

ATTACHMENT C

California Regional Water Quality Control Board
San Francisco Bay Region

Conditional Waiver of Waste Discharge Requirements

Nutrient Management Plan Minimum Requirements

Resolution No. R2-2015-0031 (hereafter, Conditional Waiver) requires the preparation and implementation of a Nutrient Management Plan (NMP) for those who apply manure and/or process water to land as a soil amendment or source of nutrients. Manure and process water cannot be applied to land for the purpose of disposal. Manure and process water that are wastes must be disposed at an appropriately permitted disposal facility.

In accordance with federal regulations, dairies with over 700 mature dairy cows (milked or dry) that discharge stormwater from cropland where manure, litter, or process wastewater has been applied may enroll under this Conditional Waiver if they are implementing a Nutrient Management Plan upon enrollment.

A. NMP Purpose and Implementation

The purpose of the NMP is to identify the management practices used at the facility to minimize adverse impacts to surface water and groundwater from runoff and leaching from land application areas. The NMP is specific for a particular facility and considers crops, soil types, climate, local conditions, sources of nutrients, and the non-nutrient salts applied to each field. All nutrient applications to land, including applications to pasture, must be made in accordance with an NMP. Implementation of the NMP is closely linked to each facility's waste management system, monitoring program, and environmental conditions. The NMP must be updated in response to changing conditions and the results of monitoring.

The NMP shall be developed by Dischargers with the assistance of specialists such as those that are appropriately certified or licensed such as a professional soil scientist, agronomist, crop advisor, University of California Cooperative Extension (UCCE) service advisor or technician, or a technical service provider certified by the Natural Resources Conservation Service (NRCS). In particular, Dischargers shall get assistance from these specialists in completing the nutrient budget calculations. The Executive Officer may approve the use of alternative specialists.

The most current version of the NMP must be kept at the facility and must be made available for review by Water Board staff during inspections. The NMP shall be submitted to the Water Board upon request.

The NMP shall be revised within 30 days when discharges from a land application area result in an exceedance of water quality objectives. The NMP shall be revised within 90 days when any of the following occur:

1. Site-specific information becomes available to replace default values used in the initial NMP,
2. Changes in operating practices result in the production of nutrients that are not addressed by the NMP,

3. Crops will be grown that are not covered by the NMP,
4. There is a change of 15% or more in the acreage used for land application, or
5. The NMP is not effective in preventing periodic discharges of manure or process water to waters of the United States (US).

The Discharger shall review the NMP annually and revise it if changes in conditions or practices at the facility require changes in the NMP. The review/revision date must be noted in the NMP. Records on the timing and amounts of manure and process water applied to land and information developed through a Monitoring and Reporting Program (MRP) for the facility must be considered when making decisions related to nutrient management.

B. Management of Manure and Process Water

During the development of a complete NMP, land application best management practices (BMPs – see Section E) must be in place to prevent discharges to surface waters and to comply with the Conditional Waiver’s Discharge Prohibitions:

1. The collection, treatment, storage, or application of manure or process water shall not result in:
 - a. Degradation of surface water or groundwater,
 - b. Contamination or pollution of surface water or groundwater, or
 - c. Condition of nuisance (as defined by the California Water Code section 13050).

This requirement applies to any degradation products or any constituents of soil mobilized by the interactions between applied materials and soil or soil biota.

2. The application of manure and process water shall not violate any applicable local, State, or federal laws or regulations or contribute to an exceedance of any applicable water quality objective in the Basin Plan or of any applicable State or federal water quality criteria.
3. The discharge of process water to surface water is prohibited.
4. For large dairies (more than 700 mature cows) the discharge of stormwater to surface water from land where manure or process water has been applied is prohibited unless all applications to land are in accordance with an NMP.

C. Contents of NMP

The NMP must contain, at a minimum, the following components:

1. **Contact Information:** The name, mailing address, and phone number of (a) the owner, (b) the operator (if different), and (c) any specialist who participated in the development of the NMP.
2. **Specific dates:** The date that the NMP was completed and documentation of subsequent updates.
3. **Maps:** One or more United States Geological Survey quadrangle maps or equivalent showing the location of the facility and all areas under the Discharger’s control, whether owned, rented, or leased, to which manure or process water may be applied. If suitable, an aerial photo with

appropriate notations may be utilized. The map(s), aerial photos, and/or drawings (see next section) should show the locations of all the following that exist at the facility:

- a. Surface water courses and conveyances,
 - b. Pipelines (above or underground), where process water is mixed with irrigation water or discharged,
 - c. Drainage flows for the production area and each field,
 - d. Drainage ditches and drainage easements,
 - e. Drainage controls (berms, levees, etc.) for tailwater and stormwater,
 - f. Extent of subsurface (tile) drainage systems and associated discharge points,
 - g. Pumping facilities and flow meters,
 - h. Wells and type (domestic, industrial, agricultural, or monitoring),
 - i. Stormwater discharge points,
 - j. Any septic systems,
 - k. Total acreage of each field,
 - l. Crops grown and rotations, if any, for each application area,
 - m. Where types of waste are applied (solids, waste water, and/or both),
 - n. All water quality sampling points, and
 - o. A map legend.
4. **Nutrient Budget Calculations:** The NMP must include calculations showing all sources of nutrients used by the facility and demonstrating that nutrients are applied at rates that are protective of water quality. These calculations must be reviewed annually and updated if there are any significant changes in conditions or practices at the facility that necessitate changes in the NMP. These calculations may be reviewed by Water Board staff during inspections. The details of the nutrient budget are discussed below in Section D.
5. **Land application practices and water quality protection:** The NMP must describe the methods by which manure and process water are applied to land application areas and describe the BMPs that are implemented to protect surface water and groundwater.
6. **Sampling and analysis program:** The NMP must describe the associated sampling program including sampling locations, sampling frequency, and sample collection and preservation procedures.

D. Nutrient Budget Calculations

The Discharger shall develop a nutrient budget that establishes the nutrient application practices for each crop in each land application area. The initial nutrient budget may be based on default values if site-specific information is not available¹. Subsequent nutrient budgets shall be based on site-

¹ Crop nutrient needs may be based on recommendations from the University of California or the Western

specific analytical data for soil, manure, process water, irrigation water, other sources of nutrients, and plant tissue. The nutrient budget for all sources of nutrients (nitrogen, phosphorus, potassium) shall include the following:

1. The rate of nutrient applications (e.g., pounds of nitrogen per acre) based on default values or site-specific analytical data in order to meet each crop's needs for nitrogen and phosphorus without exceeding the application rates that will protect water quality. The rate of nutrient applications shall be based on realistic yield goals for each crop in each land application area. For new crops or varieties, industry yield expectations may be used until site-specific yield information is available.
2. The quantity of manure, soil amendments, and/or process water to be applied shall be based on the nutrient content of the material, the characteristics of the material (e.g., the amount of organic nitrogen), and the site conditions (e.g., if a pasture is not grazed or mowed, the amount of residual nutrients in soil will be higher). In determining the quantity to apply, the Discharger shall consider all sources of nutrients including irrigation water, commercial fertilizers, and previous crops.
3. The timing of applications shall be based on seasonal and climatic conditions, the growth stage of the crop, and the availability of water. The anticipated maximum time between land application events (i.e., the storage period) shall be used to determine the needed storage capacity for manure and process water.
4. The method of manure, soil amendment, and process water application for each crop in each land application area shall be based on site-specific conditions and shall minimize the discharge of sediments, nutrients, and salts from the application area.

Nutrient application rates shall not approach a site's maximum ability to contain one or more nutrients through soil adsorption. If the nutrient budget shows that the nutrients generated by the facility exceed the amount needed by crops in the land application area, then the Discharger must implement management practices that will prevent impacts to surface water or groundwater due to application of excess nutrients. Such practices may include obtaining access to additional land for nutrient application, exporting manure, or reducing the number of animals at the facility.

Supplementary commercial fertilizers and/or soil amendments may be added when the application of nutrients contained in manure and process water alone is not sufficient to meet the crop needs. Specific nutrients are discussed below.

Nitrogen: Total Ammonia Nitrogen ($\text{NH}_3 + \text{NH}_4^+$) and Total Nitrogen will be measured at the facility through water and soil sampling. Nitrogen application rates shall not result in total nitrogen applied to the land application areas exceeding the nitrogen application in each location as recommended by UCCE, NRCS, other local information, or 1.4 times the anticipated nitrogen removal in forage.

Fertilizer Handbook (9th Edition). Acceptable default values for the nutrient content of materials include values recognized by the American Society of Agricultural and Biological Engineers (ASABE), the Natural Resources Conservation Service (NRCS), and/or the University of California. The nutrient content of commercial fertilizers shall be California Department of Food and Agriculture published values.

If application of total nitrogen to a land application area exceeds the budgeted application rate for the specific land application area, the Discharger shall either revise the nutrient budget to prevent such exceedance in the future or demonstrate and record that the application rates have not contaminated surface or ground water. Applications of nitrogen exceeding the initial recommendations are allowable if the following conditions are met:

1. Soil Plant Available Nitrogen (PAN) testing or plant tissue testing has been conducted and indicates that additional nitrogen is required to obtain crop yield estimates typical for the soils and other local conditions;
2. The amount of additional nitrogen applied is based on the soil or tissue testing; and is consistent with UCCE or NRCS guidelines or written recommendations from a nutrient management specialist or Certified Crop Advisor;
3. The form, timing, and method of application facilitates timely nitrogen availability to the crop; and
4. Records are maintained documenting the need for the additional applications.

Phosphorus and Potassium: Application of these nutrients at agronomic levels, along with reasonable erosion control and runoff control measures, will normally prevent water quality problems. In some instances, other best management practices may need to be included in the NMP.

E. Land Application Practices

Discharges to land of solid or liquid waste shall be at rates that are reasonable for crop, soil, climate, special local situations, management system and type of manure. The total nutrient loading shall not exceed the amount needed to meet crop demand and shall be in accordance with the nutrient budget calculations. 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.

The NMP must identify all surface water or potential conduits to surface water that are within 100 feet of any land application area and take appropriate actions to protect water quality. The following sections discuss practices that reduce the potential for pollutants from land application areas to reach surface water:

1. **Setbacks, vegetated buffers:** A setback is a specified distance that separates land application areas from surface water or a potential conduit to surface water, and where manure and process water may not be applied, but where crops may be grown. A vegetated buffer is a relatively narrow (approximately 35 feet), permanent strip of dense vegetation where no crops are grown and which is established perpendicular to the dominant slope of a land application area for the purposes of slowing water runoff, enhancing water infiltration, trapping pollutants bound to sediment, and minimizing the risk of pollutants reaching surface waters. A berm is another alternative to prevent runoff from reaching surface water.

Manure and process water shall not be applied within a 100-foot setback to any down-gradient surface water unless a 35-foot wide vegetated buffer or physical barrier (i.e., a berm) is substituted for the 100-foot setback; or an alternative conservation practice or field-specific

condition that provides pollutant reductions equivalent to or better than achieved by the 100-foot setback. Any alternative practice utilized must be described in the NMP.

Practices for establishing and maintaining vegetated buffers include:

- a. Limiting removal of vegetation within the buffers and promoting plant growth in the buffer;
- b. Maintaining the recommended height for the plant species;
- c. Establishing plant density for adequate filtering capacity;
- d. Improving soil conditions to reduce erosion and increase infiltration; and
- e. Preventing erosion channels and gullies from forming.

2. Best Management Practices to protect surface water:

- a. Manure and wastewater discharges to land, including spray irrigation, shall be conducted during non-rainy or non-saturated conditions, must not result in runoff to surface waters and must infiltrate completely within 72 hours after application.
- b. Land application areas that receive dry manure and/or process water shall be managed to minimize erosion.
- c. Spray irrigation applications must be accurately timed and consistently monitored in order to prevent discharges to surface waters and/or beyond the property line.

3. Avoiding conduits that can transport pollutants: Manure and process water shall not be applied closer than 100 feet to open tile line intake structures, sinkholes, or well heads unless the NMP contains a statement from a professional explaining that an alternative practice will be as protective as the 100-foot separation. This professional must be a registered or certified engineering geologist or hydrogeologist, or a responsible professional with experience in manure containment and structural facility specification. Documentation from initial wellhead construction may be acceptable upon review by Water Board staff.

4. Wetland Protection: Wetlands are waters of the State and are protected under State regulations by provisions of the California Water Code. Wetlands are also protected as waters of the U.S. under the federal Clean Water Act. The beneficial use of wetlands must be protected against water quality degradation. Discharges of manure and process water to wetlands with standing water must be addressed in the NMP. Wetlands containing standing water shall be protected through animal exclusion and the exclusion of manure or process water application.

F. Sampling, Analysis, and Calculations

Soil, manure, soil amendments, process water, irrigation water, and plant tissue shall be monitored, sampled, and analyzed, in accordance to U.S. Department of Agriculture, Natural Resource Conservation Service, 590-Practice Procedures for Nutrient Management, or an alternative sampling and analysis program developed by technical education administrator (as described above in Section A), and approved by the Executive Officer. The analytical results shall be used during the development, implementation, and revision of the NMP.

Samples of soils and crop tissues shall be analyzed for available phosphorus at least once every five years. Sampling results shall be reviewed to verify that phosphorus levels do not exceed limits needed to maintain acceptable crop yields and prevent adverse impacts to water quality. If this review determines that a buildup of phosphorus threatens water quality, application rates must be decreased until the situation is corrected.

Nutrient credit from previous legume crops shall be determined by methods acceptable to the UCCE, the NRCS, Resource Conservation District, or a technical service provider that is NRCS-certified in developing NMPs.

The NMP must identify the analytical laboratory utilized and the analyses to be conducted for soil, manure, soil amendments, process water, irrigation water, plant tissue, etc. If that information is in the MRP (Conditional Waiver, Attachment A), the NMP can reference that MRP. The laboratory utilized must be certified and use the analysis methods identified in California Analytical Methods Manual for Dairy General Order Compliance – Nutrient Management Plan Constituents:

http://anlab.ucdavis.edu/docs/uc_analytical_methods.pdf

G. Field Risk Assessment

Dischargers are required to sample discharges of stormwater from land application areas to surface water, as detailed in the MRP. The analytical results for those samples shall be used by the Discharger to assess water quality conditions and to inform management practices. If results indicate a potential for adverse impacts to receiving waters, the Discharger shall modify its NMP to reduce such movement and collect additional samples to assess the effectiveness of the modifications.

Land application areas must be managed to prevent contamination of crops grown for human consumption. When crops grown for human consumption without processing (berries, nut trees, etc.) are grown near to land application areas, the Discharger shall take appropriate actions to prevent movement of pathogens that could cause adverse impacts to human health.

H. Manifests and Third-Party Agreements

Manifests are required to be kept onsite to record transfer of waste to outside facilities and must be kept as part of the NMP. The application of manure or process water to lands not owned, leased, or controlled by the Discharger without written permission from the landowner is prohibited. The Discharger shall have a written agreement with each third party that receives process wastewater from the Discharger for its own use. The written agreement(s) shall be effective until the third party is covered under waste discharge requirements or a waiver of waste discharge requirements. The written agreement shall:

1. Clearly identify:
 - a. The Discharger and dairy facility from which the process wastewater originates,
 - b. The third party that will control the application of the process wastewater to cropland,
 - c. The Assessor's Parcel Number(s) and the acreage(s) of the cropland where the process wastewater will be applied, and

2. Include an agreement by the third party to:
 - a. Use the process wastewater at agronomic rates appropriate for the crops to be grown, and
 - b. Prevent the runoff to surface waters of wastewater, stormwater, or irrigation supply water that has come into contact with manure or is blended with wastewater.

I. Record-Keeping

The Discharger must maintain records for five years, for each land application area and use the records as a basis for revisions to the NMP. In addition to the manifest records described above, records shall include:

1. All analyses of manure, process wastewater, irrigation water, soil, plant tissue, discharges (including tailwater discharges), surface water, stormwater, subsurface (tile) drainage, and groundwater.
2. All records for nutrient management and land application areas including:
 - a. Expected and actual crop yields (or estimated yields if crop is grazed);
 - b. Identification of crop, acreage, and dates of planting and harvest for each field;
 - c. Dates, locations, and approximate weight and moisture content of manure applied to each field;
 - d. Dates, locations, and volume of process wastewater applied to each field;
 - e. Whether precipitation occurred, or standing water was present, at the time of manure and process wastewater applications and for 24 hours prior to and following applications;
 - f. Test methods and procedures for soil, manure, process wastewater, irrigation water, and plant tissue sampling;
 - g. Results from manure, process wastewater, irrigation water, soil, plant tissue, discharge (including tailwater), and stormwater sampling;
 - h. Explanation for the basis for determining manure or process wastewater application rates;
 - i. Calculations showing the total nitrogen, total phosphorus, and potassium to be applied to each field, including sources other than manure or process wastewater (Nutrient Budget);
 - j. Total amount of nitrogen, phosphorus, and potassium actually applied to each field, including documentation of calculations for the total amount applied (Nutrient Application Calculations);
 - k. The method(s) used to apply manure and/or process wastewater; and
 - l. Records documenting any corrective actions taken to correct deficiencies noted as a result of the inspections required in the Monitoring Requirements above. Deficiencies not corrected in 30 days must be accompanied by an explanation of the factors preventing immediate correction.