



DEPARTMENT OF ANIMAL SCIENCE
ONE SHIELDS AVENUE
DAVIS, CALIFORNIA 95616.8521

TELEPHONE: (530) 752.9391

FAX: (530) 752-0175

April 18, 2007

To: Polly Lowry, Regional Water Quality Control Board 5

From: UC Dairy Quality Assurance Program Workgroup subcommittee for WDR document review:

Deanne Meyer, Ph.D. Livestock Waste Management Specialist/Research Scientist (UC Davis)

Marsha Campbell Mathews, Forage Advisor (Stanislaus County)

G. Stuart Pettygrove, Ph.D. Soil Specialist (UC Davis)

Carol Frate, Forage Advisor (Tulare County)

David Crohn, Ph.D. Assoc. Prof. Environmental Sciences; Assoc. CE Specialist Biosystems Engineering (UC Riverside)

Thomas Harter, Ph.D. Subsurface Hydrologist (UC Davis)

Re: Comments on Tentative Draft WDR March 23, 2007

Research

I.A. above---identifies parcels, acreage, crops

IX below "the Discharger shall maintain records for each land application area as required in the Record-Keeping Requirements of Monitoring and Reporting Program No. ers associated with the University of California Dairy Quality Assurance Workgroup have invested significant time to provide input into the development of the Existing Milk Cow Dairies WDR and associated documents. Our written comments herein focus on significant items we have identified thus far during review of the documents. A separate document was submitted regarding the groundwater component of the MRP.

Individuals participating in the preparation of document are familiar with soil science, geohydrology, dairy manure management, engineering, irrigation and salinity management, and dairy, forage and crop production. Many of us have participated in the Comprehensive Nutrient Management Plan Guidance development process at the request of the Natural Resources Conservation Service. Many of us have also served on the committee established by the University of California (the Land Grant University) to provide technical information to the Central Valley Regional Water Quality Control Board related to dairy nutrients (Committee of Experts Report). Combined the group has more than six decades of research experience working with dairy operators. During the last ten years significant improvements have occurred related to nutrient management during land application of manure.

The WDR should be to keep the requirements simple, straight forward and transparent to allow adoption. A producer or his/her consultant should be able to sit down and read through the document with relatively minimal frustration. Significant improvement has occurred since the last version.

We concur with the comments submitted from the California Dairy Quality Assurance Program and want to emphasize the need to streamline document submittal dates and to modify the October, 2008 date to December, 2008.

Comments on General Order

Page 10 item 6. This item implies that the CAL EPA Emergency Animal Disease Regulatory Guidance for Disposal and Decontamination has established a new regulatory requirement for the handling of normal mortality associated with animal facilities (<http://www.calepa.ca.gov/Disaster/Documents/EADisease.pdf>). The referenced document serves as a guide to handle EMERGENCY ANIMAL DISEASE (during catastrophic mortality with and without infectious agents). The document was not intended to be used as a new regulatory process to handle mortality associated with normal management activities. Existing regulations do not and should not prohibit onsite disposal of animals. From a water regulatory perspective operators are required to submit a ROWD for on-site burial. Rendering options are not available throughout Region 5 jurisdiction. It is wise to allow operators who do not always use rendering to identify their mortality management plan.

Page 11 B. Title 27 adopted a 20 year peak stream flow criteria in 1984. The source of such information should be identified. FEMA data and maps are available for 100 and 500 year events. They do not compile 20 year data.

Page 11 B. 4. Suggest modifications to substitute this item with Untreated wastes and land application areas shall be managed to prevent microbial contamination of those crops grown for human consumption which are unprotected by food processing.

* The term "crops grown for human consumption" refers only to crops which will not undergo subsequent processing which adequately remove potential microbial danger to consumers. "Wastes" refers only to untreated material and not dairy manure products which are processed to produce soil amendments which can be safely used for fresh or processed human foods.

Page 12. 7. Inclusion of pond liner requirements are new. The information provided in the identifies that the Brown, Vence and Associates report determined that current standards are insufficient to protect groundwater. http://www.waterboards.ca.gov/centralvalley/available_documents/dairies/BVA-FinalTask2RptESSctns1-6.pdf They clearly pointed out that current standards "do not require low-hydraulic conductivity containment systems for waste storage ponds" and that "there is no assurance that facilities meeting the Title 27 requirement of ten percent clay will be protective of groundwater." Shortcomings of Title 27 identified in the document include: differing interpretation and application, no requirement for thickness, compaction, or distribution, and no requirement for construction quality assurance. Limitations of existing data were identified in the report "Moreover, the groundwater-monitoring data from those facilities with monitoring requirements is often difficult to interpret because there are few wells with little monitoring data and the upgradient groundwater quality may have been affected by adjacent agricultural operations. Additionally, in many cases, it has not been determined if the facility is operating in compliance with the Title 27 requirements and it is difficult to identify one possible source from another." The final remark related to ponds in the study states "Completion of additional site specific studies of the unsaturated zone beneath retention ponds. Specific knowledge about the design, construction and operational practices of the subject ponds should be incorporated into the research to quantify the hydraulic conductivity of the pond and resulting effectiveness of the self sealing theorems on which current regulations were constructed."

The fix for Title 27 as identified in Tier 1 is extreme and does not provide adequate justification given the disclaimers associated with existing Central Valley data. Identification of a hydraulic conductivity, liner compaction and depth requirements and requirement of construction quality assurance seems reasonable. There has been insufficient time to evaluate the two tiered process and provide more concise comments.

Page 14. Item 13. It is assumed that any marking device that identifies a 'do not exceed' level is sufficient. This would include a marker placed in a side of a pond in lieu of a pole marker going into the bottom of the pond. Such a marker can create management disasters in ponds that are deeper than 5'. Additionally, it should be acceptable to mark a final pond (not necessarily every pond) in a multi-pond system. It is difficult to insert a gague pole into the compacted bottom of an existing pond. Such poles may serve as conduit to groundwater. Tall poles will require anchoring components which can result in liquid flow through the pond and serve to increase solids accumulation.

Page 16. Item ii. This requirement is written here and in the NMP and is inconsistent with how liquid manure is applied. As written "incorporate the solid manure and/or process wastewater into the soil before irrigation, unless a tailwater return system is being used. Liquid manure is blended with irrigation water during the irrigation process. It is not necessarily agronomically correct nor possible to incorporate the liquid manure prior to irrigation and in fact would not meet suggested methods of application from an NMP. If the objective of the statement is to mandate that all fields have tailwater return systems then it should be clearly stated. Irrigation practices vary significantly in the Central Valley and the need for a tailwater return system varies as well.

Page 20 H.1.a. The preliminary facility assessment report is merely a preliminary report. Future annual reports should rely on site specific, detailed information.

Page 21. footnote 8. Total nitrogen in storage is not a number that can be estimated easily as it would technically require estimation of N in retention ponds, including any sludge. A whole farm balance typically includes a component that estimates N excreted from animals that is subsequently available for land application (subtract out unavoidable losses). The footnote has the wrong equation listed.

Page: 4

A balance is a comparison of inputs to outputs. The whole farm balance compares managed inputs of nutrients into the farm to managed outputs of nutrients from the farm (animals, milk, manure, crop, atmospheric losses). This assumes the inputs are brought onto the property and the outputs are removed from the property. The Committee of Experts report provided to RB 5 identified a reasonable range of unavoidable losses between 25 to 40% of excreted N.

$$[(N \text{ excreted by herd} * 0.75) + \text{bedding N} + \text{groundwater N used in parlor processes} + \text{fertilizer N applied} + \text{irrigation water nitrate-N} + \text{Atmospheric N}] \text{ divided by } (\text{Crop N removed in harvest})$$

The 0.75 is the upper limit of the range of 60-75% manure N remaining after ammonia volatilization losses that occur between excretion and application to crop land (i.e., during collection, treatment, and storage).

The 60-75% value is equivalent to the 25-40% of excreted N lost prior to land application according to the UC Committee of Experts report. Note: Atmospheric deposition is not measurable on a site specific basis and is nominal. Groundwater N used in parlor processes is typically minimal, but can be a contributing factor when high volumes of water are used in the parlor and elevated N concentrations exist.

Page 22. I. 1. Record keeping requirements in this section identify a five year accumulation of records. In a separate section a requirement of 10 years is identified. Consistency is necessary.

Page 23 Table 1.

31 December, 2007 Replace "etc." with actual identification of needed items.

1 July 2008 Statement of completion of Item II This should be a protocol not a proposal. As indicated in our previous comments, the term proposal implies that RB 5 staff will evaluate and notify discharger if the proposal meets acceptable criteria for implementation. Realistically, this is a sampling and analysis protocol.

1 July 2008 WMB 1.F. 5 is a map. Contents of submittal should include map after facility description. Facility description in contents of submittal column implies text information or completion of a matrix grid. Maps should be identified separately here and below.

Page 24

31 October 2008 reset date at 31 December 2008 to be consistent with submission of existing conditions report in 2007.

Statement of Completion of Item V Field risk assessment. The objective is to determine if management practices are in place to control discharges from land application area. The requirement of a Certified Nutrient Management Specialist is inappropriate. The individuals identified in this category should be trained in land application of nutrients and placement of nutrients in a crop root zone while the crop is growing. Replace Certified Nutrient Management Specialist with NONE in the professional certification requirements column.

Page 25

1 July 2009 A Certified Nutrient Management Specialist is not necessarily trained in the needs of piping, meters, pumps, etc. The individual can identify and sign off on the potential N balance if the infrastructure is in place. However, this individual may or may not have expertise in the infrastructure needs to get nutrients to specific locations. It is important to potentially split the retrofitting plan with schedule to have NONE as professional certification requirements for the infrastructure as the owner/operator is ultimately responsible and to have the certified nutrient management specialist sign off on the potential new balance when infrastructure is in place.

1 July 2009. WMP facility description. List map again.

Page 26

1 July 2009 Flood protection. Identify in the Order or in the WMP where an individual can identify a 20 year peak stream flow map for use.

MONITORING AND REPORTING PROGRAM

Page 2

Nutrient Monitoring

The first sentence identifies that "monitoring shall begin within the first 12 months after the adoption of the Order." The last sentence states "The Discharger is encouraged to collect and use additional data, as necessary, to refine nutrient management." However, MRP-15 2. requires that laboratory analyses be submitted. Requiring submission of additional sample results does not encourage operators to take additional samples.

Page 3

Process wastewater: Table 2 specifies field measurement of electrical conductivity of process wastewater. There will be few if any circumstances where process wastewater will be land applied absent dilution with irrigation water. The need to take a quarterly field measurement for this parameter is confusing.

Quarterly sampling will be insufficient under most circumstances. Sampling of process wastewater should occur once per irrigation event. An irrigation event is when all or most fields are irrigated. If irrigation is essentially continuous, one sample per week should be

taken. When discharge pumps draw from the bottom of the pond the initial pumped water should be recycled back into a pond or additional samples need to be taken. Likewise, when a floating pump is used additional samples need to be taken if sludge is being pumped. If fresh water is added to a pond at the same time as the irrigation is occurring, additional sampling needs to be done to characterize the changing concentration in the pond. Without adequate characterization of the concentration of the nutrient water being applied, reporting of application results becomes a meaningless exercise.

Plant tissue: sampling and analysis of plant tissue from freshly cut forages may be a safety hazard. Sampling from trucks can be dangerous. Likewise, sampling cut forages at the location where the chopped forage is dumped also can be dangerous. Safety protocols will need to be developed to minimize risk. RB 5 should also accept an analysis of silage once a correlation value is identified between the content of the ensiled material (for those materials entering silage processes) and the original substrate.

Page 4

Soil:

We recommend that 20% of the fields be sampled each year so that all fields will be sampled once every five years. If soil sampling is done on all field starting in year one, laboratories will need to increase capacity to handle the number of analyses needed during a short time span. This capacity would be needed once in five years. Depth of soil for P analysis needs to be identified.

Table 1

Laboratory analyses—preservation of samples will be different for analysis of nitrate, unionized ammonia nitrogen, total ammonia nitrogen, etc. Multiple samples will need to be collected, preserved, and delivered to the laboratory immediately. If BOD₅ is required, the sample must be received and begin the analytical process within 24 hours. Absent preservation and timely delivery to an analytical lab with subsequent immediate action, many of the identified laboratory results will be of little value. This comment applies to all laboratory analyses in Table 1. The section needs to be modified to identify multiple samples are necessary for the various preservation methods needed.

Page 5

Storm Water Discharge

“Field measurements of storm water discharge to include ammonia nitrogen and unionized ammonia nitrogen.” There is no field test for unionized ammonia nitrogen. Dairy operators who participate in a Water Coalition should be able to utilize Coalition data as part of regionalized surface water monitoring and not pay additionally for site specific monitoring.

Page 10 C.

RB 5 should work with OES, local environmental health departments, Fish and Game, and County Road Works to establish a streamlined approach to reporting off-site discharges. At a minimum, maintenance of an updated contact list (name and contact number) should exist and be readily available. Is it possible to set up a web reporting system to automatically identify the various agencies?

Page 12 General Section

For application and uptake information to be meaningful, it is important that crop seasons not be split. The intent should be to identify crops harvested and report information pertaining to land application activities associated with said harvested crops. Otherwise it is possible to have a crop with incomplete reporting. Such conditions will make it very difficult to assess if appropriate rates were applied to the crop. Furthermore, recordkeeping becomes exponentially complicated as recordkeeping software is designed to track applications on a crop by crop basis and the data needed for the permit report would be found in different years.

The reporting year should follow the crop year. The crop year begins immediately after the harvest of the last summer or fall crop on a particular field, and ends with the harvest of the next summer or fall crop, whichever is later. For each field, the report start and end dates are reported and the end date of this year's report is the beginning of the next year's. Anything applied after harvest is reported on the next year's report for that field. This system is intuitive and will generate meaningful data for both the operator and the regulatory agency, and is compatible with available recordkeeping software.

The reporting year should end in the fall because it is at this time of the year that there should be the minimum amount of water and nutrients stored in the pond. If a farm is in balance between nutrients generated and nutrients applied, it will be necessary to stockpile nutrients in the pond over the winter for use on the summer crops because the summer crops need more nutrients during a shorter time period than do the winter crops. There should be nutrients remaining in the pond at the end of the winter crop that will be used on the summer crop. There should be almost no nutrients remaining in the pond at the end of the summer or fall crop. Thus this is the logical time to evaluate if nutrients applied balanced with what was generated.

Another reason the crop year should end in the fall is because ending in the spring will require records to be assembled and reported during one of the busiest times of the year. In a double crop system it is important to get the next corn crop in the ground as soon as possible after harvest of the spring crop. Weed and insect monitoring and control treatments follow soon after planting, in addition to timely irrigations. Inattention to any of these operations during this critical period usually results in the inability to meet yield and nutrient uptake expectations. Smaller operators would be especially burdened because they commonly do much of the field work, especially the irrigating, themselves. Irrigating entails staying awake for 24-48 hours every 7 – 10 days making sure water goes where it needs to, in addition to their regular duties.

An ideal time for records to be submitted would be around the first of March, covering the crop year ending with the harvest of the last summer or fall crop, whichever is later. There is minimal field work during the period from mid-November through February on a typical Central Valley dairy farm. The dairy operators and their consultants would be better able to collect and compile records from the various custom operators and laboratories they will be getting them from during this time than during the exceptionally busy period between spring harvest and midsummer. This winter period is also a good time to do planning for the next summer's crop. The July 1 date proposed is an unnecessary burden.

Page 12 C.2 A test should not be necessary to apply nutrients to a winter crop during the rainy season if it is in accordance with the planned application of nutrients. A typical winter forage crop will always need to be fertilized during this period. The limit on total N applications limits should be adequate to prevent unnecessary applications.

Page 12 4. It is important to identify how total salt content of manure is to be calculated. There is no current process. Included in this process will be a definition of salt.

Standard Provisions and Reporting Requirements

Page 8 item a. (6) item is not necessary as on-site analyses do not require preservation. Samples are immediately analyzed according to manufacturer's instructions.

Attachment A

Additional Dairy Facility Information item g

This section requires a significant level of detail for an existing facility report. Identification of categories of materials utilized at the facility should be sufficient at the first submission.

Attachment B

The mapping activities associated with the NMP and WMP have significant overlap. It is presumed that two separate maps do not need to be created. Maps are required at various times. It would be helpful to have a simple sentence “The objective(s) of this map is/are to” This helps the regulated entity understand the purposes of the maps. Logical information needed to describe the landowner include, name of agency and available information need to be provided when items need to be defined on a map that is not readily available to the operator. What map sources provide acceptable information? Will infrastructure alterations necessitate map modification and re-submission to RB 5. How often will maps need to be modified and what happens if a map is out-of-date?

Page 4 3. Volume capacity design mandates 1.5 times rainfall minus evaporation, unless a contingency plan is developed. What is the technical basis for 1.5?

Page 6 IV A. Facilities should be designed and constructed to collect and convey water to retention pond(s). The divert water requires additional language—from point A to point B.

Page 7 B. Algae growth in ponds is typically desirable. It can be an indicator of the presence of oxygen.

I. Dead animals should be referred to as mortality.

Attachment C

Page 2 Copies of documents are required to be maintained for 10 years. This is inconsistent with requirements in the Order and in the MRP and excessive.

Page 5 V Absent a discharge during the time period this should not need a professional to sign off or certify no discharge should occur. If structural changes are needed then it is reasonable to have a professional indicate that changes have been made.

IV This section provides a long path to indicate people need to maintain records identified in the MRP. It refers to the records necessary for I.A (previous) and further discussed in Technical Standard IX (later in document). In fact the actual information needed is found in MRP and not in Attachment C. Identification in MRP pages 8-10 specify required records to maintain. Why not directly identify MRP pages in this section?

Page 9 11 This is not consistent with the soil analysis requirements in MRP. The initial soil test requires P and not N. Same comment applies to C-10 B. 2. a. Preplant soil sampling for nitrate is not generally recommended as a reliable predictor of the amount of nitrogen that needs to be applied to the crop (see below).

Page 10-11 (B.2.a.) The first two sentences of this section set a requirement that nitrogen application rates be based on a “soil analysis”, by which we presume R5 means a soil nitrate test. The two sentences are confusing. It is not clear whether the results of the soil test are to be used as the basis for (1) total N application for the season (2) “early season N application” or (3) “pre-plant or side dress applications”. Beyond that, we are not aware of any research having been conducted that would establish a quantitative relationship between an early season soil nitrate test and total crop N requirement over an entire season. An early season soil nitrate test would at best in some situations provide a basis for delaying N applications until later in the season. We note that , in the third sentence of this section, a numeric N limit (1.40) based on crop harvest N removal is described. The relationship of this to the soil test criteria in the preceding sentences is confusing. We suggest that this section be modified by removing the first two sentences, i.e., removing the soil nitrate test as a basis for N application rate. The use of a factor (1.4) times crop N harvest removal is easily understood and provides a robust general N application limit. The UC Committee of Experts report recommends that this be applied over a three-year moving period. Changes in soil nitrate inventory would become insignificant over that period..

Page C-11 B.2.a.i – ii. By the time plant tissue tests show a nutrient deficiency in warm-season annual forage crops such as corn, irreparable yield losses will likely already have occurred on that crop. Good agronomic practice is to assure the crop has the nutrients it needs prior to the crop showing deficiencies. If yield is compromised, nutrient uptake targets may not be met and groundwater quality may not be protected. Tissue tests from previous season(s), either in season or at harvest, showing the need for additional nutrients should be acceptable justification for the need for additional applications to the current crop.

Page 12 Important Note “For example, phosphorus will leave” should be may leave.

Page 12 C. 2. There is no need to prohibit applications of process wastewater due to weather. In some locations applications when fields have recently received rain allow for more uniform application and result in groundwater protection. This of course, requires adequate handling of any field runoff and justification as part of an NMP.

Page 13 D. 1. Nutrient materials should be applied as uniformly as possible. Insert underlined words.

Comments related to Attachment E. Definitions:

“Anaerobic digester” is designed to both accomplish anaerobic digestion and manage/collect the generated biogas typically to yield energy. The definition included in this Appendix would apply to many open air ponds and storage structures.

“Discharge”: The term discharge is used to describe off-site discharge to surface water as well as the application of manure or manure water. Greater understanding of the document could be achieved if land application of manure/manure nutrients is differentiated from off-site discharges to surface water.

“Freeboard” is defined incorrectly. Freeboard is the difference in elevation between the **maximum** level of liquid in a storage system and the lowest point of the embankment or overflow pipe. This area is intended to NEVER have liquid. NRCS has a standard definition.

“Mature dairy cow” is defined incorrectly. A cow is a bovine which has calved. A lactating animal is one currently lactating. A dry cow is a cow that is no longer lactating (typically in a resting phase before calving again). A mature dairy cow is a dairy animal in her third lactation or older (standard definition).