

ATTACHMENT C
ORDER R5-2017-0000

**CONTENTS OF A NUTRIENT MANAGEMENT PLAN
AND
TECHNICAL STANDARDS FOR NUTRIENT MANAGEMENT
FOR
CONFINED BOVINE FEEDING OPERATIONS**

Waste Discharge Requirements General Order R5-2017-0000 (hereinafter referred to as the Bovine General Order, or Order) requires owners and operators of Confined Bovine Feeding Operations (Dischargers) who operate a “land application area” where manure, bedding, or wastewater may be applied to land or pasture 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 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.

Owners and operators of Confined Bovine Feeding Operations (Dischargers) who do not apply manure, bedding, or wastewater to land for nutrient recycling do not need to prepare an NMP.

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, 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.

The NMP is linked to other sections of the Bovine General Order. The Monitoring and Reporting Program specifies minimum amounts of monitoring that must be conducted at the bovine facility. As indicated below, this information must be used to make management decisions related to nutrient management. Likewise,

the timing and amounts of wastewater applications to crops must be known to correctly calculate the amount of storage needed in retention ponds.

Wastes and land application areas shall be managed to prevent contamination of crops grown for human consumption. The term “crops grown for human consumption” refers only to crops that will not undergo subsequent processing which adequately removes potential microbial danger to consumers.

Contents of a Nutrient Management Plan

The NMP will include the Notice of Intent (**Attachment A** to this Order) and the annual reports required by Monitoring and Reporting Program R5-2017-0000. Copies of these reports shall be maintained on the facility for 5 years.

The NMP shall identify the name and address of the Confined Bovine Feeding Operation, and the name and mailing address of the operator and of the legal owner of the property 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).

A. Land Application Area Information

1. Identify each land application area, including pasture land (under the Discharger’s control, whether it is owned, rented, or leased, to which manure or wastewater from the production area is or may be applied for nutrient recycling) on a published base map (topographic map or aerial photo) at an appropriate scale which includes:
 - a. A field identification system (Assessor’s Parcel Number); land application area by name or number; total acreage of each land application area; crops grown; indication if each land application area is owned, rented, or leased by the Discharger; indication of the type of waste applied (solid manure only, wastewater only, or both solid manure and wastewater); drainage flow direction in each field, nearby surface waters, and storm water discharge points; tailwater and storm water drainage controls; subsurface (tile) drainage systems (including discharge points and lateral extent); irrigation supply wells and groundwater monitoring wells; sampling locations for discharges of storm water and tailwater to surface water from the field; and
 - b. Wastewater conveyance structures, discharge points and discharge mixing points with irrigation water supplies; pumping

facilities; flow meter locations; drainage ditches and canals, culverts, drainage controls (berms, levees, etc.), and drainage easements.

2. Provide the following information for each land application area identified in A.1 of this attachment:
 - a. Field's common name (name used when keeping records of nutrient and waste applications);
 - b. Assessor's Parcel Number;
 - c. Total acreage;
 - d. Crops grown and anticipated crop rotation;
 - e. Information on who owns and/or leases the field; and
 - f. Proposed sampling locations for discharges of storm water and tailwater to surface water.
3. Provide copies of written agreements with third parties that receive wastewater for their own use from the Discharger's bovine feeding operation (Technical Standards E.1.a and E.1.c of this attachment).
4. Identify each field under the control of the Discharger and within five miles of the bovine feeding operation where neither wastewater nor manure is applied. Each field shall be identified on a published base map at an appropriate scale by the following:
 - a. Assessor's Parcel Number;
 - b. Field's common name (name used when keeping records of nutrient and waste applications);
 - c. Total acreage; and
 - d. Whether the field is registered under the Irrigated Lands Regulatory Program.

Note: The NMP must be updated and the Central Valley Water Board notified in writing before waste is applied to the lands identified in this section.

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

Identify the sample location, sampling methods, sampling frequency, and analyses to be conducted for soil, manure, wastewater, irrigation water, and plant tissue analysis (Technical Standard A of this attachment).

C. Nutrient Budget (see Technical Standard E of this attachment)

The Discharger shall develop a nutrient budget for each land application area. The nutrient budget shall establish planned rates of nutrient applications for each crop based on soil test results, manure and wastewater analyses, irrigation water 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 E.1 through E.4 of this attachment. The Nutrient Budget shall include the following:

1. The planned rate of application of manure and wastewater for each crop in each land application area (also considering sources of nutrients other than manure or wastewater) to meet each crop's nutrient needs without exceeding the application rates specified in Technical Standard E.2 of this attachment. The basis for the planned manure and application rates must be provided;
2. The timing of applications for each crop in each land application area and the basis for the timing (Technical Standard E.3 of this attachment). The maximum period of time anticipated between land application events (storage period) based on proper timing and compliance with Technical Standard E.3 of this attachment. This will be referenced in the Waste Management Plan (item B.1 of **Attachment B**) to determine the storage capacity needs; and
3. The method of manure and wastewater application for each crop in each land application area (Technical Standard E.4 of this attachment).
4. If phosphorus and/or potassium applications exceed the amount of these elements removed from the land application area 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 decreased to prevent or correct the problem.

- D. Setbacks, Buffers, and Other Alternatives to Protect Surface Water (see Technical Standard G of this attachment)
1. Identify all potential surface waters or conduits to surface water that are within 100 feet of any land application area.
 2. For each land application area that is within 100 feet of 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 G of this attachment).
- E. Record-Keeping (see Technical Standard I of this attachment)
- Identify the records that will be maintained for each land application area identified in A.1 of this attachment.
- F. Nutrient Management Plan Review (see Technical Standard J of this attachment)
1. Identify the schedule for review and revisions to the NMP.
 2. Identify the person who will conduct the NMP review and revisions.

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).

A. Sampling and Analysis

Soil, manure, wastewater, irrigation water, and plant tissue shall be monitored, sampled, and analyzed as required in Monitoring and Reporting Program R5-2017-0000, and any future revisions thereto. The results of these analyses shall be used during the development and implementation of the NMP.

B. Crop Requirements

1. Realistic yield goals for each crop in each land application area shall be established. For new crops or varieties, industry yield recommendations may be used until documented yield information is available.
2. 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) for the first year only, during preparation of the NMP, or for the first year of a new crop, or from historical crop nutrient removal (as determined by harvest yields, nutrient requirements, and tissue sample analyses).

C. Available Nutrients

1. All sources of nutrients (nitrogen, phosphorus, and potassium) available for each crop in each land application area shall be identified prior to land applications. Potential nutrient sources include, but are not limited to, existing nutrients in soil, manure, wastewater, irrigation water, commercial fertilizers, and residual biomass from previous crops.
2. Nutrient values of soil, manure, wastewater, and irrigation water shall be determined based on laboratory analysis. "Book values" for manure and wastewater may be used for planning of waste applications during the first year 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 Natural Resources Conservation Service (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 California Department of Food and Agriculture published values.

3. Nutrient credit from previous legume crops shall be determined by methods acceptable to the University of California Cooperative Extension, the NRCS, or a specialist certified in developing nutrient management plans.

D. Overall Nutrient Balance

If the NMP shows that the nutrients generated by the bovine feeding operation exceed the amount needed for crop production in the land application area, the Discharger must implement 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 excess nutrients.

E. 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 considering the stage of crop growth, and that also considers all nutrient sources, climatic conditions, the irrigation schedule, and the application limitations in 1 through 4 below.

1. General Standards for Nutrient Applications

- a. 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.”*
- b. Prohibition A. 9 of the Order: *“The land application of manure or wastewater to cropland for other than nutrient recycling is prohibited.”*
- c. Land Application Specification E.2 of the Order: *“The Discharger shall have a written agreement with each third party prior to receiving wastewater from the Discharger for its own use. Land owned, operated, or controlled completely or in part by Dischargers shall not be considered to be controlled by a third party. Each written agreement shall be included in the Discharger’s Notice of Intent and Nutrient Management Plan, and each new written agreement, modified written agreement, or*

rescission of a written agreement shall be included in the Annual Report for the year in which the written agreement is either reached, modified, or rescinded. The written agreement(s) shall be effective until the third party is covered under waste discharge requirements or a waiver of waste discharge requirements that is adopted by the Central Valley Water Board. The written agreement shall:

- a. *Clearly identify:*

 - i. *The Discharger and Confined Bovine Feeding Operation from which the wastewater originates;*
 - ii. *The third party that will control the application of the wastewater to cropland;*
 - iii. *The Assessor's Parcel Number(s) and the acreage(s) of the cropland where the wastewater will be applied; and*
 - iv. *The types of crops to be fertilized with the wastewater.*

- b. *Include an agreement by the third party to:*

 - i. *Use the wastewater at agronomic rates appropriate for the crops to be grown; and*
 - ii. *Prevent the runoff to surface waters of wastewater, storm water or irrigation supply water that has come into contact with manure or is blended with wastewater.*

- c. *Include a certification statement, as specified in General Reporting Requirement C.7 of the Standard Provision and Reporting Requirements (which is attached to and made part of this Order), which is signed by both the Discharger and third party."*
- d. Land Application Specification E.4 of the Order: *"The application of animal waste and other materials containing nutrients to any cropland under control of the Discharger shall meet the following conditions:*
 - a. *The application is in accordance with a certified Nutrient Management Plan developed and implemented in accordance with Required Reports and Notices K.1.c and **Attachment C** of this Order; and*

- b. *Records are prepared and maintained as specified in the Record-Keeping Requirements of Monitoring and Reporting Program R5-2017-0000.*
- e. Land Application Specification E.6 of the Order: *“The application of waste to cropland shall be at rates that preclude development of vectors or other nuisance conditions and meet the conditions of the certified Nutrient Management Plan.”*
- f. Land Application Specification E.8 of the Order: *“All wastewater applied to land application areas must infiltrate completely within 72 hours after application.”*
- g. Land Application Specification E.9 of the Order: *“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 Nutrient Management Plan (see **Attachment C** of this Order).”*
- h. Provision H.7 of the Order: *“This Order does not apply to facilities where wastes such as, but not limited to, whey, cannery wastes, septage, municipal or industrial sludge, municipal or industrial biosolids, ash or similar types of waste are generated onsite or are proposed to be brought onto the production area or land application area of the Confined Bovine Feeding Operation for the purpose of nutrient recycling or disposal. The Discharger shall submit a complete Report of Waste Discharge and shall not apply or dispose of such waste prior to receiving waste discharge requirements or a waste-specific waiver of waste discharge requirements from the Central Valley Water Board.”*
- i. Plans for nutrient management shall specify the form, source, amount, timing, and method of application of nutrients on each land application area to minimize nitrogen and/or phosphorus movement to surface and/or ground waters to the extent necessary to meet the provisions of the Order.
- j. Where crop material is not removed from the land application area, waste applications are not allowed. For example, if a pasture is not grazed or mowed (and cuttings removed from the land application area), waste shall not be applied to the pasture.

- k. Manure and/or wastewater will be applied to the land application area for use by the first crop covered by the NMP only to the extent that soil tests indicate a need for nitrogen application.
 - l. Supplementary commercial fertilizer(s) and/or soil amendments may be added when the application of nutrients contained in manure and/or wastewater alone is not sufficient to meet the crop needs, as long as these applications do not exceed provisions of the Order.
 - m. Nutrient applications to a crop shall not be made prior to the harvest of the previous crop except where the reason for such applications is provided in the NMP.
 - n. Water applications shall not exceed the amount needed for efficient crop production.
 - o. Nutrients shall be applied in such a manner as not to degrade the soil's structure, chemical properties, or biological condition.
2. Nutrient Application Rates
- a. General
 - i. Planned rates of nutrient application shall be determined based on soil test results, crop tissue test results, nutrient credits, manure and 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.
 - ii. 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.
 - b. Nitrogen

Total nitrogen applications to a land application area prior to and during the growing of a crop will be based on pre-plant or pre-side dress soil analysis to establish residual nitrogen remaining in the field from the previous crop to establish early season nitrogen

applications. Pre-plant or side dress nitrogen applications will not exceed the estimated total crop use as established by the nutrient management plan. Dischargers shall use their best efforts to ensure that application rates do not result in total nitrogen applied to the land application areas exceeding 1.4 times the nitrogen that will be removed from the field in the harvested portion of the crop. Failure to use best efforts is a violation which may be subject to enforcement action.

c. Phosphorus and Potassium

- i. 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 leaving the land application area as surface runoff contributes 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 manure, which contains these nutrients, at agronomic levels, along with reasonable erosion control and runoff control measures, will normally prevent such problems.

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

3. Nutrient Application Timing

- a. Wastewater application is not the same as irrigation. 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.

- b. Wastewater shall not be applied when soils are saturated. During the wet season rainfall can exceed crop water demand. However, the application of wastewater is allowable if tests show that there is an agronomic need and current conditions indicate that threat of nitrate leaching is minimal.
- c. 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 land application area accessibility.
- d. Nutrient applications for spring-seeded crops shall be timed to avoid surface runoff and leaching by winter rainfall.
- e. Except for orchards and vineyards, nutrients shall not be applied during periods when a crop is dormant.

4. Nutrient Application Methods

- a. The Discharger shall apply nutrient materials uniformly to application areas or as prescribed by precision agricultural techniques.
- b. Land Application Specification E.7 of the Order: *“Land application areas that receive solid manure shall be managed through implementation of erosion control measures to minimize erosion and must be consistent with a certified Nutrient Management Plan.”*

F. Wastewater Management on Land Application Areas

Control of water and 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 wastewater to, and runoff from, cropland:

- 1. Prohibition A.3 of the Order: *“The discharge of waste from Confined Bovine Feeding Operations to surface waters in a manner causing or contributing to an exceedance of any applicable water quality objective in the Basin Plans or any applicable federal water quality criteria, or a violation of any applicable State or federal policies or regulations is prohibited.”*

2. Prohibition A.4 of the Order: *“The collection, treatment, storage, discharge or disposal of wastes at a Confined Bovine Feeding Operation shall not result in the creation of a condition of pollution or nuisance.”*
 3. Prohibition A.10 of the Order: *“The discharge of wastewater to surface waters from a land application area is prohibited. Irrigation supply water that comes into contact or is blended with waste or wastewater shall be considered wastewater under this prohibition.”*
 4. Prohibition A.11 of the Order: *“The application of wastewater to a land application area before, during, or after a storm event that may result in the discharge of commingled applied water and runoff to surface water is prohibited.”*
 5. Prohibition A.12 of the Order: *“The discharge of storm water or tailwater to surface water from a land application area where manure or wastewater has been applied is prohibited unless the land application area has been managed consistent with a certified Nutrient Management Plan.”*
 6. Land Application Specification E.3 of the Order: *“Land application of wastes for nutrient recycling from Confined Bovine Feeding Operations 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, in excess of the groundwater limitations set forth in this Order.”*
 7. Land Application Specification E.8 of the Order: *“All wastewater applied to land application areas must infiltrate completely within 72 hours after application.”*
 8. Land Application Specification E.9 of the Order: *“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 Nutrient Management Plan (see **Attachment C** of this Order).”*
- G. Setbacks and Vegetated Buffer
1. General Specification B.4 of the Order: *“Manure and wastewater shall not be applied, and composting operations shall not be located, 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 or groundwater, unless (i) a 35-foot wide vegetated buffer or physical barrier is substituted for the 100-foot*

setback or (ii) alternative conservation practices or field- or site-specific conditions are demonstrated to provide pollutant reductions equivalent to or better than the reductions achieved by the 100-foot setback.”

2. A setback is a specified distance from surface waters or potential conduits to surface waters where manure and wastewater may not be land applied, but where crops may continue to be grown.
3. 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 land application area 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 land application area and reaching surface waters.
4. 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.
5. Practices and management activities for vegetated buffers include the following:
 - a. 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.
 - b. Do not mow below the recommended height for the plant species.
 - c. Maintain adequate ground cover and plant density to maintain or improve filtering capacity of the vegetation.
 - d. Maintain adequate ground cover, litter, and canopy to maintain or improve infiltration and soil condition.
 - e. Periodic rest from mechanical harvesting may be needed to maintain or restore the desired plant community following episodic events such as drought.
 - f. When weeds are a significant problem, implement pest management to protect the desired plant communities.
 - g. Prevent channels from forming.

H. Field Risk Assessment

The results of the water quality monitoring of discharges of manure, wastewater, storm water, and tailwater to surface water from each land application area, as required by Monitoring and Reporting Program R5-2017-0000, shall be used by the Discharger to assess the movement of nitrogen and phosphorus from each land application area. The Discharger shall follow guidelines provided by the Central Valley Water Board in conducting these assessments.

I. Record-Keeping

The Discharger shall maintain records for each land application area as required in the Record-Keeping Requirements of Monitoring and Reporting Program R5-2017-0000.

J. Nutrient Management Plan Review

1. Provide the name and contact information (including address and phone number) of the person who created the NMP; the date that the NMP was drafted; the name, title, and contact information of the person who approved the final NMP; and the date of NMP implementation.
2. 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, nitrogen application rates in any land application area exceed the rates specified in Technical Standard E.2 or the Field Risk Assessment finds that management practices are not effective in minimizing discharges.
3. 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 changes in the volume of wastewater generated.
4. The Discharger shall review the NMP at least once every five years and notify the Central Valley Water Board in the annual report of any proposed changes that would affect the NMP.