CDQAP - WDR General Order Reference Binder TAB 7.4, Version 2-29-08

Interim Facility Modifications- Short-term Options to Improve Dairy Facility Nitrogen Balance

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In May, 2007 the Central Valley Regional Water Quality Control Board (Regional Board) adopted Waste Discharge Requirements General Order R5-2007-0035 for Existing Milk Cow Dairies (the General Order). The General Order required that all dairy operators complete a Preliminary Dairy Facility Assessment (PDFA - due December 31, 2007). This document estimated nitrogen present for land application based on animal excretion, nutrient imports (fertilizer, outside manure, and atmospheric deposition), nutrient exports (manifests) and nitrogen removed from harvested crops based on user input information. Preliminary summary information for nitrogen balance is located in Sections E through H and Figure Two of the printed PDFA report. This information is used to make a preliminary determination (aggregated for the whole farm) of whether nitrogen applied to fields where manure or process wastewater was applied exceeded a regulatory limit, which is set in the General Order at 1.4-1.65 times (i.e. 140-165% of) the nitrogen removed from fields in the harvested crops.

- The General Order requires that if the site-specific PDFA report indicates that the Whole Farm Nitrogen Balance is greater than 1.65, then producers must develop and submit a list of ***"proposed interim facility modifications (such as acquiring more cropland, exporting more wastes, reducing herd size, etc.) that can be completed within 12 months to balance the nitrogen generated and imported with the nitrogen removed by crops and exported, with schedule to implement proposed modifications within 12 months"*** (General Order; Table 1 Page 26). These interim modifications must be submitted to the Regional Board as part of the first year's reporting activities (due July 1, 2008). The Annual Report due July 1, 2009 will require documentation of completed interim modifications and explanations of non-completion of proposed modifications. The following outline is intended to provide guidance for creating an effective short-term modification plan.

Check your inputs

Be sure there were no typographical errors in your data inputs in the PDFA. Errors in reported animal numbers or estimates of crop acreage or yields will affect the calculated acreage required for land application.

Understand your calculations

The Whole Farm Nitrogen Balance is driven by nutrients present for land application and nutrients harvested in crops. Milk production, nitrogen volatilization rate, and manure manifested from the facility are key items in determining the amount of nitrogen that is present for land application. Ratios can be incorrect if errors exist in any of these factors. Be aware that there will be more actual nitrogen present for land application if nitrogen volatilization rate is less than program default values. Also, the PDFA does not account for contributions of irrigation water nitrogen (if present). Although nutrient content of animal diets is not considered in the PDFA calculations, excess nitrogen will be excreted from animals if protein is overfed, further increasing the amount of nitrogen present for land application.

Nutrients harvested in crops are determined by crop variety, yield and nutrient content. Yield and nutrient content may vary tremendously. For many dairies, maximizing crop dry matter yields (and therefore nutrient harvest removals) will be essential for meeting the N loading limits imposed by the General Order.

APPROACHES TO IMPROVING THE WHOLE FARM NITROGEN BALANCE

Consider reducing nutrients generated by animals

1. Alter use of bedding materials while maintaining milk quality.
   - ☐ Reduce use of purchased organic materials (such as shavings, rice hulls, almond shells)
   - ☐ Reduce use of corral solids (most nutrients and salt in corral scrapings used for bedding will ultimately end up in the liquid waste storage system, thereby, making it more difficult to move those nutrients offsite).

2. Evaluate the contribution of parlor water to nitrogen content of waste stream when supply wells contain elevated nitrate concentrations.
   - ☐ Reduce parlor water used for cleaning cows and reuse water used for cooling milk.

Consider improving the ratio of nitrogen in manure present for land application to nitrogen harvested by crops.

3. Export more manure.
   - ☐ Increase removal of solid or liquid manure (manifest off-site).

4. Reduce use of commercial fertilizer.
   - ☐ Analyze manure for nitrogen content.
   - ☐ Include nutrient contribution of manure before applying commercial fertilizer.
   - ☐ Include nutrient contribution of irrigation source waters before applying commercial fertilizer.
   - ☐ Plan to use soil and plant analysis before any liquid manure or fertilizer nitrogen applications.

5. Increase acreage available for land application of manure.
   - ☐ Rent/lease or otherwise acquire the ability to apply manure on additional acres.
   - ☐ Improve distribution infrastructure to allow application of liquid manure on more acres.

6. Increase crop nutrient removal.
   - ☐ Increase crop yields
   - ☐ Adjust cropping pattern to increase nutrients harvested by selecting crops/varieties with high nutrient removal rates or triple cropping (if applicable).
   - ☐ Evaluate the potential for increasing manure applications to alfalfa fields.

7. Export cows.
   - ☐ Remove replacement calves and/or heifers from the production facility.
   - ☐ Reduce cow numbers.

Evaluate consequences of modifying nitrogen balance

Even though the General Order obligates producers to propose interim facility modifications for nitrogen balance, it is important to remember the potential consequences of changes made to improve nitrogen balance on other aspects of the facility. Milk cow bedding modifications may impact milk quality if not closely monitored. Work with your dairy nutritionist to be sure that changes in crop production or quality do not affect the forage component for animal diets. Timing and form of nitrogen application will become more critical as the target ratio is achieved with the expectation that yields will not be compromised. Work with your certified nutrient management specialist to address timing and form of nitrogen applications.

Annual evaluation of nitrogen ratios by field

Beginning July 1, 2008 operators will submit annual reports that will include the ratio of nitrogen present for land application to nitrogen removed by harvested crops on a field by field basis. Inputs of actual farm-specific data should provide better information than merely using a default value of estimated nitrogen volatilization.

Seek permits prior to structural changes

Be sure that any structural changes receive appropriate permitting by local county use permit processes, San Joaquin Valley Air Pollution Control District, and Regional Water Quality Control Board.

Information in this document was compiled by CDQAP to assist dairy producers in understanding and complying with the General Order Waste Discharge Requirements for Existing Milk Cow Dairies (Central Valley Regional Water Quality Control Board Order R5-2007-0035). Effort has been made to ensure accuracy, but these summaries are not official regulatory guidance and are not legal advice. Producers are advised that these summaries are not intended to be a substitute for producers reading the complete order and consulting their own legal counsel to ensure compliance with the waste discharge requirements. Should any information here conflict with the General Order and/or official information provided by the Regional Board, Board-provided information takes precedence.

Technical review provided by: Regional Water Quality Control Board 5 CAFO staff. Financial support was provided wholly or in part by grants received from the California Dairy Research Foundation, and from the SWRCB Grant number 05-095-550-0. The contents of this document do not necessarily reflect the views and policies of the US EPA, SWRCB, or RWQCB, nor does mention of trade names or commercial products constitute endorsement or recommendation for use.