape crop grown in the region.

e. The Discharger spends approximately $80 million per year on purchase of bottles, labels, corks, and packaging materials.

f. Spending on supplies, services, and other materials is approximately $18.7 million per year.

g. Local property taxes, licenses, and fees are approximately $2 million per year.

h. State and federal excise taxes are approximately $26 million annually.

i. Facility improvements and maintenance have averaged $11.8 million annually.

j. In addition to the measureable economic benefits described above, indirect economic effects include employee wages spent in the community, participation in community/charitable organizations, and participating in events that promote tourism to the area.

64. Some shallow groundwater degradation has occurred, but it has not caused exceedance of a water quality objective. Several treatment and control measures have been implemented, but the salinity source reduction achieved to date needs to be quantified and may need to be improved.

This Order does not authorize any degradation beyond that which exists today. The Groundwater Limitations are effective immediately and allow no degradation beyond existing groundwater quality in any compliance monitoring well and this Order requires intrawell analysis of groundwater monitoring data to determine compliance with the Groundwater Limitations.

This Order also requires implementation of upgrades and any additional measures that will be required to comply with the Groundwater Limitations of this Order. This Order imposes new effluent limitations, and contains a time schedule for assuring that BPTC

and the highest water quality consistent with the maximum benefit to the people of the State will be achieved while minimizing any degradation that may occur pending completion of the required tasks. Following completion of the time schedule, this Order will be reopened if necessary to reconsider effluent limitations and other requirements to comply with Resolution 68-16. Based on the existing record, the discharge is consistent with the antidegradation provisions of Resolution 68-16.

The use of winery wastewater to irrigate crops in place of higher quality surface or ground water supplies is a benefit to the people of the State. This Order establishes requirements to ensure the discharge will not unreasonably threaten present and anticipated beneficial uses or result in groundwater quality that exceeds water quality objectives set forth in the Basin Plan.

65. **OTHER REGULATORY CONSIDERATIONS** California Water Code section 13267(b) provides that: "*In conducting an investigation specified in subdivision (a), the regional board may require that any person who has discharged, discharges, or is suspected of having discharged or discharging, or who proposes to discharge waste within its region, or any citizen or domiciliary, or political agency or entity of this state who has discharged, discharges, or is suspected of having discharged or discharging, or who proposes to discharge, waste outside of its region that could affect the quality of waters within its region shall furnish, under penalty of perjury, technical or monitoring program reports which the regional board requires. The burden, including costs, of these reports shall bear a reasonable relationship to the need for the report and the benefits to be obtained from the reports. In requiring those reports, the regional board shall provide the person with a written explanation with regard to the need for the reports, and shall identify the evidence that supports requiring that person to provide the reports*."

The technical reports required by this Order and the attached Monitoring and Reporting Program R5-2012-__ are necessary to assure compliance with these WDRs. The Discharger owns and operates the facility that generates the waste subject to this Order.

66. California Department of Water Resources standards for the construction and destruction of groundwater wells is described in California Well Standards Bulletin 74-90 (June 1991) and Water Well Standards: State of California Bulletin 94-81 (December 1981). These standards, and any more stringent standards adopted by the state or county pursuant to Water Code section 13801, apply to all monitoring wells.

67. The discharge authorized herein is exempt from the requirements of *Consolidated Regulation for Treatment, Storage, Processing, or Disposal of Solid Waste*, as set forth in Title 27, California Code of Regulations, Division 2, Subdivision 1, Section 20005 et seq. (hereafter Title 27). The exemption, pursuant to Section 20090(b), 20090(f), and 20090(h) is based on the following:

    a. The operation of the lined wastewater treatment and storage ponds, and the application of treated wastewater to the LAAs is exempt based on Section 20090(b):

i. The Central Valley Water Board has issued waste discharge requirements.

ii. This discharge is in compliance with the Basin Plan.

iii. The wastewater does not need to be managed according to Title 22 CCR, Division 4.5, Chapter 11, as a hazardous waste.

b. Discharge of treated wastewater to the LAAs is exempt based on Section 20090(h). Application of treated wastewater to LAAs will result in additional waste treatment, water reuse, and nutrient recycling. Natural processes in the LAAs provide the additional treatment; percolate wastewater/supplemental irrigation/storm water moving below the crop root zones will recharge groundwater; and nutrients will be taken up by crops and removed from the LAAs.

68. Although the facility is exempt from Title 27, the statistical data analysis methods of Title 27, section 20415(e) are appropriate for determining whether the discharge complies with Groundwater Limitations specified in this Order.

69. The State Water Board adopted Order 97-03-DWQ (NPDES General Permit CAS000001) specifying waste discharge requirements for discharges of storm water associated with industrial activities, and requiring submittal of a Notice of Intent by all affected industrial dischargers. Because storm water that falls on processing areas is directed to the wastewater system, the Discharger is not required to obtain coverage under NPDES General Permit CAS000001.

70. A Negative Declaration was approved by the San Joaquin County Community Development Department on 9 December 1997 for the expansion of the facility per the provisions of the California Environmental Quality Act (CEQA). However, the 1997 environmental document did not envision expansion of the LAAs as currently proposed. A subsequent Negative Declaration was approved by the San Joaquin County Community Development Department on 17 May 2012 for the expansion of the winery in five phases, including discharge of wastewater to 100 acres of LAAs.

71. Pursuant to Water Code section 13263(g), discharge is a privilege, not a right, and adoption of this Order does not create a vested right to continue the discharge.

PUBLIC NOTICE

72. All the above and the supplemental information and details in the attached Information Sheet, incorporated by reference herein, were considered in establishing the following conditions of discharge.

73. The Discharger and interested agencies and persons have been notified of the Central Valley Water Board's intent to prescribe waste discharge requirements for this discharge, and they have been provided an opportunity to submit written comments and an opportunity for a public hearing.

74. All comments pertaining to the discharge were heard and considered in a public hearing.

IT IS HEREBY ORDERED that Order 87-184 is rescinded except for purposes of enforcement and pursuant to sections 13263 and 13267 of the California Water Code, Constellation Brands US Operations Incorporated, its agents, successors, and assigns, in order to meet the provisions contained in Division 7 of the California Water Code and regulations adopted thereunder, shall comply with the following:

Note: Other prohibitions, conditions, definitions, and the method of determining compliance are contained in the attached "Standard Provisions and Reporting Requirements for Waste Discharge Requirements" dated 1 March 1991.

A. Discharge Prohibitions:

1. Discharge of wastes, including irrigation tailwater, to surface waters or surface water drainage courses is prohibited.
2. Bypass or overflow of untreated or partially treated wastewater is prohibited.
3. Discharge of waste classified as "hazardous," defined in Section 20164 of Title 27, CCR is prohibited.
4. The discharge of toxic substances into the Discharger's wastewater ponds such that biological treatment is significantly reduced is prohibited.
5. The discharge of treated wastewater other than to the approved LAAs identified in Finding 27 and shown on Attachment B is prohibited; however, discharge of treated wastewater to landscaped areas that do not drain to surface water drainage courses is permissible.
6. The discharge of domestic wastewater to the winery wastewater treatment system is prohibited.
7. The discharge of winery wastewater to the domestic wastewater septic system is prohibited.
8. Discharge of storm water not consistent with the procedures described in Finding 25, or more stringent measures if developed and approved by the Executive Officer, is prohibited.

B. Discharge Specifications:

1. **Effective immediately**, the discharge to the Upper Ponds shall not exceed 15.75 million gallons per calendar month as a monthly maximum. In addition, the discharge to the Upper Ponds shall not exceed an annual total of 75 million gallons of wastewater and/or storm water per calendar year.

2. **Effective upon written approval of the reports required pursuant to Provisions G.1.b and c by the Executive Officer,** the discharge to the Upper Ponds shall not exceed 21 million gallons per calendar month as a monthly maximum. In addition, the discharge to the Upper Ponds shall not exceed an annual total of 100 million gallons of wastewater and/or storm water per calendar year.

3. Neither the treatment nor the discharge of wastewater shall cause a nuisance or condition of pollution as defined by the Water Code section 13050.

4. No wastewater constituent shall be released or discharged, or placed where it will be released or discharged, in a concentration or in a mass that causes violation of the Groundwater Limitations.

5. Objectionable odors shall not be perceivable beyond the limits of the facility boundary at an intensity that creates or threatens to create nuisance conditions.

6. As a means of discerning compliance with Discharge Specification B.6, the dissolved oxygen (DO) content in the upper one foot of any wastewater pond shall not be less than 1.0 mg/L for three consecutive weekly sampling events. If the DO in any single pond is below 1.0 mg/L for three consecutive sampling events, the Discharger shall report the findings to the Regional Water Board in writing within 10 days and shall include a specific plan to resolve the low DO results within 30 days.

7. The Discharger shall operate all systems and equipment to maximize treatment of wastewater and optimize the quality of the discharge.

8. All ponds shall be managed to prevent the breeding of mosquitoes. In particular:
   a. An erosion control program should assure that small coves and irregularities are not created around the perimeter of the water surface.
   b. Weeds shall be minimized through control of water depth, harvesting, and/or use of herbicides.
   c. Dead algae, vegetation, and debris shall not accumulate on the water surface.

9. The LAAs shall be managed to prevent the breeding of mosquitoes and flies.

10. The Upper Ponds shall be designed, constructed, operated, and maintained to prevent inundation or washout due to floods with a 100-year return frequency. The Lower Ponds shall be managed in accordance with the NPDES Low Threat General Waste Discharge Requirements, Order R5-2008-0081, and subsequent updates, for as long as they are vulnerable to inundation by the Mokelumne River in a 100-year flood event.

11. The freeboard in each pond shall never be less than two feet, as measured vertically from the water surface to the lowest point of overflow, except for internal berms that are not required to contain the waste.

12. The wastewater treatment, wastewater storage, and land application systems shall have sufficient capacity to accommodate wastewater flow and seasonal precipitation. Design seasonal precipitation shall be based on total annual precipitation using a return period of 100 years, distributed monthly in accordance with historical rainfall patterns.

13. On or about **15 October** each year, available pond storage capacity shall at least equal the volume necessary to comply with Discharge Specifications B.11 and B.12.

14. **Beginning in 2017**, the Discharger shall test the integrity of all pond liners every five years and repair all significant leaks in accordance with an approved workplan pursuant to Provision G.1.j.

15. Storage of pomace and/or DE on areas not equipped with means to prevent leachate generation or collect leachate and prevent its infiltration into the ground is prohibited. Acceptable alternatives include storage on paved areas that are equipped with liquid collection systems or other alternatives that prevent generation of leachate, such as roofed areas or use of "ag bags" for well-drained materials.

16. Application of pomace, stems/leaves, and/or DE to the LAAs is prohibited.

17. Pomace, filter solids, and/or process wastewater screening solids can be applied to off-site cropland as a soil amendment. If solids are composted, the composting operation must be a permitted green waste facility.

18. All irrigation systems are acceptable as long as treated wastewater applications are performed consistent with the requirements in this Order, allow even distribution, and prevent spills outside the LAAs. Reapplying tailwater to the LAAs or returning it to the wastewater ponds is acceptable.

C. Effluent Limitations:

1. The blend of treated wastewater, storm water, and supplemental irrigation water applied to the LAAs shall not exceed the following effluent limits.

Constituent	Units	Daily Maximum	Monthly Average	Annual Average
Biochemical Oxygen Demand	lbs/ac/day	300	100	NA
Fixed Dissolved Solids[1]	mg/L	NA	NA	775
Total Nitrogen[2]	lbs/ac/year	NA	NA	300

[1] Calculated flow weighted average concentration in mg/L
[2] Annual average for Total Nitrogen based on the sum of all nitrogen applied as described below.

a. The mass of BOD applied to each LAA on a daily basis shall be calculated using the following formula:

$$M = \frac{8.345(C_U V_U + C_L V_L)}{A}$$

Where:
M = mass of BOD applied to an LAA in lbs/ac/day
C_X = concentration of BOD in mg/L based on most recent monitoring result
V_X = volume of wastewater applied to the LAA in millions of gallons
A = area of the LAA irrigated in acres
8.345 = unit conversion factor

$_U$ and $_L$ Refer to values for the Upper Ponds and Lower Ponds, respectively

b. The mass of total nitrogen applied to each LAA on an annual basis shall be calculated using the following formula:

$$M = \sum_{i=1}^{12} \frac{(8.345(C_{Ui}V_{Ui} + C_{Li}V_{Li}) + M_x)}{A}$$

Where:
M = mass of nitrogen applied to LAA in lbs/ac/yr
C_{Xi} = concentration of total nitrogen in month *i* in mg/L
V_{Xi} = volume of wastewater applied to the LAA during calendar month *i* in million gallons
A = area of the LAA irrigated in acres
i = the number of the month (e.g., January = 1, February = 2, etc.)
M_x = nitrogen mass from other sources (e.g., fertilizer) in pounds
8.345 = unit conversion factor

$_U$ and $_L$ Refer to values for the Upper Ponds and Lower Ponds, respectively

c. The flow-weighted average annual FDS concentration shall be calculated using the following formula:

$$C_a = \frac{\sum_{1}^{12}[(C_{Ui} \text{ x } V_{Ui}) + (C_{Li} \text{ x } V_{Li})]}{\sum_{1}^{12}(V_{Ui} + V_{Li})}$$

Where:
C_a = Flow-weighted average annual FDS concentration in mg/L
$_i$ = the number of the month (e.g., January = 1, February = 2, etc.)
C_{Ui} = Upper Pond FDS concentration for calendar month *i* in mg/L
C_{Li} = Lower Pond FDS concentration for calendar month *i* in mg/L
V_{Ui} = volume of wastewater applied from the Upper Ponds to LAAs during calendar month *i* in million gallons
V_{Li} = volume of wastewater applied from the Lower Ponds to LAAs during calendar month *i* in million gallons

2. Wastewater applied to the LAAs shall not have a pH of less than 6.5 or greater than 10.0.

D. Land Application Area Requirements:

1. The discharge shall be distributed uniformly on adequate acreage in compliance with the Discharge Specifications and Effluent Limitations.

2. Crops shall be grown on the LAAs. Crops shall be selected based on nutrient uptake capacity, tolerance to soil moisture conditions, consumptive use of water, and irrigation requirements. Cropping activities shall be sufficient to take up the nitrogen and other macronutrients applied, and crops shall be harvested and removed from the land at least on an annual basis.

3. Discharge of treated wastewater, including runoff, spray or droplets from the irrigation system, shall not occur outside the boundaries of the approved LAAs. Treated wastewater application using sprinklers, flood, or drip irrigation is acceptable if the discharge complies with all requirements of this Order.

4. Discharge of storm water runoff from the LAAs and landscaped areas irrigated with wastewater is prohibited.

5. Hydraulic loading of treated wastewater and irrigation water shall be at reasonable agronomic rates designed to minimize the potential impact to groundwater quality by percolation of waste constituents below the root zone.

6. The Discharger shall use higher quality surface water from the Mokelumne River for supplemental irrigation to the maximum extent permissible under its riparian water rights.

7. Grade separations, berms, swales or ditches shall be maintained around the perimeter of the LAAs and landscaped areas irrigated with wastewater to prevent the runoff of treated wastewater or storm water.

8. Application of treated wastewater to the LAAs using sprinkler irrigation is prohibited when wind velocities exceed 30 miles per hour.

9. The LAAs shall be managed to prevent breeding of mosquitoes. More specifically:

    a. All applied irrigation water must infiltrate completely within 24 hours.

    b. Ditches not serving as wildlife habitat should be maintained free of emergent, marginal, and floating vegetation.

    c. Low pressure pipelines, unpressurized pipelines, and ditches that are accessible to mosquitoes shall not be used to store wastewater.

10. A 50-foot buffer zone shall be maintained between any properties developed as residences and the wetted area resulting from application of wastewater.

11. The resulting effect of the wastewater discharge on the soil pH shall not exceed the buffering capacity of the soil profile and shall not cause significant mobilization of soil constituents such as iron and manganese.

12. Effluent shall not be discharged to the LAAs when soils are saturated.

13. Application of treated wastewater to the LAAs via flood irrigation shall only occur on furrows graded or irrigation checks configured so as to achieve uniform distribution, minimize ponding, and provide for tailwater control. Furrow runs and irrigation checks shall not be longer and slopes shall not be greater than what permits reasonably uniform infiltration and maximum practical irrigation efficiency.

14. There shall be no standing water in the LAAs 24 hours after treated wastewater is applied, except during periods of heavy rains sustained over two or more consecutive days.

E. Solids/Sludge Disposal Requirements:

1. Collected screenings and other solids removed from winery wastewater shall be disposed of offsite in a manner that is consistent with Title 27, Division 2, Subdivision 1 of the CCR and approved by the Executive Officer. The disposal options in Discharge Specifications B.18 are acceptable.

2. Winery sludge and other solids shall be removed from sumps, screens, wastewater ponds, etc. as needed to ensure optimal operation and adequate hydraulic capacity. Winery solids drying operations, if any, shall be designed and operated to prevent leachate generation.

3. Storage and disposal of domestic wastewater sludge shall comply with existing Federal, State, and local laws and regulations, including permitting requirements and technical standards.

4. Sludge and other solids shall be removed from solids separation tanks and septic tanks as needed to ensure optimal operation and adequate hydraulic capacity. A duly authorized carrier shall haul sludge, septage, and domestic wastewater.

5. Any proposed change in solids use or disposal practice from a previously approved practice shall be reported to the Executive Officer at least 90 days in advance of the change.

F. Groundwater Limitations:

1. **Effective immediately**, the discharge shall not cause a statistically significant concentration increase in any compliance monitoring well, as defined in the attached Monitoring & Reporting Program (MRP) for the following constituents.

Constituent	**Limitation [1]**
Chloride	No statistically significant increase.
Sodium	No statistically significant increase.
Iron	No statistically significant increase.

Constituent	Limitation [1]
Manganese	No statistically significant increase.
Nitrate (as N)	No statistically significant increase.
Sulfate	No statistically significant increase.
Total Dissolved Solids	No statistically significant increase.
Fixed Dissolved Solids	No statistically significant increase.
Electrical Conductivity	No statistically significant increase.

[1] In accordance with the definition of "statistically significant" specified in Title 27, Section 20164 and based on conditions as of the date of this Order.

Compliance with this requirement shall be determined annually based on an approved intrawell statistical analysis that uses methods prescribed in Title 27, Section 20415(e)(10). This limitation requires intrawell analysis (comparing the well to historic data collected at the well rather than an upgradient well). Updated values shall be calculated annually as described in the MRP.

G. Provisions:

1. All of the following reports shall be submitted pursuant to Water Code section 13267, and prepared by a California registered professional as described in Provision G.2.

   a. **At least 180 days** prior to any discharge to LAAs P or Q, the Discharger shall submit a *Groundwater Monitoring Well Installation Workplan* prepared in accordance with, and including the items listed in, Section 1 of Attachment D which is attached hereto and is made part of this Order by reference. The workplan shall describe plans to install additional well(s) to monitor groundwater beneath LAAs Q and P. All groundwater monitoring wells shall be designed to yield samples representative of the uppermost portion of the first saturated interval below the water table.

      As described in Paragraph G, Section 1 of Attachment D, the workplan shall include a *Sampling and Analysis Plan* that describes sampling techniques designed to ensure that representative samples of sufficient volume are obtained and analyzed for all monitoring wells.

   b. **At least 60 days** prior to any planned flow increase above the interim flow limits of this Order, the Discharger shall submit a *Land Application Area Expansion Completion Report* that certifies completion of improvements to LAA blocks P and Q as needed to ensure compliance with the requirements of this order. The report shall include as-built drawings of the new LAA irrigation and tailwater/storm water runoff control systems.

   c. **At least 60 days** prior to any discharge to LAAs P or Q, the Discharger shall submit a *Groundwater Monitoring Well Installation Report* that describes the installation and provides initial monitoring results of the new groundwater monitoring wells required by Provision G.1.a. The report shall be consistent with

the Section 2 of Attachment D. If additional information is needed to characterize the hydrogeologic conditions at the site, recommendations for additional work shall be included in the report.

d. **By 31 December 2012**, the Discharger shall submit a *Groundwater Limitations Compliance Assessment Plan*. The plan shall include details of the proposed groundwater quality evaluation methods and proposed concentration limits for each constituent listed in Groundwater Limitations. As described in the MRP, Compliance shall be determined annually based on an intrawell (comparing the well to historic data collected at the well rather than an upgradient well) statistical analysis that uses methods prescribed in Title 27, Section 20415(e)(7 and 8).

e. **By 30 October 2013**, the Discharger shall submit a *Best Practicable Treatment or Control Workplan* that evaluates options for further salinity reduction and nutrient management. The workplan shall include the following:

   i. A *Salinity Reduction Workplan* that describes specific salinity reduction activities performed to date, includes flow estimates and laboratory characterization of all current contributing waste streams (including seasonal variation), evaluates the feasibility of additional salinity control measures, specifies those measures that will be implemented, and presents an implementation schedule. Estimates of capital and operation/maintenance costs for each option shall be provided. Full implementation shall be achieved no more than 3 years from the date of this Order.

      The workplan shall present updated flow rates and salinity concentrations for the following waste streams: bottling, water softening, refrigeration, tank sanitation, barrel rinsing, and filtering. These data shall be used to estimate percentage of the total salinity load represented by each waste stream.

   ii. The *Nutrient Management Workplan* shall evaluate the nutrient load to each land application area and develop pollution prevention management practices to restrict nutrient loading necessary. The workplan shall address nitrogen, phosphorous, and potassium.

f. **By 1 June 2013**, the Discharger shall submit a *Land Application Area Crop Status Report* that describes the crops planted in the LAAs. Crops selected shall be consistent with the recommendations in the RWD. Specifically, the crop shall consist of a combination Sudan grass/winter forage double crop or a perennial alfalfa crop, or equivalent.

g. **By 30 October 2015**, the Discharger shall submit a *Salinity Reduction Implementation Report* that describes implementation of the *Salinity Reduction Workplan* required by Provision G.1.e. The report shall quantify the salinity reduction for each waste stream and for the facility. For actions not yet implemented, or not measurable at the time of the report deliverable, calculated values are acceptable.

h. **By 30 May 2013,** the Discharger shall submit a *Potential Conduit Well Abandonment/Destruction Workplan* that addresses the discussion in Finding 52. The *Workplan* shall describe how Wells X, PW-2, and PW-3 (if applicable, see discussion below) will be properly abandoned/destroyed to prevent shallow groundwater from migrating to lower groundwater zones.

i. If the Discharger proposes to investigate and abandon Well PW-3, rather than destroy the well, then the following items shall be included in the workplan:

1) Relative groundwater elevations between the first saturated interval and lower saturated intervals.

2) Production geophysical well logs to determine borehole conditions. Logs may include fluid resistivity, video, flow meter, and depth specific sampling. If appropriate, the relative groundwater elevations and geophysical logs shall be recorded during both operational and non-operational periods.

ii. If the Discharger proposes to abandon Well PW-3, Proposed abandonment procedures, if any. Well abandonment shall effectively seal the upper groundwater zones from lower zones. Interpretation of the geophysical logs may be necessary to determine the extent of work required.

i. **By 30 November 2013**, the Discharger shall submit a *Potential Conduit Well Destruction Report* that describes the destruction of Wells X, PW-2, and PW-3 (if applicable).

j. **By 30 September 2016**, the Discharger shall submit a *Pond Liner Integrity Evaluation Workplan* that specifies the means and methods that the Discharger proposes to use to evaluate all geosynthetic liner and leak detection systems.

2. If the Discharger proposes to abandon any monitoring wells, the Discharger shall submit a *Well Abandonment Workplan* with a request to revise the Monitoring and Reporting Program. The Workplan shall include a specific description of the wells to be abandoned and justification for removing them from the compliance monitoring network; and a detailed description of the proposed abandonment procedures. The Discharger shall continue to comply with the Monitoring and Reporting Program unless and until the Executive Officer approves well abandonment and issues a revised Monitoring and Reporting Program.

3. In accordance with California Business and Professions Code sections 6735, 7835, and 7835.1, engineering and geologic evaluations and judgments shall be performed by or under the direction of registered professionals competent and proficient in the fields pertinent to the required activities. All technical reports specified herein that contain workplans for investigations and studies, that describe the conduct of investigations and studies, or that contain technical conclusions and recommendations concerning engineering and geology shall be prepared by or under the direction of appropriately qualified professional(s), even if not explicitly stated. Each technical report submitted by the Discharger shall bear the professional's signature and stamp.

4. The Discharger shall submit the technical reports and work plans required by this Order for consideration by the Executive Officer, and incorporate comments the Executive Officer may have in a timely manner, as appropriate. Unless expressly stated otherwise in this Order, the Discharger shall proceed with all work required by the foregoing provisions by the due dates specified.

5. The Discharger shall comply with Monitoring and Reporting Program R5-2012- , which is part of this Order, and any revisions thereto as ordered by the Executive Officer. The submittal dates of Discharger self-monitoring reports shall be no later than the submittal date specified in the MRP.

6. The Discharger shall comply with the "Standard Provisions and Reporting Requirements for Waste Discharge Requirements", dated 1 March 1991, which are attached hereto and made part of this Order by reference. This attachment and its individual paragraphs are commonly referenced as "Standard Provision(s)."

7. The Discharger shall comply with all conditions of this Order, including timely submittal of technical and monitoring reports. On or before each report due date, the Discharger shall submit the specified document to the Central Valley Water Board or, if appropriate, a written report detailing compliance or noncompliance with the specific schedule date and task. If noncompliance is being reported, then the Discharger shall state the reasons for such noncompliance and provide an estimate of the date when the Discharger will be in compliance. The Discharger shall notify the Central Valley Water Board in writing when it returns to compliance with the time schedule. Violations may result in enforcement action, including Central Valley Water Board or court orders requiring corrective action or imposing civil monetary liability, or in revision or rescission of this Order.

8. The Discharger shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) that are installed or used by the Discharger to achieve compliance with the conditions of this Order. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems that are installed by the Discharger when the operation is necessary to achieve compliance with the conditions of this Order.

9. As described in the Standard Provisions, the Discharger shall report promptly to the Central Valley Water Board any material change or proposed change in the character, location, or volume of the discharge.

10. The Discharger shall report to the Central Valley Water Board any toxic chemical release data it reports to the State Emergency Response Commission within 15 days of reporting the data to the Commission pursuant to section 313 of the "Emergency Planning and Community Right to Know Act of 1986."

11. The Discharger shall use the best practicable cost-effective control technique(s) including proper operation and maintenance, to comply with this Order.

12. At least **90 days** prior to termination or expiration of any lease, contract, or agreement involving disposal or recycling areas or off-site reuse of effluent, used to justify the capacity authorized herein and assure compliance with this Order, the Discharger shall notify the Central Valley Water Board in writing of the situation and of what measures have been taken or are being taken to assure full compliance with this Order.

13. In the event of any change in control or ownership of the facility, the Discharger must notify the succeeding owner or operator of the existence of this Order by letter, a copy of which shall be immediately forwarded to the Central Valley Water Board.

14. To assume operation as Discharger under this Order, the succeeding owner or operator must apply in writing to the Executive Officer requesting transfer of the Order. The request must contain the requesting entity's full legal name, the state of incorporation if a corporation, the name and address and telephone number of the persons responsible for contact with the Central Valley Water Board, and a statement. The statement shall comply with the signatory paragraph of Standard Provision B.3 and state that the new owner or operator assumes full responsibility for compliance with this Order. Failure to submit the request shall be considered a discharge without requirements, a violation of the Water Code. If approved by the Executive Officer, the transfer request will be submitted to the Central Valley Water Board for its consideration of transferring the ownership of this Order at one of its regularly scheduled meetings.

15. A copy of this Order including the MRP, Information Sheet, Attachments, and Standard Provisions, shall be kept at the discharge facility for reference by operating personnel. Key operating personnel shall be familiar with its contents.

16. The Central Valley Water Board will review this Order periodically and will revise requirements when necessary.

If, in the opinion of the Executive Officer, the Discharger fails to comply with the provisions of this Order, the Executive Officer may refer this matter to the Attorney General for judicial enforcement, may issue a complaint for administrative civil liability, or may take other enforcement actions. Failure to comply with this Order or with the WDRs may result in the assessment of Administrative Civil Liability of up to $10,000 per violation, per day, depending on the violation, pursuant to the Water Code, including sections 13268, 13350 and 13385. The Central Valley Water Board reserves its right to take any enforcement actions authorized by law.

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 Water Code 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 of this Order, except that if the thirtieth day following the date of this Order falls on a Saturday, Sunday, or state holiday, 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 _____.

PAMELA C. CREEDON, Executive Officer

ALO/SAA:8/25/2012