

ATTACHMENT C

Contents Of A Nutrient Management Plan And Technical Standards For Nutrient Management For Existing Milk Cow Dairies

Waste Discharge Requirements General Order No. ____ (Order) requires owners and operators of existing milk cow dairies (Dischargers) who apply manure, bedding, or process wastewater, and/or who provide process wastewater to third parties for application, to land for nutrient recycling to develop and implement management practices that control nutrient losses and that are described in a Nutrient Management Plan (NMP). The purpose of the NMP is to budget and manage the nutrients applied to the land application area(s) considering all sources of nutrients, crop requirements, soil types, climate, and local conditions in order to prevent adverse impacts to surface water and groundwater quality. The NMP must take the site-specific conditions into consideration in identifying steps that will minimize nutrient movement through surface runoff or leaching past the root zone.

The NMP must contain, at a minimum, all of the elements listed below under Contents of a Nutrient Management Plan and must be in conformance with the applicable Technical Standards for Nutrient Management (Technical Standards), also listed below. Note that the NMP must be updated in response to changing conditions, monitoring results and other factors.

A specialist who is certified in developing nutrient management plans shall develop the NMP. A certified specialist is a Professional Soil Scientist, Professional Agronomist, Professional Crop Scientist, or Crop Advisor certified by the American Society of Agronomy or a Technical Service Provider certified in nutrient management in California by the Natural Resources Conservation Service (NRCS). The Executive Officer may approve alternative proposed specialists. Only NMPs prepared and signed by these parties will be considered certified.

Contents of a Nutrient Management Plan

The NMP will include the initial Preliminary Dairy Facility Assessment (Attachment A) and the annual updates as required by Monitoring and Reporting Program No. _____. Copies of these assessments shall be maintained for 10 years.

The NMP shall identify the name and address of the dairy, the dairy operator, and legal owner of the dairy property as reported in the Notice of Intent (Attachment A) and shall contain all of the following elements to demonstrate that the Discharger can control nutrient losses that may impact surface water or groundwater quality and comply with the requirements of the Order and the Technical Standards for Nutrient Management (Technical Standards).

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I. Land Application Area Information

A. Identify each field under the Discharger's control where manure and/or process wastewater is (are) applied and each field under the control of a third party where the Discharger's process wastewater is applied. Each field shall be identified on a single published base map at an appropriate scale which also identifies in sufficient detail nearby surface waters, wastewater conveyance structures, pumping facilities, process wastewater mixing and/or distribution points with irrigation water supplies, flow meter locations, drainage controls (berms, levees, etc.) culverts, drainage easements, drainage flow directions in each field, tailwater and storm water drainage controls, storm water discharge points, subsurface (tile) drainage systems (including discharge points and lateral extent), irrigation supply wells, and sampling locations for discharges of storm water and tailwater to surface water from the field.

B. Provide the following information for each field identified in I.A above:

1. Field's common name.
2. Assessor's Parcel Number.
3. Total acreage.
4. Crops grown.
5. Information on who owns and/or leases the field.
6. Information on who has control over the application of dairy waste and other nutrient sources to the field.
7. Proposed sampling locations for discharges of storm water and tailwater to surface water.
8. Copies of any formal agreements for use of the field for the application of manure or process wastewater from the Discharger's dairy (Technical Standards V.A.1 and V.A.9 below) if the field is not owned, leased, or controlled by the Discharger.

C. Identify each field under the control of a third party where only solid manure from the Discharger is applied. Each such field shall be identified on a single published base map at an appropriate scale by the following:

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1. Assessor's Parcel Number.
2. Total acreage.
3. Crops grown.
4. Information on who owns or leases the field.
5. Information on who has control over the application of solid manure to the field.
6. Copies of any formal agreements for use of the field for the application of solid manure from the Discharger's dairy that specifies plans for the use and management of the offsite cropland (Technical Standards V.A.1 and V.A.9 below).

D. Identify each field under the control of the Discharger where neither process wastewater nor manure is applied. Each field shall be identified on a single published base map at an appropriate scale by the following:

1. Assessor's Parcel Number.
2. Total acreage.
3. Crops grown.
4. Information on who owns or leases the field.

II. Sampling and Analysis (see Technical Standard I below)

Identify the sampling methods, sampling frequency, and analyses to be conducted for soil, manure, process wastewater, irrigation water, and plant tissue analysis (Technical Standard I below).

III. Nutrient Budget (see Technical Standard V below)

The Discharger shall develop a nutrient budget for each field identified in I.A above which establishes planned rates of nutrient applications for each crop based on soil test results, manure and process wastewater analyses, crop nutrient requirements and patterns, seasonal and climatic conditions, the use and timing of irrigation water, and the nutrient application restrictions listed in Technical Standards V.A through V.D below. The Nutrient Budget shall include the following:

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- A. The rate of application of manure and process wastewater for each crop in each field (also considering sources of nutrients other than manure or process wastewater) to meet each crop's needs (from III.C above) without exceeding the application rates specified in Technical Standard V.B below. The basis for the application rates must be provided.
 - B. The timing of applications for each crop in each field and the basis for the timing (Technical Standard V.C below). The maximum period of time anticipated between land application events based on proper timing and compliance with Technical Standard V.C. below. This will be used in the Waste Management Plan (item II.A of Attachment B) to determine the storage capacity needs.
 - C. The method of manure and process wastewater application for each crop in each field (Technical Standard V.D below).
 - D. If phosphorus and/or potassium applications exceed the amount of these elements removed from the field in the harvested portion of the crop, the soil and crop tissue analyses shall be reviewed by an agronomist at least every five years. If this review determines that the buildup of phosphorus or potassium threatens to reduce the long-term productivity of the soil or the yield, quality or use of the crops grown, application rates will be adjusted downward to prevent or correct the problem.
- IV. Setbacks, Buffers, and Other Alternatives to Protect Surface Water (see Technical Standard VII below)
- A. Identify all potential surface waters or conduits to surface water that are within 100 feet of any field identified in I.A above where manure or process wastewater is applied.
 - B. For each field that has been identified in I.A above to be within 100 feet of a surface water or a conduit to surface water, identify the setback, vegetated buffer, or other alternative practice that will be implemented to protect surface water (Technical Standard VII below).
- V. Field Risk Assessment (see Technical Standard VIII below)
- A. Identify erosion, runoff, and water management control measures, conservation practices, and management activities used, and each one's ability, to (1) reduce the potential for movement of nitrogen and phosphorus from each land application area identified in I.A above to surface water and groundwater (Technical Standard VIII.A below) and (2) comply with Technical Standard VI below (Wastewater Management).

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B. Identify concentrations of nitrogen and phosphorus present in discharges of manure, process wastewater, tailwater, subsurface (tile) drainage, or storm water from each field identified in I.A above to surface water (Technical Standard VIII.B below).

C. Identify methods and a schedule to further control any observed discharges of nitrogen or phosphorus identified in V.III.B above.

VI. Record-Keeping (see Technical Standard IX below)

Identify the records that will be maintained for each land application area identified in I.A above.

VII. Nutrient Management Plan Review (see Technical Standard X below)

A. Identify the schedule for review and revisions to the NMP.

B. Identify the person who will conduct the NMP review and revisions.

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Technical Standards for Nutrient Management

The Discharger shall comply with the following Technical Standards for Nutrient Management in the development and implementation of the Nutrient Management Plan (NMP).

I. Sampling and Analysis

Soil, manure, process wastewater, irrigation water, and plant tissue shall be monitored, sampled, and analyzed as required in Monitoring and Reporting Program No. ____, and any future revisions thereto. The results of these analyses shall be used during the development and implementation of the NMP.

II. Crop Requirements

- A. Realistic yield goals for each crop in each field shall be established. For new crops or varieties, industry yield recommendations may be used until documented yield information is available.
- B. Each crop's nutrient requirements for nitrogen, phosphorus, and potassium shall be determined based on recommendations from the University of California, *Western Fertilizer Handbook* (9th Edition), or from historic crop nutrient removal.

III. Available Nutrients

- A. All sources of nutrients (nitrogen, phosphorus, and potassium) available for each crop in each field shall be identified prior to land applications. Potential nutrient sources include, but are not limited to, manure, process wastewater, irrigation water, commercial fertilizers, soil, and previous legume crops.
- B. Nutrient values of soil, manure, process wastewater, and irrigation water shall be determined based on laboratory analysis. "Book values" for manure and process wastewater may be used for planning of first year application(s) during initial development of the NMP if necessary. Acceptable book values are those values recognized by American Society of Agricultural and Biological Engineers (ASABE), the NRCS, and/or the University of California that accurately estimate the nutrient content of the material. The nutrient content of commercial fertilizers shall be derived from the published values certified by the California Department of Food and Agriculture.
- C. Nutrient credit from previous legume crops shall be determined by methods acceptable to the University of California Cooperative Extension, the Natural

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Resources Conservation Service (NRCS), or a specialist certified in developing nutrient management plans.

IV. Overall Nutrient Balance

The total of nutrients generated at the dairy from manure and process wastewater plus the total nutrients available in soil, planned applications of commercial fertilizers, irrigation water, and previous legume crops shall not exceed the total nutrient requirements for all crops in all of the land application areas, unless the Discharger implements management practices (such as offsite removal of the excess nutrients, treatment, or storage) that will prevent impacts to surface water or groundwater quality due to the excess nutrients.

V. Nutrient Budget

The NMP shall include a nutrient budget which includes planned rates of nutrient applications for each crop that do not exceed the crop's requirements for total nitrogen at the time of application considering the stage of crop growth and that also considers all nutrient sources, climatic conditions, the irrigation schedule, and the application limitations in A through D below.

A. General Standards for Nutrient Applications

1. Prohibition A.8 of the Order: *“The application of waste to lands not owned, leased, or controlled by the Discharger without written permission from the landowner or in a manner not approved by the Executive Officer, is prohibited.”*
2. Prohibition A. 9 of the Order: *“The land application of manure or process wastewater for other than nutrient recycling is prohibited.”*
3. General Specification B.14 of the Order: *“The application of manure or process wastewater to the land application area must be done in a manner that is consistent with a NMP that is developed as required in Required Reports and Notices H.2.b.”*
4. Land Application Specification C.2 of the Order: *“Land application of process wastewater to offsite property under third party control shall be conducted (1) in accordance with a certified NMP consistent with the technical standards for nutrient management as specified in Attachment C and (2) under a written formal agreement, which shall be included in the Discharger's NMP. The Discharger shall include management of such land application areas as part of the Discharger's NMP (see Contents of a Nutrient Management Plan in Attachment C).”*

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5. Land Application Specification C.3 of the Order: *“The Discharger shall have a written agreement with any third party that has control on the use of solid manure provided by the Discharger. The written agreement with the third party shall be included in the Discharger’s NMP and shall specify plans for the use and management of the third party’s land application area. Land application areas under control of a third party that receive solid manure from the Discharger will be regulated under the Conditional Waiver of Waste Discharge Requirements for Discharges from Irrigated Lands (Order No. R5-2006-0053 for Coalition Group or Order No. R5-2006-0054 for Individual Discharger).”*
6. Land Application Specification C.5 of the Order: *“The application of waste from manure and other sources for nutrient recycling to any cropland under control of the Discharger shall meet the following conditions:*
 - a. *The application is in accordance with a certified NMP developed and implemented in accordance with Required Reports and Notices H.2.b and Attachment C of this Order; and*
 - b. *Records are prepared and maintained as specified in Record-Keeping Requirements of Monitoring and Reporting Program No. ____.”*
7. Land Application Specification C.6 of the Order: *“The application of manure, process wastewater or other wastes to cropland shall be at rates that preclude development of vectors or other nuisance conditions and meet the conditions of the certified NMP.”*
8. Land Application Specification C.8 of the Order: *“All applied process wastewater must infiltrate completely within 72 hours after application.”*
9. Land Application Specification C.9 of the Order: *“Process wastewater shall not be applied to land application areas during periods when the soil is at or above field moisture capacity unless consistent with a certified NMP.”*
10. Provision E.5 of the Order: *“This Order does not apply to facilities where wastes such as, but not limited to, whey, cannery wastes, septage, sludge, biosolids, ash or similar types of waste are generated onsite or are proposed to be brought onto the dairy or associated cropland for the purpose of nutrient recycling or disposal. The Discharger shall submit*

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a complete Report of Waste Discharge and receive WDRs or a waste-specific waiver of WDRs from the Central Valley Water Board prior to receiving this waste.”

11. Provision E.7 of the Order: *“If plans for animal waste include application to land not under ownership of the Discharger, the Discharger’s NMP shall include this land as specified in Attachment C and the Discharger shall provide to the Executive Officer a copy of a written agreement with the property owner that specifies plans for the use and management of the offsite cropland.”*
12. Plans for nutrient management shall specify the form, source, amount, timing, and method of application of nutrients on each field to minimize nitrogen and/or phosphorus movement to surface and/or ground waters to the extent necessary to meet the provisions of the Order.
13. Where crop material is not removed from the field, waste applications are not allowed. For example, if a pasture is not grazed or mowed (and cuttings removed from the field), waste shall not be applied to the pasture.
14. Manure and/or process wastewater will be applied to the field for use by the first crop covered by the NMP only to the extent that soil tests indicate a need for nitrogen application.
15. Supplementary commercial fertilizer(s) and/or soil amendments may be added when the application of nutrients contained in manure and/or process wastewater alone is not sufficient to meet the crop needs, as long as these applications do not exceed provisions of the Order.
16. Nutrient applications to a crop shall not be made prior to the harvest of the previous crop.
17. Water applications shall not exceed crop water use requirements except where leaching is required to control salt levels in the soil. Leaching amounts shall not exceed the leaching requirements (leaching fraction) calculated using procedures in “Water Quality for Agriculture” by R.S. Ayers and D.W. Westcot, Food and Agriculture Organization of the United Nations Paper 29, Revision 1, 1985.
18. Nutrients shall be applied in such a manner as not to degrade the soil’s structure, chemical properties, or biological condition.

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B. Nutrient Application Rates

1. General

- a. Planned rates of nutrient application shall be determined based on soil test results, nutrient credits, manure and process wastewater analysis, crop requirements and growth stage, seasonal and climatic conditions, and use and timing of irrigation water. Actual applications of nitrogen to any crop shall be limited to the amounts specified below.
- b. Nutrient application rates shall not attempt to approach a site's maximum ability to contain one or more nutrients through soil adsorption. Excess applications or applications that cause soil imbalances should be avoided. Excess manure nutrients generated by the Discharger must be handled by export to a good steward of the manure, or the development of alternative uses.

2. Nitrogen

- a. Total nitrogen applications to a field prior to and during the growing of a crop shall not exceed 1.0 times the total nitrogen removed from the field through the harvest and removal of the previous crop. Additional applications of nitrogen are allowable if the following conditions are met:
 - i. Plant tissue testing has been conducted and it indicates that additional nitrogen is required to obtain a crop yield typical for the soils and other local conditions;
 - ii. The amount of additional nitrogen applied is based on the plant tissue testing and is consistent with University of California Cooperative Extension written guidelines or written recommendations from a professional agronomist;
 - iii. The form, timing, and method of application make the nitrogen immediately available to the crop; and
 - iv. Records are maintained documenting the need for additional applications.
- b. At no time will application rates result in total nitrogen applied to the land application area exceeding 1.65 times the total nitrogen

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removed from the field through the harvest and removal of the previous crop.

- c. If, in calendar year 2010 or later years, application of total nitrogen to a field exceeds 1.65 times total nitrogen removed from the field through the harvest and removal of the previous crop, and the irrigation leaching fraction (see V.A.15) for the field exceeds 1.2, the Discharger shall revise the NMP to prevent these exceedances.

3. Phosphorus and Potassium

- a. Phosphorus and potassium may be applied in excess of crop uptake rates. If, however, monitoring indicates that levels of these elements are causing adverse impacts, corrective action must be taken. Cessation of applications may be necessary until crop uptake and harvest has reduced the concentration in the soil.

Important Note:

Use of animal manure as a primary source of nitrogen commonly results in applications of phosphorus and potassium at rates that exceed crop needs. Over time, these elements build up in the soils and can cause adverse impacts. For example, phosphorus will leave the field in surface runoff and contribute to excessive algae growth in receiving waters and potassium can build up in crops to the point of limiting their use as animal feed. Application of these nutrients at agronomic levels, along with reasonable erosion control measures, will normally prevent such problems.

Nutrients are being evaluated in several Central Valley surface waters. Where these studies show that nutrients are adversely impacting beneficial uses, the Regional Water Board will work with parties in the watershed, including dairies, to reduce discharges of phosphorus, nitrogen and possibly other constituents.

C. Nutrient Application Timing

- 1. Process wastewater application is not the same as irrigation. Process wastewater application scheduling should be based on the nutrient needs of the crop, the daily water use of the crop, the water holding capacity of the soil, and the lower limit of soil moisture for each crop and soil.
- 2. The application of process wastewater is not allowed during weeks of the year when historical records for the area indicate that rainfall exceeds crop water demand. The NMP shall identify these weeks and

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during this period application of irrigation water (without waste) is only allowed if an extended dry spell places the crop at risk.

3. The timing of nutrient application must correspond as closely as possible with plant nutrient uptake characteristics, while considering cropping system limitations, weather and climatic conditions, and field accessibility.
4. The Discharger shall avoid winter nutrient application for spring-seeded crops.
5. Except for orchards, nutrients shall not be applied during periods when a crop is dormant.

D. Nutrient Application Methods

1. The Discharger shall apply nutrient materials uniformly to application areas or as prescribed by precision agricultural techniques.
2. Land Application Specification C.4 of the Order: *“Land application areas that receive dry manure shall be managed to minimize erosion and to prevent the discharge of storm water to surface water unless consistent with a Nutrient Management Plan. Except on pasture or alfalfa, dry manure shall be incorporated into the soil as soon as practicable, but no later than 48 hours after application.”*

VI. Wastewater Management on Land Application Areas

Control of water and process wastewater applications and runoff is a part of proper nutrient management since water transports nutrients, salts, and other constituents from cropland to groundwater and surface water. The Discharger shall comply with the following provisions of the Order, which place requirements on applications of manure and process wastewater to, and runoff from, cropland:

- A. Prohibition A.3 of the Order: *“The discharge of waste from existing milk cow dairies to surface waters which causes or contributes to an exceedance of any applicable water quality objective in the Basin Plans or water quality criteria set forth in the California Toxics Rule and the National Toxics Rule is prohibited.”*
- B. Prohibition A.4 of the Order: *“The discharge or disposal of waste from existing milk cow dairies that results in pollution or nuisance is prohibited.”*

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- C. Prohibition A.10 of the Order: *“The discharge of wastewater to surface waters from cropland is prohibited. Irrigation supply water that comes into contact or is blended with waste or wastewater shall be considered wastewater under this Prohibition.”*
- D. Prohibition A.11 of the Order: *“The application of process wastewater to a land application area before, during, or after a storm event that would result in runoff of the applied water is prohibited.”*
- E. Prohibition A.12 of the Order: *“The discharge of storm water to surface water from a land application area where manure or process wastewater has been applied is prohibited unless the manure has been incorporated into the soil and the land application area has been managed consistent with a certified Nutrient Management Plan (NMP).”*
- F. General Specification B.1 of the Order: *“The collection, treatment, storage, or disposal of wastes at an existing milk cow dairy shall not result in: a discharge of waste constituents in a manner which could cause degradation of surface water or groundwater except as allowed by this Order, contamination or pollution of surface water or groundwater, or a condition of nuisance (as defined by the California Water Code Section 13050).”*
- G. Land Application Specification C.4 of the Order: *“Land application of wastes for nutrient recycling from existing milk cow dairies shall not cause the underlying groundwater to contain any waste constituent, degradation product, or any constituent of soil mobilized by the interactions between applied wastes and soil or soil biota, to exceed the groundwater limitations set forth in this Order.”*
- H. Land Application Specification C.8 of the Order: *“All applied process wastewater must infiltrate completely within 72 hours after application.”*
- I. Land Application Specification C.9 of the Order: *“Process wastewater shall not be applied to land application areas during periods when the soil is at or above field moisture capacity unless consistent with a certified NMP.”*

VII. Setbacks and Vegetated Buffer

- A. Land Application Specification C.10 of the Order: *“Manure and process wastewater shall not be applied closer than 100 feet to any down gradient surface waters, open tile line intake structures, sinkholes, agricultural or domestic well heads, or other conduits to surface waters, unless a 35-foot wide vegetated buffer is substituted for the 100-foot setback or alternative conservation practices or field-specific conditions will provide pollutant*

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reductions equivalent or better than the reductions achieved by the 100-foot setback.”

- B. A setback is a specified distance from surface waters or potential conduits to surface waters where manure and process wastewater may not be land applied, but where crops may continue to be grown.
- C. A vegetated buffer is a narrow, permanent strip of dense perennial vegetation where no crops are grown and which is established parallel to the contours of and perpendicular to the dominant slope of the field for the purposes of slowing water runoff, enhancing water infiltration, trapping pollutants bound to sediment, and minimizing the risk of any potential nutrients or pollutants from leaving the field and reaching surface waters.
- D. The minimum widths of setbacks and vegetated buffers must be doubled around the wellhead of a drinking water supply well constructed in a sole-source aquifer.
- E. Practices and management activities for vegetated buffers include the following:
 - 1. Removal of vegetation in vegetated buffers will be in accordance with site production limitations, rate of plant growth, and the physiological needs of the plants.
 - 2. Do not mow below the recommended height for the plant species.
 - 3. Maintain adequate ground cover and plant density to maintain or improve filtering capacity of the vegetation
 - 4. Maintain adequate ground cover, litter, and canopy to maintain or improve infiltration and soil condition.
 - 5. Periodic rest from mechanical harvesting may be needed to maintain or restore the desired plant community following episodic events such as drought.
 - 6. When weeds are a significant problem, implement pest management to protect the desired plant communities.
 - 7. Prevent channels from forming.

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VIII. Field Risk Assessment

- A. The Discharger shall assess the ability of any erosion, runoff, or water management control measures, conservation practices, and management activities to (1) reduce the potential for movement of nitrogen and phosphorus from each land application area and (2) comply with Technical Standard VI (Wastewater Management).
- B. The results of the Discharge and Surface Water Monitoring, Tailwater Monitoring, and Storm Water Monitoring for each land application area required by Monitoring and Reporting Program No. ____ shall be used by the Discharger to assess the movement of nitrogen and phosphorus from each land application area where manure and/or process wastewater is applied.

IX. Record-Keeping

The Discharger shall maintain records for each land application area as required in Monitoring and Reporting Program No. ____ (Monitoring Provisions 37.c, 37.d, and 37.f).

X. Nutrient Management Plan Review

- A. The NMP shall be updated when discharges from any land application area exceed water quality objectives, a nutrient source has changed, site-specific information has become available to replace default values used in the overall nutrient balance or the nutrient budget, or nitrogen application rates in any field where manure and/or process wastewater is applied exceed the rates specified in Technical Standard V.B.
- B. The NMP shall be updated prior to any anticipated changes that would affect the overall nutrient balance or the nutrient budget such as, but not limited to, a crop rotation change, changes in the available cropland, or the changes in the volume of process wastewater generated.
- C. The Discharger shall review the NMP at least once every 5 years and notify the Regional Board in the annual report of any proposed changes that would affect the NMP.

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