CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD

CENTRAL VALLEY REGION

ORDER R5-2015-_____

WASTE DISCHARGE REQUIREMENTS

FOR
E. & J. GALLO WINERY
FRESNO WINERY
FRESNO COUNTY

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

1. On 14 May 2012, E. & J. Gallo Winery (hereafter "Gallo" or "Discharger"), a California Corporation, submitted a Report of Waste Discharge (RWD) prepared by Kennedy/Jenks Consultants (Kennedy/Jenks) for Gallo's Fresno Winery (Winery). The RWD describes Gallo's existing and proposed wastewater and winery solids disposal and recycling programs.

2. Gallo owns and operates the winery that generates the wastewater and the land application areas, and is responsible for compliance with these Waste Discharge Requirements (WDRs).

3. The Winery is at 5610 East Olive Avenue in Fresno County, as shown on Attachment A, which is attached hereto and made part of this Order by reference. The Winery property consists of about 700 acres in portions of Sections 28 and 33, T13S, R21E, Mount Diablo Baseline & Meridian. The Winery property occupies several parcels with Assessor's Parcel Numbers (APN) as listed in Table 1 in the RWD, which is incorporated by reference as Attachment B, which is attached hereto and made part of this Order by reference.

4. WDRs Order 94-103, adopted by the Central Valley Water Board on 22 April 1994, prescribes requirements for two discharges: Discharge 001, designated crusher/press wastewater; and Discharge 002, designated stillage wastewater; to about 550 acres of adjacent farmland. Since WDRs Order 94-103 was issued, the Discharger has added a third waste stream (general process wastewater), upgraded the Winery wastewater treatment system adding an anaerobic treatment system, and changed the lands used for the discharge of winery wastewater. WDRs Order 94-103 is no longer adequate because it does not reflect the current conditions of the Winery, current treatment and disposal activities, and it does not reflect current discharge flow rates. The continued discharge of both treated and untreated Winery wastewater to the land application areas warrant the adoption of revised WDRs.

Facility and Regulatory Background

5. Wine making and distillation activities have occurred at the Winery since the 1930s and the property was purchased by Gallo in 1953. Winery wastewater has been discharged to surrounding farm lands or land application areas for years, and the Winery operations have contributed to and/or caused the degradation/pollution of groundwater beneath and downgradient of the land application areas with salts and nitrate as nitrogen, as discussed in more detail below. Gallo is currently working with the Central Valley Water Board Enforcement Unit staff to characterize the lateral and vertical extent of elevated nitrate as nitrogen and salt concentrations in groundwater.

6. The earliest WDRs for Gallo were WDRs Order 56-18 adopted on 3 May 1956 for the discharge of cooling water (up to 1,500 gallons per minute) to a well on the Winery property. WDRs Order 59-95 was issued on 18 February 1959 and allowed the discharge of cooling water to an adjacent irrigation canal (Mill Ditch) and a second discharge of "spent still slops and other liquid wastes" to a 71-acre vineyard for "disposal to land by use for irrigation." Flow limits for the two discharges were not included in WDRs Order 59-95.

7. The current WDRs Order 94-103 were adopted on 24 April 1994, and allow a monthly average daily flow not to exceed 0.68 million gallons per day (mgd) for Discharge 001 (crusher/press wastewater) and a maximum daily flow of up to 2.3 mgd for Discharge 002 (stillage wastewater). Discharge 002 also has an annual discharge limit of 158 million gallons.

Existing Facility and Discharge

8. The Winery property comprises about 700 acres and currently includes about 433 acres for the land application of winery wastewater and an 85-acre composting facility, as shown on Attachment C, which is attached hereto and made part of this Order by reference. The Winery property is one mile wide (east/west), one and a half miles in length, and is generally bounded by Belmont Avenue to the south, Clovis Avenue to the west, Clinton Avenue to the north, and Fowler Avenue to the east.

9. The Gallo Fresno Winery is a wine making grape juice concentrate facility in the San Joaquin Valley and produces four primary products: wine, grape juice concentrate, distilled spirits, and compost. Gallo processes about 650,000 tons of grapes annually at the Fresno Winery. Crushed grapes are transferred to tanks for fermenting, and solids such as skins and seeds are further processed to extract alcohol and grape byproducts, including pomace which is used as cattle feed, cogeneration material, and for compost . A portion of the grape juice is sent to an evaporator for concentrating. Concentrate is processed, blended, and in some cases pasteurized and packaged at its San Joaquin Valley Concentrate facility. The distillation process involves boiling grape products in a still and transferring the liquid to tanks for storage. Gallo reuses any excess condensate in its Winery boilers and cooling towers.

10. The Winery currently produces three primary wastewater streams:

    a. General process wastewater from the cleaning of equipment and tanks; boiler blowdown; water softening regenerate; and concentrate condensation (This wastewater stream is generated year round).

    b. Crusher/press wastewater (This wastewater is generated during the "crush" which typically extends from August through November).

    c. Stillage wastewater (This wastewater is generated year round, but the majority is generated from August through December).

11. In 2007, Gallo installed an anaerobic treatment system to improve the quality of its process wastewater to be discharged to the land application areas or to the Fresno-Clovis Regional Wastewater Treatment Facility (Fresno WWTF). The anaerobic treatment system consists of the following pre-treatment, treatment, and post-treatment primary components:

    - Solids settling – Prior to treatment in the anaerobic treatment system, general process wastewater and stillage is routed through a settling tank. Solids from the settling tank are disposed of off-site by a food waste recycling company.

    - Equalization and chemical/nutrient adjustment – Pre-treatment of the general process and stillage wastewaters continues as the wastewater from the settling tank is routed to a 577,000-gallon equalization tank. Nutrient dosing and alkalinity adjustments are made to the wastewater if necessary.

    - Recycling and chemical/nutrient adjustment – Following equalization and chemical/nutrient adjustment of the wastewater, it is discharged to a 56,000 gallon covered recycle tank and pre-treatment alkalinity adjustments are made to the wastewater if necessary.

    - Anaerobic treatment – Wastewater from the recycle tank is routed to one of two high-rate internal circulation (IC) anaerobic reactors. IC-1 has a capacity of 175,000 gallons and IC-2 has a capacity of 502,000 gallons. The IC reactors contain a mixing zone, an expanded sludge bed compartment, a polishing compartment, and an internal recirculation compartment. Anaerobic organisms consume the organic matter in the wastewater and produce a biogas that is reused in the Winery's boilers.

    - Sulfide oxidation – Overflow from the recycle tank is routed to a 502,000 gallon oxidation tank that is equipped with a bubble diffuser to oxidize objectionable odors created by the anaerobic treatment process.

    - Biogas reuse – Biogas produced during the anaerobic treatment process is reused by the Winery's boilers. The biogas is treated by a scrubber to remove hydrogen sulfide from the gas mixture prior to reuse in the boilers. Biogas not used in the boilers is burned in an enclosed flare.

12. Gallo treats all of the general process wastewater and the majority of its stillage wastewater with the anaerobic treatment system. While the stillage wastewater is typically not land applied, Gallo does apply untreated stillage wastewater to land application areas on occasion. In 2009, 14.9 million gallons of untreated stillage wastewater were discharged to the land application areas and in 2010, 634,000 gallons were discharged to the land application areas. To further reduce solids in the stillage wastewater, Gallo has installed filters (Graver membranes) that remove solids from the stillage before introduction to the anaerobic treatment system or direct discharge to land. The filtered solids are delivered to the composting facility for processing. Crusher/press wastewater is not treated before discharge to the land application areas.

13. All of the waste streams combined (general process, crusher/press, and stillage) amount to approximately 400 million gallons of wastewater annually. Currently, both treated and untreated Winery wastewater is discharged to either the Fresno WWTF or to the 433-acre land application areas to irrigate crops. Gallo and the City of Fresno have a contract that allows Gallo to discharge an average of 1.37 mgd of wastewater to the Fresno WWTF on a 30-day rolling average. Prior to the construction of the anaerobic treatment system, the RWD indicates Gallo discharged about 100 million gallons per year to the land application areas and about 300 million gallons a year to the Fresno WWTF. Since construction of the anaerobic treatment system in 2007, Gallo has discharged about 50 million gallons a year to the land application areas and about 300 to 350 million gallons a year to the Fresno WWTF. In 2011, Gallo produced about 365 million gallons of wastewater, of which about 319 million gallons were discharged to the Fresno WWTF and 46 million gallons were applied to the land application areas. The anaerobic treatment system has reduced the volume of the discharge to the land application areas by about 60 to 80% percent.

14. The land application areas are comprised of 19 parcels or blocks that are east of the Winery and either north or south of Olive Avenue, as shown in Attachment C, which is attached hereto and made part of this Order by reference. The RWD indicates that wastewater is reused at four distinct areas and loading estimates are provided for each of the four areas (two south and two north of Olive Avenue). Crusher/press wastewater is discharged to 71 acres of farmland south of Olive Avenue. The 71 acres are split into two areas designated land application area No. 1 and land application area No. 2. Land application area No. 1 is identified as a 59-acre parcel that is double cropped with Sudan grass and winter forage. Land application area No. 2 is identified as a 12-acre parcel cropped with vineyards. General process wastewater and stillage wastewater treated by the anaerobic treatment system are discharged to land application areas containing 362 acres north of Olive Avenue. These land application areas are divided into two areas designated land application areas No. 3 and No. 4. Land application area No. 3 is a 273 acre parcel planted with vineyards, and Land application area No. 4 is an 89-acre parcel double cropped with Sudan grass and winter forage crops. The 85-acre composting facility is not included in 362 acres of land application areas situated north of Olive Avenue.

Composting Facility

15. An 85-acre composting facility is present in the central to northeastern portion of the approximately 700-acre Winery property. Pomace, grape skins, seeds; and sometimes diatomaceous earth removed from the wine making activities; are mixed with green waste received from the community and are composted on the 85-acre composting area. Composting activities have been conducted since 1975. Gallo produces about 378,000 cubic yards of compost annually and about 250,000 cubic yards of finished compost is onsite at any one time. The composting facility is regulated by Fresno County (Facility File No. 10-AA-0182) and is comprised of seven distinct areas as follows and shown on Attachment D, which is attached hereto and made part of this Order by reference:

    - Truck and employee parking area;
    - Winery by-products storage area – Providing storage for grape pomace prior to processing with green waste;
    - Stem area – Area where grape stems are stored prior to processing;
    - Green waste loading/unloading area – Area where green waste supplied by local gardeners is stored prior to processing;
    - Grinding area – Area where green waste is ground prior to mixing with other composting materials;
    - Seed drying area – Asphalt covered area where seeds are dried. The seeds are either returned to the Winery for processing or are included in the compost; and
    - Compost pad – A graded and compacted soil pad where materials are blended and formed into compost windrows.

16. Green waste is received at the composting facility, unloaded, sorted, and ground on a paved surface. The green waste and winery by-products areas contain two runoff collection sumps that collect storm water during rain events and leachate from the winery by-products storage area. A third sump is in the Stem area for the collection of storm water during rain events and any leachate that may drain from the stored stems. Storm water and wastewater (leachate) collected by the sumps is routed/pumped to the land application area distribution systems, and at other times is transferred to a water truck and used for dust control.

17. Gallo uses diatomaceous earth to filter its wines and spent diatomaceous earth is stockpiled near the composting operation. Spent diatomaceous earth is either added to the composting operation (about 5 to 10 percent of the compost volume), or is hauled offsite by a licensed contractor for application to farmlands as a soil amendment.

18. After filtering the wine/juice through the diatomaceous earth, the wine/juice may be processed in an ion exchange unit prior to bottling. The ion exchange units remove potassium and adjust the color of the wine/juice. The ion exchange units are regenerated with sulfuric acid.

19. Gallo historically discharged spent ion exchange regenerate to lands immediately south of the Winery. The discharge degraded/polluted groundwater underlying the former land application area and downgradient of the Winery with salinity and sulfates. The direct discharge to land of the spent ion exchange regenerate was discontinued in 1994, and it is currently discharged onto the compost windrows. Groundwater quality is improving downgradient of the land application area to which the ion exchange regenerate was discharged as discussed in Finding 74. The compost is removed from the site and sold as a fertilizer amendment.

20. Compost is formed into windrows and placed to cure on a graded and compacted, but unlined soil pad. Ion exchange regenerate from the wine making process is added for moisture control. Gallo indicates it added 7.3 million gallons of ion exchange regenerate to the compost windrows in 2012 and 9.3 million gallons in 2013. That calculates to an average of about 29,200 and 37,200 gallons per day (gpd) in 2012 and 2013, respectively, based on a 5-day work week. Storm water runoff from the compost windrow area must travel south to southwest across the compacted soil (unlined) windrow area to the storm water collection sumps in the winery by-products storage area, as described in Finding 16.

21. The RWD did not contain analytical results of the ion exchange regenerate, but the record for the Winery contains results from two samples collected in 2001. These results are shown in the following table. Sample No. 1 was collected by Central Valley Water Board staff after Gallo had adjusted the pH of the wastewater with ammonium hydroxide. Sample No. 2 was a sample collected by Gallo prior to adjusting the pH.

Ion Exchange Regenerate Results

Constituents[1]	Units[2]	Sample No. 1	Sample No.2
pH	s.u.	2.9	1.2
EC	umhos/cm	26,000	43,901
TDS	mg/L	24,000	18,503
Sulfate	mg/L	15,000	26,244
Potassium	mg/L	2,800	1,580
Sodium	mg/L	86	123
Hardness	mg/L	1,300	na[3]
BOD	mg/L	na[3]	7,680
Nitrate as Nitrogen	mg/L	15	5
Ammonia as Nitrogen	mg/L	2,000	120

1. EC = Electrical Conductivity, TDS = Total dissolved solids, BOD = Biochemical oxygen demand.
2. s.u. = Standard pH units, umhos/cm = micromhos/cm, mg/L = milligrams per liter.
3. na = Not analyzed

Effluent Quality

22. Analytical results for the general process wastewater treated by the anaerobic treatment system and crusher/press wastewater were presented in the RWD, and Gallo provided additional data for late 2012 and 2013. The results of the anaerobic treatment system wastewater are divided into the wastewater generated during the Crush period (typically August through November), and the wastewater generated the rest of the year. The results presented in the RWD are summarized in the following table. The first number listed in the table is the average of the data set followed by the range of the results shown below in parentheses.

RWD - Effluent Quality

Constituents	Units	Crusher/Press[1]	Anaerobic Treatment System[2]	Anaerobic Treatment System Crush[3]
pH	s.u.	5.2 (3.6 – 8.2)	na	na
EC	umhos/cm	983 (350 –1,900)	2,949 (1,680 – 6,710)	3,507 (1,680 – 6,710)
TDS	mg/L	5,484 (460 – 23,000)	1,749 (790 – 4,900)	2,232 (915 – 4,900)
FDS[4]	mg/L	Na	1,509 (680 – 4,260)	1,770 (690 – 4,260)
TKN[5]	mg/L	60 (5 – 270)	120 (20 – 474)	153 (22 – 394)
Nitrate as Nitrogen	mg/L	1.4 (ND[6] – 3.6)	1.9 (ND[6] – 21)	1.6 (ND[6] – 5)
Total Nitrogen	mg/L	62 (5 – 270)	127 (21 – 483)	156 (23 – 400)
BOD	mg/L	Na	173 (6 – 3,340)	401 (38 – 3,340)

1. The data set for the crusher/press wastewater consists of results from up to 15 monthly sampling events from August 2009 and November 2011.
2. The data set for the anaerobic treatment system wastewater consists of 105 samples collected from Jan 2011 through March 2012.
3. The Crush period is typically from August through November.
4. FDS = Fixed dissolved solids.
5. TKN = Total Kjeldahl Nitrogen
6. ND = not detected.

23. Averages of the anaerobic treatment system and crusher/press wastewater data from September 2012 through August 2014 are presented in the following table.

Post RWD – Effluent Quality

Constituents	Units	Crusher/Press[1]	Anaerobic Treatment System, Crush[2]
pH	s.u.	4.7 (3.7 – 7.0)	8.0 (7.9 – 8.0)
EC	umhos/cm	1,213 (740 – 2,600)	na
TDS	mg/L	7,478 (2,400 – 32,000)	na

Post RWD - Effluent Quality (continued)

Constituents	Units	Crusher/Press[1]	Anaerobic Treatment System, Crush[2]
TKN	mg/L	54 (8 – 220)	136 (11 – 200)
Nitrate as nitrogen	mg/L	3.8 (ND – 7.6)	3.1 (ND – 3.1)
Total Nitrogen	mg/L	58 (5 – 270)	139 (14 – 280)
BOD	mg/L	Na	442 (34 – 1,200)

1. The data set for the crusher/press wastewater consists of results from up to 9 monthly sampling events from August 2012 through August 2014.
2. The data set for the anaerobic treatment system wastewater consists of results from up to 7 monthly sampling events from September 2012 through August 2014.

When compared to the results presented in the RWD, the recent (2012 through 2013) crusher/press data indicates the various nitrogen results remained about the same, but the EC and TDS results of the crusher/press wastewater increased in 2012/2013. The recent nitrogen and BOD results of the anaerobic treatment system wastewater are less than the results reported in the RWD.

24. The EC and TDS results in the anaerobic treatment system and crusher/press wastewater are higher than upgradient groundwater quality (see Findings 67 through 68). The average EC result for the crusher/press wastewater is 1,213 umhos/cm and the average EC of the anaerobic treatment system wastewater ranges from 2,949 umhos/cm during the non-crush period to 3,507 umhos/cm during the crush period. All of the crusher/press and a portion of the anaerobic treatment system (up to 21 million gallons annually) wastewater are discharged to the land application areas.

25. Total nitrogen in the anaerobic treatment system wastewater averages 139 mg/L during the crush. The average total nitrogen concentration in the crusher/press wastewater is 58 mg/L. Nitrogen in wastewater is a constituent of concern because Gallo's discharge has already contributed to and/or caused the pollution of the underlying groundwater with nitrate as nitrogen upgradient of the City of Fresno's drinking water wells. The downgradient extent of the nitrate as nitrogen plume is as of yet, not fully defined, but Gallo is working with Central Valley Water Board staff to delineate the downgradient extent of the nitrate as nitrogen plume at this time.

26. Analytical results of the general process wastewater prior to treatment by the anaerobic treatment system were not included in the RWD, but Gallo did provide salinity (EC, TDS, FDS, and VDS) data for the general process wastewater as part of the development of this Order. Stillage wastewater results were provided in the 2012 RWD and Gallo provided additional stillage data from 2002 and 2003. Monitoring and Reporting Program (MRP) 94-013 does not require general process and stillage wastewaters to be analyzed for EC and TDS. This Order requires EC and TDS monitoring of the general process, stillage, crusher press, and anaerobic treatment

system wastewaters. The results of both the stillage and general process wastewater sampling are summarized in the following table.

Stillage and General Process Wastewater Quality

Constituents	Units	Stillage[1]	General Process[2]
pH	s.u.	5.3 (3.0 – 7.5)	na
EC	umhos/cm	2,834 (1,415 – 3,800)	1,428
TDS	mg/L	7,890 (3,367 – 15,000)	1,356
FDS[5]	mg/L	3,527 (1,217 – 6,700)	759
TKN[6]	mg/L	100 (5 – 350)	na
Nitrate as Nitrogen	mg/L	5.2 (ND – 61)	na
Total Nitrogen	mg/L	109 (5 – 350)	na
BOD	mg/L	6,559 (20 – 14,000)	na

1. The data set for the stillage wastewater results for pH, TKN, nitrate as nitrogen, total nitrogen, and BOD consists of results from up to 12 monthly sampling events from April 2009 through November 2011. The data set for TDS, FDS, and VDS consists of seven samples collected from August 2002 to July 2003.
2. The number of samples of the general process results for EC, TDS, FDS, and VDS was not reported, but the averages are from data obtained from the Wine Institute study conducted from large wineries, one of which was the Fresno Gallo winery.

27. Gallo treats 80 to 90% of the stillage wastewater in the anaerobic treatment system. Comparing these results to the anaerobic treatment system results shown in Findings 22 and 23 indicate the anaerobic treatment system is effective in reducing the BOD and TDS concentrations of the combined general process and stillage wastewaters. Total nitrogen and EC results increased slightly.

Proposed Discharge

28. Gallo estimates it will generate about 410 million gallons of wastewater annually and will discharge about 356 million gallons to the Fresno WWTF, while about 54 million gallons will be land applied to 433 acres of land application areas annually. The RWD indicates that about 33.1 million gallons will be crusher/press wastewater generated during the crush season (August through November), and about 21.1 million gallons will be blended general process and stillage wastewater that will be comingled and treated by Gallo's anaerobic treatment system. The RWD notes that while Gallo plans to treat the majority of the stillage discharge through the anaerobic treatment system, Gallo wants to retain the privilege to discharge stillage wastewater to land to accommodate maintenance of the anaerobic treatment system.

29. The water balance included in the RWD indicates supplemental irrigation water is required to grow the various crops on the land application areas. The water balance indicates Gallo will use over 430 million gallons of supplemental irrigation water annually, in addition to the 54 million gallons of wastewater estimated to be discharged along with the supplemental irrigation water. Supplemental irrigation water is provided by the Fresno Irrigation District via the Mill Ditch or from three onsite groundwater supply wells as discussed in Finding 42.

30. BOD loading estimates in the RWD indicate the discharge of the three waste streams will add from three to 204 pounds per acre per day (lbs/ac/day) on a monthly average to the land application areas. BOD concentrations of the anaerobic treatment system wastewater average about 400 mg/L during the crush period and average about 173 mg/L the remainder of the year. BOD analysis is not part of the current monitoring and reporting program for the crusher/press discharge; but Kennedy/Jenks provides a value of 8,200 mg/L for the loading analysis. On 30 November 2014, Kennedy/Jenks provided updated BOD loading estimates. Using updated data, the result is that the discharges of wastewater to the specific land application areas will add between five and 242 lbs/ac/day on a proposed seven-day-cycle average. The discharge of anaerobic treatment system wastewater to 89-acres will add between 142 and 155 lbs/ac/day during the crush period (typically mid-August through mid-December for the anaerobic treatment system discharges). The discharge of crusher press wastewater to 59-acres will add between 228 and 242 lbs/ac/day during the crush period (typically mid-August through November for the crusher/press discharge).

Other Considerations for Food processing Waste

31. Excessive application of food processing wastewater to land can create objectionable odors, soil conditions that are harmful to crops, and potentially unreasonable degradation of the underlying groundwater. 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 the cation exchange capacity of the soil may immobilize some salinity constituents.

32. The RWD indicates the proposed discharge will add between 30 to 166 pounds per acre per year (lbs/ac/yr) of total nitrogen to the four land application areas as shown in the table below.

Nitrogen Loading

land application area	Acres	Crops	Total Nitrogen (lbs/ac/yr)
A – South of Olive Ave.	59	Sudan/Forage	119
B – South of Olive Ave.	12	Vineyard/cover crop	30
C – North of Olive Ave.	273	Vineyard/cover crop	59
D – North of Olive Ave.	89	Sudan/Forage	166

The RWD indicates the double-cropped fields can remove up to 500 lbs/ac/yr of nitrogen, while a vineyard with a cover crop can remove up to 100 lbs/ac/yr of nitrogen. The estimated nitrogen uptake of the crops grown is reported to be greater than the estimated loading of the wastewater, indicating the crops should remove the available nitrogen from the soil. Total nitrogen is used in the RWD calculations to provide a conservatively high estimate of nitrogen loading. This estimate is high because the nitrogen removal methods in soil, mentioned in Finding 31, further reduce nitrogen availability in soil, especially for the organic nitrogen fraction which is present in the Gallo facility wastewater.

33. Food processing wastewater may contain elevated concentrations of total dissolved solids (TDS) resulting from the fruit and vegetable products or materials used for production. Typically, a percentage of the TDS is organic, which will generally decompose into its component elements of carbon, hydrogen and oxygen that can be utilized by plants and microorganisms in the soil. In contrast, the fixed dissolved solids (FDS), is primarily that portion of the TDS that consists of inorganic constituents, which can accumulate in the soil. Excessive salts may leach to groundwater where they could degrade groundwater quality. Growing and harvesting crops provides a means to remove some of these constituents, particularly calcium, magnesium, potassium, phosphorus, nitrate, and ammonia.

34. Typically, irrigation with high strength wastewater can result in high BOD loading on the day of application. It is common practice to follow a BOD loading event with a number of days without application so that soil biochemical processes will consume the applied BOD. If the rate of oxygen transfer into the soil is not adequate, anaerobic or reducing conditions may result and lead to nuisance odor conditions. When insufficient oxygen is present below the ground surface, anaerobic decay of organic matter can cause dissolution and leaching of some metals (primarily iron, manganese, and arsenic) and increases in groundwater alkalinity that can degrade groundwater quality. Excessive BOD loading over extended periods may impact beneficial uses.

35. The maximum BOD loading rate that can be applied to land without creating nuisance conditions or leaching of metals varies significantly depending on soil conditions and operation of the land application system. *Pollution Abatement in the Fruit and Vegetable Industry*, published by the United States Environmental Protection Agency (USEPA Publication 625/3-77-0007), cites BOD loading rates for irrigation purposes in the range of 36 to 100 lbs/acre/day to prevent nuisance, but indicates that loading rates can be even higher under certain conditions. The studies that supported this report did not evaluate either the mechanisms of BOD consumption in soils or actual or potential groundwater degradation associated with those loading rates. There are few studies that have attempted to determine maximum BOD loading rates for protection of groundwater quality. Those that have are not readily adapted to varying soil, groundwater, and climate conditions that are prevalent throughout the region.

36. Field studies for the 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 to each field plot each year. Lysimeter water sample measurements at 1-foot and 5-foot depths showed that much of the BOD was removed in the surface-foot of soil where aerobic conditions favor microbial oxidation. Between 66 and 79 percent of averaged applied BOD concentrations were removed in the surface-foot of soil. At 5 feet, between 80 and nearly 100 percent of the average BOD concentration was removed. Similarly, the study indicates average BOD loading was reduced by 89 to almost 100 percent in the percolate at 5 feet. Results for individual lysimeter readings were highly variable. The study results do indicate that careful management of land application of stillage and non-stillage process water can result in significant BOD removal.

37. Two years of the Wine Institute field testing were conducted in the land application areas at the Gallo facility. The following table summarizes the site specific results: With applications ranging from 3 to 885 lb/Ac/day, 79% of BOD removal occurred in the surface foot of soil. At the 5-foot depth BOD removal was 89 to 93%. The remaining BOD concentrations at five feet bgs were 551 and 543 mg/L.

Gallo Facility Studies of Stillage Land Application

	Average BOD loading			1-foot lysimeter	5-foot lysimeter		Percentage BOD removal		
Year	mg/L	lb/ac	Range in lb/ac/day	BOD, mg/L	mg/L	lb/ac	1-foot (mg/L)	5-foot (mg/L)	5-ft percolate load (lb/ac)
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%

38. The California League of Food Processor's (CLFP) 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/acre/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/acre/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/acre/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, and recommends that additional safety factors be used for sites with heavy and/or compacted soils. Although it has not been subject to a scientific peer review process, the Manual of Good Practice provides science-based guidance for BOD loading rates that, if fully implemented, may be considered management practices to help prevent groundwater degradation due to reducing conditions.

39. The cycle average BOD loading rates for the proposed discharges to the land application areas indicate low BOD cycle average BOD loading rates with the exception of the discharge to the 59- acre land application south of Olive Avenue, and the discharge to the 89-acre land application area north of Olive Avenue during the crush period from mid-August through mid-December. The discharge of wastewater at loading rates of less than 100 lbs/ac/day is unlikely to cause or contribute to continued groundwater degradation. The estimated BOD loading to the 59-acres ranges from 228 to 242 lbs/ac/day, while the BOD loading estimates for the 89-acres ranges from 142 to 155 lbs/ac/day. The discharge requires good management practices and even application (including proper resting periods between applications) to allow sufficient oxygen transfer in the shallow soils. The vadose zone/groundwater model (Model) prepared by Kennedy/Jenks and used to estimate BOD loading proposes a minimum 7-day resting period to allow for sufficient oxygen transfer to minimize the potential for reducing conditions to form in the vadose zone. As noted above, increases in the BOD loading rate can be justified by using sprinkler irrigation to evenly distribute the wastewater. To further evaluate the potential to degrade the underlying groundwater, the Discharger is required to conduct soil and vadose zone monitoring to ensure these loading rates are protective of groundwater. This Order includes Provision G.13 that requires Gallo to submit a work plan and time schedule for the installation and sampling of a Vadose Zone Monitoring System for any land application area that received winery wastewater with BOD loading rates in excess of 150 lbs/ac/day on a cycle average.

40. 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.

Site-Specific Conditions

41. Source water is provided by four supply wells (PW-5 through PW-8). Gallo provided source water analytical results for nitrate as nitrate and TDS as summarized in the following table. Central Valley Water Board staff converted the nitrate as nitrate results to nitrate as nitrogen. The size of the sample sets vary for each well and for each constituent. The nitrate as nitrogen results for PW-5 and PW-6 are the averages from sample sets of 32 and 34 samples respectively, collected from June 2002 through April 2012. Nitrate as nitrogen results for PW-7 are the averages of 14 samples collected since March 2005, but the result from PW-8 is from only one sample collected in June 2010. The TDS results shown are for one sample collected from each well, with the exception of the results from PW-7, which had two samples collected and analyzed. This Order requires annual monitoring of all of the source water wells.

Source Water Quality

Constituent	Units	PW-5	PW-6	PW-7	PW-8
Nitrate as Nitrogen	mg/L	2.7 (ND – 4.7)	1.5 (1.0 – 2.5)	0.8 (ND – 1.3)	1.5
TDS	mg/L	220	200	230 (200 – 260)	160

The one sample from PW-8 was analyzed for additional constituents as listed below.

EC	Chloride	Sodium	Nitrate as Nitrogen	Bicarbonate	Sulfate
umhos/cm	mg/L	mg/L	mg/L	mg/L	mg/L
309	9	34	1.5	150	7

42. The Fresno Irrigation District (FID) provides irrigation water to Gallo from about April through early October, but this varies depending on the water year and the availability of surface water. FID deliveries of surface water in 2014 were severely limited due to the ongoing drought conditions in the region. Gallo supplements the FID water with groundwater from three onsite irrigation wells. TDS and nitrate as nitrogen results for one sampling event conducted in November 2010 were presented in the RWD for the three irrigation wells, as summarized in the following table.

Irrigation Water Quality

Constituent	MCL[1]	Units	IW-1	IW-4	IW-8
Nitrate as Nitrogen	10	mg/L	21.1	<2	<2
TDS	500/1000	mg/L	891	143	310

1. MCL = Maximum contaminant level. An MCL shown with a lesser value over a larger value (500/1000) represents the "Recommended" MCL and the "Upper" MCL.

The values from well IW-1 exceed the MCLs for TDS and nitrate as nitrogen, and suggest that IW-1 has been degraded and/or polluted with respect to salts and nitrate as nitrogen, respectively.

43. The land surface in the vicinity of the Winery is generally flat with a slight slope to the southwest. The elevation at the northeast corner of the winery property (southwest corner of Clinton and Fowler Avenues) is about 335 feet above mean sea level while the elevation at the southeast corner of the site is about 325 feet above mean sea level. Natural flow from the northern portion of the Winery property would have ended up in the Mill Ditch, but the fields have been graded, leveled, and bermed so that all storm water stays on site and does not enter the Mill Ditch or other surface water sources.

44. According to Federal Emergency Management Agency maps (Map Numbers 06019C1590H and 06019C1595H); the Winery property is not within a 100-year flood plain.

45. According to the Web Soil Survey published by the United States Department of Agriculture Natural Resources Conservation Service, soils in the vicinity of the Winery and land application areas are predominantly the Atwater sandy loam and Ramona sandy loam. Both soils are described as well drained soils that are "prime farmland if irrigated." The Atwater sandy loam is a Class 2s soil that has moderate limitations that reduce the choice of plants or that require moderate conservation practices. The "s" subclass indicates the soil is limited mainly because it is shallow, droughty, or stony. The Atwater sandy loam is described as having moderate available water capacity and a high capacity to transmit water. The Ramona sandy loam is a Class 1 soil that has few limitations that restrict its use and is described as having low available water capacity and a moderately low capacity to transmit water.

46. The Discharger monitors total nitrogen concentrations in surface soil and presents results from 2009 and 2010 in the RWD. In December 2009, background soil samples had total nitrogen concentrations ranging from 55 to 96 milligrams per kilogram (mg/kg) while total nitrogen concentrations in soil samples collected from within the land application areas ranged from less than 48 mg/kg (the laboratory detection limit) to 800 mg/kg. The highest concentrations were reported in samples collected from the land application areas north of Olive Avenue, in the northeastern land application areas just southwest of the intersection of Clinton and Fowler Avenues. These parcels historically received stillage wastewater and are now proposed for the land application of the anaerobic treatment system treated wastewater. In December 2010, background soil samples contained total nitrogen at concentrations ranging from less than 48 to 76 mg/kg and samples collected from the land application areas ranged from less than 48 mg/kg to 170 mg/kg, much less than the 800 mg/kg reported in 2009 soil sampling.

47. The RWD also reports results of a 2011 deep vadose zone investigation using soil borings at 2 background locations, 4 locations within the land application areas, and 1

soil boring beneath the compost windrow area. The following observations were made based on the dataset:

- The EC and sulfate soil results from samples collected and analyzed from within the land application areas are typically higher than the background locations, indicating the discharge has affected the soil quality at depth.

- The Soil boring SB-6 was advanced within the composting area and the shallow sample results (one-foot bgs) for calcium, magnesium, sodium, potassium, sulfate, and EC are the highest reported for any of the samples analyzed. EC and sulfate are an order of magnitude higher than the other results indicating the shallow soils in the composting area have been affected by the composting operation.

48. The Fresno area is characterized by hot, dry summers and cool winters. The rainy season generally extends from November through March. According to the DWR, the average annual precipitation for the area is about 11.23 inches and the average monthly evaporation is about 65 inches. The maximum annual precipitation for a 100-year rainfall return period is estimated to be about 21 inches.

49. The land use in the vicinity of the Winery is mixed, with industrial facilities to the west and north of the Winery and the land application areas, suburban residential housing along the southern property boundary, and mixed agricultural and rural residential housing units to the east. State Highway 180 bisects the land application areas south of Olive Avenue. The Fresno-Yosemite International Airport is adjacent to the west/northwest of the Winery.

Basin Plan, Beneficial Uses, and Regulatory Considerations

50. The *Water Quality Control Plan for the Tulare Lake Basin, Second Edition*, revised January 2004 (the "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 Board. Pursuant to Water Code section 13263(a), waste discharge requirements must implement the Basin Plan.

51. The Winery and land application areas are in Detailed Analysis Unit (DAU) No. 233, within the Kings Basin hydrologic unit. The Basin Plan identifies the beneficial uses of groundwater in the DAU as municipal and domestic supply (MUN), agricultural supply, industrial service supply, and industrial process supply.

52. The Winery is in the Fresno Hydrologic Area (No. 551.30) of the South Valley Floor Hydrologic Unit, as depicted on hydrologic maps prepared by State Water Resources Control Board in August 1986.

53. The Basin Plan includes a water quality objective for chemical constituents that, at a minimum, require waters designated as MUN to meet the State drinking water MCLs specified in Title 22 of the California Code of Regulations. The Basin Plan recognizes that the Central Valley Water Board may apply limits more stringent than MCLs to ensure that waters do not contain chemical constituents in concentrations that adversely affect beneficial uses.

54. The Basin Plan establishes narrative water quality objectives for Chemical Constituents, Taste and Odors, and Toxicity. The Toxicity objective, in summary, requires that groundwater be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life associated with designated beneficial uses. Quantifying a narrative water quality objective requires a site-specific evaluation of those constituents that have the potential to impact water quality and beneficial uses.

55. The Basin Plan identifies the greatest long-term problem facing the entire Tulare Lake Basin as the increase in salinity in groundwater, which has accelerated due to the intensive use of soil and water resources by irrigated agriculture. The Basin Plan recognizes that degradation is unavoidable until there is a long-term solution to the salt imbalance. Until then, the Basin Plan establishes several salt management requirements, including:

    a. The incremental increase in salt from use and treatment must be controlled to the extent possible. The Tulare Lake Basin Plan effluent limit for EC limits the increase from a point source discharge to a maximum of 500 umhos/cm. When the source water is from more than one source, the EC shall be a weighted average of all sources.

    b. Discharges to areas that may recharge good quality groundwater shall not exceed an EC of 1,000 umhos/cm, a chloride content of 175 mg/L, or boron content of 1.0 mg/L.

56. The Basin Plan allows for an exception to the EC limit for industrial wastewaters when the discharger technically demonstrates that allowing a greater net incremental increase in EC will result in lower mass emissions of salt and in conservation of water, provided that beneficial uses are protected. The RWD did not address the Basin Plan exception related to water conservation for the discharge from the crusher/press, stillage operations, or the anaerobic treatment system, but in November 2014 Gallo provided a review of water conservation measures initiated at the Fresno Winery since 2002 to conserve water usage. Gallo qualifies for the water conservation exception due to various projects it initiated since 2002 saving 35 million gallons of wastewater from being discharged to the land application areas annually that results in about 400,000 pounds of TDS annually not being discharged to the land application areas.

57. Stillage wastewater will only be land applied during periods when maintenance is conducted to the anaerobic treatment system. This Order contains Discharge Prohibition A.6 that allows the direct discharge of untreated stillage wastewater to the land application areas only during maintenance of the anaerobic treatment system and Provision G.11 that requires Gallo to submit a Salinity Management Plan that requires Gallo to evaluate salinity sources in its discharge and provide recommendations for alternatives that will add less salt to the discharge.

58. Quantifying a narrative water quality objective requires a site-specific evaluation of those constituents that have the potential to impact water quality and beneficial uses. The Basin Plan states that when compliance with a narrative objective is required to protect specific beneficial uses, the Central Valley Water Board will, on a case-by-case basis, adopt numerical limitations in order to implement the narrative objective.

59. In the absence of specific numerical water quality limits, the Basin Plan methodology is to consider any relevant published criteria. General salt tolerance guidelines, such as *Water Quality for Agriculture* by Ayers and Westcot and similar references indicate that yield reductions in nearly all crops are not evident when irrigation water has an EC less than 700 umhos/cm. There is, however, an eight- to ten-fold range in salt tolerance for agricultural crops and the appropriate salinity values to protect agriculture in the Central Valley are considered on a case-by-case basis. It is possible to achieve full yield potential with waters having EC up to 3,000 umhos/cm if the proper leaching fraction is provided to maintain soil salinity within the tolerance of the crop.

60. Some salts are plant macronutrients (e.g., nitrogen, potassium, and phosphorus) and the threat to groundwater quality posed by these salts can be minimized through controlled use to irrigate crops at agronomic rates for these nutrients. Because nitrate and nitrate precursors are common constituents in food processing wastewater, either treatment to reduce the nitrogen content or reuse for crop irrigation are important methods to prevent exceedances of the water quality objective for nitrate in groundwater.

61. For some industrial wastewaters, particularly food processing waste, sodium concentrations may be reduced or controlled by changing from sodium-based cleaning solutions (such as sodium hydroxide) to potassium-based solutions (such as potassium hydroxide). Because potassium is a plant nutrient, land application systems can be designed maximize potassium uptake by the crop.

62. Chloride is an anion that moves readily through the soil column with percolation. It will not adsorb to soil as sodium can, and crop uptake of chloride is minimal for most crops. However, plants do take up some chloride and excessive chloride in the soil and/or irrigation water can be toxic to crops. Crop sensitivity to chloride varies greatly, but leaching is often used to control chloride to keep crop land in production. Leaching, whether intentional or not, can degrade groundwater quality and may cause water quality objectives for chloride to be exceeded.

63. Many surface waters and local groundwater supplies have been degraded with salt. In some areas, the high salinity is naturally occurring, but in many areas it is due to the acts of man. In 2006, the Central Valley Water Board, the State Water Board, and stakeholders began a joint effort to address salinity and nitrate problems in the region and adopt long-term solutions that will lead to enhanced water quality and economic sustainability. Central Valley Salinity Alternatives for Long-Term Sustainability (CV-SALTS) is a collaborative basin planning effort aimed at developing and implementing a comprehensive salinity and nitrate management program.

Groundwater Conditions

64. Gallo currently monitors an eleven well groundwater monitoring network around the Winery and land application areas. The Gallo property is roughly one mile wide from east to west (Clovis Avenue to Fowler Avenue) and one and a half miles in length from north to south (Belmont Avenue to Clinton Avenue). MW-1 through MW-3 were installed along the eastern edge of the land application areas and serve as upgradient wells, while MW-4 through MW-8 (including MW-5a and MW-5b) were installed within or along the western edge of the land application areas to serve as downgradient wells. MW-7 was damaged and destroyed in 2002, and MW-8 was installed in 2003 to replace MW-7. Wells MW-18-1 and MW-18-2 were installed offsite to the west and downgradient of the Winery.

65. Regionally, the depth to groundwater has been increasing due to the lack of precipitation over the last several years and increased groundwater pumping. The increasing depth to groundwater has caused MW-4, MW-5, and MW-8 to go dry, and MW-6 had only 1.89 feet of water in the well in September 2014. Gallo replaced MW-5 with wells MW-5a and MW-5b in 2012. Provision G.15 requires Gallo to submit a work plan to replace the currently dry monitoring wells in the network, propose additional groundwater monitoring wells within the land application areas, and includes a time schedule for the wells to be installed within 12 months from the adoption of this Order.

66. The direction of groundwater flow is to the west/southwest and the depth to first encountered groundwater has ranged from about 70 to 110 feet bgs since 2000. The depth to water recorded in the groundwater wells in 2014 ranged from about 88 to 111 feet bgs.

67. The RWD includes a “Background Groundwater Characterization” in Section 5.0 of the RWD. The RWD calculates “background” groundwater concentrations using the 95% Upper Confidence Limit (UCL) statistical methods. The “background” groundwater concentrations were calculated using analytical results from Gallo’s onsite groundwater monitoring well network, wells MW-1 through MW-3, and the results of select constituents of concern are in included the following table.

RWD "BACKGROUND GROUNDWATER CHARACTERIZATION"

	EC	TDS	Total Nitrogen	Sulfate	Sodium	Chloride
Units	umhos/cm	mg/L	mg/L	mg/L	mg/L	mg/L
Maximum	3,300	870	190	212	54	96
Mean	678	452	15	47	28	15
UCL[1]	825	463	18	51	28	16

1. UCL = Upper Confidence Limit

The three upgradient wells have different water qualities. MW-2 is adjacent to irrigation canal carrying high quality surface water that dilutes the monitoring results from the well, while MW-3 is downgradient of a former dairy and salinity and nitrate as nitrogen results from MW-3 were considerably higher than the other two wells. The results in MW-1 are intermediate of the other two wells, and are consistent with the land use upgradient of the Winery. The results do not represent background groundwater quality unaffected by outside sources, but the data can be used to assess upgradient groundwater quality.

68. As discussed in Finding 74, the results from MW-3 are decreasing and a result is the average background values have decreased. The averages using data from 2011 through May 2014 for the three upgradient wells are shown in the following table. All of the maximum values decreased and all of the averages decreased with the exception of chloride, which remained the same.

UPGRADIENT GROUNDWATER RESULTS - 2011 through May 2014

	EC	TDS	Total Nitrogen	Sulfate	Sodium	Chloride
	umhos/cm	mg/L	mg/L	mg/L	mg/L	mg/L
MW-1	766	491	9.5	39	44	16
MW-2	184	144	3.2	7	8	2.9
MW-3	855	565	22.2	59	28	24
Maximum	980	660	27.2	70	30	32
Mean	**596**	**401**	**8.1**	**35**	**26**	**15**

The values presented in the table above are a more current assessment of upgradient groundwater quality. While there are significant differences in the water quality in each well, the findings of the updated upgradient groundwater characterization can be used to assess groundwater quality upgradient of the Winery property. The mean values presented in the table above represent the average upgradient groundwater quality and are similar in concentration to the values observed in upgradient MW-1.

69. A search of the Water Quality Portal web site shows numerous wells in the vicinity of the winery (47 shown within a five mile radius), but only five are generally upgradient of the Winery and the land application area. Total depths of the five wells were reported to range from about 102 to 660 feet below the ground surface (bgs), with only two having total depths that would be near first encountered groundwater. USGS well 364521119411401 was listed as having a depth of 102 feet bgs and a depth to water of 48 feet bgs during one sampling event in July 1960. The well is or

was within Gallo's current land application area south of Olive Avenue. The data is summarized in the following table.

USGS WELL 364521119411401

EC	TDS	Nitrate as Nitrogen	Sulfate	Sodium	Chloride
umhos/cm	mg/L	mg/L	mg/L	mg/L	mg/L
274	210	5.2	16	11	3.6

The reported water quality in 1960 was very good, and better than the water quality shown in wells MW-3 or MW-8 that are south of Olive Avenue currently.

70. Another USGS well, well 364356119374001, was reported to be 100 feet deep and is about 3.5 miles southeast and is generally upgradient to cross gradient of the Winery. Data for this well was available from 1993 and from 2001 and is shown in the following table.

USGS WELL 364356119374001

Date	EC	TDS	Nitrate as Nitrogen	Sulfate	Sodium
	(umhos/cm)	(mg/L)	(mg/L)	(mg/L)	(mg/L)
9/20/93	533	373	5.4	87	22
8/23/01	725	493	8.3	na	23

The data indicates an increase in EC from 1993 to 2001. The results are similar to the mean values presented for upgradient water quality and similar to the results observed from upgradient MW-1.

71. The RWD includes groundwater analytical results from 1994 through 2011. The following table includes the data from the RWD (2009 – 2011) and more recent results for averages of select constituents from 2012 through 2013 (MW-5a and MW-5b since September 2012) that are summarized as follows. Values that exceed the State primary or secondary MCLs for the given parameters are shown in bold.

GROUNDWATER QUALITY

	EC	TDS	Nitrate as Nitrogen	Sulfate	Sodium	Chloride
Wells	(umhos/cm)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)
MW-1	764	490	8.7	38	44	16
MW-2	178	140	2.2	6.6	7.7	3.2
MW-3	829	**544**	**21**	57	28	24
MW-4	**1475**	**996**	**41**	63	67	21
MW-5	**1457**	**1071**	**58**	42	71	37
MW-5a	**1080**	**718**	**24**	35	93	31
MW-5b	727	477	**15**	33	58	18
MW-6	**1625**	**1075**	**47**	106	42	55
MW-8	**1173**	**824**	**22**	135	71	33
MW-18-1	682	452	2.5	36	39	40

MW-18-2	**1236**	**848**	**24**	89	47	48
MCL[1]	900/1600	500/1000	10	250	na	250

1. The MCLs for EC and TDS are shown with a smaller value placed over a larger value (500/1000). The first number shown in the "recommended" MCL and the second number shown below is the "upper" MCL.

72. The groundwater results illustrate that the discharge of wastewater contributes to and/or causes the degradation/pollution of groundwater in the downgradient wells. The highest EC and TDS results are observed in downgradient wells MW-4, MW-5, and MW-6, with the highest averages observed in MW-6. MW-6 is at the southwest corner of the northern land application areas and is downgradient of the land application areas and the composting facility. The historical results from MW-6 for EC and TDS show a dramatic increase from 1994 until about 2006, and stable to slightly increasing results since 2006, after land application area management practices were improved. The average EC and TDS results from MW-6 in 2013 were 1,675 umhos/cm and 1,100 mg/l, respectively. While the EC and TDS results in MW-4 also historically have exceeded the MCLs, the results have been generally lower than those observed in MW-5 or MW-6. However, concentrations in MW-4 have increased recently with the average EC and TDS results from MW-4 in 2013 being 1,675 umhos/cm and 1,100 mg/l, respectively (the same values as observed in MW-6). The composting pad with a compacted but unlined soil base that uses seven to nine million gallons annually of ion exchange regenerate for moisture control of the compost is about 1,200 feet upgradient of MW-6. The data suggest that the composting facility may be contributing to the poor groundwater quality in MW-6. Provision G.14 requires Gallo to demonstrate the composting facility satisfies Title 27 requirements for operations of a composting facility, or to demonstrate using other methods (groundwater monitoring wells) that the composting facility is exempt from Title 27 requirements and that it's not causing or contributing to the underlying groundwater pollution.

73. Nitrate as nitrogen results exceed the MCL of 10 mg/L in all downgradient wells except MW-18-1, which is set next to a storm water retention basin. Upgradient MW-3 exceeds the MCL as well, but nitrate as nitrogen concentrations in this well have decreased from results as high as 52 mg/L back in 1996 to a low of 15.8 in August 2012.

74. Recent results from MW-3 and MW-8 indicate decreasing trends of EC, TDS, nitrate as nitrogen, and sulfate. MW-3 is about three quarters of a mile downgradient of a former dairy (Belmont Farms) that discontinued operations in 1994. Results of EC, TDS, nitrate as nitrogen, and sulfate results began to show decreasing trends around 2008, about 14 years after the dairy ceased operations. Additionally, ion exchange regenerate from the wine making process was historically discharged to land application areas (Block 18) in the area upgradient of MW-8 degrading groundwater, but the direct discharge of the ion-exchange regenerate to the land application areas in this area was discontinued in 1994. The discharge of ion exchange regenerate was discontinued in 1994, and downgradient MW-8 began to show decreasing EC,

TDS, and sulfate results from when it was installed in 2004, 10 years after ceasing the discharge to Block 18.

75. In its 30 January 2012 *Phase I Field Investigation Report*, Kennedy/Jenks indicates it will take "22 to 36 years" for applied water to reach the groundwater, and it will take another "17 to 165" years for the groundwater then to move laterally beneath the site. However as described in Finding 74, decreasing concentrations of sulfate and EC in wells MW-3 and MW-8 indicate it takes far less time for wastewater/irrigation water to move downward to the groundwater table, and then for the groundwater to move laterally under the site. Gallo began discharging wastewater treated by the anaerobic treatment system to the land application areas in 2007 (seven years ago). Given the time it took to observe changes in MW-3 and MW-8, groundwater quality should begin to show improvements in the downgradient monitoring wells as predicted by the Kennedy/Jenks Model within ten years at the most. Additional groundwater monitoring wells in the middle of the land application areas between the upgradient and downgradient monitoring wells (one north and one south of the composting facility) would provide a method of assessing if the Model's predictions for groundwater quality are accurate. This Order contains Provision G.15 that requires Gallo to submit a work plan to replace groundwater monitoring wells that have or are going dry and to install additional groundwater monitoring wells to assess groundwater quality beneath the land application areas.

76. The results of the sampling of recently installed wells MW-5a and MW-5b indicate decreasing concentrations with depth. However, the average EC, TDS, and nitrate as nitrogen results in MW-5a are all still in excess of the MCLs for EC, TDS, and nitrate as nitrogen. Groundwater quality improves in the deeper well MW-5b, with only nitrate as nitrogen being detected in excess of the MCL. The well cluster at MW-5 has helped define the vertical extent for EC and TDS, but nitrate as nitrogen results in MW-5b are still higher than the MCL of 10 mg/L, and the vertical extent of the pollution with respect to nitrate as nitrogen in groundwater remains undefined. The results from MW-18-1 are lower than those reported for MW-18-2 and MW-8. This is likely due to MW-18-1 being adjacent a storm water recharge basin that dilutes the results in MW-18-1.

77. Additional groundwater results for select constituents are presented in the following table:

GROUNDWATER QUALITY

Wells	Bicarbonate mg/L	Alkalinity mg/L	Potassium mg/L	Phosphorus mg/L	Calcium mg/L
MW-1	415	342	4.0	0.6	67
MW-2	92	75	1.6	0.13	16
MW-3	324	267	4.8	0.14	83
MW-4	762	625	9.0	2.0	148
MW-5	746	610	7.9	2.1	147
MW-5a	522	428	9.6	Nd	83
MW-5b	327	270	4.5	0.5	55

MW-6	689	565	8.8	2.7	173
MW-8	488	400	6.7	0.16	108
MW-18-1	332	274	5.8	0.13	62
MW-18-2	601	493	8.3	0.13	136

The results indicate higher concentrations of all five of the constituents in the downgradient wells than in the upgradient wells. The results from MW-4, MW-5, and MW-6 are about twice that of upgradient well MW-1. This indicates discharge has degraded and/or contributed to the degradation of the underlying groundwater with respect to bicarbonate, alkalinity, potassium, phosphorus, and calcium.

78. The City of Fresno depends upon groundwater for its drinking water source. City of Fresno Well 155-2, which is downgradient of Gallo's discharge, is still operational, but since about 2000 it has had to be blended with groundwater from another well to meet the Primary MCL of 10 mg/L for nitrate as nitrogen. The City of Fresno has estimated that increasing nitrate as nitrogen concentrations may result in the loss of Well 84, which is west of the discharge area, within the next year. Bakman Water Company also has wells west and southwest of the Winery, three of which were shut down because of nitrate as nitrogen pollution that may be due, at least in part, to Gallo's discharge of Winery wastewater to the land application areas. The City of Fresno has water supply wells with elevated nitrate as nitrogen concentrations as much as two miles downgradient of the Gallo Fresno Winery and Gallo's discharge of wastewater to the land application areas has contributed, along with other sources, to the nitrate as nitrogen concentrations in these downgradient water supply wells. One of Gallo's own irrigation wells (IW-1) has an average nitrate as nitrogen result of 21.1 mg/L (Finding 42), which exceeds the Primary MCL of 10 mg/L.

Report of Waste Discharge – Vadose Zone/Groundwater Model

79. The RWD includes a Model to project salt, nutrient, and BOD loading rates from the proposed discharge. The RWD proposes that the land application areas will either be cropped with vineyards and a cover crop, or double-cropped with Sudan grass and winter forage crops. The Model indicates salt loadings will range from 758 to 2,631 lbs/ac/yr. The Model relies on crops removing from about 550 to up to 1,100 lbs/ac/yr of salt, which results in crop uptake of 32 to 45 percent of the salt applied. The Model assumes that the percolate after mixing with the upgradient groundwater (TDS = ~ 463 mg/L), will have a TDS of about 458 mg/L, which is about the same but slightly better than the upgradient groundwater value of 463 mg/L.

80. Kennedy/Jenks provided an update of the Model in November 2014 showing that the percolate after mixing with the upgradient groundwater will have a TDS that ranges from about 510 to 588 mg/L depending upon the source of irrigation water used to supplement the wastewater used for irrigation.

81. Based on the Model update, the proposed discharge will add between 20 and 354 lbs/ac/yr of nitrogen to the land application areas. The proposed crops should

remove from 150 to 500 lbs/ac/yr of nitrogen. The land application areas with cropped vineyards and a cover crop (up to 150 lbs/ac/yr removal) will receive loadings from 20 to 61 lbs/ac/yr, while the land application areas cropped with Sudan Grass and a winter forage crop (up to 500 lbs/ac/yr removal) will receive loadings of 147 and 354 lbs/ac/yr. The estimated nitrogen loads are less than crop nitrogen requirements and if applied at agronomic rates for the crops grown, the potential for the discharge to further degrade the underlying groundwater with respect to nitrogen will be low.

82. The recalculated BOD loading rates of the Model indicate daily cycle BOD loading on a seven day cycle will range from 5 to 242 lbs/ac/day.

Land application areas	Acres	Crops	Cycle (lbs/ac/day)
No.1 – South of Olive Avenue	59	Sudan/Forage	242
No.2 – South of Olive Avenue	12	Vineyard/cover crop	86
No.3 – North of Olive Avenue	273	Vineyard/cover crop	5.0
No.4 – North of Olive Avenue	89	Sudan/Forage	147

83. The cycle average of 242 lbs/ac/day could cause organic overloading of the land application area if not properly managed. This Order contains Land Application Area Specification D.3 that limits the daily cycle average BOD loading rate to 250 lbs/ac/day. This Order also requires Gallo to conduct soil monitoring to ensure these loading rates are protective of groundwater and includes Provision G.13 that requires Gallo to submit a work plan and time schedule for the installation and sampling of a Vadose Zone Monitoring System around parcels receiving wastewater at BOD loading rates greater than 150 lb/ac/day on a cycle average.

84. The Model uses an average TDS of 61 mg/L for the TDS of the irrigation water delivered by FID, but Gallo may also use other irrigation water sources such as the three onsite irrigation wells. In times of low precipitation, FID is limited to how much water it can distribute to its users and Gallo uses onsite irrigation wells. The TDS results from these wells range from about 140 mg/L to nearly 900 mg/L. The updated Model uses a value of 141 mg/L for TDS, but that is the lowest TDS result of the three wells. If the other irrigation wells are used, the salt load would increase accordingly. The Model also used an average FDS value of 1,112 mg/L for the crusher/press discharge to the land application areas south of Olive Avenue. Subsequent data submitted by Gallo indicates the average FDS of the crusher/press discharge is 1,759 mg/L. Actual salt loadings to the land application areas may be higher than modeled and the discharge must be managed carefully (spread evenly over the entire acreage at agronomic rates) to ensure water quality objectives are not exceeded.

Antidegradation

85. State Water Resources Control Board Resolution 68-16 ("Policy with Respect to Maintaining High Quality Waters of the State") (hereafter Resolution 68-16) prohibits degradation of groundwater unless it has been shown that:

    a. The degradation will not unreasonably affect present and anticipated future beneficial uses;

    b. The degradation does not result in water quality less than that prescribed in State and regional policies, including violation of one or more water quality objectives;

    c. The discharger employs best practicable treatment or control (BPTC) to minimize degradation; and

    d. The degradation is consistent with the maximum benefit to the people of the state.

86. Constituents of concern that, when discharged to the land application areas, have the potential to cause degradation of high quality waters include, in part, organics, inorganics, nutrients, and salts.

    a. As described in Finding 34, application of organic materials (as measured by BOD) at excessive rates can cause anaerobic conditions that result in nuisance odor conditions dissolution and leaching of some metals (primarily iron, manganese, and arsenic) to groundwater. Organic overloading can also cause increases in groundwater alkalinity that can degrade groundwater quality. Historic discharges at Gallo have caused some reducing conditions and increases in groundwater salinity associated with increases in alkalinity. To address organic loading, Gallo installed the anaerobic treatment system to treat its general process and stillage wastewater in 2007. The BOD of the general process water is unknown, but the BOD in the stillage wastewater averages 6,559 mg/L. The BOD of the anaerobic treatment system discharge averages about 400 mg/L during the crush season and about 173 mg/L the remainder of the year. The treatment system has resulted in a significant reduction in BOD loading to the land application areas by reducing the concentration of the waste applied and by allowing Gallo to discharge a significantly larger portion of its discharge to the Fresno WWTF. BOD loading from the anaerobic treatment system discharge will add from five to 147 lbs/ac/day to the land application areas north of Olive Avenue. BOD is not currently monitored in the crusher/press discharge, but the RWD indicates that BOD loading from the crusher/press discharge will add from about 89 to 242 lbs/ac/day to the land application areas south of Olive Avenue. BOD loading at 250 lbs/ac/day is far less than what was historically authorized (no limits previously) and Gallo will employ best management practices that include even application over the entire land application area, application at agronomic rates, application with appropriate resting periods (minimum of seven days) between applications, and

supplementing with fresh irrigation water during the majority of the year. As authorized by this Order, the discharges of organic materials to the land application areas are not expected to cause or contribute to groundwater exceedances of applicable water quality objectives or to adversely affect the beneficial uses of groundwater.

b. For nitrogen, groundwater up-gradient of the site is of generally good quality with respect to nitrate as nitrogen as seen in Finding 68 with an average nitrate as nitrogen concentration of about 8.1 mg/L for the three upgradient wells. However, groundwater in and around the Winery contains nitrate as nitrogen in excess of the primary MCL.

   In order to ensure that the discharge will not cause or contribute to groundwater nitrate as nitrogen degradation/pollution, this Order requires that nitrogen loading to the land application areas be at reasonable agronomic rates, and requires the Discharger to prepare a Nutrient and Wastewater Management Plan. The application of wastewater and fertilizers at reasonable agronomic rates for nitrogen will preclude further degradation/pollution of groundwater for nitrate as nitrogen, and will result in nitrogen as nitrate concentration in groundwater of less than 10 mg/L.

c. For salinity, the average effluent EC and TDS of Gallo's discharges exceed the background groundwater quality for the area. Gallo's diversion of various waste streams for water conservation and/or to the Fresno WWTF has reduced the annual salt load to the land application area by about 400,000 pounds of salt (TDS). Discharges will be diluted with irrigation water reducing their effect on underlying groundwater. Modeling results by Kennedy/Jenks indicate that groundwater TDS, after dilution with irrigation water and groundwater underflow may reach as high as 588 mg/L. This is above the Recommended Secondary Maximum Contaminant Level for TDS of 500 mg/L, but below the Upper Secondary MCL of 1000 mg/L. The model assumes significant salt uptake by plants, uses high quality irrigation water that may not always be available, and a fixed dissolved solids value that is less than that submitted with more recent data. As a result, the degradation with TDS may be more than modeled; however, with proper management the discharge should not cause groundwater to exceed the Upper Secondary MCL for TDS of 1000 mg/L or to adversely effect the beneficial uses of groundwater. To ensure that this is the case, this Order requires soil, vadose zone, and groundwater monitoring. Provision G.11 also requires Gallo to submit a Salinity Management Plan to evaluate salinity sources in its discharge.

87. Historically, Gallo's discharge of winery wastewater has contributed to and/or caused groundwater degradation/pollution in the vicinity of the Winery and affected beneficial uses, but the Kennedy/Jenks Model predicts that by discharging the waste as proposed in the RWD, groundwater quality will improve over current conditions. Provision G.15 requires Gallo to assess groundwater quality beneath the central

portion of the land application areas to assess if Kennedy/Jenks predictions that the discharge of wastewater is actually improving groundwater quality beneath the facility.

88. Discharges from the composting facility may not meet the antidegradation requirements described in Finding 85.a.-d. This Order includes a compliance schedule that requires Gallo to demonstrate that the discharges to and from its composting facility meet 84.a.-d above and to comply with the requirements of California Code of Regulations, title 27 (hereafter Title 27), or qualify for exemption therefrom.

Treatment and Control Practices

89. The Discharger provides or will provide, for its discharges of winery wastewater to the land application areas, as required by this Order, treatment and control of the discharge that incorporates:

- Elimination of the direct discharge of ion exchange regenerate to the land application areas south of Olive Avenue;
- Source control strategies to reduce use of cleaning chemicals which reduce salt load to wastewater system and ultimately to the land application areas;
- Reuse of condensate water from the grape juice concentrated process;
- Removal of solids (grape stems, seeds, skins, etc.) and sediment from the waste stream;
- Additional filtering (graver Membranes) to filter stillage effluent;
- Appropriate solids disposal practices;
- Construction of the anaerobic treatment system to improve process water quality;
- Reduction (~50%) of land applied wastewater;
- Implementation of a Salinity Management Plan;
- Implementation of a Nutrient Management Plan; and
- Comprehensive Monitoring.

Antidegradation Conclusions

90. This Order establishes terms and conditions to ensure that the authorized discharge from the Winery will not excessively degrade groundwater, contribute to existing

pollution, or unreasonably affect present and anticipated future beneficial uses of groundwater.

91. The provisions of this Order require the Discharger to implement treatment or control measures listed in Finding 89. These Treatment and Control Practices are reflective of BPTC of the discharge.

92. Economic prosperity of valley communities and associated industry is of maximum benefit to the people of the State, and therefore sufficient reason exists to accommodate growth and limited groundwater degradation around the Winery, provided that the terms of the Basin Plan are met. Gallo aids in the economic prosperity of the region by directly employing over 250 workers, it provides incomes for numerous surrounding farmers (estimated $210 million annually on local grape purchases) and associated trucking firms, and provides a tax base for local and county governments. Gallo also contributes over $100,000 annually to educational and charitable causes in the Fresno area. This Order does authorize degradation of groundwater for salinity, but this Order is expected to improve groundwater quality and protect beneficial uses. Degradation authorized herein is to the maximum benefit to the people of the state.

Other Regulatory Considerations

93. Based on the threat and complexity of the discharge, the facility is determined to be classified as 1A as defined below:

    a. Category 1 threat to water quality: “Those discharges of waste that could cause the long-term loss of a designated beneficial use of the receiving water. Examples of long-term loss of a beneficial use include the loss of drinking water supply, the closure of an area used for water contact recreation, or the posting of an area used for spawning or growth of aquatic resources, including shellfish and migratory fish.”

    b. Category A complexity, defined as: “Any discharge of toxic wastes; any small volume discharge containing toxic waste; any facility having numerous discharge points and groundwater monitoring; or any Class 1 waste management unit.”

94. California Code of Regulations, title 27 (hereafter Title 27) contains regulatory requirements for the treatment, storage, processing, and disposal of solid waste, which includes designated waste, as defined by Water Code section 13173. However, Title 27 exempts certain activities from its provisions. The Winery contains treatment, processing, storage facilities, and agricultural wastewater land application areas. Some discharges regulated by this Order are exempt from Title 27 pursuant to a provision that exempts wastewater under specific conditions. This exemption, found at Title 27, section 20090, is described below:

(b) Wastewater – Discharges of wastewater to land, including but not limited to evaporation ponds, percolation ponds, or subsurface leachfields if the following conditions are met:

(1) The applicable regional water quality control board has issued WDRs, reclamation requirements, or waived such issuance;

(2) The discharge is in compliance with applicable water quality control plan; and

(3) The wastewater does not need to be managed according to Chapter 11, Division 4.5, Title 22 of this code as a hazardous waste.

95. The discharge of winery wastewaters as described in Finding 10 to the land application areas authorized herein and the treatment and storage facilities associated with the discharge of winery wastewater to the land application areas and/or the Fresno WWTF, are exempt from the requirements of Title 27 section 20090(b) because:

a. The Central Valley Water Board is issuing WDRs,

b. Following completion of the improvements required by this Order, the discharge will be in compliance with the Basin Plan, and;

c. The treated effluent discharged to the land application areas does not need to be managed as hazardous waste.

96. The discharge of untreated wastewater (ion exchange regenerate) to the 85-acre composting facility and therefrom to the land application areas, may meet the requirements of Title 27 section 20090(b)(1) and/or section 20090(b)(3), but as the composting pad is unlined, wastewater, leachate, and storm water mixed with the ion exchange regenerate, have the potential to percolate to the underlying groundwater. Groundwater downgradient of the composting facility contains EC and TDS at levels that exceed the Upper MCL of 1,600 umhos/cm and 1,000 mg/L, respectively. The highest average groundwater EC and TDS values are observed from MW-6, which is directly downgradient of composting facility. The discharge of waste at the composting facility does not appear to comply with the Tulare Lake Basin Plan, or all of the Title 27 requirements. Provision G.14 requires Gallo to demonstrate it satisfies the Title 27 requirements for operations at the composting facility, or to demonstrate that the groundwater quality in the vicinity of the composting facility is not being degraded by composting facility activities.

97. The statistical data analysis methods of Title 27, section 20415(e) may be appropriate for determining whether the discharge complies with groundwater limitations specified in this Order.

98. The Discharger is not required to obtain coverage under a National Pollutant Discharge Elimination System General Industrial Storm Water Permit for the Winery because all storm water runoff is retained onsite and does not discharge to a water of the United States.

99. Water Code section 13267(b) states:

> 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.

100. The technical reports required by this Order and the attached Monitoring and Reporting Program R5-2015-____ are necessary to ensure compliance with these waste discharge requirements. The Discharger owns and operates the facility that discharges the waste subject to this Order.

101. The California Department of Water Resources sets standards for the construction and destruction of groundwater wells (hereafter DWR Well Standards), as 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 used to monitor the impacts of wastewater storage or disposal governed by this Order.

102. The action to adopt waste discharge requirements for this existing facility is exempt from the provisions of the California Environmental Quality (CEQA), in accordance with the California Code of Regulations, title 14, section 15301.

103. 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.

104. In compliance with Water Code section 106.3, it is the policy of the State of California that every human being has the right to safe, clean, affordable, and accessible water adequate for human consumption, cooking, and sanitary purposes. This order promotes that policy by requiring discharges to meet maximum contaminant levels designed to protect human health and ensure that water is safe for domestic uses.

Public Notice

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

106. 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.

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

IT IS HEREBY ORDERED that Order 94-103 is rescinded except for purposes of enforcement, and, pursuant to Water Code sections 13263 and 13267, E. & J. Gallo Winery, its agents, successors, and assigns, in order to meet the provisions contained in Division 7 of the Water Code and regulations adopted thereunder, shall comply with the following:

A. Discharge Prohibitions

1. Discharge of wastes to surface waters or surface water drainage courses is prohibited.

2. Bypass of untreated wastes or partially treated wastes, except as allowed by Provision E.2 of Standard Provisions and Reporting Requirements for Waste Discharge Requirements, dated 1 March 1991, is prohibited.

3. Discharge of hazardous wastes, as that term is defined in California Code of Regulations, title 22, section 66261.1et seq., is prohibited.

4. Discharge of wastewater in a manner or location other than that described in the report of waste discharge and herein is prohibited.

5. The discharge of wastewater to a septic system is prohibited.

6. The direct discharge of stillage wastewater not treated in the anaerobic treatment system to the land application areas is prohibited except when the anaerobic treatment system has been taken out of operation for maintenance.

B. Effluent Limitations

1. Discharge of wastewater from all sources to the land application areas shall not exceed an annual flow of 54.2 million gallons.

C. Discharge Specifications

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

2. Wastewater treatment, storage, and disposal shall not cause pollution or a nuisance as defined by Water Code section 13050.

3. The discharge shall remain within the permitted waste treatment/containment structures and land application areas at all times.

4. The Discharger shall operate all systems and equipment to optimize the quality of the discharge.

5. All conveyance, treatment, storage, and disposal systems shall be designed, constructed, operated, and maintained to prevent inundation or washout due to floods with a 100-year return frequency.

6. Objectionable odors shall not be perceivable beyond the limits of the property where the waste is generated, treated, and/or discharged at an intensity that creates or threatens to create nuisance conditions.

7. Wastewater treatment, storage, and conveyance systems shall have sufficient capacity to accommodate allowable wastewater flow, design seasonal precipitation, and ancillary inflow and infiltration during the winter while ensuring continuous compliance with all requirements of this Order. 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.

8. Storage of residual solids, including pomace and/or diatomaceous earth on areas not equipped with means to prevent storm water infiltration, or a paved leachate collection system is prohibited.

9. Application of pomace and/or diatomaceous earth to land application areas is prohibited.

D. Land Application Area Specifications

1. For the purposes of this Order, “land application areas” refers to the discharge areas described in Finding 14.

2. Application of waste constituents to the land application areas shall be at reasonable agronomic rates to preclude creation of a nuisance and unreasonable degradation of groundwater, considering the crop, soil, climate, and irrigation management system. The annual nutritive loading of the land application areas, including the nutritive value of organic and chemical fertilizers and of the wastewater and nutrients in applied irrigation water and available in the root zone shall not exceed the annual crop demand.

3. The discharges to the land application areas will not exceed a BOD daily cycle average loading rate of 250 lbs/ac/day at any time. Compliance with this limit

shall be determined by using the average of the last months (twice-monthly sampling frequency) effluent BOD monitoring results.

4. Crops shall be grown within the land application areas. Crops shall be selected based on nutrient uptake, consumptive use of water, and irrigation requirements to maximize crop uptake of waste constituents.

5. The Discharger shall ensure that water, BOD, and nitrogen are applied and distributed uniformly across each land application area field. The Discharger shall implement changes to the irrigation system and/or operational practices as needed to ensure compliance with this requirement.

6. The Discharger shall maximize the use of available land application areas to minimize waste constituent loading rates.

7. Any irrigation runoff shall be confined to the land application areas and shall not enter any surface water drainage course or storm water drainage system.

8. The perimeter of the land application areas shall be graded to prevent ponding along public roads or other public areas and prevent runoff onto adjacent properties not owned or controlled by the Discharger.

9. The volume of wastewater applied to the land application areas on any single day shall not exceed reasonable agronomic rates based on the vegetation grown, pre-discharge soil moisture conditions, and weather conditions.

10. Hydraulic loading of wastewater and supplemental irrigation water including precipitation shall be at reasonable agronomic rates designed to:

    a. Maximize crop nutrient uptake;

    b. Maximize breakdown of organic waste constituents in the root zone; and

    c. Minimize the percolation of waste constituents below the root zone.

11. The irrigation with wastewater shall be managed to minimize erosion within the land application areas.

12. The land application areas shall be managed to prevent breeding of mosquitoes. In particular:

    a. All applied irrigation water must infiltrate completely within 48 hours;

    b. Tailwater ditches shall be maintained essentially free of emergent, marginal, and floating vegetation; and

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

13. No physical connection shall exist between wastewater and any domestic water supply or domestic well, or between wastewater piping and any irrigation well that does not have an air gap or reduced pressure principle device.

14. 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.

E. Solids Specifications

Solids as used in this document, means the residual solids, including grape stems and pomace, diatomaceous earth, semisolid, and liquid residues removed during grape processing, wine making, or cleaning of wine making equipment.

1. Any handling and storage of residual solids shall be temporary, and controlled and contained in a manner that minimizes leachate formation and precludes infiltration of waste constituents into soils in a mass or concentration that will violate Groundwater Limitations of this Order.
2. Collected screenings and other solids removed from the liquid waste shall be transported to and used in Gallo's on-site composting facility, which is regulated by Fresno County, or hauled off-site by a licensed contractor. The volume of the compost generated shall be reported annually as required in MRP R5-2015-____.
3. Any proposed change in solids disposal practices shall be reported to the Executive Officer in writing at least 90 days in advance of the change.

F. Groundwater Limitations

Release of waste constituents from any treatment unit, delivery system, storage areas, or Land Application Area associated with the Facility shall not cause or contribute to groundwater containing concentrations of constituents identified below, or natural background quality, whichever is greater.

1. Nitrate as nitrogen of 10 mg/L.

2. EC of 900 umhos/cm.

3. For constituents identified in Title 22, the MCLs established therein.

G. Provisions

1. The Discharger shall comply with the Standard Provisions and Reporting Requirements for Waste Discharge Requirements, dated 1 March 1991 (Standard Provisions), which are a part of this Order.

2. The Discharger shall comply with Monitoring and Reporting Program (MRP) R5-2015-____, which is part of this Order, and any revisions thereto as adopted by the Central Valley Water Board or approved by the Executive Officer.

3. The Discharger shall keep at the Facility office copies of this Order including its MRP, Information Sheet, attachments, and Standard Provisions, for reference by operating personnel. Key operating personnel shall be familiar with its contents.

4. The Discharger must at all times properly operate and maintain its respective facilities and systems of treatment and control (and related appurtenances) that are installed or used to achieve compliance with the conditions of this Order. Proper operation and maintenance also include 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 only when the operation is necessary to achieve compliance with the conditions of the Order.

5. All technical reports and work plans required herein that involve planning, investigation, evaluation, or design, or other work requiring interpretation and proper application of engineering or geologic sciences, shall be prepared by or under the direction of a person registered to practice in California pursuant to California Business and Professions Code Sections 6735, 7835, and 7835.1. As required by these laws, completed technical reports and work plans must bear the signature(s) and seal(s) of the registered professional(s) in a manner such that all work can be clearly attributed to the professional responsible for the work. All reports required herein are required pursuant to Water Code section 13267.

6. The Discharger must comply with all conditions of this Order, including timely submittal of technical and monitoring reports as directed by the Executive Officer. Accordingly, the Discharger shall submit to the Central Valley Water Board on or before each report due date the specified document or, if an action is specified, a written report detailing evidence of compliance with the date and task. If noncompliance is being reported, the reasons for such noncompliance shall be stated, plus an estimate of the date when the Discharger will be in compliance. The Discharger shall notify the Central Valley Water Board by letter 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.

7. In the event of any change in control or ownership of land or waste treatment and storage facilities presently owned or controlled by the Discharger, the Discharger shall 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.

8. To assume operation 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 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 California 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.

9. The Discharger shall submit the technical reports and work plans required by this Order for Central Valley Water Board staff consideration and incorporate comments they may have in a timely manner, as appropriate.

10. 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.

11. **By (6 months from the adoption of this order)**, the Discharger shall submit a Salinity Management Plan, with salinity source reduction goals and an implementation time schedule for Executive Officer approval. The control plan shall identify any additional methods that could be used to further reduce the salinity of the discharge to the maximum extent feasible, include an estimate on load reductions that may be attained through the methods identified, and provide a description of the tasks, cost, and time required to investigate and implement various elements in the salinity control plan. The Discharger shall implement the plan in accordance with the approved schedule.

12. **By (6 months from the adoption of this order)**, the Discharger shall submit a Nutrient Management Plan for the land application areas for Executive Officer approval. At a minimum the Plan must include procedures for monitoring the land application areas including daily records of wastewater applications and acreages, an action plan to deal with objectionable odors and/or nuisance conditions, a discussion on blending of wastewater and supplemental irrigation water, supporting data and calculations for monthly and annual water and nutrient balances, and management practices that will ensure wastewater, irrigation water, commercial fertilizers and soil amendments are applied at agronomic rates.

13. **By (6 months from the adoption of this order)**, the Discharger shall submit a work plan and time schedule, subject to Executive Officer approval, for the

installation and sampling of a Vadose Zone Monitoring System for any land application area that receives wastewater with a cycle average of 150 lbs/ac/day or more. The System shall be designed to measure the quality of percolate beneath land application areas and determine whether the discharge will degrade, or contribute to continued degradation/pollution, of underlying groundwater.

14. Regarding discharges to and from the composting facility, the Discharger shall comply with Discharge Specifications C.1, C.2, and C.8 and Groundwater Limitations F.1, F.2, and F.3, and the requirements of California Code of Regulations, Title 27, in accordance with the following compliance schedule:

Task	**Task Description**	**Due date**
a.	Submit a work plan and proposed schedule to characterize all discharges to and from the composting facility and evaluate whether they are consistent with the Basin Plan, the State Antidegradation Policy, and requirements of WDRs Order 2015-____ such that they qualify for exemption to the requirements of California Code of Regulations, Title 27. The work plan and schedule shall be subject to the approval of the Executive Officer.	**(1 year from the adoption of this Order)**
b.	Implement the approved work plan.	**In accordance with the approved schedule, but by no later than (2 years from the adoption of this Order)**
	Submit the results of the characterization and evaluation with either: i. A demonstration with appropriate supporting evidence that the composting facility operations meet the requirements for exemption from Title 27, section 20090(b), or ii. A work plan and schedule for implementing modifications to the composting facility and/or composting facility operations that would qualify it for exemption from Title 27, section 20090(b). The work plan shall provide for compliance with the California Environmental Quality Act and include a Report of Waste Discharge for any proposed structural modifications to the composting facility, or iii. A Report of Waste Discharge with a schedule for constructing modifications to the composting facility to meet the containment requirements of Title 27.	

c.	Begin implementation of b.i., b.ii., or b.iii, as approved by the Executive Officer.	**In accordance with the approved schedule but by no more than 3 years from the approval of b.i., b.ii., or b.iii.**
d.	Submit a technical report demonstrating complete implementation of the approved work plan and schedule. Upon receipt of written concurrence of Executive Officer approval of the technical report, this provision shall be considered satisfied.	**In accordance with the approved schedule, but by no later than (5 years from adoption of this Order)**

15. The Discharger shall at all times maintain an operational groundwater monitoring well network. If wells go dry, and remain dry for more than four consecutive quarters, or are otherwise rendered inoperable, they shall be augmented within six months of the last unsuccessful sampling event with in-kind wells drilled to monitor first encountered groundwater. The Discharger shall obtain written approval of the replacement well locations from the Central Valey Water Board Executive Officer. In addition, groundwater monitoring wells are required within the land application areas to assess groundwater quality beneath the land application areas and to evaluate the predictions of the Model. The Discharger shall implement the following schedule of Tasks for replacement:

Task	**Task Description**	**Due date**
a.	Submit a work plan for replacement groundwater monitoring wells for existing groundwater monitoring wells that have gone dry, and wells proposed to monitor the interior of the land application areas.	**(60 days from the adoption of this Order)**
b.	Install and sample the monitoring wells upon receipt of Executive Officer approval of the work plan required by Task a, but by no later than the due date for Task b. The wells shall be sampled consistent with the requirements of Monitoring and Reporting Program R5-2015-____.	**(12 months from the adoption of this Order)**

16. If the Central Valley Water Board determines that waste constituents in the discharge have reasonable potential to cause or contribute to an exceedance of an objective for groundwater, this Order may be reopened for consideration of addition or revision of appropriate numerical effluent or groundwater limitations for the problem constituents.

17. The Central Valley Water Board is currently implementing the CV-SALTS initiative to develop a Basin Plan amendment that will establish a salt and nitrate management plan for the Central Valley. Through this effort the Basin Plan will be

amended to define how the narrative water quality objectives are to be interpreted for the protection of agricultural use. If new information or evidence indicates that groundwater limitations different than those prescribed herein are appropriate, this Order will be reopened to incorporate such limits.

18. 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 that the foregoing is a full true, and correct copy of an Order adopted by the California Regional Water Quality Control Board on __

_____

PAMELA C. CREEDON, Executive Officer