CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

ORDER R5-2012-0104-01

WASTE DISCHARGE REQUIREMENTS

FOR
DARLING INGREDIENTSTERNATIONAL INC., OSCAR HEARD,
AND VAL AND MARY AZEVEDO
DARLING INGREDIENTSTERNATIONAL RENDERING PLANT, TURLOCK FACILITY
STANISLAUS COUNTY

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

1. On 7 April 2011, Darling Ingredientsternational, Inc. submitted a Report of Waste Discharge (RWD) to apply for revised Waste Discharge Requirements (WDRs) for a rendering plant. An amended RWD and additional information to complete the RWD was submitted on 15 December 2011, 16 April 2012, and 18 June 2012.

2. Darling Ingredientsternational, Inc. (hereafter "Discharger") owns and operates the Darling Ingredientsternational Rendering Plant, Turlock Facility and associated land discharge areas referred to herein as the "Darling property", and is primarily responsible for compliance with these WDRs. Oscar Heard, and Val and Mary Azevedo (hereafter "Co-Dischargers") own farmland that will be irrigated with treated wastewater generated by Darling International, Inc. Oscar Heard owns the "Heard property" and Val and Mary Azevedo own the "Azevedo property."

3. The rendering plant is at 11946 Carpenter Road near Crows Landing (Section 30, T5S, R9E, MDB&M). The rendering plant and Darling property occupy Assessor's Parcel Number (APN) 058-022-005; the Heard property occupies APNs 058-022-042, 058-022-044, 058-022-046, and 058-022-047; and the Azevedo property occupies APN 058-002-005 The facility location is shown on Attachment A, which is attached hereto and made part of this Order by reference.

4. Waste Discharge Requirements (WDRs) Order 5-01-171, adopted by the Central Valley Water Board on 14 June 2001, prescribes requirements for the rendering plant's discharges to land. Because the discharge previously caused groundwater degradation, Order 5-01-171 established a time schedule for the Discharger to eliminate waste streams or reduce waste characteristics below the site-specific total dissolved solids (TDS) background value of 1,620 mg/L; close the existing wastewater ponds; and/or construct new Class II surface impoundments to contain the waste. Pursuant to the WDRs, the Discharger constructed a new treatment system and upgraded operations to improve salinity source control and wastewater quality. The Discharger applies treated wastewater, which is blended with Turlock Irrigation District (TID) Lateral No. 5 water, to irrigate crops grown on the Darling and Heard properties. The Discharger proposes to expand the land application areas to include the Azevedo

property for land application of treated wastewater. Therefore, the WDRs are no longer adequate to regulate the discharge, and it is appropriate to revise the WDRs.

Facility and Discharge Regulated Under Previous WDRs

5. The rendering plant receives animal mortalities and meat processing by-products that include fat, bone, and offal. Only animal mortalities of a certain quality are accepted. These raw materials are recycled into fats and proteins that are sold into animal feed, fertilizer, oleochemical, and biofuel markets.

6. Wastewater streams include condensate from the cooker, truck and plant cleaning wash water, boiler blowdown, reverse osmosis reject water, feather plant knockdown tower wastewater, and overflow from a Venturi system associated with the plant odor abatement system.

7. The following table summarizes recent influent wastewater flows.

Flow Parameter	Average Daily Influent Flow (gpd)
2006 Annual Average	117,245
2007 Annual Average	107,415
2008 Annual Average	106,919
2009 Annual Average	138,788
2010 Annual Average	142,293
2011 Annual Average	145,944

8. Prior to 2012, wastewater was treated by a wastewater treatment system (WWTS) that consisted of a paddle wheel skimmer dissolved air floatation (DAF) system and eight unlined ponds[1]. The pond locations are shown on Attachment B, which is attached hereto and made part of this Order by reference. Wastewater was first discharged to Pond 1A and flowed sequentially through the ponds to provide settling and aerobic and anoxic treatment of organic matter. Wastewater from the ponds was used for supplemental irrigation water on the Darling and Heard properties by blending with Turlock Irrigation District (TID) Lateral No. 5 water.

9. Wastewater generated by the rendering plant is high in BOD, nitrogen, and salinity. The following table summarizes the quality of wastewater that was discharged to and from the ponds prior to source control and completion of the new WWTS.

[1] The Discharger states that the ponds are lined with clay, but the liners were not engineered or constructed under a Construction Quality Assurance (CQA) Plan to verify thickness or the as-built permeability of the clay.

		Influent Wastewater Quality (Pond 1A)[1]		Effluent Wastewater Quality (Pond 6)[1]	
Parameter	Units	Average	Range	Average	Range
BOD_5 at 20˚C	mg/L	5,264	394 to 25,000	334	ND to 1,570
Nitrate (as nitrogen)	mg/L	1.85	ND to 48.4	1.29	ND to 10.0
Total Nitrogen	mg/L	– –	– –	– –	– –
TDS	mg/L	1,833	570 to 5,000	1,727	409 to 4,000
FDS [2]	mg/L	1,103	557 to 2,220	900	564 to 1,540
Chloride	mg/L	327	69 to 1,050	445	71 to 1,200

[1] Monthly data from June 2001 through March 2009 (before source control and wastewater treatment upgrades).
[2] Monthly data from May 2007 through March 2009 (before source control and wastewater treatment upgrades).

10. Because the previous discharge had degraded groundwater quality, WDRs Order 5-01-171 established a time schedule for the Discharger to cease discharge of wastewater containing total dissolved solids greater than 1,620 mg/L to the seven unlined ponds, or to construct Class II surface impoundments that meet the performance standard specified in Section 20310(a) of Title 27. The effluent limit was based on the upper tolerance limit of TDS in MW-5, which is the background monitoring well for the site. At the time the WDRs were adopted, the TDS concentration of wastewater discharged to the ponds was greater than 1,620 mg/L, and the Central Valley Water Board found that the discharge was not exempt from the requirements of Title 27.

11. Monitoring and Reporting Program (MRP) 5-01-171 required the Discharger to determine effluent concentration limits each year based on background groundwater monitoring data for the last three years. The following table summarizes the annual average TDS concentration for wastewater to Pond 1A and the calculated concentration limit.

Year	Wastewater TDS Annual Avg. Concentration (mg/L)	TDS Concentration Limit (mg/L)
2002	2,974	1,620
2003	1,623	1,810
2004	1,548	1,212
2005	1,269	1,076
2006	1,326	1,218
2007	1,522	1,231
2008	2,331	1,199
2009	1,113	1,192

Year	Wastewater TDS Annual Avg. Concentration (mg/L)	TDS Concentration Limit (mg/L)
2010	634	1,440
2011	1,058	1,705

The Discharger did not meet all of the compliance dates in the WDRs, but requested an extension of time to implement upgrades to improve wastewater quality. As described below, the Discharger has completed major upgrades to improve wastewater quality.

Changes in the Facility and Discharge

12. In 2002, the Discharger began using surface water from TID for rendering plant wash water, which is less saline than the two on-site source water supply wells used previously. Water from the facility's supply wells is still used for boiler feed water after reverse osmosis (RO) treatment. The RO reject water is sent to the wastewater treatment system.

13. In 2009, the Discharger implemented operational modifications to improve salinity source control and wastewater quality. Improvements include upgrading the animal mortality and by-product receiving areas, upgrading the rendering plant, and minimizing use of chemicals that contribute salts to the wastewater. By-products are now received directly into receiving pits rather than a paved receiving area, which reduces rinse water flows. Fluids collected in the pits are processed in the rendering plant rather than being discharged to the wastewater treatment system.

14. In late 2011, the Discharger completed construction of a new wastewater treatment system that first became operational in early 2012. The Discharger no longer uses the unlined ponds for wastewater treatment. The new WWTS consists of the existing paddle wheel skimmer DAF system for primary treatment to remove fats; biological treatment in aboveground tanks to reduce BOD and nitrify/denitrify; and a DAF for secondary clarification.

15. Based on monitoring data reported by the Discharger through November 2011, source control has reduced the average concentration of salinity constituents. The following table compares wastewater quality before and after the Discharger implemented source control.

Parameter	Units	Wastewater Quality Discharged to Ponds	
		Prior to Source Control[1]	After Source Control[2]
BOD_5 at 20˚C	mg/L	5,264	5,945
TDS	mg/L	1,833	829
FDS	mg/L	1,103 [3]	290

Parameter	Units	Wastewater Quality Discharged to Ponds	
		Prior to Source Control[1]	After Source Control[2]
Chloride	mg/L	327	78

[1] Average of monthly data from June 2001 through March 2009.
[2] Average of monthly data from April 2009 through November 2011.
[3] Average of monthly data from May 2007 (data first collected) through March 2009.

However, in a letter dated 30 August 2012, the Discharger stated that the TDS, FDS, and chloride concentrations reported in monitoring reports after April 2009 are not representative of actual concentrations discharged to the ponds. The Discharger stated that, as part of the 2009 source control and operational improvements, the low salinity condensate was discharged directly to the ponds instead of being comingled with the process wastewater. The Discharger stated that, since May 2009, composite samples consisting of three parts condensate to one part primary DAF effluent have been analyzed to characterize effluent quality for its monitoring reports, but that the composite samples underestimated the salinity of the combined waste streams.

16. The RWD projected effluent quality for the new WWTS as follows:

Constituent	Effluent Concentration (mg/L)
BOD	80
TSS	60
TKN	<40
Nitrate nitrogen	1
TDS	800
FDS	400

In April 2012, the Discharger provided post-start-up effluent monitoring data showing that the weekly average concentration of total nitrogen was approximately 13.5 mg/L, and the weekly average COD concentration was 41 mg/L. Current BOD monitoring data were not provided but BOD concentrations are expected to be less than the COD concentration. However, in a 27 August 2012 meeting, the Discharger stated that there is currently not sufficient data to verify the level of nitrification/denitrification that the system can achieve, and that effluent nitrogen concentrations are likely to fluctuate seasonally depending on seasonal temperature variation. Current BOD monitoring data were not provided but the Discharger states that the effluent BOD concentration is expected to be less than the COD concentration.

On 30 August 2012, the Discharger submitted all monitoring data from the new wastewater treatment system. The following data summarizes available sampling results from 22 March 2012 through 15 August 2012. The treatment system suffered

an upset on 16 August, so results for 16 August through 21 August were excluded from the averages shown in the table.

Constituent	Number of Samples	Average Effluent Concentration (mg/L)[1]
BOD	8	24
Nitrate nitrogen	8	<2
TKN	5	31
Total nitrogen	5	31
FDS	11	680
Chloride	8	181

[1] Average of available data from 22 March 2012 through 15 August 2012.

17. In 2002, the Discharger began using TID water for plant cleaning in place of groundwater from on-site supply wells. The Discharger relies in part on the low salinity concentration of the TID water to achieve salinity source control. A summary of the TID Lateral Drain No. 5 water quality is provided in the following table.

		TID Water Quality	
Parameter	Units	Average	Range
BOD[1]	mg/L	3.2	ND to 12
Nitrate (as nitrogen)[1]	mg/L	21.9	3.3 to 97
TDS[2]	mg/L	505	222 to 928
FDS[3]	mg/L	418 [2]	128 to 853 [2]
Chloride[1]	mg/L	81	33 to 180

[1] Quarterly data from June 2001 through November 2011.
[2] Monthly data from June 2001 through November 2011.
[3] Monthly data from May 2007 through November 2011.

The last ten years of monitoring data show that salinity in the TID water has been relatively stable with some seasonal fluctuation. A significant increase of salinity in the TID water would affect the effluent quality.

The Discharger also adds magnesium hydroxide to control pH for denitrification in the biological treatment system. Because the treatment system is new, the Discharger is not certain how much magnesium hydroxide is necessary to maintain optimum alkalinity or the degree to which effluent salinity will be affected by its use. Therefore, this Order provides for a one-year performance evaluation to demonstrate whether the system can comply with the final effluent limitations of this Order.

18. As discussed above, the Discharger obtains most of its process water from Lateral Drain No. 5 (also known as the Harding Drain). The City of Turlock discharges up to 20 million gallons per day (MGD) to the Harding Drain under WDRs Order

R5-2010-0002-01 (NPDES No. CA0078948). Because of the City's discharge, the Harding Drain is an effluent dominated stream. The City is currently planning to construct a pipeline to convey its effluent directly to the San Joaquin River, and the pipeline is expected to be completed in 2013. It is currently not known whether the Discharger will be able to obtain higher quality water from the current surface water supply after the City of Turlock ceases its discharge to the Harding Drain. Such a change would increase the salinity of the waste and thereby increase the threat to groundwater quality. Therefore, this Order requires that the Discharger submit a new Report of Waste Discharge if there is a change in the water supply quality.

19. The eight unlined ponds are no longer used for wastewater treatment. Treated wastewater is stored in the ponds and withdrawn from Pond 6A or Pond 6B for land application. The Discharger is proposing to ~~use at least six of the eight ponds for storage~~ line Ponds 2, 3, 4, 5, 6A, and 6B with a 60-mil high density polyethylene (HDPE) liner in stages by 1 October 2019. Ponds 1A and 1B will remain unlined and may be used for temporary storage of wastewater during emergency conditions. ~~of treated wastewater prior to land application.~~

20. Currently sludge from the DAF units and wasted sludge from wastewater treatment system is returned to the rendering plant and incorporated into the end product. However, the Discharger proposes to use two of the existing unlined ponds for storage and drying of wasted sludge from the new wastewater treatment system. The RWD did not propose lined sludge drying beds or specify operational procedures to protect groundwater quality and prevent nuisance conditions associated with drying sludge. Therefore it is appropriate to require that the Discharger submit design and operational details prior to use of on-site sludge drying beds.

21. On 20 August 2012, the Discharger requested to be allowed to land apply wastewater treatment system sludge to the LAAs. However, the Discharger has not characterized the sludge, determined the sludge mass that will be generated, or developed an operations plan for sludge application. Additionally, based on the high organic matter content of the raw wastewater, it appears that the LAAs may not have the additional assimilative capacity to accommodate the additional nitrogen loading from sludge. Therefore, this Order does not allow the Discharger to land apply wastewater treatment system sludge. This Order may be revised to allow land application of sludge if the Discharger submits a new Report of Waste Discharge that provides the information above and shows that the LAAs can assimilate the sludge without violating the groundwater limitations of this, or any subsequent, Order.

22. As noted above, the Discharger land applies wastewater to the Darling and Heard properties, and plans to add the 74-acre Azevedo property as a new LAA.

23. Treated wastewater is pumped to the LAAs from the storage ponds and blended with TID water prior to land application. Hydraulic flows to the LAAs are currently not metered.

24. Each property is irrigated using a border check flood irrigation method. A typical application consists of approximately 6 to 12 inches applied over the irrigated area. Border checks are rotated every 14 to 21 days depending on the time of year.

25. Irrigation and storm water runoff for the Darling and Heard properties are collected by a tailwater ditch system and recycled. Irrigation and storm water on the Azevedo property is contained onsite by a system of berms and allowed to accumulate at the eastern and western boundaries were it percolates and evaporates.

26. The LAAs are double cropped typically with corn in the winter and mixed forage (e.g. alfalfa or sorghum sudan) in the winter. Crops are harvested for silage that is used to feed dairy cows. Typically the LAAs are not irrigated during the crop harvest and rotation, which occurs in May and October.

27. Based on nutrient utilization rates provided in the Western *Fertilizer Handbook*. The annual nitrogen needs of the crops are summarized in the following table. Sorghum sudan is used as a representative crop during the winter rotation.

Crop	Nitrogen Uptake (pounds/acre/year)	Phosphate Uptake (pounds/acre/year)	Potassium Uptake (pounds/acre/year)
Corn (silage)	250	105	250
Sorghum sudan	325	125	475
Double Crop Total	575	225	725

28. On 30 August 2012, the Discharger proposed the following as interim effluent limitations pending determination of optimal WWTS performance. These values were proposed based on data from recent monitoring of the new treatment system during non-upset conditions and generally represent the maximum reported effluent concentrations between 19 March and 15 August 2012.

Constituent	Annual Average Effluent Concentration (mg/L)
BOD	100
Total nitrogen	45
FDS	770
Chloride	250

29. Wastewater will provide approximately 10 percent of the hydraulic crop irrigation demands, and the landowners will use TID water to satisfy the remaining demand. The following table compares key waste constituent loading rates for the proposed discharge and hypothetical alternative irrigation scenarios.

	Land Application Area		
	Darling	**Heard**	**Azevedo**
Acreage	40	255	74
Total Applied Irrigation Water (Mgal/yr)	59.8	374.4	108.5
Interim Loading Rates – 10% Discharger's wastewater and 90% TID water			
BOD (lb/ac/yr) [1]	155	152	152
Total Nitrogen (lb/ac/yr) [2]	572	562	562
FDS (lb/ac/yr) [3]	5,649	5,549	5,539
Hypothetical Loading Rates – TID water as sole irrigation supply			
BOD (lb/ac/yr) [1]	37	37	37
Total Nitrogen (lb/ac/yr) [2]	574	563	562
FDS (lb/ac/yr) [3]	5,225	5,131	5,124

[1] BOD concentration: wastewater = 80 mg/L (design annual average of new treatment plant effluent); TID water = 3mg/L (average concentration from June 2001 to November 2011).

[2] Total nitrogen concentration: wastewater = 40mg/l (design annual average of new treatment plant effluent); TID water = 46mg/L (average nitrate-N concentration from March 2009 to November 2011).

[3] FDS concentration: wastewater = 290mg/l (avg. after upgrades);
TID water = 419mg/L (average May 2007 to November 2011).

30. The Discharger submitted a nitrogen balance showing that a total nitrogen load of 540 lb/ac/yr (621 lb/ac/yr after accounting for 15 percent irrigation loss) is needed to meet double-cropping crop demands with corn (silage) and forage crops. This nitrogen load correlates with the values referenced above. Other cropping scenarios might exert less nitrogen demand, but supplemental nitrogen may be needed because the proposed loading rates will provide no more than 572 pounds of total nitrogen per acre per year.

31. The Discharger submitted a revised water balance dated 15 June 2012. The water balance was conservative (i.e., no pond evaporation or percolation was assumed), but did not determine whether the facility has sufficient pond storage volume to accommodate the 100-year, 365-day precipitation event. Additionally, the water balance did not account for rainfall on the LAAs and its effect on irrigation needs. However, Central Valley Water Board staff revised the water balance to include reasonable estimates of pond evaporation, pond percolation, and rainfall on the LLAs. The water balance model shows that the facility provides the following capacity if at least six of the existing ponds are maintained for use as storage ponds:

Treatment System Influent Flow	Capacity
Total Annual Flow	117 MG
Monthly Average Flow	0.318 MGD

Site-Specific Conditions

32. The ground elevation in the area of the WWTS and LLAs is relatively flat and approximately 50 to 55 feet above mean sea level (MSL) with drainage to the southwest towards the San Joaquin River.

33. Geologically, the WWTS and LAAs lie within the western boundary of the Great Valley geomorphic province. The uppermost stratigraphic sequence of the province consists of coalescing low alluvial fans and river flood plain deposits. Well logs show that the first ten feet below ground surface is primarily silty sand with some clayey sand. The minimum reference coefficient of permeability for silty sand is 1×10^{-6} cm/s.

34. The WWTS is located within the 100-year flood plain of the San Joaquin River. Prior to constructing the new WWTS, the Discharger determined that the Base Flood Elevation (BFE) at the site is 57.0 feet above MSL. To prevent pond inundation and potential release of wastewater during a 100-year flood event, the lowest point on top of the pond dikes is at least one foot above the BFE and the wastewater treatment tanks were built on a slab foundation approximately six inches above the BFE.

35. Surrounding land uses are primarily agricultural. Annual precipitation in the vicinity averages approximately 10.7 inches, the 100-year total annual precipitation is approximately 21.4 inches, and the average reference evapotranspiration rate is approximately 57 inches per year.

36. Domestic wastewater generated at the facility is discharged to a septic system north of the office building.

Groundwater Conditions

37. At least two aquifers underlie the facility; an upper unconfined aquifer and a lower confined aquifer separated by the Corcoran Clay (a unit of the Riverbank formation). The RWD states that the unconfined aquifer is the most extensively developed aquifer in the Modesto-Merced area, yielding well water for domestic, irrigation, industrial, and public-supply use. Groundwater in the unconfined aquifer generally flows westward towards the San Joaquin River, but local gradients can be affected by groundwater pumping. The confined aquifer occurs in unconsolidated deposits below the Corcoran Clay. According to the RWD, the bottom of the confined aquifer is approximately 800 to 1,000 feet below ground surface.

38. Six groundwater monitoring wells monitor first groundwater at the site and their locations are shown in Attachment B. The well casings of three monitoring wells (MW-1, MW-2, MW-3) became damaged so the Discharger installed three new wells (MW-1R, MW-2R, MW-3R) in 2012 near the original locations. Groundwater monitoring data for the new wells are not yet available and data from MW-1 are not available after June 2008. The following table summarizes the current monitoring wells and their function.

Monitoring Well	Average Depth to Groundwater (ft. bgs)[1]	Description
MW-1R	12.6 [2]	Compliance well crossgradient of LAA; installed in 2012
MW-2R	13.7 [2]	Compliance well downgradient of LAA; installed in 2012
MW-3R	9.7 [3]	Compliance well downgradient of ponds; installed in 2012
MW-4	10.3	Compliance well downgradient of LAA
MW-5	3.8	Background well upgradient of discharge
MW-6	13.4	Downgradient of ponds; may be influenced by surface water (TID or San Joaquin River)

[1] Average ground elevation (52.5 ft.) minus average groundwater elevation (March 2008 through September 2011).

[2] Groundwater elevation datum from 2012 monitoring well installation report.

[3] Groundwater elevation data from MW-3.

39. Depth to first groundwater at the site typically ranges from four to 14 feet. The shallow groundwater typically flows towards the Tuolumne River and the gradient is typically to the southwest. Monitoring well MW-5 is upgradient of the wastewater ponds and LAAs and is representative of background groundwater quality. The groundwater elevation at MW-3 is typically shallower than other monitoring wells in the area (i.e., MW-4 and MW-6), which is likely due to groundwater mounding below the wastewater ponds and monitors groundwater quality immediately downgradient of the wastewater ponds. MW-6 is downgradient of the ponds and the Darling and Heard LAAs, but appears to be influenced by the adjacent TID drain and San Joaquin River.

40. Groundwater monitoring data for the site are summarized in the table below.

		Groundwater Concentrations Prior to WWTP Upgrades [1]		Groundwater Concentrations After WWTP Upgrades [2]		Average % Change
Parameter	Units	Average	Range	Average	Range	
MW-5*						
TDS	mg/L	823	340 to 1,230	– –	– –	– –
FDS	mg/L	725 [3]	287 to 1,090 [3]	– –	– –	– –
Chloride	mg/L	93	23 to 215	– –	– –	– –
Nitrate-N	mg/L	21	3 to 56	– –	– –	– –
MW-2						
TDS	mg/L	1424	833 to 1,900	948	567 to 1,110	-33.4%
FDS	mg/L	1098 [3]	646 to 1,430 [3]	756	384 to 1,030	-31.1%
Chloride	mg/L	240	ND to 400	124	67 to 187	-48.3%
Nitrate-N	mg/L	69	ND to 117	66	43 to 75	-4.3%

Parameter	Units	Groundwater Concentrations Prior to WWTP Upgrades [1]		Groundwater Concentrations After WWTP Upgrades [2]		Average % Change
		Average	Range	Average	Range	
MW-3						
TDS	mg/L	2,153	1,770 to 2,800	869	474 to 1,270	-59.6%
FDS	mg/L	1,832 [3]	1,550 to 2,100 [3]	744	428 to 931	-59.4%
Chloride	mg/L	490	ND to 837	110	29 to 287	-77.6%
Nitrate-N	mg/L	60	ND to 185	3	ND to 9	-95.0%
MW-4						
TDS	mg/L	675	458 to 1,300	596	389 to 766	-11.7%
FDS	mg/L	522 [3]	452 to 583 [3]	437	225 to 598	-16.3%
Chloride	mg/L	88	41 to 192	84	50 to 118	-4.5%
Nitrate-N	mg/L	5	ND to 14	2	ND to 15	-60.0%
MW-6						
TDS	mg/L	501	357 to 676	678	524 to 911	+35.3%
FDS	mg/L	455 [3]	221 to 516 [3]	571	390 to 787	+25.5%
Chloride	mg/L	79	49 to 144	125	77 to 181	+58.2%
Nitrate-N	mg/L	7	2 to 11	6	2 to 14	-14.3%

[1] Quarterly data from June 2001 through March 2009 (before source control).
[2] Quarterly data from April 2009 through November 2011 (after source control).
[3] Data from May 2007 through March 2009 (before source control).
* Background groundwater monitoring well. Data from June 2001 through November 2011

Based on the data summarized above, the Discharger's upgrades have resulted in improved groundwater quality, especially in MW-3. For all constituents, concentrations in MW-3 are similar to or better than background. Salinity in MW-2 (within the Darling property) shows a decreasing trend similar to MW-3, but nitrate concentrations have not changed since the upgrades. The apparent nitrate degradation in MW-2 could be caused by previous discharges to the Darling and Heard properties or possibly irrigation water intrusion when MW-2 was damaged. The concentration of nitrate in this area is expected to decrease over time as a result of the improved effluent quality. Groundwater in this area will be monitored by replacement well MW-2R. Constituents in MW-4 show some reduction since the upgrades but are largely unchanged. Salinity concentrations have increased in MW-6, but the increase may not be due to the discharge since the Discharger has implemented salinity source control and salinity concentrations in MW-3, which is upgradient of MW-6, have subsequently declined. Water from TID Lateral Drain No. 5, which is adjacent to MW-6, is relatively high in salinity and nitrate and may influence groundwater quality. However, nitrate has not increased in MW-6, so the cause of the salinity increase in MW-6 is questionable.

Basin Plan, Beneficial Uses, and Regulatory Considerations

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

42. Local drainage is to the San Joaquin River. The beneficial uses of the San Joaquin River, as stated in the Basin Plan, are municipal and domestic supply; agricultural supply; industrial process supply; water contact recreation; non-contact water recreation; warm freshwater habitat; wildlife habitat; migration of aquatic organisms; and spawning, reproduction, and/or early development.

43. The Basin Plan designates the beneficial uses of underlying groundwater as municipal and domestic supply, agricultural supply, and industrial supply.

44. The Basin Plan establishes narrative water quality objectives for chemical constituents, tastes and odors, and toxicity in groundwater. It also sets forth a numeric objective for total coliform organisms.

45. The Basin Plan's numeric water quality objective for bacteria requires that the most probable number (MPN) of coliform organisms over any seven-day period shall be less than 2.2 per 100 mL in MUN groundwater. The applicability of this objective to groundwater designated as MUN has been affirmed by State Water Board Order WQO-2003-0014 and by subsequent decisions of the Sacramento County Superior Court and California Court of Appeal, 3rd Appellate District.

46. The Basin Plan's narrative water quality objectives for chemical constituents, at a minimum, require waters designated as domestic or municipal supply to meet the MCLs specified in Title 22 of the California Code of Regulations (hereafter Title 22). 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.

47. In summary, the narrative toxicity objective requires that groundwater be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, animal, plant, 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.

48. 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.

49. 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 µmhos/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 µmhos/cm if the proper leaching fraction is provided to maintain soil salinity within the tolerance of the crop.

50. The list of crops in Finding 26 is not intended as a definitive inventory of crops that are or could be grown in the area. The discharge previously degraded groundwater quality to levels that could affect plant growth if the shallow groundwater were to be used for irrigation of crops such as almonds. However, after the improvements completed by the Discharger, the salinity of the treated wastewater is now similar to TID lateral Drain No. 5 water, which is generally used by agricultural operations in the area. Additionally, the groundwater quality in MW-3, which is immediately downgradient of the unlined ponds, is now similar to the background well MW-5. Therefore, the land application of treated wastewater does not threaten to further degrade groundwater.

Special Considerations for High Strength Waste

51. Excessive application of high organic strength wastewater to land can create objectionable odors, soil conditions that are harmful to crops, and degradation of underlying groundwater with nitrogen species and metals, as discussed below. Such groundwater degradation can be prevented or minimized through implementation of best management practices which include planting crops to take up plant nutrients and maximizing oxidation of BOD to prevent nuisance conditions.

52. With regard to BOD, excessive application can deplete oxygen in the vadose zone and lead to anoxic conditions. At the ground surface, this can result in nuisance odors and fly-breeding. Typically, irrigation with high strength wastewater results in high BOD loading on the day of application. It is reasonable to expect some oxidation of BOD at the ground surface, within the evapotranspiration zone and below the root zone within the vadose (unsaturated) zone. The maximum BOD loading rate that can be applied to land without creating nuisance conditions or leaching of metals can vary significantly depending on soil conditions and operation of the land application system.

53. *Pollution Abatement in the Fruit and Vegetable Industry*, published by the United States Environmental Protection Agency, cites BOD loading rates in the range of 36 to 600 lb/acre-day to prevent nuisance, but indicates the loading rates can be even higher under certain conditions. The studies that supported this report did not evaluate actual or potential groundwater degradation associated with those rates. There are few studies that have attempted to determine maximum BOD loading rates for protection of groundwater quality. Those that have been done are not readily

adapted to the varying soil, groundwater, and climate conditions that are prevalent throughout the region.

54. The Discharger has significantly improved the wastewater quality and reduced the BOD concentration discharged to land. Based on the loading rates presented above, the discharge does not have the potential to cause excessive BOD loading rates before other limits (e.g. the flow limit) are reached. Therefore this Order does not set a BOD loading limit.

Antidegradation Analysis

55. 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 is consistent with the maximum benefit to the people of the state.

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

    c. 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, and

    d. The Discharger employs best practicable treatment or control (BPTC) to minimize degradation.

56. Degradation of groundwater by some of the typical waste constituents associated with discharges from a rendering facility is consistent with the maximum benefit to the people of the state after effective source control, treatment, and control measures are implemented. The water recycling, waste management advantages, and services provided by such a rendering facility far exceed any benefits derived from requiring individuals to properly handle the waste, which would likely have a greater detrimental impact on water quality. The Discharger has 40 full-time employees. The economic prosperity of valley communities and associated industry is of maximum benefit to the people of the State, and provides sufficient justification for allowing the limited groundwater degradation that may occur pursuant to this Order.

57. The Discharger has been monitoring groundwater quality at the site since 1988. Based on the data available, it is not possible to determine pre-1968 groundwater quality. Therefore, determination of compliance with Resolution 68-16 for this facility will be based on existing background groundwater quality.

58. Prior to the source control and WWTS upgrades described above, the discharge degraded groundwater quality for TDS, chloride, and nitrate. Current constituents of concern that have the potential to degrade groundwater include salts (primarily chloride, TDS, and FDS) and nutrients (primarily nitrate), as discussed below:

a. 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 objective is to be interpreted for the protection of agricultural use. All studies conducted through this Order to establish an agricultural limit to implement the narrative objectives will be reviewed and consistent with the efforts underway by CV-SALTS.

The secondary MCL for chloride is 250 mg/L as a recommended level, 500 mg/L as an upper level, and 600 mg/L as a short-term maximum. The Central Valley Water Board must determine the applicable numeric limit to implement the narrative objective for the protection of agricultural supply. The most limiting agricultural water quality goal may be as low as 106 mg/L as a long-term average[1], which is intended to protect against adverse effects on sensitive crops when irrigated via sprinklers. However, the water quality goal is not a site-specific goal or objective, but rather a general measure to protect salt-sensitive crops. Site specific chloride levels of the receiving waters are necessary to interpret the narrative chemical constituent objective for protection of agricultural supply.

A review of the Discharger's monitoring reports shows that the average chloride concentration in the upgradient monitoring well (MW-5) is 93 mg/L with a range from 23 mg/L to 215 mg/L. The average chloride concentration in MW-3, which monitors potential groundwater degradation resulting from the wastewater discharge, has been reduced by 77.6 percent to 110 mg/L since the Discharger implemented source control (post-March 2009). The chloride concentration decrease in MW-3 is consistent with the decrease observed in the treated wastewater. ~~Because t~~The Discharger proposes to line effluent storage ponds 2, 3, 4, 5, 6A, and 6B with a 60-mil high density polyethylene (HDPE) liner. This Order sets a time schedule to line the ponds by 1 October 2019.~~is still evaluating the wastewater treatment system performance,~~ While the ponds are unlined this Order sets a performance-based interim chloride effluent limit of ~~250~~ 300 mg/L. ~~and~~This Order sets a final effluent limit of 200 mg/L to protect groundwater quality beneath ~~the~~any ponds that are not lined by 1 October 2019 ~~unlined effluent storage ponds~~. This Order does not allow further groundwater degradation. The one-sided upper tolerance interval (with 95% confidence of covering 95% of the population) of the current background groundwater chloride concentration was determined to be 218 mg/L. ~~Depending on the results of the Discharger's treatment system performance evaluation, further treatment or control may be necessary to protect groundwater.~~

b. The secondary MCL for TDS is 500 mg/L as a recommended level, 1,000 mg/L as an upper level, and 1,500 mg/L as a short-term maximum. The Central Valley Water Board must determine the applicable numeric limit to implement the narrative objective for the protection of agricultural supply. The most limiting agricultural water quality goal may be as low as 450 mg/L as a long-term average based on Ayers and Westcot[1], which evaluates the impacts of salinity levels on crop tolerance and yield reduction, and establishes water quality goals that are protective of the agricultural

[1] *Water Quality for Agriculture*, Food and Agriculture Organization of the United Nations—Irrigation and Drainage Paper No. 29, Rev. 1, R.S. Ayers and D.W. Westcot, Rome, 1985.

uses. However, the water quality goal is not a site-specific goal or objective, but rather a general measure that was determined to protect salt-sensitive crops. Only the most salt-sensitive crops require irrigation water of 450 mg/L or less to prevent loss of yield. Most other crops can tolerate higher TDS concentrations without harm.

A review of the Discharger's monitoring reports shows that the average TDS concentration in the up-gradient monitoring well MW-5 is 823 mg/L with a range from 340 mg/L to 1,230 mg/L. The average chloride concentration in MW-3, which is expected to monitor immediate impacts to groundwater resulting from the wastewater discharge, has been reduced by 59.6 percent to 869 mg/L since the Discharger implemented source control (post March 2009). The TDS concentration decrease in MW-3 is consistent with the decrease in the treated wastewater. This Order does not allow further groundwater degradation. The one-sided upper tolerance interval (with 95% confidence of covering 95% of the population) of the current background groundwater TDS concentration was determined to be 1,300 mg/L. Depending on the results of the Discharger's treatment system performance evaluation, further treatment or control may be necessary to protect groundwater quality.

c. A water quality objective does not exist for FDS; however due to degradable organic matter in the wastewater, FDS is the best indicator of actual salinity levels. Therefore, this Order sets a performance based effluent limit for FDS rather than TDS. Because tThe Discharger is still evaluating the wastewater treatment system performanceproposes to line effluent storage ponds 2, 3, 4, 5, 6A, and 6B with a 60-mil high density polyethylene (HDPE) liner. This Order sets a time schedule to line the ponds by 1 October 2019. While the ponds are unlined, this Order sets a performance based interim FDS effluent limit of 770900 mg/L. This Order sets and a final effluent limit of -700 mg/L to protect groundwater quality beneath any ponds that are not lined by 1 October 2019.based on the current performance (post-March 2012). However, depending on the results of the Discharger's treatment system performance evaluation, further treatment or control may be necessary to protect groundwater quality.

d. For nutrients such as nitrate, the potential for degradation depends not only on the quality of the treated effluent, but the nutrient uptake of the LAA crops and the ability of the vadose zone below the LAAs and unlined effluent storage ponds to provide an environment conducive to further nitrification and denitrification to convert the residual effluent nitrogen to nitrate and the nitrate to nitrogen gas before it reaches the water table. Background groundwater on average exceeds the Basin Plan water quality objective for nitrate-nitrogen (10 mg/L) and downgradient monitoring wells MW-2 and MW-3 on average have exceeded nitrate-nitrogen concentrations in background. However, nitrate concentrations in MW-3 have improved as a result of the improved effluent quality and nitrate concentrations in MW-2 are also expected to improve. Because tThe Discharger is proposes to line effluent storage ponds 2, 3, 4, 5, 6A, and 6B with a 60-mil high density polyethylene (HDPE) liner. This Order sets a time schedule to line the ponds by 1 October 2019. still evaluating the treatment system performance While the ponds are unlined this Order sets a performance based interim- total nitrogen effluent limit of 45 mg/L based on current performance. and aThis Order sets a final effluent limit of 30 mg/L to protect

groundwater quality beneath any ponds that are not lined by 1 October 2019.the unlined effluent storage ponds. This Order does not allow further groundwater degradation and sets a time schedule for MW-2R to meet the background nitrate concentration one-sided upper tolerance interval (with 95% confidence of covering 95% of the population), which was determined to be 27 mg/L. This value was calculated based on MW-5 data after March 2008 to represent current groundwater conditions. Nitrate data prior to March 2008 was not considered due to a temporary elevated shift in background quality from June 2004 through December 2007. Depending on the results of the Discharger's treatment system performance evaluation, further treatment or control may be necessary to protect groundwater quality.

59. The Discharger provides treatment and control of the discharge that incorporates:
    a. Salinity source control;
    b. Use of a relatively high quality process water supply
    c. Solids separation before and after wastewater treatment;
    d. Aboveground tanks for biological BOD and nutrient removal (nitrification and denitrification);
    e. Collection of facility storm water to prevent runoff to surface waters; and
    f. Land application of wastewater at agronomic rates for water and plant nutrients;
    g. Utilizing tailwater and storm water runoff control systems on all LAAs.
    g.h. Lining effluent storage Ponds 2, 3, 4, 5, 6A, and 6B.

60. The operational upgrades and salinity source control have effectively reduced salinity in the WWTS influent. The new wastewater treatment system is expected to further reduce the nitrogen and BOD concentrations in the effluent. Moving the treatment process from the unlined ponds to the aboveground tanks has reduced the threat to groundwater quality. However, while recent effluent monitoring data show that the treatment system has the potential to be protective of groundwater, the Discharger needs to demonstrate the reliability of the system. If the treatment system is found not capable of producing effluent that meet the final effluent limitations, further treatment or control may be necessary. This Order requires that the Discharger evaluate the optimal performance of the new wastewater treatment system and determine whether the final effluent limitations of this Order are feasible with the current treatment system.

61. This Order establishes groundwater limitations and interim and final effluent limitations that will not unreasonably threaten present and anticipated beneficial uses or result in groundwater quality that exceeds water quality objectives set forth in the Basin Plan. Current groundwater monitoring data indicates that shallow groundwater has previously been degraded beyond background groundwater quality, but has recently improved with respect to salinity and nitrate. Shallow groundwater quality is expected to improve further with respect to nitrate. The requirements of this Order do not allow any further degradation to occur. However, because the sustainability of the current high quality process water supply is uncertain and the optimal performance of the WWTS has not been evaluated, this Order may be reopened to

consider revision of the effluent and/or groundwater limitations if the Discharger submits a new Report of Waste Discharge demonstrating that compliance with those limits is infeasible and that the proposed limits will ensure compliance with the Basin Plan.

Other Regulatory Considerations

62. Title 27 of the California Code of Regulations (hereafter Title 27) contains regulatory requirements for the treatment, storage, processing, and disposal of solid waste. However, Title 27 exempts certain activities from its provisions. Discharges regulated by this Order are exempt from Title 27 pursuant to provisions that exempt domestic sewage, wastewater, and reuse. Title 27, section 20090 states in part:

> The following activities shall be exempt from the SWRCB-promulgated provisions of this subdivision, so long as the activity meets, and continues to meet, all preconditions listed:
>
> (…)(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 RWQCB has issued WDRs, reclamation requirements, or waived such issuance;
>
> (2) the discharge is in compliance with the 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. (…)

63. The discharge authorized herein (except for the discharge of residual sludge and solid waste), and the treatment and storage facilities associated with the discharge, are exempt from the requirements of Title 27 as follows:

    a. The wastewater treatment plant DAF units, aerated tanks, and appurtenant structures, are exempt pursuant to Title 27, Section 20090(i) because they are fully enclosed units used to treat the waste.

    b. The effluent storage ponds, future sludge drying beds (if any), and the land application areas are exempt pursuant to Title 27, section 20090(b) because they are wastewater land discharge areas and:

        i. The Central Valley Water Board is issuing WDRs.

        ii. The discharge is in compliance with the Basin Plan, and;

        iii. The treated effluent and solids do not need to be managed as hazardous waste.

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

65. The State Water Board adopted Order 97-03-DWQ (NPDES General Permit CAS000001) specifying waste discharge requirements for discharges of storm water associated with industrial activities, and requiring submittal of a Notice of Intent by all affected industrial dischargers. All storm water from the facility is collected, and mingled and disposed with the process wastewater. The Discharger is therefore not required to obtain coverage under NPDES General Permit CAS000001.

66. 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 discharging, or who proposes to discharge within its region … shall furnish, under penalty of perjury, technical or monitoring program reports which the board requires. The burden, including costs of these reports, shall bear a reasonable relationship to the need for the reports and the benefits to be obtained from the reports. In requiring those reports, the regional board shall provide the person with a written explanation with regard to the need for the reports, and shall identify the evidence that supports requiring that person to provide the reports.

The technical reports required by this Order and the attached Monitoring and Reporting Program R5-2012-0104 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.

67. 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.

68. With respect to discharges to the existing wastewater ponds and Darling and Heard LAA sites, the action to adopt waste discharge requirements for this existing facility is categorically exempt from the provisions of the California Environmental Quality (CEQA), in accordance with the California Code of Regulations, title 14, section 15301.

69. The discharge of treated wastewater to irrigate the Azevedo property will not present a threat to water quality any greater than the threat posed by the landowner's current use of irrigation water from TID Lateral Drain No. 5. The treated wastewater does not contain constituents of concern that are not already present in the TID water, and it exhibits better quality than the TID water with respect to nitrate and salinity. Additionally, the discharge will utilize existing irrigation systems at the Azevedo site. Therefore, with respect to discharges at the Azevedo property only, the discharge is categorically exempt from CEQA (Class I: Existing Facilities – guidelines section 15301).

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

Public Notice

71. 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.

72. The Discharger, Co-Discharger's, 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.

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

IT IS HEREBY ORDERED that Order 5-01-171 is rescinded except for purposes of enforcement, and, pursuant to Water Code sections 13263 and 13267, the Discharger and Co-Discharger's, their agents, successors, and assigns, in order to meet the provisions contained in Division 7 of the Water Code and regulations adopted hereunder, shall comply with the following:

A. Discharge Prohibitions

1. Discharge of wastes to surface waters or surface water drainage courses, including irrigation ditches or agricultural drains outside of control of the Discharger and Co-Dischargers, is prohibited.

2. Discharge of waste classified as 'hazardous', as defined in the California Code of Regulations, title 23, section 2510 et seq., is prohibited.

3. Discharge of waste classified as 'designated', as defined in Water Code section 13173, is prohibited.

4. Treatment system bypass of untreated or partially treated waste is prohibited, except as allowed by Standard Provision E.2 of the *Standard Provisions and Reporting Requirements for Waste Discharge Requirements*.

5. Discharge of waste at a location or in a manner different from that described in the Findings is prohibited.

6. Discharge of treated wastewater outside of the LAAs identified in this Order is prohibited.

7. Discharge of toxic substances into the wastewater treatment system or land application areas such that biological treatment mechanisms are disrupted is prohibited.

8. Discharge of domestic wastewater to the process wastewater treatment system is prohibited.

9. Application of residual solids to the land application areas is prohibited.

10. Discharge of industrial wastewater to septic systems is prohibited.

B. Flow Limitations

1. **Effectively immediately**, flows from the secondary DAF to the ponds shall not exceed the following limits:

Flow Measurement	Flow Limit
Total Annual Flow [1]	117 MG
Monthly Average Flow[2]	0.318 MGD

[1] As determined by the total flow for the calendar year.
[2] As determined by the total flow for each calendar month divided by the number of days in that month.

C. Effluent Limitations

1. **Effectively immediately through 30 September 2019**, effluent from the secondary DAF to theunlined ponds shall not exceed the following limits.: Effluent discharged to lined effluent storage ponds is not required to meet these limits:

Constituent	Units	Quarterly Average Limit[1]	Annual Average Limit[2]
BOD_5 [3]	mg/L	100	– –
Total Nitrogen	mg/L	45	– –
FDS	mg/L	– –	770900
Chloride	mg/L	– –	250300

[1] Calculated as the average from all sampling results acquired each calendar quarter (i.e., January through March, etc.)
[2] Calculated as a flow-weighted average for the calendar year.
[3] 5-day biochemical oxygen demand at 20˚C.

2. **Effective 1 October 2019**, effluent from the secondary DAF discharged to unlined effluent storage ponds shall not exceed the following limits except under emergency conditions defined pursuant to the Provisions of this Order. Effluent discharged to lined effluent storage ponds is not required to meet these limits:**Effective 1 November 2014**, effluent from the secondary DAF to the ponds shall not exceed the following limits:

Constituent	Units	Quarterly Average Limit[1]	Annual Average Limit[2]
BOD_5 [3]	mg/L	80	– –
Total Nitrogen	mg/L	30	– –
FDS	mg/L	– –	700
Chloride	mg/L	– –	200

1 Calculated as the average from all sampling results acquired each calendar quarter (i.e., January through March, etc.)

2 Calculated as a flow-weighted average for the calendar year.

3 5-day biochemical oxygen demand at 20˚C.

Compliance with the annual average limits shall be determined as specified in the Monitoring and Reporting Programusing the following flow-weighted formula:.

$$C = \frac{\sum_{i=1}^{12} C_i \times V_i}{\sum_{i=1}^{12} V_i}$$

Where

C	annual flow weighted average in mg/L;
i	the number of the month (i.e., January = 1, February = 2, etc.);
C_i	arithmetic mean of monitoring results for calendar month i in mg/L;
V_i	total effluent flow for calendar month i in million gallons;

D. Mass Loading Limitations

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

Constituent	Units	Daily Maximum	Irrigation Cycle Average	Annual Maximum
BOD Mass Loading	lb/ac/day	300	100	--
Total Nitrogen Mass Loading	lb/ac/year	--	--	Crop Demand

Compliance with the above requirements shall be determined as specified in the Monitoring and Reporting Program.The total nitrogen mass loading to each LAA shall not exceed the agronomic rate for the crop grown. Compliance with this requirement shall be determined using published nitrogen uptake rates for the crops grown and the following formula:

$$M = \sum_{i=1}^{12} \frac{C_i \times V_i \times 8.345}{A} + M_{supplemental}$$

Where

M = annual total nitrogen loading rate in pounds per acre per year;

i = the number of the month (i.e., January = 1, February = 2, etc.);

C_i = arithmetic mean of total nitrogen monitoring results for calendar month i in mg/L;

V_i = total effluent flow to the LAA for calendar month i in million gallons;

A = the area of the LAA or field in acres; and

$M_{supplemental}$ = additional total nitrogen loading in the form of fertilizer or other sources in pounds per acre per year.

E. Groundwater Limitations

Effective immediately except as noted, release of waste constituents from any portion of the facility and LAAs shall not cause groundwater to:

1. Contain total dissolved solids, chloride, nitrate nitrogen, arsenic, iron, and manganese in concentrations statistically greater than background groundwater quality.

2. Exceed a total coliform organism level of 2.2 MPN/100mL.

3. Exhibit a pH of less than 6.5 or greater than 8.4 pH units.

4. Contain taste or odor-producing constituents, toxic substances, or any other constituents in concentrations that cause nuisance or adversely affect beneficial uses.

Compliance with these limitations shall be determined annually based on comparison of compliance well concentrations to background groundwater quality using historical MW-5 monitoring data to represent background groundwater quality and approved statistical methods (i.e., inter -well comparison) in accordance with the approved workplan submitted pursuant to Provision I.1.a. Compliance wells are defined in Monitoring and Reporting Program R5-2012-0104.

Effective until 1 November 2015 only, for any single well and constituent, an exceedance of background groundwater quality will not constitute a violation of this Order unless the intrawell temporal trend for that constituent exhibits a statistically significant increase since adoption of this Order.

F. 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. The discharge shall not cause degradation of any water supply.

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

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

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

6. 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.

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

8. As a means of discerning compliance with Discharge Specification F.7, the dissolved oxygen (DO) content in the upper one foot of any wastewater pond shall not be less than 1.0 mg/L for three consecutive ~~weekly~~ sampling events. If the DO in any single pond is below 1.0 mg/L for three consecutive sampling events, the Discharger shall report the findings to the Regional Water Board in writing within 10 days and shall include a specific plan to resolve the low DO results within 30 days.

9. The Discharger shall operate and maintain all ponds sufficiently to protect the integrity of containment dams and berms and prevent overtopping and/or structural failure. Unless a California-registered civil engineer certifies (based on design, construction, and conditions of operation and maintenance) that less freeboard is adequate, the operating freeboard in any pond shall never be less than two feet (measured vertically from the lowest possible point of overflow). As a means of management and to discern compliance with this requirement, the Discharger shall install and maintain in each pond a permanent staff gauge with calibration marks that clearly show the water level at design capacity and enable determination of available operational freeboard.

10. The treatment, storage, and disposal ponds or structures 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.

11. On or about **1 October** of each year, available capacity shall at least equal the volume necessary to comply with Discharge Specifications F.9 and F.10.

12. All ponds and open containment structures shall be managed to prevent breeding of mosquitoes. Specifically:

    a. An erosion control program shall be implemented to ensure that small coves and irregularities are not created around the perimeter of the water surface.

    b. Weeds shall be minimized through control of water depth, harvesting, or herbicides.

    c. Dead algae, vegetation, and debris shall not accumulate on the water surface.

    d. The Discharger shall consult and coordinate with the local Mosquito Abatement District to minimize the potential for mosquito breeding as needed to supplement the above measures.

13. Newly constructed or rehabilitated berms or levees (excluding internal berms that separate ponds or control the flow of water within a pond) shall be designed and constructed under the supervision of a California Registered Civil Engineer.

14. Wastewater contained in any unlined pond shall not have a pH less than 6.0 or greater than 9.0.

~~14.~~15. **Every five years after completing the liner installation of a pond**, the Discharger shall test the integrity of the pond liner and repair all significant leaks in accordance with an approved workplan pursuant to Provision I.1.d

G. Land Application Area Specifications

1. Application of waste constituents to the land application areas (LAAs) shall be at reasonable agronomic rates to preclude creation of a nuisance or degradation of groundwater, considering the crop, soil, climate, and irrigation management system. The annual nutritive loading of each LAA, including the nutritive value of organic and chemical fertilizers and of the wastewater shall not exceed the annual crop demand.

2. Wastewater shall not be discharged to the LAAs when the soil is saturated or in a manner that causes wastewater to stand for greater than 48 hours.

3. Discharge of process wastewater to any LAA not having a fully functional tailwater/runoff control system is prohibited.

4. All tailwater and storm water shall be confined to the LAAs and shall not enter any surface water drainage course or storm water drainage, except that tailwater may be returned to the storage ponds.

5. Grazing of animals on the LAAs is prohibited.

6. Discharge of process wastewater to land overlying septic system leach lines or seepage pits is prohibited.

H. Solids Disposal Specifications

Sludge, as used in this document, means the solid, semisolid, and liquid residues removed during primary, secondary, or advanced wastewater treatment processes. Solid waste refers to grit and screenings generated during preliminary treatment. Residual sludge means sludge that will not be subject to further treatment at the WWTS.

1. Sludge and solid waste shall be removed from screens, sumps, ponds, and clarifiers as needed to ensure optimal plant operation.

2. Any handling and storage of residual sludge, solid waste, and biosolids at the WWTS shall be temporary (i.e., no longer than one year) 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 the groundwater limitations of this Order.

3. Residual sludge, biosolids, and solid waste shall be disposed of in a manner approved by the Executive Officer and consistent with Title 27, division 2. Removal for further treatment, disposal, or reuse at disposal sites (i.e., landfills, WWTFs, composting sites, soil amendment sites) operated in accordance with valid waste discharge requirements issued by a Regional Water Board will satisfy this specification.

4. Any proposed change in sludge use or disposal practice shall be reported in writing to the Executive Officer at least 90 days in advance of the change.

I. Provisions

1. The following reports shall be submitted pursuant to CWC Section 13267 and shall be prepared as described in Provision K.5:

   a. **By 1 January 2013**, the Discharger shall submit a *Groundwater Limitations Compliance Assessment Plan*. The plan shall describe and justify the statistical methods used to propose groundwater concentration limits and compliance for the constituents listed in the Monitoring and Reporting Program. Compliance shall be determined annually based on an interwell statistical analysis that uses methods prescribed in Title 27, section 20415(e)(7) and (8) to compare monitoring data collected at each down gradient well to background groundwater quality as measured in MW-5.

   b. **By 1 April 2013**, the Discharger shall submit a *LAA Flow Meter Installation Report* that describes the installation of flow meters as needed to individually monitor flows from all sources to each LAA (i.e., Azevedo, Darling, and Heard properties). The report shall specify how daily wastewater flows to each check within a given LAA will be estimated if more than one check is to be irrigated at one time and how supplemental irrigation flows to each check will be measured or estimated.

   c. **By 1 February 2014**, the Discharger shall submit a *Treatment System Performance Evaluation Report* that provides the following information:

      i. A summary of all flow, influent, and effluent monitoring data between the first date of operation of the new WWTS and 30 December 2013;

      ii. Identification of each upset event that occurred during that period, the cause of the upset, operational modifications made to correct the upset, and the duration of the upset event;

      iii. An evaluation of need for supplemental alkalinity (including typical range of dose rates and the criteria used to select the dose rate) and its effect on effluent FDS (specifying the expected range of incremental FDS increases associated with optimum nitrogen removal);

      iv. An evaluation of the Discharger's ability to comply with final effluent limits for salinity and nitrogen without additional treatment or control;

      v. Proposed final performance based effluent limits for BOD, total nitrogen, FDS, and chloride;

      vi. Evaluation of compliance with the groundwater limitations of this Order and temporal trends since adoption of WDRs, and;

vii. Proposed scope and implementation schedule for additional control (e.g., lining wastewater storage ponds) or treatment if needed to comply with the groundwater limitations. The schedule for implementation shall not extend beyond **1 December 2015**. If any proposed final effluent limitation is greater than the final limitation of this Order, the Discharger shall also submit a new *Report of Waste Discharge* that provides the information included in Attachment C, which is attached hereto and made part of this Order by reference and demonstrates that the proposed limit(s) will ensure compliance with the Basin Plan.

d. **By 1 December 2019**, the Discharger shall submit a *Pond Liner Integrity Evaluation Workplan* that specifies the means and methods that the Discharger proposes to use to evaluate all geosynthetic liner systems to comply with Discharge Specification F.15~~**By 1 December 2015**, unless the Executive Officer issues written approval to do otherwise pursuant to submittal of report specified in Provision I.1.c, the Discharger shall submit a *Wastewater Treatment Facility Upgrades Completion Report*. The report shall describe the completed improvements and provide all construction quality assurance reports (as applicable) associated with completion of the improvements proposed in the approved *Treatment System Performance Evaluation Report*.~~

e. **At least 120 days prior** to planned construction or use of any sludge drying and storage areas, the Discharger shall submit for approval an engineered design and operational plan of the sludge drying system. At a minimum, the design and operational plan shall include lining the ponds, annual sludge cleanout, and maintenance methods to avoid nuisance conditions. The report shall detail the design for sludge removal, drying, and disposal. The plan shall specifically describe the phasing of the project, measures to be used to control runoff or percolate from the sludge as it is drying, and a schedule that shows how all dried sludge will be removed from the site prior to the onset of the rainy season (**1 October**).

f. **At least 60 days after** completing any phased improvement of lining pond, the Discharger shall submit a *Pond Liner Installation Completion Report*. The report shall document the lining of the ponds completed in accordance with the 18 December 2015 Construction Quality Assurance Plan and certify that the ponds are fully functional and ready to receive wastewater in compliance with the requirements of this Order. The report shall include final dimensions and liner specifications and document all construction observation, testing, and test results for the pond lining system showing that the lining system was leak-free at the time of completion.

g. **After 1 October 2019 and within 72 hours** of discharging wastewater that exceeds the final effluent limits to an unlined pond (i.e. an emergency discharge), the Discharger shall submit an *Emergency Response Report*. The plan shall document the following:

i. An explanation of what caused the emergency discharge,

ii. The duration or expected duration to complete the emergency discharge,

iii. The volume of wastewater discharged or expected to be discharged during the emergency duration,

iv. A one-sample characterization of the wastewater discharged to the unlined pond(s) for nitrogen, FDS, BOD, and pH,

v. The actions taken to stop the discharge and to transfer the wastewater either to the wastewater treatment system or the lined effluent storage ponds, and

vi. The actions that have or will be taken to prevent the reoccurrence of the emergency discharge condition.

For every seven day period of emergency discharge, the Discharger shall submit an updated *Emergency Response Report.* After the first seven day period of emergency discharge, Central Valley Water Board staff may evaluate whether the emergency discharge is within compliance of the effluent limits.

2. If groundwater monitoring results show that the discharge of waste is causing groundwater to violate any groundwater limitation contained in this Order, within **120 days** of the request of the Executive Officer, the Discharger shall submit a BPTC Evaluation Workplan that sets forth the scope and schedule for a systematic and comprehensive technical evaluation of each component of the facility's waste treatment and disposal system to determine best practicable treatment and control for each waste constituent that exceeds a Groundwater Limitation. The workplan shall contain a preliminary evaluation of each component of the WWTS and effluent disposal system and propose a time schedule for completing the comprehensive technical evaluation. The schedule to complete the evaluation shall be as short as practicable, and shall not exceed one year.

3. If the quality of the TID process water supply changes significantly or reduced availability of higher quality TID water necessitates increased use of a lower quality water supply, the Discharge shall submit a new Report of Waste Discharge within 90 days. This Order may be reopened if the Report of Waste Discharge demonstrates that an unavoidable change in the process water supply quality makes compliance with the effluent and/or groundwater limitations of this Order infeasible and that the proposed limits will ensure compliance with the Basin Plan.

4. A discharger whose waste flow has been increasing, or is projected to increase, shall estimate when flows will reach hydraulic and treatment capacities of its treatment, collection, and disposal facilities. The projections shall be made in January, based on the last three years' monthly average flow and total annual flows, as appropriate. When any projection shows that capacity of any part of the facilities may be exceeded in four years, the discharger shall notify the Central Valley Water Board by **31 January**.

5. In accordance with California Business and Professions Code sections 6735, 7835, and 7835.1, engineering and geologic evaluations and judgments shall be performed by or under the direction of registered professionals competent and proficient in the fields pertinent to the required activities. All technical reports specified herein that contain workplans for investigations and studies, that describe

the conduct of investigations and studies, or that contain technical conclusions and recommendations concerning engineering and geology shall be prepared by or under the direction of appropriately qualified professional(s), even if not explicitly stated. Each technical report submitted by the Discharger shall bear the professional's signature and stamp.

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

7. The Discharger shall comply with Monitoring and Reporting Program R5-2012-0104-01, which is part of this Order, and any revisions thereto as ordered by the Executive Officer. The submittal dates of Discharger self-monitoring reports shall be no later than the submittal date specified in the MRP.

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

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

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

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

12. 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.

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

14. The Discharger shall not allow pollutant-free wastewater to be discharged into the wastewater collection, treatment, and disposal systems in amounts that significantly diminish the system's capability to comply with this Order. Pollutant-free wastewater means rainfall, groundwater, cooling waters, and condensates that are essentially free of pollutants.

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

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

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

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

19. 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.

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

Any person aggrieved by this action of the Central Valley Water Board may petition the State Water Board to review the action in accordance with Water Code section 13320 and California Code of Regulations, title 23, sections 2050 and following. The State Water Board must receive the petition by 5:00 p.m., 30 days after the date of this Order, except that if the thirtieth day following the date of this Order falls on a Saturday, Sunday, or state holiday, the petition must be received by the State Water Board by 5:00 p.m. on the next business day. Copies of the law and regulations applicable to filing petitions may be found on the Internet at:

http://www.waterboards.ca.gov/public_notices/petitions/water_quality

or will be provided upon request.

I, PAMELA C. CREEDON, Executive Officer, do hereby certify the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Central Valley Region, on 4 October 2012 and as amended on ___.

_____

PAMELA C. CREEDON, Executive Officer