Attachment D

Waste Discharge Requirements
For
McClelland Dairy West

Order No. R1-2016-0011

Nutrient Management Plan (NMP)

Waste Discharge Requirements (WDRs) Order R1-2016-0011 requires the Discharger to prepare and implement a Nutrient Management Plan (NMP) for the new dairy operation within 180 days of adoption of this Order. The NMP is to ensure that the Facility is designed, constructed, operated and maintained so that nutrients and wastes generated and applied to fields are managed to prevent conditions of nuisance or adverse impacts to surface water and groundwater. The NMP must be specific to the maximum number of dairy cattle kept onsite. The Nutrient Management Plan must be available to Regional Water Board staff during inspections and must be submitted to the Regional Water Board upon request.

In 2014, the McClelland's completed a Comprehensive Nutrient Management Plan (CNMP) for its property at 5000 Llano Road, Santa Rosa for current heifer grazing and potential future dairy operations. Portions of the CNMP may be used to meet this NMP requirement, however, within 180 days of the Order adoption, the Discharger must prepare and implement an NMP consistent with the requirements in this Attachment D.

Manure and process wastewater cannot be applied to land for the purpose of disposal. Manure and process wastewater that are wastes must be disposed at an appropriate permitted disposal facility. The Discharger must report on NMP progress by filling out the Annual Report (Monitoring and Reporting Program, Appendix 1) for submittal by November 30 each year starting in 2017.

A. NMP Purpose and Implementation

The purpose of the NMP is to identify management practices to prevent and minimize adverse impacts to surface water and groundwater from runoff and leaching from land application areas. The NMP is specific for the Facility and considers crops, soil types, climate, local conditions, all sources of nutrients, and the non-nutrient salts applied to each field. The NMP must be updated in response to changing conditions and the results of monitoring.

The NMP must be developed by the Discharger with the assistance of specialists such as those with a degree in or certification as: Soil Scientist, Agronomist, Crop Advisor, University of California Cooperative Extension (UCCE) service advisor or technician, or a Technical Service Provider certified by the Natural Resource Conservation Service (NRCS). In particular, the Discharger shall get assistance from these specialists in completing the nutrient budget calculations. The Regional Water Board staff 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 Regional Water Board staff during inspections. The NMP shall be submitted to the Regional Water Board upon request.

The nutrient budget component of the NMP shall be revised within 30 days when discharges from a land application area result in 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 wastewater to waters of the state and 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 wastewater applied to land and information developed through the Monitoring and Reporting Program (MRP) associated with the Order must be considered when making decisions related to nutrient management.

B. Management of Dairy Manure and Process Wastewater

Compliance with the following management measures is required once the Discharger begins implementation of the NMP. Best Management Practices (BMPs) must be in place to prevent discharges to surface waters at all times:

1. The collection, treatment, storage, or application of manure or process wastewater shall not result in:
   a. Degradation of surface water or groundwater except as allowed by the Order;
   b. Contamination or pollution of surface water or groundwater; or
   c. A 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.

   For instance, one BMP must include the following: animal waste storage piles (excluding small temporary piles within the corrals) must be covered with a waterproof covering during the rainy season such as from October through May.

2. The application of manure and process wastewater 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 wastewater to surface water is prohibited.

4. The discharge of stormwater to surface water from land where manure or process wastewater has been applied is prohibited unless all applications to land are in accordance with a NMP.

5. The application of manure and process wastewater to land shall be in accordance with the NMP.

C. Contents of NMP

The NMP must contain the following components:

1. **Contact Information:** The name, mailing address, and phone number of (a) the Facility owner, (b) the Facility 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, the date that the NMP will be implemented, and the dates of anticipated NMP reviews and revisions.

3. **Description of the Facility:** The following information must be included:
   a. Name of the dairy;
   b. The Facility address or, if no street number, the street and nearest cross street;
   c. Design maximum cow population by type (milk cows, dry cows, heifers, calves);
   d. Current cow population by type;
   e. Assessor's Parcel Number(s) for the Facility and all associated land;
   f. For each Assessor's Parcel, the total acreage; the acreage used for crops including pasture, the acreage used for application of (a) manure, (b) process wastewater, or (c) both; and
   g. The crop rotation, if any, within each land application area.

4. **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 wastewater 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) shall show the locations of all the following that exist at the Facility: surface watercourses and conveyances, underground pipelines, where process wastewater is mixed with irrigation water or discharged, drainage flows for the production area and each field, drainage ditches and drainage easements, drainage controls (berms, levees, etc.) for tailwater and storm water; extent of subsurface (tile) drainage systems and associated discharge points, pumping facilities and flow meters, wells and type (domestic, industrial, agricultural, or monitoring), storm water discharge points, a point locating any septic systems, all water quality

sampling points, and a map legend. More than one map may be used for clarity. These mapping components are also required in the Water Quality Plan (Attachment C). Duplicates may be used.

5. **Drawings:** A scaled drawing, aerial photo or topographic map that shows the production area including the livestock feeding and housing areas, feed storage areas, manure and process wastewater storage areas, milk barn, chemical storage areas, and waste storage areas. These drawings, photos or maps may also be used to show the locations of features listed above under "Maps."

6. **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 the groundwater 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 Regional Water Board staff during inspections. The details of the nutrient budget are discussed below in Section D.

7. **Land application practices and water quality protection:** The NMP must describe the methods by which manure and process wastewater is applied to land application areas, and describe the BMPs that are implemented to protect surface water and groundwater.

8. **Sampling and analysis program:** The NMP must describe the associated sampling program including sampling locations, sampling frequency, sample collection and preservation procedures. The NMP must identify the analytical laboratory utilized and the analyses to be conducted for soil, manure, soil amendments, process wastewater, irrigation water, plant tissue, etc. If that information is in the MRP, the NMP can reference that MRP. The laboratory utilized must be certified by Environmental Laboratory Accreditation Program. Laboratory analysis methods are identified in California Analytical Methods Manual for Dairy General Order Compliance – Nutrient Management Plan Constituents:

   http://anlab.ucdavis.edu/dairy-general-order-compliance-2013-nutrient-management-plan/uc_analytical_methods.pdf/view

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 available[1]. Subsequent nutrient budgets shall be based on site-specific analytical data for soil, manure, process wastewater, irrigation water, other sources of nutrients, and plant tissue. The nutrient budget 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 to protect groundwater 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 wastewater 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 wastewater.

4. The method of manure, soil amendment, and process wastewater 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 cows at the Facility.

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[1] Crop nutrient needs may be based on recommendations from the University of California or the Western 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 that accurately estimate. The nutrient content of commercial fertilizers shall be California Department of Food and Agriculture published values.

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

Nitrogen: Total Ammonia Nitrogen (NH_3 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. 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 plant 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

Application of manure and process water to croplands shall be at rates which are reasonable for the crop, soil, climate, special local situations, management systems, and type of manure. 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. Land application areas that receive dry manure and process water shall be managed to minimize erosion.

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, and other alternatives to protect surface water:** 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 dairy 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 perennial 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.

   Animals must be separated from surface waters by a 35-foot wide vegetated buffer unless an alternative practice demonstrating equal or better water quality protection is utilized and described in the NMP. Alternative practices may include rocked crossings, fences, bridges, culverts, bioengineered slopes, etc. Vegetation along flowing watercourses shall be protected from overgrazing to maintain natural water temperatures and protect stream banks. Flash grazing of the vegetated buffer, as an alternative practice, must be described in the NMP.

   Practices for establishing and maintaining vegetated buffers must include:
   - limiting removal of vegetation within the buffers and promoting plant growth in the buffer;
   - maintaining the recommended height for the plant species;
   - establishing plant density for adequate filtering capacity;
   - improving soil conditions to reduce erosion and increase infiltration;
   - fencing must be maintained to exclude cattle from sensitive areas especially where adverse impacts could occur to riparian vegetation or special-status species;
   - preventing erosion channels and gullies from forming.

2. **Avoiding conduits that can transport pollutants:** Manure and process wastewater shall not be applied closer than 100 feet to open tile line intake structures, sinkholes, or wellheads 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 Regional Water Board staff.

3. **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. Wetlands containing standing water shall be protected through dairy cow 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. 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 5 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 NMP.

G. Field Risk Assessment

The Discharger is required to sample discharges of storm water 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 their 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. Record-Keeping and NMP Review

The Discharger must maintain records for each land application area and use the records as a basis for revisions to the NMP. The NMP must be available for Regional Water Board staff review during inspections.