

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

Reissued Order R5-2007-0035-R

INFORMATION SHEET
WASTE DISCHARGE REQUIREMENTS GENERAL ORDER
FOR
EXISTING MILK COW DAIRIES

INTRODUCTION

This Information Sheet provides information to supplement, clarify, and elaborate upon the findings and requirements contained in the reissued Waste Discharge Requirements General Order for Milk Cow Dairies R5-2007-0035 (the "Dairy General Order"). This Information Sheet is considered a part of the Dairy General Order.

The Dairy General Order will serve as general Waste Discharge Requirements (WDRs) for discharges of waste from existing milk cow dairies. The Dairy General Order is not a National Pollutant Discharge Elimination System (NPDES) permit, and does not authorize discharges to surface waters that would otherwise require a NPDES permit.

All dairies receiving coverage under the Dairy General Order are required to:

- Monitor wastewater, soil, crops, manure, surface water discharges, and storm water discharges;
- Monitor surface water and groundwater in accordance with a monitoring and reporting program (regulated dairies have the option to join a Representative Groundwater Monitoring Program (RMP) in lieu of individual monitoring of first encountered groundwater);
- Implement a Waste Management Plan for the dairy production area;
- Implement a Nutrient Management Plan (NMP) for all land application areas;
- Retain records for the production area and the land application areas;
- Submit annual monitoring reports; and
- Improve or replace management practices that are found not to be protective of water quality.

BACKGROUND

Pursuant to Water Code section 13260, any person discharging or proposing to discharge wastes that could affect the quality of the waters of the state is obliged to file a report of that discharge with the appropriate regional water board (this report is referred to as a "Report of Waste Discharge" or "ROWD"). The regional water boards have the authority to waive this requirement pursuant to Water Code section 13269. In 1982, the California Regional Water

Quality Control Board, Central Valley Region (Central Valley Water Board or Board) adopted Resolution No. 82-036, which waived the ROWD requirement for most dairies in the Central Valley Region. This waiver remained in place until statutory changes to Water Code section 13269 resulted in the automatic expiration of all existing waivers on 1 January 2003.

Knowing that the existing waiver was due to expire, the Central Valley Water Board adopted Resolution R5-2002-0205 on 6 December 2002. This resolution stated that all dairies would be expected to obtain regulatory coverage under either:

- Individual or general waste discharge requirements prescribed by the Board pursuant to Water Code section 13263;
- A conditional waiver that the Board would adopt pursuant to Water Code section 13269; or
- Individual or general National Pollutant Discharge Elimination System (NPDES) permits, which would be issued by the Board pursuant to Federal law.

The Board rescinded Resolution R5-2002-0205 on 13 March 2003 because it had failed to issue general waste discharge requirements or a general NPDES permit, and thus dairy operators could not apply for regulatory coverage under either one of those permitting schemes before the deadlines in the resolution expired.

The Central Valley Water Board spent the next couple of years developing a regulatory strategy for addressing dairy wastes. On 8 August 2005, in furtherance of this strategy, the Board issued certified letters to the owners and operators of all known operating dairy facilities. These letters requested that the owners and operators submit a ROWD for each dairy (i.e., multiple RWODs if they owned or operated more than one dairy) to the Central Valley Water Board by 17 October 2005 (this correspondence is referred to as the "ROWD Request Letter"). On 3 May 2007, the Central Valley Water Board issued General Order R5-2007-0035 (the "2007 General Order"). The 2007 General Order regulated "existing milk cow dairies," defined as those dairies that were operating as of 17 October 2005 and that had filed a ROWD in response to the ROWD Request Letter.

Following the issuance of the 2007 General Order, the Asociación de Gente Unida por el Agua (a coalition of community residents and non-profit organizations) and the Environmental Law Foundation (collectively referred to as the "Petitioners") petitioned the 2007 General Order to the State Water Resources Control Board (State Water Board). The State Water Board dismissed the petition, concluding that it failed to raise substantial issues. The Petitioners then filed a petition for writ of mandate in the Sacramento County Superior Court (the "Superior Court"), arguing that the Central Valley Water Board failed to comply with the requirements of State Water Board Resolution 68-16, the Statement of Policy with Respect to Maintaining High Quality of Waters in California (*State Anti-Degradation Policy*) when it issued the 2007 General Order. The Superior Court denied the petition, and the Petitioners subsequently filed an appeal in the Third District Court of Appeal (the "Appellate Court"). The Appellate Court reversed the Superior Court's decision, and found that the Board's 2007 General Order did not comply with the requirements of the *State Anti-Degradation Policy*. (*Asociación de Gente Unida por el Agua*

v. Central Valley Regional Water Quality Control Bd. (hereafter AGUA) (2012) 210 Cal.App.4th 1255.)

Responding to the reversal, the Superior Court issued a Writ of Mandate that compels the Central Valley Water Board to, “[s]et aside the [2007 General Order] and reissue the permit only after application of, and compliance with, the State's anti-degradation policy ... as interpreted by the Court of Appeal in its opinion.” The reissued Dairy General Order is intended to set aside and replace the 2007 General Order in compliance with the Superior Court’s writ of mandate.

When the Board issued the 2007 General Order, it also issued a companion Monitoring and Reporting Program (MRP) pursuant to Water Code section 13267. This MRP included monitoring, record-keeping, and reporting requirements that were applicable to all dairies regulated by the 2007 General Order. However, due to resource constraints, the dairy industry and the Central Valley Water Board acknowledged that it would be infeasible for all the dairies to immediately implement individual monitoring programs: the dairies lacked the financial resources to install multiple monitoring wells at each facility, there were not enough consultants available to develop groundwater monitoring programs and install multiple monitoring wells at each dairy facility, and the Central Valley Water Board lacked the staff to analyze thousands of individual groundwater monitoring reports.

In order to efficiently assess the water quality impacts associated with various waste management practices employed at the dairies, the Central Valley Water Board proposed two parallel approaches to monitoring: 1) the dairies that elected to conduct their own monitoring could continue to do so under their individual monitoring programs, and 2) the dairies that would prefer to pool their resources could enroll in a RMP. After soliciting public comments on revisions to the MRP that would add an RMP option, the Board’s Executive Officer issued the revised version of the MRP (the “Revised MRP”) on 23 February 2011.

Under the RMP approach, individual dairies have the option of joining together to collectively monitor different waste management practices in a variety of geologic settings in lieu of developing individual monitoring programs. The collective monitoring effort is being used to develop a suite of effective management practices, and substantially decreases the expense and unnecessary duplication of implementing individual monitoring programs. Dairies utilizing management practices that are found not to be protective of groundwater quality will be required to improve upon those management practices. In accordance with the terms of the Revised MRP, the Board’s Executive Officer approved a Monitoring and Reporting Workplan for the Central Valley Dairy Representative Monitoring Program (CVDRMP), which is discussed in greater detail under the section entitled *How Will the Board Evaluate the Effectiveness of Management Practices?*, which is presented later on in this Information Sheet.

DAIRIES REGULATED BY THE DAIRY GENERAL ORDER

There were approximately 1,600 dairy operations that received regulatory coverage under the 2007 General Order. Since then, the number of dairy operations within the Central Valley Region has declined significantly, largely due to economic reasons. Since 2007, revenues from

milk produced by dairies have not kept up with the rising cost of doing business. Increased charges for producing and purchasing cattle feed and depressed milk prices have been the dominant factors in this decline, although regulatory compliance costs have also been a factor. The Board estimates that at this time about 1,300 dairy operations are covered by the 2007 General Order and will be subject to the reissued Dairy General Order.

The herd sizes at these dairy operations vary as operators strive to maintain a consistent milk production. Maintaining consistent milk production requires a dairy operator to manage the herd by continually producing calves, some of which eventually replace the dairy's producing herd over time, while excess stock are marketed for beef production or herd replacement elsewhere. Professionals at the University of California Davis estimate that the normal variation in California dairy herd sizes ranges from about 10 to 15 percent.

For the purposes of this Order, existing herd size is defined as the maximum number of mature dairy cows reported in the ROWDs that were submitted in response to the ROWD Request Letter, plus or minus 15 percent (to account for the normal variation in herd sizes). An increase in the number of mature dairy cows of more than 15 percent is considered an expansion, and the expanded dairy will be required to file a new ROWD to obtain regulatory coverage under a different General Order or an individual order.

As stated above, neither the 2007 General Order nor this Order purports to be a NPDES permit. Dairies that have a discharge requiring coverage under a NPDES permit must obtain coverage under Revised Order R5-2010-118, Revised Waste Discharge Requirements/NPDES Permit CAG015001 (as revised by Order R5-2011-0091). As Order R5-2011-0091 simply modifies Order R5-2010-0118, R5-2011-0091 does not exist as a separate order and the Expiration Date of Order R5-2010-0118 has not changed.

For a variety of reasons, the Central Valley Water Board may also determine that an individual dairy facility is not appropriately regulated under the Dairy General Order, and may require such a facility to be regulated under individual WDRs.

RATIONALE FOR ISSUING A GENERAL ORDER

The Central Valley Water Board has the authority to regulate waste discharges that could affect the quality of the waters of the state under Division 7 of the Water Code. The Board regulates most discharges by prescribing waste discharge requirements (including both waste discharge requirements issued under state law and waste discharge requirements issued under the federal Clean Water Act) or by issuing conditional waivers. All confined animal facilities (as defined in Cal. Code Regs., tit. 27, § 20164), including dairies, are subject to the Board's regulatory authority.

Water Code section 13263(i) describes the criteria that the Board uses to determine whether a group of facilities should be regulated under a general order (as opposed to individual orders). These criteria include:

- The discharges are produced by the same or similar types of operations,
- The discharges involve the same or similar types of wastes,

- The discharges require the same or similar treatment standards, and
- The discharges are more appropriately regulated under general WDRs rather than individual WDRs.

Dairy facilities are appropriately regulated by a general order because they: (a) involve similar types of operations, where animals are confined and where their wastes are managed by onsite storage, land application, or removal offsite; (b) the discharges from these facilities, which are primarily composed of animal waste, are similar; (c) the dairies are subject to regulations that impose the same or similar treatment standards; (d) discharges of dairy wastes have the same potential to impact waters of the state; and, (e) given the large number of facilities and their similarities, the dairies are more appropriately regulated under a general order.

APPLICABLE REGULATIONS, PLANS, AND POLICIES

Water Quality Control Plans

The Central Valley Water Board has adopted Water Quality Control Plans (Basin Plans) for the Sacramento River and San Joaquin River Basins (4th ed.) and for the Tulare Lake Basin (2nd ed.). These two Basin Plans designate the beneficial uses of groundwater and surface waters of the Central Valley Region, specify water quality objectives to protect those uses, and include implementation programs for achieving water quality objectives. The Basin Plans also incorporate, by reference, plans and policies of the State Water Board, including the *State Anti-Degradation Policy* and State Water Board Resolution 88-63 (*Sources of Drinking Water Policy*). The Dairy General Order contains requirements necessary to bring the discharges of waste from the dairies into compliance with the Basin Plans, including requirements to meet the water quality objectives and protect beneficial uses specified in the Basin Plans, and other applicable plans and policies.

Beneficial Uses of Surface Water and Groundwater

The State Water Board adopted statewide standard definitions for beneficial uses of surface and ground waters. These standard definitions were used to identify the existing and potential future beneficial uses contained in the Basin Plans. Consideration also was given to the practicability of restoring uses which may have been lost because of water quality.

Surface Waters: Pursuant to Chapter II of the Basin Plans, the beneficial uses of surface water may include: municipal and domestic supply; agricultural supply; industrial process supply; industrial service supply; hydro-power generation; water contact recreation; non-contact water recreation; warm freshwater habitat; cold freshwater habitat; migration of aquatic organisms; spawning reproduction and/or early development; wildlife habitat; navigation; rare, threatened, or endangered species; groundwater recharge; freshwater replenishment; aquaculture; and preservation of biological habitats of special significance. The Sacramento River and San Joaquin River Basins Plan includes four additional beneficial use designations not specified in the Tulare Lake Basin Plan (agricultural stock watering, commercial and sport fishing, estuarine habitat, and shellfish harvesting). Both Basin Plans contain a Table that lists the surface water

bodies and the beneficial uses. Where water bodies are not specifically listed, the Basin Plans designate beneficial uses based on the waters to which they are tributary.

The beneficial uses are protected in the Dairy General Order by, among other requirements, a prohibition on the direct or indirect discharge of waste and/or storm water from the production area to surface waters, a prohibition on the discharge of wastewater to surface waters from cropland, a prohibition on any discharge of storm water to surface water from the land application areas unless the land application area has been managed consistent with a certified Nutrient Management Plan, and a prohibition on the discharge of waste from existing milk cow dairies to surface waters that causes or contributes to an exceedance of any applicable water quality objective or any applicable state or federal water quality criterion.

Ground waters: Chapter II of the Sacramento River and San Joaquin River Basin Plan states:

“Unless otherwise designated by the Regional Water Board, all groundwaters in the Region are considered as suitable or potentially suitable, at a minimum, for municipal and domestic water supply, agricultural supply, industrial service supply, and industrial process supply.”

Chapter II of the Tulare Lake Basin Plan designates the beneficial uses of groundwater to include municipal and domestic supply, agricultural supply, industrial service supply, industrial process supply, water contact recreation, and wildlife habitat. The Tulare Lake Basin Plan includes a Table that lists the designated beneficial uses of groundwater within the Basin.

These beneficial uses are protected in this Order by, among other requirements, the specification that the discharge of waste at an existing milk cow dairy shall not cause a violation of water quality objectives or cause pollution or nuisance. Degradation of groundwater is allowed provided it is in accordance with this Dairy General Order.

Water Quality Objectives

Pursuant to Water Code section 13263(a), WDRs must implement the Basin Plans, and the Board must consider the beneficial uses of water, the water quality objectives reasonably required to protect those beneficial uses, other waste discharges, and the need to prevent nuisance conditions. Water quality objectives are the limits or levels of water quality constituents or characteristics that are established for the reasonable protection of beneficial uses of water or the prevention of nuisance within a specific area. (Wat. Code, § 13050(h).) Water quality objectives apply to all waters within a surface water or groundwater resource for which beneficial uses have been designated. Water quality objectives are listed separately for surface water and groundwater in Chapter III of the Basin Plans and are either numeric or narrative. The water quality objectives are implemented in WDRs consistent with the Basin Plans' *Policy for Application of Water Quality Objectives*, which specifies that the Central Valley Water Board “will, on a case-by-case basis, adopt numerical limitations in orders which will implement the narrative objectives.” To derive numeric limits from narrative water quality objectives, the Board considers relevant numerical criteria and guidelines developed and/or published by other agencies and organizations.

The primary waste constituents of concern (COC's) due to discharges of waste from dairies with respect to surface waters are: nitrogen in its various forms (ammonia and un-ionized ammonia, nitrate, nitrite, and total Kjeldahl nitrogen), phosphorus, potassium, salts (as measured by total dissolved solids and electrical conductivity), total suspended solids, and pathogens. In addition, dairy operators typically use chemicals such as cleaning products to disinfect their milking equipment, footbaths to maintain the health of their herd, and pesticides in the production area and land application areas. Some portion of some of these chemicals may be commingled with process wastewater before it is stored in the retention pond.

The COC's due to discharges of waste from dairies with respect to groundwater are: nitrogen in its various forms (ammonia and un-ionized ammonia, nitrate, nitrite, and total Kjeldahl nitrogen), salts, and general minerals (calcium, magnesium, sodium, potassium, bicarbonate, carbonate, sulfate, and chloride). The discharge of waste from dairies must not cause surface water or groundwater to exceed the applicable water quality objectives for those constituents. If compliance cannot be immediately achieved, the Board may set a compliance time schedule for the discharger to achieve compliance with the water quality objectives. Under the Basin Plans, this time schedule must be "as short as practicable."

Water Quality Objectives and Federal Criteria for Surface Water¹

Water quality objectives that apply to surface water include, but are not limited to, (1) numeric objectives, including the bacteria objective, the chemical constituents objective (includes listed chemicals and state drinking water standards, i.e., maximum contaminant levels (MCLs) promulgated in Cal. Code Regs., tit. 22, §§ 64431 and 64444 and are applicable through the Basin Plans to waters designated as municipal and domestic supply), dissolved oxygen objectives, pH objectives, and the salinity objectives; and (2) narrative objectives, including the biostimulatory substances objective, the chemical constituents objective, and the toxicity objective. The Basin Plans also contain numeric water quality objectives that apply to specifically identified water bodies, including for example, electrical conductivity objectives for the Delta.

Federal water quality criteria that apply to surface water are contained in federal regulations referred to as the California Toxics Rule and the National Toxics Rule. (See 40 C.F.R. §§ 131.36 and 131.38.)

Water Quality Objectives for Groundwater

Water quality objectives that apply to groundwater include, but are not limited to, (1) numeric objectives, including the bacteria objective and the chemical constituents objective (includes

¹ The Dairy General Order prohibits the direct or indirect discharge of waste and/or storm water from the production area to surface waters, the discharge of wastewater to surface waters from cropland, and the discharge of storm water to surface water from the land application areas where manure or process wastewater has been applied unless the land application area has been managed consistent with a certified Nutrient Management Plan.

state MCLs promulgated in Cal. Code Regs., tit. 22, §§ 64431 and 64444 and are applicable through the Basin Plans to municipal and domestic supply), and (2) narrative objectives including the chemical constituents, taste and odor, and toxicity objectives. The Tulare Lake Basin Plan also includes numeric salinity limits for groundwater.

State Water Board Resolution 88-63 (The Sources of Drinking Water Policy)

The *Sources of Drinking Water Policy* states that all surface waters and groundwaters of the state are considered to be suitable, or potentially suitable, for municipal or domestic water supply, except where the groundwater meets one or more of the criteria specified in the Basin Plan, including:

- a. The TDS exceeds 3,000 milligrams per liter (mg/L) (5,000 micromhos per centimeter (umhos/cm) electrical conductivity) and the aquifer cannot reasonably be expected by the Regional Board to supply a public water system;
- b. There is contamination, either by natural processes or by human activity (unrelated to a specific pollution incident), that cannot reasonably be treated for domestic use using either Best Management Practices or best economically achievable treatment practices; or
- c. The water source does not provide sufficient water to supply a single well capable of producing an average, sustained yield of 200 gallons per day.
- d. The aquifer is regulated as a geothermal energy producing source or has been exempted administratively pursuant to 40 CFR, Section 146.4. for the purpose of underground injection of fluids associated with the production of hydrocarbon or geothermal energy, provided that these fluids do not constitute a hazardous waste under 40 CFR, Section 261.3.

Both Basin Plans include criteria for granting exceptions to municipal and domestic supply designations based on the *Sources of Drinking Water Policy*. The Tulare Lake Basin Plan also includes criteria for granting exceptions to the designation of beneficial uses for agricultural supply and industrial supply. The Tulare Lake Basin Plan specifies exceptions to the designated beneficial uses for some groundwater within the Tulare Lake Basin. Exceptions to the *Sources of Drinking Water Policy* are not self-implementing, but must be established in an amendment to the Basin Plan.

Title 27 of the California Code of Regulations

Title 27 of the California Code of Regulations prescribes minimum standards for animal waste at confined animal facilities. For surface water protection, Title 27 includes requirements for the design of containment facilities for both storm water and process wastewater and for adequate flood protection. For groundwater protection, the minimum standards in Title 27 require existing milk cow dairies to minimize percolation of wastewater to groundwater in disposal fields, apply manure and wastewater to disposal fields at reasonable agronomic rates, and minimize infiltration of water into underlying soils in manured areas. Furthermore, retention ponds must be located in, or lined with, soils of at least 10 percent clay and no more than 10 percent gravel. (Cal. Code. Regs., tit. 27, § 22562(d).)

However, it is Central Valley Water Board staff's understanding that the retention pond standard was developed based on the assumption that manure solids contained within the wastewater would effectively reduce the permeability of the soils lining the wastewater ponds. This reduced permeability would result in a lowering of the pond leaching rate to a level thought to be protective of groundwater quality. An October 2003 report (the "Task 2 Report") by Brown, Vence, and Associates (BVA) confirmed that the "...current Title 27 requirements are insufficient to prevent groundwater contamination from confined animal facilities, particularly in vulnerable geologic environments." Adverse impacts have been detected in areas where groundwater is as deep as 120 feet below ground surface, and in some areas underlain by fine-grained sediments. Factors that appear to affect a clay-lined pond's ability to be protective of groundwater quality vary significantly from site to site due to native soil conditions, pond construction, pond age, manure properties, climate, pond operation, pond maintenance and depth to groundwater. Potential controlling factors appear to include: the inherent structure of the underlying soil, the moisture content of the unsaturated portion of the aquifer (vadose zone), the presence or absence of macropores or preferential pathways within the vadose zone (desiccation cracking, earthworm channels, development of root holes), and the oxidation reduction conditions present within the vadose zone and within the aquifer itself.

Resolution 68-16 (State Anti-Degradation Policy)

The *State Anti-Degradation Policy*, adopted by the State Water Board in October 1968, limits the Board's discretion to authorize the degradation of high-quality waters. This policy has been incorporated into the Board's Basin Plans. High-quality waters are those waters where water quality is more than sufficient to support beneficial uses designated in the Board's Basin Plan. Whether or not a water is a high-quality water is established on a constituent-by-constituent basis, which means that an aquifer can be considered a high-quality water with respect to one constituent, but not for others. (State Water Board Order WQ 91-10.)

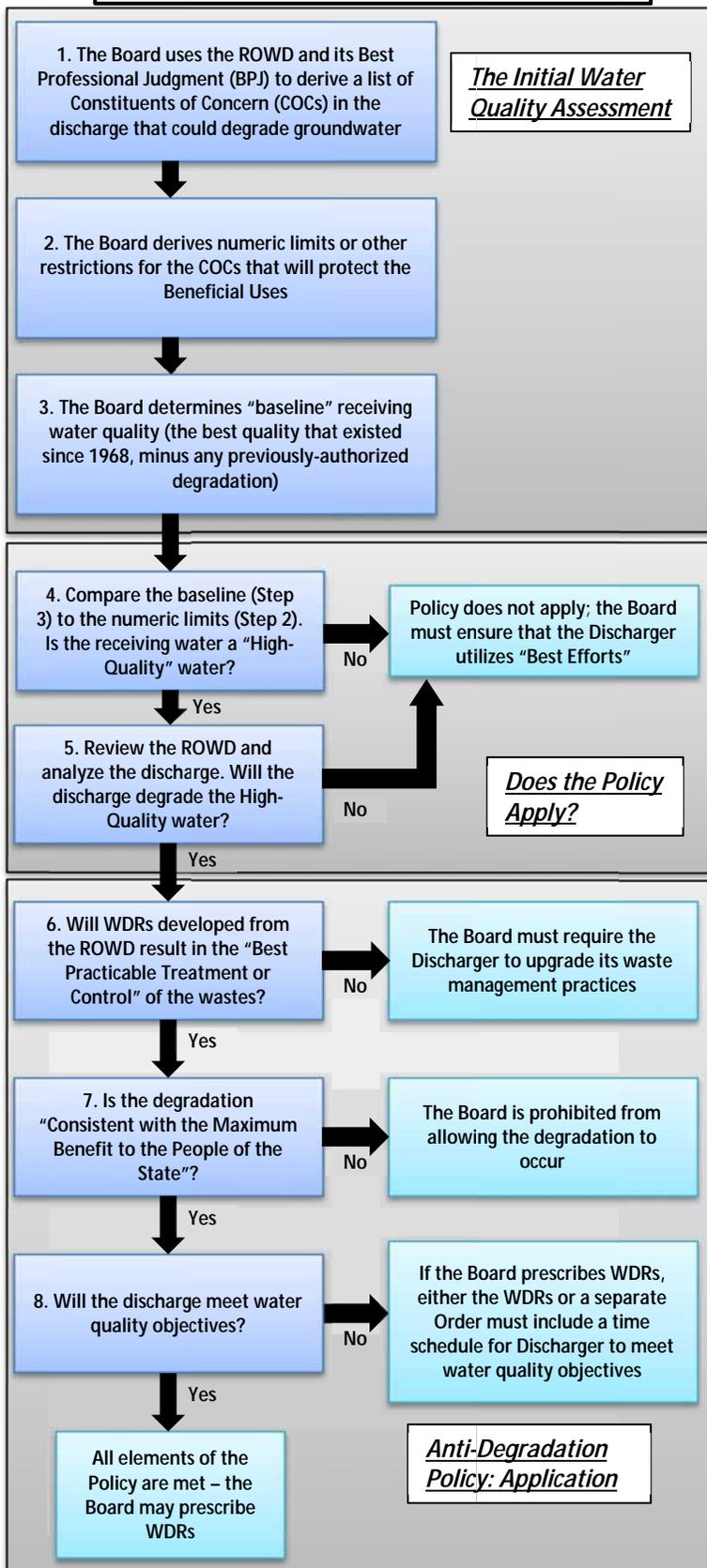
The following provisions of the *State Anti-Degradation Policy* are directly applicable to the discharges regulated by the Dairy General Order:

1. Whenever the existing quality of water is better than the quality established in policies as of the date on which such policies become effective, such existing high quality will be maintained until it has been demonstrated to the State that any change will be consistent with maximum benefit to the people of the State, will not unreasonably affect present and anticipated beneficial use of such water, and will not result in water quality less than that prescribed in the policies.
2. Any activity which produces or may produce a waste or increased volume or concentration of waste and which discharges or proposes to discharge to existing high quality waters will be required to meet waste discharge requirements which will result in the best practicable treatment or control of the discharge necessary to assure that (a) a pollution or nuisance will not occur and (b) the highest water quality consistent with maximum benefit to the people of the State will be maintained.

Generally speaking, these provisions require that the Board adopt standards and requirements to ensure the discharger controls the discharge by employing "best practicable treatment or control" methodologies to limit the extent of the degradation, and that the Board carefully

consider whether the permitted degradation inheres to the maximum benefit to the people of the State when the Board prescribes waste discharge requirements that will result in the degradation of high-quality waters. The *State Anti-Degradation Policy* also requires that the

State Anti-Degradation Policy Flowchart



Board prohibit waste discharges from resulting in water pollution or nuisance, though this is a requirement that also exists outside the context of the *State Anti-Degradation Policy*. (see Wat. Code, § 13263.)

The State Water Board has provided only limited guidance regarding the *State Anti-Degradation Policy*. The State Water Board's Administrative Procedures Update 90-004 provides guidance for implementing *State Anti-Degradation Policy* and the Clean Water Act's anti-degradation provisions (40 C.F.R. § 131.12.) in the context of NPDES permitting. Although APU 90-004 is not directly applicable to the Dairy General Order because nonpoint discharges from agriculture are exempt from NPDES permitting requirements, the Appellate Court found this document informative in interpreting the *State Anti-Degradation Policy*. The following analysis adheres to existing guidance and the Appellate Court's decision in the *AGUA* case.

As recounted in the *AGUA* litigation, the Board erred when it issued the 2007 General Order because it failed to comply with the *State Anti-Degradation Policy*. The reissued Dairy General Order contains revisions designed to comply with the *AGUA* decision, which interpreted the requirements of the *State Anti-Degradation Policy*. The flow chart on this page describes the process that the Board generally uses to apply the *State Anti-Degradation Policy*, and the following discussion elaborates on how

these requirements are applied in the context of the Dairy General Order.

The following sections describe the step-by-step approach for applying the Anti-Degradation Policy, followed by the direct application of this policy to the Dairy General Order.

The Initial Water Quality Assessment

Step 1: Due to the constituent-by-constituent nature of an anti-degradation analysis, the Board must first compile a list the waste constituents present in the discharge that could degrade groundwater. These constituents are referred to as “constituents of concern,” or COCs. The Board uses its best professional judgment to determine this suite of COCs, which is usually extrapolated from the ROWD that was submitted by the discharger.

Step 2: Once the Board has compiled the list of COCs, it then references numeric limits or other restrictions that would protect the beneficial uses associated with the receiving water. Some constituents, such as those constituents that have Maximum Contaminant Levels established in Title 22 of the California Code of Regulations, have numeric water quality objectives associated with them, while others have only narrative water quality objectives associated with them. For constituents that have only narrative water quality objectives associated with them, the Board derives numeric limits by considering relevant numerical criteria and guidelines developed and/or published by other agencies and organizations. (e.g., State Water Board, California Department of Health Services, California Office of Environmental Health Hazard Assessment, California Department of Toxic Substances Control, University of California Cooperative Extension, California Department of Fish and Game, U. S. EPA, U. S. Food and Drug Administration, National Academy of Sciences, U. S. Fish and Wildlife Service, Food and Agricultural Organization of the United Nations).

Step 3: The Board then makes a good-faith effort to determine best water quality that has existed since 1968, the year in which the anti-degradation policy was promulgated (often data from 1968 or earlier are unavailable). The Board then determines whether any subsequent lowering of water quality was due to a regulatory action taken by the Board. The best quality that has existed since 1968, minus any authorized degradation, becomes the “baseline” water quality².

Determining Whether the Anti-Degradation Policy is Triggered

Step 4: The Board compares the numeric limits derived in Step 2 with the baseline water quality derived in Step 3. For each constituent, if the baseline water quality is better than the derived limits (i.e., the quality needed to support all of the beneficial uses), then the water is considered a “high-quality water.” If the receiving water is not a high-quality water for all of the COCs, then the *State Anti-Degradation Policy* does not apply.

Step 5: The Board determines whether the discharge will degrade the receiving water. The Board makes this determination by comparing the information contained in the discharger’s ROWD or other applicable information with the baseline water quality. If the discharge will not

² Water quality control policies adopted subsequent to 1968 may alter the calculation of this baseline.

degrade the receiving water, then the *State Anti-Degradation Policy* does not apply. *Application of the State Anti-Degradation Policy's Requirements*

Step 6: If the discharge will degrade a high-quality water, then the *State Anti-Degradation Policy* requires the Board to prescribe requirements that will result in the best practicable treatment or control (BPTC) of the wastes in the discharge. BPTC is an evolving concept that takes into account changes in the technological feasibility of deploying new or improved treatment or control methodologies, new scientific insights regarding the effect of pollutants, and the economic realities that regulated industries face. Because this concept evolves over time, standard industry practices that are considered BPTC today may not be considered BPTC in the future. And though “practicality” limits the extent to which a discharger must implement expensive treatment or control measures, the Board must ultimately ensure that discharges do not cause pollution or nuisance, thereby protecting those who rely on the quality of groundwater and surface waters.

Neither the Water Code nor the *State Anti-Degradation Policy* defines the term “best practicable treatment or control.” However, the State Water Board has stated that “one factor to be considered in determining BPTC would be the water quality achieved by other similarly situated dischargers, and the methods used to achieve that water quality.” (See Order WQ 2000-07, at pp. 10-11). Furthermore, in a “Questions and Answers” document for Resolution 68-16 (the Questions and Answers Document), BPTC is interpreted to include:

“[A] comparison of the proposed method to existing proven technology; evaluation of performance data (through treatability studies); comparison of alternative methods of treatment or control, and consideration of methods currently used by the discharger or similarly situated dischargers.”

Though the Board is prohibited from specifying the design, location, type of construction, or particular manner in which a discharger may comply with a requirement, order, or decree (Wat. Code § 13360.), the Board can still compare the treatment or control practices that a discharger has described in its ROWD to the treatment or control practices employed by similarly-situated dischargers in order to make a BPTC determination. (State Water Board Order WQ 2000-7.) Furthermore, “practicability” dictates that the Board consider the costs associated with the treatment or control measures that are proposed in the ROWD.

Step 7: The *State Anti-Degradation Policy* also requires that the Board consider whether the degradation authorized in a permit is “consistent with the maximum benefit to people of the state.” For discharges subject to the federal Clean Water Act, it is only after “intergovernmental coordination and public participation” and a determination that “allowing lower water quality is necessary to accommodate important economic or social development in the area in which the waters are located” that the Board can allow for degradation. (40 C.F.R. § 131.12.)

As described in the Question and Answers Document mentioned above, some of the factors that the Board considers in determining whether degradation is consistent with the maximum benefit to people of the State include: economic and social costs, tangible and intangible, of the proposed discharge, as well as the environmental aspects of the proposed discharge, including

benefits to be achieved by enhanced pollution controls. USEPA guidance clarifies that the federal anti-degradation provision,

“... is not a ‘no growth’ rule and was never designed or intended to be such. It is a policy that allows public decisions to be made on important environmental actions. Where the state intends to provide for development, it may decide under this section, after satisfying the requirements for intergovernmental coordination and public participation, that some lowering of water quality in “high quality waters” is necessary to accommodate important economic or social development” (EPA Handbook for Developing Watershed Plans to Restore and Protect Our Waters, Chapter 4).

APU 90-004 requires the Board to consider both the costs to the discharger and the costs imposed upon the affected public in the NPDES context, and states that “[c]ost savings to the discharger, standing alone, absent a demonstration of how these savings are necessary to accommodate ‘important social and economic development’ are not adequate justification’ for allowing degradation.”

It is, however, important to keep the “maximum benefit to people of the state” requirement in context. Neither the *State Anti-Degradation Policy* nor the Water Code allows unreasonable effects to beneficial uses. Therefore, such unreasonable effects (such as the unmitigated pollution of a drinking water source) are not the focus of the Board’s inquiry, because they are legally prohibited. Instead, the *State Anti-Degradation Policy* requires the Board to consider the costs that may be imposed on other dischargers as a result of the degradation that the Board is allowing to occur. For example, if the Board allows a discharger to operate a sub-standard facility that degrades a high-quality groundwater, dischargers situated downstream (for surface waters) or downgradient (for groundwaters) from that discharge would be discharging to a receiving water that lacks any capacity to assimilate additional waste loads. This may impose higher treatment costs on the downstream/downgradient discharger.

Ultimately, the Board may allow degradation to occur following a demonstration that the degradation is consistent with the maximum benefit to the people of the state; the *State Anti-Degradation Policy* is not a no-growth or no-degradation policy. However, the Board must justify why this degradation is beneficial not only to the discharger, but to others reliant on the water quality of the receiving water body.

Step 8: the Board must ensure that discharges will not unreasonably affect present and anticipated beneficial use of such water, will not result in water quality less than that prescribed in relevant policies, and will not cause pollution or nuisance. The Water Code defines “pollution” to mean an alteration of the quality of the waters of the state by waste to a degree which unreasonably affects either the waters for beneficial uses or the facilities which serve these beneficial uses, i.e., violation of water quality objectives. (Wat. Code, § 13050(1).) The term nuisance is defined as anything that is, (1) injurious to health, indecent or offensive to the senses, or an obstruction to the free use of property so as to interfere with the comfortable enjoyment of life or property; (2) affects an entire community or considerable number of persons; and (3) occurs during, or as a result of, the treatment or disposal of wastes. (Wat. Code, § 13050(m).) To constitute a nuisance, all three factors must be met.

The Board ensures that this component of the *State Anti-Degradation Policy* is met by requiring a discharger to comply with water quality objectives designed to protect all designated beneficial uses, thereby protecting those who rely on the quality of groundwater and surface waters.

The State Anti-Degradation Policy as Applied to the Dairy General Order

Steps 1-5 (Applied): Although background water quality varies significantly in those areas covered by the Dairy General Order, most receiving waters are considered high-quality waters for one or more constituents of concern, and wastes from dairy facilities will degrade these waters. As the court concluded, “it is certain that the water quality of [at least some of] the existing groundwater is better than the water quality objective, making the groundwater high quality water for antidegradation purposes. Water can be considered high quality for purposes of the antidegradation policy if it is determined to be so for any one constituent, because the determination is made on a constituent by constituent basis.” (*AGUA* at 1271.) Furthermore, evidence in the Administrative Record indicates that wastes discharged from the regulated dairies will degrade this high-quality water, thereby triggering the *State Anti-Degradation Policy*.

Step 6 (Applied): Given that the *State Anti-Degradation Policy* applies, the Board must ensure that the Dairy General Order requires regulated dairies to implement BPTC measures to minimize the amount of degradation that will occur.

Generally speaking, the waste management practices employed by dairies can be broken down into three distinct areas: production areas (including milk barns, feed storage areas, and corral areas), wastewater ponds, and land application areas. The following is a discussion of what the Board considers to be BPTC for each of these three components of the regulated dairy operations.

Best Practicable Treatment or Control Measures for the Production Area

The Dairy General Order considers the term “Production Area” to include milk barns, wash/sprinkler pens, feed and non-liquid manure storage areas, and corrals (i.e., animal confinement areas). For these areas, the most effective way to reduce or eliminate water quality impacts is to restrict the infiltration of waste in these areas. Title 3 of the California Code of Regulations (Title 3), sections 645 et seq., set specifications for milk dairy buildings, including:

- § 646.1 (Corrals, Ramps, and Surroundings). This section requires that dirt or unpaved corrals be graded to promote drainage and that cow washing areas shall be paved (concrete or equivalent) and sloped to a drain. Water troughs, permanent feed racks, and mangers shall have paved access, and water troughs shall have a drain to carry water away from the corrals;
- § 648(c) Requires that milk rooms be floored with concrete or other suitable material and be provided with a vented, trapped drain and §649(a) requires that milk barns be floored with concrete or other suitable material and be sloped to drain; and
- § 661 Requires that roof drainage from barns, milk houses, or shelters shall not drain into a corral unless the corrals are paved and properly drained.

In addition to the requirements of Title 3, the Dairy General Order requires that milk barns, including their related sprinkler pens and gutters be designed and maintained to convey all water that has contacted animal wastes or feed directly to the wastewater retention system, and that all production area structures must be constructed or otherwise designed so that clean rainwater is diverted away from manured areas, feed storage areas, and waste containment facilities, unless drainage is fully contained in the wastewater retention system. Dairy operators must design and maintain the animal confinement area (including corrals), and manure and feed storage areas in a manner that limits infiltration so that wastes, nutrients, and contaminants generated are directed to the manure retention pond(s). The Dairy General Order prohibits standing water in these areas as of 72 hours after the last rainfall (see Production Area Specification D-6 of the reissued Dairy General Order).

Best Practicable Treatment or Control Measures for Land Application Areas

Normal commercial farming practices, including the application of dairy wastes to cropland as fertilizer, can contribute salts, nutrients, pesticides, trace elements, sediments, and other by-products that can affect the quality of surface water and groundwater. Evaporation and crop transpiration remove water from soils, which can result in an accumulation of salts in the root zone. Additional amounts of water are often applied to leach the salts below the root zones. These leached salts can cause impacts to groundwater or surface waters. Even using the most efficient irrigation systems and appropriate fertilizer application rates and timing to correspond to crop needs, irrigation of cropland may degrade high-quality groundwater. In addition, in land application areas where groundwater is shallow, some Dischargers have installed subsurface (tile) drainage systems to maintain the groundwater level below the crop's root zone. Drainage from these systems, which may include constituents originating from the dairies, may be discharged directly to surface water bodies or to drainage ditches that discharge to surface water bodies. Some of these systems discharge to evaporation basins that are subject to waste discharge requirements.

With respect to salts and nutrients, the key to limiting degradation and ensuring compliance with water quality objectives at the dairies' land application areas is an effective Nutrient Management Plan, which specifies the volume and composition of the wastewater that can be applied to land application areas without causing adverse groundwater impacts. The Board considers an effective Nutrient Management Plan to be BPTC for the land application areas. The majority of the dairies covered under the 2007 General Order had been operating for many years without a Nutrient Management Plan. In response, the Board required each dairy operator to develop and implement a Nutrient Management Plan, and the reissued Dairy General Order will continue this requirement.

Unlike most other groundwater-related components of a dairy's waste management strategy, Nutrient Management Plans have received a significant amount of attention from the USEPA. This is because precipitation-related discharges from land application areas are considered agricultural storm water discharges, and are therefore not subject to the federal Clean Water Act's CAFO regulations. However, this exemption applies only when the "...manure, litter, or process wastewater [at the land application area] has been applied in accordance with site specific nutrient management practices that ensure appropriate agricultural utilization of the

nutrients in the manure, litter, or process wastewater...” (40 C.F.R. §122.23.) Therefore, the USEPA has taken a close interest in the “site specific nutrient management practices” for application of waste from large concentrated animal feeding operations to land application areas. The Dairy General Order mandates that dairies employ the management practices required by Title 40 Code of Federal Regulations Section 122.42(e)(1)(vi)-(ix).

Because the Dairy General Order requires compliance with the federal CAFO regulatory requirements, precipitation-related discharges from land application areas at facilities operating in compliance with this Order are considered agricultural storm water discharges. And since they are consistent with USEPA’s “best practicable control technology,” the technical standards for nutrient management represent BPTC for the purposes of compliance with the *State Anti-Degradation Policy*. In addition, the Dairy General Order requires dairies who utilize tile drain systems to identify their location and discharge point(s) and to monitor discharges from these systems. The Dairy General Order also specifies well and surface water setbacks and requires certification of backflow prevention for all irrigation wells (Standard Provisions 18 and Attachment B. VI [*Waste Management Plan for the Production Area for Existing Milk Cow Dairies*]). Additionally, the Dairy General Order’s Land Application Specifications contains additional requirements regarding waste infiltration and soil moisture capacity limits for waste application.

Pond Requirements: Generally

The Dairy General Order includes requirements that all ponds must be verified by an engineer to have adequate capacity and structural integrity to hold generated process water and precipitation. All ponds must be managed and maintained to prevent breeding of mosquitoes and other vectors. Ponds shall not have small coves and irregularities around the perimeter of the water surface. Weeds shall be minimized in all ponds through control of water depth, harvesting, or other appropriate method, and dead algae, vegetation, and debris shall not be allowed to accumulate on the water surface. These measures are required elements of a BPTC program for all ponds, whether they are already existing ponds or whether they are new or expanded ponds.

Best Practicable Treatment or Control Measures for New or Expanded Ponds

Three counties in the Central Valley Region, many other states, and the Natural Resources Conservation Service have pond design requirements that are more stringent than is required by Title 27 (see Table 1 at the end of this Information Sheet). For new or expanded ponds, the Board considers these more stringent design standards to be BPTC.

Kings County and Merced County require pond liners to have a maximum seepage rate of 1×10^{-6} centimeters per second (cm/sec). Four of the top ten milk producing states (Wisconsin, Pennsylvania, Michigan, and Washington) require ponds to be designed to comply with the state’s Natural Resources Conservation Service Practice Standard 313 (CPS 313). These states’ CPS 313s have pond liner requirements that range from in-place soils (two to three feet thick with more than 50 percent fines or maximum permeability of 1×10^{-6} cm/sec), or a liner of one foot thick compacted clay with maximum permeability of 1×10^{-7} or maximum seepage rate

of 1×10^{-6} if manure sealing cannot be credited or 1×10^{-5} cm/sec if manure sealing can be credited, minimum thickness of one foot) concrete, geomembranes, or geosynthetic clay liners³.

One state (Idaho) requires pond liners to comply with NRCS Agricultural Waste Management Field Handbook Appendix 10D, which recommends either: two feet of in-place soils with maximum permeability of 1×10^{-6} cm/sec or a liner of compacted clay (minimum one foot thick with allowable seepage rate of 1×10^{-5} cm/sec if manure sealing credit allowed or 1×10^{-6} cm/sec if manure sealing credit not allowed), concrete, geomembrane, or geosynthetic clay. New Mexico and Texas require pond liners have a maximum permeability of 1×10^{-7} cm/sec and Minnesota requires pond liners with a maximum seepage rate of 5×10^{-7} cm/sec.

California CPS 313 requires pond liners have a maximum target seepage rate of 1×10^{-6} cm/sec, except where aquifer vulnerability or risk is high in which case a synthetic liner or other alternative liner is required (see Table 1 of this Information Sheet).

While these pond design requirements provide more groundwater protection than the Title 27 requirements, there are no known studies that fully evaluate the ability of any of these county, state, or NRCS pond liner requirements to protect groundwater quality. It would be difficult to determine if any proposed pond design would be protective of groundwater quality without an evaluation of information on depth to groundwater, existing groundwater quality beneath the facility, nature of the geologic material between the bottom of the retention pond and the first encountered groundwater, nature of the leachate from the retention pond, and proximity to existing supply wells. Proposed pond designs that do not include such an evaluation should be very conservative to assure protection of groundwater under any likely conditions. The most conservative pond design would include a double lined pond with a leachate collection and removal system between two geosynthetic liners. Such pond designs are currently being approved by the Central Valley Water Board at classified waste management units regulated under Title 27 of the California Code of Regulations (i.e., landfills and Class II surface impoundments) and a limited number of wastewater retention ponds at dairies.

The Dairy General Order provides a two-tiered approach that will allow the Discharger two options for retention pond design. Tier 1 includes a retention pond designed to consist of a double liner constructed with 60-mil high density polyethylene or material of equivalent durability with a leachate collection and removal system (constructed in accordance with Cal. Code Regs., tit. 27, § 20340) between the two liners. Review for retention ponds designed to this standard will be conducted in less than 30 days of receipt of a complete design plan package submitted to the Board. Tier 2 includes a retention pond designed in accordance with California Natural Resource Conservation Service (NRCS) Conservation Practice Standard 313 or equivalent and which the Discharger must demonstrate through submittal of technical reports that the alternative design is protective of groundwater quality.

³ National Resources Conservation Service, Agricultural Waste Management Field Handbook, Appendix 10D – Geotechnical, Design, and Construction Guidelines.

Best Practicable Treatment or Control Measures for Existing Dairy Ponds

Existing dairy ponds were built to contain and store the large quantities of dairy cow wastes prior to discharge to land application areas. These ponds present a difficult challenge for the dairies that may be causing unacceptable groundwater impacts. This is because requiring the immediate retrofitting of existing ponds to meet Tier 1 or Tier 2 requirements (the Dairy General Order's requirements for new or expanded ponds) would be beyond practicable economic limits for most dairies (See Memorandum from John Schaap and Steve Bommelje, Provost & Pritchard to Theresa A. Dunham, Somach Simmons & Dunn (August 5, 2013), *Costs to Retrofit Existing Dairies That Do Not Have Tier 1 or Tier 2 Lagoons* (Provost & Pritchard 2013); see also Memorandum from Annie AcMoody, Western United Dairywomen to Theresa A. Dunham, Somach Simmons & Dunn (August 6, 2013), *Financial Impact to Retrofit Existing Dairies That Do Not Have Tier 1 or Tier 2 Lagoons* (AcMoody 2013).) Specifically, the range of costs to retrofit lagoons range from an estimated low of \$180,000 for a single liner at a 300 milk cow dairy to almost \$1.4 million for a double liner at a 3000 milk cow dairy. (See Provost & Pritchard 2013, p. 3.) Considering the net loss in dairy operation revenues over the past five years and the likelihood of an inability to obtain financing, it would be near impossible for most dairy operations retrofit dairy lagoons and remain in operation. (AcMoody 2013, p. 4.) If forced to retrofit such lagoons, many dairy operations would likely go out of business. The widespread closure of dairies in the Central Valley would have regional and state economic impacts.

Considering the wide-spread economic impacts that would occur with respect to requiring application of Tier 1 or Tier 2 requirements to existing ponds, the Central Valley Water Board finds that BPTC for existing ponds constitutes an iterative process of evaluation that includes groundwater monitoring individually or through the RMP, assessment of data collected, evaluation of Existing Pond conditions and their impact on groundwater quality, and case studies that evaluate potential changes in management practices and/or activities that may be necessary to further protect groundwater quality from existing ponds.

The Board will use the SRMR (for dairies represented in the RMP) or individual Summary Monitoring Reports (SMRs), for dairies that are in an individual monitoring program, to determine whether upgrades to existing ponds will be required. Facilities where data demonstrate that an existing pond is resulting in degradation beyond what is authorized under this order will be required to upgrade facilities on a time schedule that is as short as practicable. Substituting alternative management practices for the existing ponds (such as reducing the water level in the ponds, dry-scrape, or other methods) would also be acceptable, provided those management practices are found to be protective of groundwater quality for the conditions present where they would be implemented. Regulated dairies that are found not to be protective of underlying groundwater must upgrade their management practices on a time schedule that is as short as practicable, supported with appropriate technical or economic justification, but in no case may time schedules extend beyond 10 years from the date that the Summary Report or SRMR is approved by the Executive Officer.

Step 7 (Applied): In the case of the dairies regulated by the Dairy General Order, allowing the maximum extent of degradation allowed by law (i.e., degradation up to the water quality objectives that are protective of the designated beneficial uses) would allow the Board to focus

its efforts on ensuring that the discharges do not impact sensitive populations that rely on the quality of the receiving waters. In other words, while the focus of the *State Anti-Degradation Policy* is on justifying degradation that will ultimately result in water quality somewhere between the “best water quality that has existed since 1968” and a numeric limit that is protective of all beneficial uses, the Board and the dairy industry acknowledge that their primary task lies in preventing pollution and protecting sensitive uses.

The Board acknowledges that significant degradation at dairies has occurred throughout the Central Valley Region due to historic practices. In issuing the Dairy General Order, the Board will allow the maximum extent of degradation allowed by law to occur. The Dairy General Order is structured in such a way as to compel the dairy industry to focus their available resources on meeting water quality objectives, thereby protecting communities that are dependent on groundwater. As the dairy industry develops more effective management practices in the coming years, the Board may re-evaluate this goal, and may impose more stringent requirements that reflect the availability of better practicable management practices.

Step 8 (Applied): Although dairy waste materials provide nutrients to crops, they can create pollution or nuisance conditions if improperly managed or cause pollution of surface water and/or groundwater if site conditions are not taken into account in preparing a nutrient utilization and management strategy.

While the Board recognizes that it may be impracticable for the dairy industry to make dramatic changes to its waste management practices overnight, or even in a few years, those dairies whose practices are found to not be protective of the underlying groundwater through required individual or representative monitoring must upgrade their operations to ensure compliance with water quality objectives on a time schedule that is as short as practicable.

Allowing regulated dairies to degrade high quality waters is consistent with maximum benefit to people of the State as long as that degradation does not result in detrimental impacts to beneficial uses over the long term. California’s dairy industry, built on the foundation of 1,563 family-owned dairies statewide⁴, is important to the economic well-being of the Central Valley. Dairy farms generate jobs in a variety of sectors, from employees on the farm, providers of farm and veterinary services, other farmers who grow feed, processors of milk and dairy products, and in transportation of feed, milk and dairy products, and many others. According to a California Milk Advisory Board analysis⁵, California’s dairy industry is responsible for creating a total of 443,574 jobs and \$63 billion in economic activity. The same report estimated that a typical dairy cow generates \$34,000 in economic activity annually and a herd of 100 cows creates about 25 jobs.

⁴ Source for this and all data on number of dairies, cows and farm gate value of milk:
CDFA.ca.gov/dairy/dairystatsannual.html

⁵ <http://www.californiadairyroom.com/node/289>, study by J/D/G Consulting using economic output multipliers developed by the U.S. Department of Commerce, Bureau of Economic Analysis. Based on 2008 data (size of the California dairy industry in number of cows has declined about 3.4 percent since 2008 but the economic impact of the industry is expected to be roughly similar today as to 2008 due to slightly higher overall levels of milk production).

The economic value of the dairy industry is particularly important within the Central Valley, where 89 percent of the state's cows and 81 percent of the state's dairy farms are located, as well as a significant fraction of the state's 117 dairy processing plants. Moreover, the jobs generated in the Central Valley are of even greater importance given routine double-digit unemployment rates in many rural counties and a high reliance on a healthy agricultural sector. Furthermore, California dairy farms are a significant producer of the nation's milk supply. In 2012, California dairy farms produced about 41.7 million pounds of milk, which is about a fifth of the nation's milk supply. As such, California dairies play an important role in food and nutrition security for California and the nation.

Considering the economic significance of the Central Valley dairy industry as well as the important role Central Valley dairies play in providing adequate milk supplies to the nation, the Central Valley Water Board finds that maintaining the Central Valley dairy industry is to the benefit of the people of the state.

Verifying that the State Anti-Degradation Policy is Satisfied

Although not an explicit provision of the *State Anti-Degradation Policy*, the Appellate Court determined that the Dairy General Order does not comply with the *State Anti-Degradation Policy* without a monitoring program sufficient to determine whether the discharges are in compliance with the *State Anti-Degradation Policy*.

The primary method used to determine if water quality objectives and the requirements of the *State Anti-Degradation Policy* are being met is surface water and groundwater quality monitoring. The Dairy General Order prohibits discharges of storm water from the production area to surface water and any discharge of storm water to surface water from the land application areas being used for nutrient utilization unless that discharge is from land that has been managed consistent with a certified Nutrient Management Plan. Should discharges of manure, process wastewater, or storm water occur from the production area, the Dairy General Order requires discharge monitoring and chemical analysis to determine if an exceedance of a water quality objective has occurred. The Dairy General Order also requires monitoring of the first storm water discharge of the year to surface waters from land application areas on a rotating basis (1/3 of the fields per year); and tailwater discharges to surface waters from the land application areas if they have occurred less than 60 days following an application of manure and/or process wastewater. Likewise, the Dairy General Order requires individual or representative groundwater monitoring of natural background water quality and the water quality downgradient of the waste management units (production area, corrals, and land application areas).

The Revised MRP requires dairy operators to sample domestic and irrigation supply wells on their property, and to either monitor first-encountered groundwater at their facility or participate in an approved representative groundwater monitoring program. The purpose of requiring monitoring of water supply wells includes identifying the quality and trends of water being used at the dairy and the amount of nutrients contained in irrigation water so it can be accounted for in the development of the required nutrient management plan. The purpose of requiring monitoring of first-encountered groundwater is to evaluate current management practices in

order to determine whether such practices are protective of groundwater quality at the most vulnerable point. Groundwater monitoring at existing dairies is necessary to: determine background groundwater quality, determine existing groundwater conditions near retention ponds, production areas, and land application areas, determine whether improved management practices need to be implemented, and confirm that any improved management practices will have the desired result on groundwater quality.

This Order requires the Discharger to report any noncompliance that endangers human health or the environment or any noncompliance with the Prohibitions contained in the Order within 24 hours of becoming aware of its occurrence. The Dairy General Order also requires the Discharger to submit annual monitoring reports which contain the analytical results of laboratory data, including all laboratory analyses (including Chain of Custody forms and laboratory QA/QC results) for surface and groundwater monitoring. Additionally, an annual assessment of groundwater monitoring is required. The assessment must include an evaluation of the groundwater monitoring program's adequacy to assess compliance with the Order, including whether the data provided are representative of conditions upgradient and downgradient of the wastewater management area, production area, and land application area of the dairy facility.

Similar to the individual groundwater monitoring program, the representative groundwater monitoring program is required to submit annual monitoring reports and an evaluation of data collected to date and an assessment of whether participating dairies are implementing management practices that minimize degradation of high quality groundwaters and are protective of beneficial uses.

The Central Valley Water Board recognizes that monitoring the effectiveness of the dairies' waste management practices and their effect on groundwater is needed to verify that water quality is adequately protected and the intent of the anti-degradation policy is met. Accordingly, the Dairy Order, in conjunction with the MRP, requires additional groundwater monitoring that must be conducted on an individual dairy basis or through Representative Monitoring Programs (RMPs). Under the terms of the Dairy Order and MRP, all dairies subject to the terms of the Dairy Order must either conduct their own groundwater monitoring or actively participate in a RMP. Currently, most dairies subject to the Dairy Order (more than 98 percent) are members of an RMP.

Both the individual groundwater monitoring provisions and the RMP's monitoring requirements are designed to measure water quality data over time in first-encountered groundwater. An RMP is further required to conduct such monitoring on a variety of dairy farms that represent the overall range of conditions on dairies within the Central Valley. This means for a RMP that a variety of physical site conditions must be monitored, such as varying soil types and depth to groundwater. Varying management conditions must also be measured, such as different types of crops, irrigation methods, waste storage structures and animal housing.

It is recognized that in many cases, a single set of groundwater monitoring data, or even monitoring data over a period of months or years, may not be sufficient to determine the effectiveness of existing management practices. Evaluating groundwater results over an

extended period of time, in conjunction with gathering data regarding existing surface practices, is necessary to determine whether water quality is being protected or is being unreasonably impacted.

Waters that are Not High Quality: The “Best Efforts” Approach

When a receiving water body quality exceeds or just meets the applicable water quality objective due to naturally-occurring conditions or due to prior Board-authorized activities, it is not considered a high-quality water, and it is not subject to the requirements of the *State Anti-Degradation Policy*. However, where a groundwater constituent exceeds or just meets the applicable water quality objective, the Board must set limitations no higher than the objectives set forth in the Basin Plan. This rule may be relaxed if the Board can show that “a higher discharge limitation is appropriate due to system mixing or removal of the constituent through percolation through the ground to the aquifer.” (State Water Board Order No. WQ 81-5.) However, the Board should set limitations that are more stringent than applicable water quality objectives if the more stringent limitations can be met through the use of “best efforts.” (State Water Board Order No. WQ 81-5.)(*City of Lompoc*) The “best efforts” approach involves the establishment of requirements that require the implementation of reasonable control measures. Factors which are to be analyzed under the “best efforts” approach include the water quality achieved by other similarly situated dischargers, the good faith efforts of the discharger to limit the discharge of the constituent, and the measures necessary to achieve compliance. (*City of Lompoc*, at p. 7.) The State Water Board has applied the “best efforts” factors in interpreting BPTC. (see State Water Board Order Nos. WQ 79-14 and WQ 2000-07.)

In summary, the Board may establish requirements more stringent than applicable water quality objectives even outside the context of the *State Anti-Degradation Policy*. The “best efforts” approach must be taken where a water body is not “high quality” and the antidegradation policies are accordingly not triggered.

California Environmental Quality Act

The Central Valley Water Board adopted a Negative Declaration in 1982 concurrent with the adoption of Resolution 82-036, which waived waste discharge requirements for milk cow dairies. The adoption of the Dairy General Order, which prescribes regulatory requirements for existing facilities in order to ensure the protection of groundwater resources, is exempt from the requirements of the California Environmental Quality Act (CEQA)(Pub. Resources Code, § 21000 et seq.) based on the following three categorical exemptions:

- California Code of Regulations, title 14, section 15301 exempts the “operation, repair, maintenance, [and] permitting ... of existing public or private structures, facilities, mechanical equipment, or topographical features” from environmental review. Eligibility under the Dairy General Order is limited to milk cow dairies that were existing facilities as of 17 October 2005, and the Order does not authorize the expansion of these facilities. The restoration of, or improvements to, dairy waste management systems to ensure proper function in compliance with this Order will involve minor alterations of existing private facilities.

- California Code of Regulations, title 14, section 15302 exempts the "...replacement or reconstruction of existing structures and facilities where the new structure will be located on the same site as the structure replaced and will have substantially the same purpose and capacity as the structure replaced..." The Dairy General Order will likely require covered dairies to replace or reconstruct waste management systems to ensure compliance with the Order's requirements.
- California Code of Regulations, title 14, section 15302 exempts "... minor public or private alterations in the condition of land, water, and/or vegetation which do not involve removal of healthy, mature, scenic trees except for forestry and agricultural purposes..." The Dairy General Order will require covered dairies to make improvements to their waste management systems that will result in only minor alterations to land, water, and/or vegetation.

The majority of the approximately 1,600 dairies covered under the initial Dairy General Order operated under a waiver program that was in effect from 1982 to December 2002.

Approximately 86 of those existing facilities were operating under either an individual WDR Order or a 1996 General WDR Order. This Dairy General Order imposes significantly more stringent requirements compared to the previous WDRs or the waiver of WDRs.

The Dairy General Order reduces impacts to surface water by prohibiting discharges of: (1) waste and/or storm water to surface water from the production area, (2) wastewater to surface waters from cropland, and (3) storm water to surface water from the land application area where manure or process wastewater has been applied, unless the land application has been managed consistent with a certified Nutrient Management Plan.

This General Order reduces impacts to groundwater by requiring Dischargers to: (1) develop and implement Nutrient Management Plans that will control nutrient losses from land application areas; (2) implement remedial measures when groundwater monitoring demonstrates that an existing pond has adversely impacted groundwater quality; (3) design and construct new ponds and reconstructed existing ponds to comply with the groundwater limitations and specifications in the Dairy General Order; (4) document that no cross connections exist that would allow the backflow of wastewater into a water supply well; and (5) submit an Operation and Maintenance Plan to ensure that (a) procedures have been established for solids removal from retention ponds to prevent pond liner damage and (b) corrals and/or pens, animal housing areas, and manure and feed storage areas are maintained to collect and divert process wastewater and runoff to the retention pond and to minimize infiltration of wastewater and leachate from these areas to the underlying soils.

In the Revised MRP, the Board is requiring the monitoring of discharges, surface water, groundwater, storm water, tile drainage water, and tailwater to determine compliance with the Dairy General Order.

Central Valley Salinity Alternatives for Long-Term Sustainability

The Central Valley Salinity Alternatives for Long-Term Sustainability (CV-SALTS) initiative has the goal of developing sustainable solutions to the increasing salt and nitrate concentrations that threaten achievement of water quality objectives in Central Valley surface waters and

groundwater. The Dairy General Order requires actions that will reduce nitrate discharges and should result in practices that reduce salt loading. The Central Valley Water Board intends to coordinate all such actions with the CV-SALTS initiative. CV-SALTS may identify additional actions that need to be taken by existing milk cow dairies and others to address these constituents. The Dairy General Order can be amended in the future to implement any policies or requirements established by the Central Valley Water Board as a result of the CV-SALTS process.

REQUIREMENTS AND ENFORCEMENT OF THE DAIRY GENERAL ORDER

What are Dairy Wastes, and what are their Potential Impacts to Water Quality?

For the purposes of this General Order, dairy waste includes, but is not limited to, manure, leachate, process wastewater and any water, precipitation or rainfall runoff that came into contact with raw materials, products, or byproducts such as manure, compost piles, feed, silage, milk, or bedding.

Waste generated at dairies is stored in solid form in piles or in liquid form in waste retention ponds. The wastes are then applied to cropland or transported off-site for utilization on cropland as a nutrient source. These nutrient-laden materials are applied to soils of varying character and drainage characteristics, varying proximity to surface drainages and waterways, and different character of geology and depth to groundwater. Because of the site variability, this General Order requires the development of a Nutrient Management Plan that is field specific to ensure that optimum nutrient utilization takes place. Although the waste materials provide nutrients to crops, they can create nuisance conditions if improperly managed or cause pollution of surface water and/or groundwater if site conditions are not taken into account in preparing a nutrient utilization and management strategy. This General Order regulates the management of dairy wastes onsite and requires nutrient monitoring, discharge monitoring, groundwater monitoring (individual or representative) and continuous tracking of materials being taken off-site for utilization.

Manure from dairies contains high concentrations of salts (total dissolved solids, including constituents such as sodium and chloride) derived primarily from the feed and water sources used in the dairy production activities. Some dairies also use water softening devices for milk barn cleaning and other activities and the concentrated brines or reject water is usually sent to the retention pond, thus increasing the salt concentrations further.

Manure from dairies contains nutrients (including nitrogen, ammonia, phosphorus and potassium compounds) that can be used in crop production. A review of dairy manure by a University of California Committee of Experts on Dairy Manure Management (UCCE) indicates that dairy cows in the Central Valley Region excrete approximately one (1) pound (lb.) of nitrogen per head per day and approximately 1.29 lbs. of inorganic salts (including only Na⁺, K⁺, and Cl⁻) per head per day. Thus, a 1,000-cow dairy generates approximately 365,000 lbs. of nitrogen and 470,000 lbs. of inorganic salts (Na⁺, K⁺, and Cl⁻) per year that must be managed to prevent impacts to water quality.

The application of dairy waste to cropland provides some challenges due to the complexity of nitrogen in the soil-crop system. Soil nitrogen occurs primarily in three different forms - organic nitrogen, ammonium, and nitrate. Sources of organic nitrogen in soil include crop residue, the soil organic matter pool, and dairy waste applications. Organic nitrogen will mineralize to ammonium over time (one to seven years according to the UCCE Review). Thus, organic nitrogen provides a steady, relatively slow release of plant available and leachable nitrogen. Applying manure with high organic nitrogen content may not meet a crop's nitrogen need during the most rapid growth stage, while exceeding the crop nitrogen uptake during the remainder of the crop's growing season, when the nitrogen may be subject to leaching.

Ammonium nitrogen is immediately available to the plant, but also sorbs to soil particles. Ammonium nitrogen that is unused by the plant remains in the soil and is converted to nitrate typically within days to weeks under oxidizing conditions which are present in much of the Central Valley. Nitrate is also immediately available to the plant, but unlike organic nitrogen and ammonium nitrogen it does not adsorb to soil particles, rather it is in a dissolved form and moves readily with soil water.

The application of manure or process wastewater to a land application area results in the discharge of salts and nitrogen compounds. Oxidation of nitrogen compounds by nitrifying bacteria (i.e., ammonia and organic nitrogen compounds) to nitrites and nitrates has the potential to degrade the quality of surface water and groundwater in the Central Valley Region, if not properly managed. Runoff from manured land application areas poses a threat to surface water quality. A similar threat to groundwater exists if the wastes are applied to the land application area at rates that exceed crop needs. The UCCE review of dairy waste states that based on field experiments and computer models, the appropriate nitrogen loading rate that minimizes nitrogen leaching and maximizes nitrogen harvest is between 140 to 165% of the nitrogen harvested. This is a slightly higher loading rate than what is allowed under New Mexico regulations, which require "...the total nitrogen in effluent that is applied to a crop that is harvested shall not exceed by more than 25 percent the maximum amount of nitrogen reasonably expected to be taken up by the crop..." (20.6.2.3109 NMAC). New Mexico does not allow adjustment of the nitrogen content to account for volatilization or mineralization processes.

Surface water can also be degraded and polluted by both the type and high concentrations of pollutants in dairy cow manure and manure wastewater. Ammonia in the waste is highly toxic to aquatic life and can suppress dissolved oxygen concentrations. In addition, nitrogen and phosphorus compounds in the waste can cause excessive algal growth in surface waters, resulting in lower oxygen levels and which in turn causes fish and other organisms to die. The presence of pathogens in the waste can create a public health threat through human contact with affected waters.

Prior to the issuance of the 2007 General Order, the Central Valley Water Board had documented many discharges of waste from existing milk cow dairies to surface water. Between 2004 and 2007, approximately 70 Dischargers had received Notices of Violation from the Central Valley Water Board for such discharges. The Notices of Violation required immediate cleanup of the discharge and either remediation of the cause of the discharge or a plan with an implementation schedule for such remediation. Additional formal enforcement can be taken

based on a case-by-case evaluation of the circumstances. Such enforcement could include the issuance of Administrative Civil Liability by the Board or referral to prosecutors for civil or criminal action.

This General Order includes prohibitions, specifications, and provisions for the existing ponds and new ponds, the production area and land application areas that are consistent with state regulations. Consistent with Title 27, this General Order prohibits the direct or indirect discharge of waste from the production area to surface water. This General Order also prohibits discharges of: (1) wastewater to surface waters from cropland, and (2) waste to surface waters that causes pollution or nuisance, or that causes or contributes to exceedances of any water quality objective in the Basin Plans or water quality criteria set forth in the California Toxics Rule and the National Toxics Rule.

Storm water may contain pollutants from dairy wastes if the storm water is allowed to contact manured areas or commingle with wastewater from the dairy. This General Order prohibits discharges of storm water from the production area to surface water and any discharge of storm water to surface water from the land application areas being used for nutrient utilization unless that discharge is from land that has been managed consistent with a certified Nutrient Management Plan.

How Will the Board Regulate the Discharge of These Wastes?

Prohibitions: The Dairy General Order includes a number of prohibitions to protect surface and groundwater quality, and to ensure that waste discharges not regulated by this Order are prohibited unless otherwise regulated by another Order of the Central Valley Water Board.

General Specifications: The Dairy General Order includes a number of General Specifications that require dairy facilities regulated under this Order to: maintain and retain process wastewater together with all precipitation and drainage through manured areas up to including a 25-year, 24-hour storm; protect ponds and manured areas from inundation or washout by overflow from any stream channel at least during 20-year peak stream flows, and for many facilities be protected against 100-year peak stream flows; direct all precipitation and surface drainage from outside of the dairy away from manured areas unless such drainage is fully contained; not apply manure and process wastewater closer than 100 feet to vulnerable pathways (e.g., down gradient surface waters, well heads) unless there are sufficient vegetated buffers or physical barriers; and, not use unlined ditches, swales or earthen-berm channels to store process wastewater, manure or tailwater.

Pond Specifications: The Dairy General Order includes requirements that all ponds must be verified by an engineer to have adequate capacity and structural integrity to hold generated process water and precipitation. Specifically, the level of waste in retention ponds shall be kept a minimum of two feet from the top of each aboveground embankment and a minimum of one foot from the ground surface of each belowground pond. All ponds must be managed and maintained to prevent breeding of mosquitoes and other vectors. Ponds shall not have small coves and irregularities around the perimeter of the water surface. Weeds shall be minimized in all ponds through control of water depth, harvesting, or other appropriate method, and dead algae, vegetation, and debris shall not be allowed to accumulate on the water surface.

New or Reconstructed Pond Specifications: New or Reconstructed Ponds must be designed to meet specified Tier 1 or Tier 2 standards and design for such New or Expanded Ponds must be approved by the Executive Officer. Tier 1 standards consist of a double liner constructed with 60-mil high density polyethylene or material of equivalent durability with a leachate collection and removal system. Tier 2 standards are consistent with Natural Resource Conservation Service Practice Standard 313 or equivalent and the Discharger has demonstrated through submittal of technical reports that the alternative design will comply with the groundwater limitations of this Order.

Existing Pond Specifications: In addition to the general pond specifications, ponds in existence as of 3 May 2007 must be evaluated to determine whether they are protective of underlying groundwater. This will be accomplished through compliance with an individual monitoring program or by participation in the Representative Monitoring Program. When existing ponds are found not to be sufficiently protective of underlying groundwater, a dairy must upgrade the pond in accordance with the time schedule for compliance detailed in section M. of the reissued Dairy General Order. Alternatively, if groundwater monitoring demonstrates that a discharge of waste threatens to exceed a water quality objective, the Executive Officer may issue an order to the owner/operator of the monitored dairy to identify and implement management practices that are protective of groundwater quality on a schedule that is as short as practicable (reissued Dairy General Order, General Specification B.5).

Production Area Specifications: The production area includes the barns, corrals, milk parlors, manure and feed storage areas, process water conveyance facilities and any other area of the dairy facility that is not the land application area or retention ponds. The General Order includes a number of requirements that apply to the production area, including: roofs, buildings, and non-manured areas within the production area shall be constructed and/or designed so that clean rainwater is diverted away from manured areas and waste containment facilities; drainage from the roofs of barns, milk houses, or shelters shall not drain into corrals unless the corrals are properly graded and drained; all portions of the production area shall be designed and maintained to convey all water that has contacted animal wastes or feed to the wastewater retention system and shall be designed and maintained to minimize standing water. Standing water is not to be present as of 72 hours after the last rainfall. Dischargers shall implement any newly identified management practices/activities from the Summary Representative Monitoring Report which are applicable for their facility on a time schedule that is as short as practicable but cannot exceed 10 years.

Land Application Area Specifications: This General Order includes land application specifications that require Dischargers to develop and implement a Nutrient Management Plan (NMP) that provides protection of both surface water and groundwater. The contents of the NMP and technical standards for nutrient management are specified in Attachment C to this General Order. The land application specifications also require Dischargers to have a written agreement with each third party that receives process wastewater from the Discharger for its own use. The written agreement will be effective until the third party is covered under waste discharge requirements or a waiver of waste discharge requirements that are adopted by the

Central Valley Water Board and that are specific to the application of the Discharger's process wastewater to land under the third party's control.

The written agreement must identify the Discharger, the third party, the Assessor's Parcel Number and acreage of the cropland where the process wastewater will be applied, and the types of crops to be fertilized with the process wastewater. The written agreement must also include an agreement by the third party to: (1) use the process wastewater at agronomic rates appropriate for the crop(s) grown, and (2) 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.

The technical standards for nutrient management require Dischargers to monitor soil, manure, process wastewater, irrigation water, and plant tissue. The results of this monitoring are to be used in the development and implementation of the NMP. The Dairy General Order also requires Dischargers to create and maintain specific records to document implementation and management of the minimum elements of the NMP, records for the land application area, a copy of the Discharger's NMP, and records on manure, bedding, and process wastewater transferred to other persons.

If existing management practices implemented in the land application area(s) are found not to be sufficiently protective of underlying groundwater, a dairy must change its management practices in accordance with the time schedule for compliance detailed in section M. of the reissued Dairy General Order. Alternatively, if groundwater monitoring demonstrates that a discharge of waste threatens to exceed a water quality objective, the Executive Officer may issue an order to the owner/operator of the monitored dairy to identify and implement management practices that are protective of groundwater quality on a schedule that is as short as practicable (Reissued Dairy General Order, General Specification B.5)

Closure Provisions: This General Order includes a provision that the Discharger must maintain coverage under this Order or a subsequent revision to this Order until all manure, process wastewater, and animal waste impacted soil, including soil within the pond(s), is disposed of or utilized in a manner which does not pose a threat to surface water or groundwater quality or create a condition of nuisance. These closure requirements ensure compliance with the provisions of the *State Anti-Degradation Policy*.

Receiving Water Limitations: This Order includes Groundwater Limitations that require the discharge of waste at existing milk cow dairies not cause the underlying groundwater to exceed water quality objectives, unreasonably affect beneficial uses, or cause a condition of pollution or nuisance.

These limitations are effective immediately except where Dischargers are in compliance with the requirements of Sections II or III of the Revised Monitoring and Reporting Program R5-2007-0035-R, Attachment A, and such Dischargers are implementing management practices/activities on a time schedule that is as short as practicable. For Dischargers participating in the RMP, management practices/activities must be implemented on a time schedule that is as short as practicable and that is consistent with the Time Schedule for Compliance (section M.) contained in the reissued Dairy General Order.

How Will the Board Evaluate the Effectiveness of Management Practices?

This Dairy General Order includes a provision that requires compliance with the Revised MRP, and future revisions thereto, or with an individual monitoring and reporting program, as specified by the Central Valley Water Board or the Executive Officer. The Revised MRP requires:

- periodic inspections of the production area and land application areas
- monitoring of manure, process wastewater, crops, and soil
- recording of operation and maintenance activities
- groundwater monitoring
- storm water monitoring
- tile drainage water monitoring
- monitoring of surface water and discharges to surface water
- annual reporting
- annual reporting of groundwater monitoring
- annual storm water reporting
- noncompliance reporting
- discharge reporting

Specifically, the Dairy General Order requires Dischargers to monitor, either individually or through the RMP, first encountered groundwater upgradient and downgradient of the production area, retention ponds, and land application areas. The purpose of the groundwater monitoring program is to determine whether management practices being employed at the dairies do not cause receiving waters to exceed applicable groundwater objectives and confirm compliance with the requirements of this order.

The Dairy Order contains significant requirements for dairies that are designed to be protective of surface and groundwater quality while also being practicable and economically feasible. These include implementation of nutrient management plans prepared by certified specialists (including testing and measurement of manure, irrigation water, soil and plant tissue to track nutrient flow), and implementation of waste management plans prepared by professional engineers. The Dairy Order practices and design and maintenance standards include measures that apply to all areas of the dairy farm, including the crop production areas, existing manure retention ponds and animal housing areas, including all barns and corrals.

These practices (with the exception of certain pond standards that apply only to new or reconstructed ponds) are already in place, were developed over time with expert input from dairy professionals, the United States Department of Agriculture Natural Resources

Conservation Service and the University of California⁶ and are expected to reduce impacts to water quality from the operation of dairy facilities. However, the Regional Board recognizes that monitoring the effectiveness of these practices is needed to verify that they protect water quality adequately and under a variety of conditions. Accordingly, the Dairy Order in conjunction with the MRP requires additional groundwater monitoring that must be conducted on an individual dairy basis or through Representative Monitoring Programs (RMPs). All dairies subject to the Dairy Order must either conduct their own groundwater monitoring or actively participate in a RMP. Currently, most dairies subject to the Dairy Order (more than 98 percent) are members of an RMP.

Individual Groundwater Monitoring: The individual groundwater monitoring program requires the Discharger to submit a Monitoring Well Installation and Sampling Plan (MWISP) which details the installation of a sufficient monitoring well network to characterize groundwater flow direction and gradient beneath the site; natural background (unaffected by the Discharger or others) groundwater quality upgradient of the facility; and groundwater quality downgradient of the production area, retention ponds, and the land application areas.

Under the individual groundwater monitoring program, the Discharger is required to submit to the Executive officer an annual assessment of the groundwater monitoring data which includes analytical lab reports for data collected during the past year and a tabulated summary of all analytical data collected to date. The annual assessment requires an evaluation of the groundwater monitoring program's adequacy to assess compliance with the Order, including whether the data provided are representative of conditions upgradient and downgradient of the wastewater management area, production area, and land application area of the dairy facility. If the monitoring parameters used to evaluate groundwater quality are found to be insufficient to identify whether site activities are impacting groundwater quality, the Discharger must employ all reasonable chemical analyses to differentiate the source of the particular constituent. This includes, but is not limited to, analyses for a wider array of constituents and chemical isotopes. Within six years of initiating sampling, or at an earlier date if required by the Executive Officer, a Discharger conducting individual sampling is required to submit a summary report that presents a detailed assessment of the monitoring data to evaluate if site activities associated with the operation have impacted groundwater quality. The Summary Report is subject to Executive Officer approval and must include a description of changes in management practices or activities if the data indicate that Groundwater Limitation D.1 of the Order has been violated.

Representative Monitoring Program: As an alternative to installing monitoring wells on an individual basis, dischargers may participate in a Representative Monitoring Program. The Representative Monitoring Program is a data collection and analysis effort that will develop a knowledge base from a subset of Central Valley dairy farms that will support conclusions with respect to existing management practices and their ability to be protective of groundwater quality that are applicable to non-monitored dairies covered under the Dairy General Order.

⁶ See "Managing Dairy Manure in the Central Valley of California," published by the University of California Committee of Experts on Dairy Manure Management, 2005.

It is recognized that a single set of monitoring data, or even monitoring data over a short period of months or years, may not be sufficient to determine the effectiveness of existing practices. In many cases, because of time lags of weeks, months or even years between surface practices and resulting effects in groundwater, the effects of improved management practices will not be reflected immediately in monitoring wells. Evaluating these results over time and in conjunction with data regarding surface practices and other data is necessary to determine whether water quality is being protected or is being unreasonably impacted. In order to provide time for the development of this knowledge base, a period of six years has been allotted for the installation of groundwater monitoring wells, collection and chemical analysis of the groundwater samples, and assembly of an adequate data set for statistical evaluation of the data. The completed knowledge base will be utilized to identify management practices for the various management units (i.e., production areas, land application areas and wastewater ponds) that are protective of groundwater quality for the range of conditions found at facilities covered by the Representative Monitoring Program.

Dischargers choosing to participate in a Representative Monitoring Program must notify the Central Valley Water Board. Notification to the Central Valley Water Board must include identification of the Representative Monitoring Program that the Discharger intends to join. Dischargers choosing not to participate in a Representative Monitoring Program will continue to be subject to individual groundwater monitoring program requirements.

Representative Monitoring Programs are required to submit a monitoring and reporting workplan for Executive Officer approval. The workplan must explain how data collected at facilities that are monitored will be used to assess impacts to groundwater at facilities that are not part of the Representative Monitoring Program's network of monitoring wells. This information is needed to demonstrate that data collected at the representative facilities allows for identification of practices that are protective of water quality at all facilities represented by the Representative Monitoring Program, including those for which on-site data are not collected. The Monitoring and Reporting Workplan must additionally propose constituents the Representative Monitoring Program will monitor and the frequency of monitoring for each constituent identified. The Monitoring and Reporting Workplan must propose a list of constituents that is sufficient to identify whether activities at facilities being monitored are impacting groundwater quality, and by extension if other "represented" facilities may also be impacting groundwater quality due to similar management units and site conditions.

To date, the Central Valley Dairy Representative Monitoring Program (CVDRMP) submitted a Phase 1 workplan to establish a Representative Monitoring Program. On 9 September 2012, the Executive Officer conditionally approved the first phase of the CVDRMP Monitoring and Reporting Workplan and Monitoring Well Installation and Sampling Plan for Existing Milk Cow Dairies. The workplan prepared by the CVDRMP consisted of 18 dairies and 126 dedicated monitoring well sites. Of these well sites, CVDRMP constructed 108 as nested wells (i.e., two wells in one borehole) with the remaining 18 well sites being pre-existing, single-well facilities, for a total of 234 wells.

On 6 June 2012 the CVDRMP submitted a Phase II workplan (approved by the Executive Office on 27 August 2012) which expanded the program's monitoring efforts to incorporate 24

additional dairies, including several dairies with numerous pre-existing monitoring wells that have been subject to academic research for many years. CVDRMP now collects data from monitoring wells at 42 Central Valley dairies from Tehama County in the north to Kern County in the south, with 440 wells at 274 well sites.

As part of its Representative Monitoring Program, CVDRMP will examine conditions in first encountered groundwater beneath a select number of Central Valley dairies over time. The Representative Monitoring Program will extrapolate monitoring results from dairy farms monitored under the program to non-monitored member dairy farms to evaluate dairy operations and management practices for specific waste management units (land application areas, production areas, and wastewater ponds), to facilitate the evaluation of cause and effect relationships between subsurface loading of nutrients and salts, and to establish current groundwater quality conditions. For example, dairy management practices on coarse-grained/sandy soils over shallow groundwater that result in groundwater quality improvements beneath cropped manure application fields that are part of the Representative Monitoring Program are expected to produce similar results beneath non-monitored fields of similar soil types, in areas of similar precipitation patterns, and similar application practices. The same rationale applies to the production area and the liquid manure (i.e., wastewater) storage ponds. Representative monitoring is designed to identify a causal link between groundwater chemical characteristics and dairy management practices specific to management units. This includes the identification of groundwater chemical changes in response to changing management practices.

The Representative Monitoring Program is required to submit (on behalf of its member Dischargers) to the Executive Officer an Annual Representative Monitoring Report (ARMR) which describes the monitoring activities (including a tabulated summary of groundwater analytical data) conducted by the Representative Monitoring Program, and identifies the number and location of installed monitoring wells and other types of monitoring devices. Within each ARMR, the Representative Monitoring Program must evaluate the groundwater monitoring data to determine whether groundwater is being impacted by activities at facilities being monitored by the Representative Monitoring Program. The submittal must include a description of the methods used in evaluating the groundwater monitoring data.

No later than six (6) years following submittal of the first ARMR, the Representative Monitoring Program must produce a Summary Representative Monitoring Report (SRMR) identifying management practices for the various management units (i.e., production areas, land application areas and wastewater ponds) that are protective of groundwater quality for the range of conditions found at facilities covered by the Representative Monitoring Program. The identification of management practices for the range of conditions must be of sufficient specificity to allow participants covered by the Representative Monitoring Program and the Central Valley Water Board to identify which practices at monitored facilities are appropriate for facilities with a corresponding range of site conditions, and generally where such facilities may be located within the Central Valley (e.g., the summary report may need to include maps of the Central Valley that identify the types of management practices that should be implemented in certain areas based on specified site conditions). The summary report must include adequate technical justification for the conclusions incorporating available data and reasonable

interpretations of geologic and engineering principles to identify management practices protective of groundwater quality. Further, the SRMR must include a proposed schedule for implementation of management practices that are protective of groundwater quality that is as short as practicable.

Each ARMR must include an evaluation of whether the representative monitoring program is on track to provide the data needed to complete the SRMR. If the evaluation concludes that information needed to complete the summary report may not be available by the required deadline, the ARMR shall include measures that will be taken to bring the program back on track. The ARMR shall include an evaluation of data collected to date and an assessment of whether monitored dairies are implementing management practices that are protective of groundwater quality. If the management practices being implemented at a dairy being monitored are found to not be protective of groundwater quality, the Executive Officer can issue an order to the owner/operator of the monitored dairy to identify and implement management practices that are protective of groundwater quality prior to submittal of the report.

Both the individual groundwater monitoring provisions and the RMP monitoring requirements are designed to measure water quality data in first-encountered groundwater. A RMP is further required to conduct such monitoring on a variety of dairy farms that represent the overall range of conditions on dairies within the Central Valley. This means for a RMP that a variety of physical site conditions must be monitored, such as varying soil types and depth to groundwater. Varying management practices must also be measured, such as different types of crops, irrigation methods, waste storage structures, and animal housing.

In cases where water quality is not being sufficiently protected, additional time is needed to identify additional practices for the various dairy facility areas that both improve water quality protection, and are feasible and practicable for dairy operators to implement. This is a chief goal of the RMP process and work is actively underway, to be completed no later than 2019, to identify and verify additional practices where necessary to protect beneficial uses of groundwater. This process includes ongoing monitoring and analysis, field studies of management alternatives, and more intensive evaluation of existing practices, including existing manure storage ponds and nutrient management plans.

Considering the need to evaluate the effectiveness of current practices that are being implemented to comply with the Dairy Order, the Regional Board finds that it is not possible in all circumstances for dairy facilities to immediately comply with groundwater limitations. Accordingly, the Dairy Order provides dischargers with an appropriate amount of time to comply with such limitations. The time being provided is consistent with the time frames established in the MRP with respect implementation of RMPs.

Individual Monitoring Orders: The Executive Officer has issued orders to each dairy that require the dairies to either submit individual groundwater monitoring and sampling plans or join a representative groundwater monitoring program. Submitted groundwater monitoring and sampling plans must include a schedule to install groundwater monitoring wells into first encountered groundwater, to collect representative groundwater samples from the wells and have these samples analyzed by a State-certified laboratory for selected constituents, and to

report the results back to the Board. The first phase of orders were issued to those dairies where nitrate-nitrogen was detected at 10 milligrams per liter or more in any one domestic well, agricultural well, or subsurface (tile) drainage system in the vicinity of the dairy. The Executive Officer further prioritized the orders based on factors such as: proximity to a municipal or domestic supply well, artificial recharge area, or Department of Pesticide Regulation Groundwater Protection Area; nitrate concentrations in neighboring domestic wells; number of crops grown per year; whether or not the NMP was completed by 1 July 2009; and any other pertinent site-specific conditions. A summary of how the Executive Officer determined priorities for installation of monitoring wells is provided in Table 5 of Attachment A to the Revised MRP.

What Has Been Done Under the 2007 General Order?

The 2007 General Order established a schedule for Dischargers to develop and implement their Waste Management Plan (WMP) and NMP and required them to make interim facility modifications as necessary to protect surface water and groundwater, improve storage capacity, and improve the facility's nitrogen balance before all infrastructure changes are completed. The 2007 General Order required that all Dischargers submit:

- By 31 December 2007
 - Existing Conditions Report (Attachment A).
- By 1 July 2008
 - Annual Report including Annual Dairy Facility Assessment (an update to the Preliminary Dairy Facility Assessment of Attachment A) with interim facility modifications considered to be implemented.
 - Statement of Completion of the following items in Attachment C (Nutrient Management Plan):
 - Items I.A.1, I.B, I.C. and I.D. (Land Application information), II (Sampling and Analysis Proposal), IV (Setbacks, Buffers, and Other Alternatives to Protect Surface Water), and VI (Record-Keeping Requirements).
 - The following items in Attachment B (Waste management Plan):
 - Items I.A. I.B, I.C, I.D, I.E, I.F.1.a, I.F.2.a, I.F.3, I.F.4, and I.F.5 (Facility Description) and V (Operation and Maintenance Plan).
 - Identification of Backflow Problems.
 - Proposed interim facility modifications to improve storage capacity and balance nitrogen.
- By 31 December 2008
 - Statement of Completion of item V (Field Risk Assessment) of Attachment C.
 - Preliminary Infrastructure Needs Checklist.
- By 1 July 2009

- Annual Report including Annual Dairy Facility Assessment with modifications implemented to date.
- Documentation of interim facility modifications completion for storage capacity and to balance nitrogen.
- Nutrient Management Plan – Retrofitting Plan to improve nitrogen balance with schedule.
- Statement of Completion of items I.A.2 (Land Application Information) and III (Nutrient Budget) of Attachment C.
- Waste Management Plan with Retrofitting Plan and Schedule
- Items I.F.1.b and I.F.2.b (Facility Description), II (Storage Capacity), III (Flood Protection), IV (Production Area Design and Construction), and VI (Documentation there are no cross-connections) of Attachment B.
- Salinity Report.
- By 1 July 2010
 - Annual Report including the Annual Dairy Facility Assessment with facility modifications implemented to date.
 - Status on facility retrofitting completed or in progress.
- By 1 July 2011
 - Annual Report including the Annual Dairy Facility Assessment with facility modifications implemented to date.
 - Certification of facility retrofitting completion including:
 - Retrofitting to improve nitrogen balance.
 - Items II.C (certification of completion of modifications for storage capacity needs), III.D (certification of completion of modifications for flood protection needs), and IV.C (certification of modifications for production area construction criteria) of Attachment B.
- By 1 July 2012
 - Annual Report including the Annual Dairy Facility Assessment with facility modifications implemented to date.
 - Certification that the Nutrient Management Plan has been completely implemented.

How Will This Order Be Enforced?

The State Water Board's Water Quality Enforcement Policy (Enforcement Policy) establishes a process for using progressive levels of enforcement, as necessary, to achieve compliance. It is the goal of the Central Valley Water Board to enforce this order in a fair, firm, and consistent

manner. Violations of this order will be evaluated on a case-by-case basis with appropriate enforcement actions taken based on the severity of the infraction and may include issuance of administrative civil liabilities. Progressive enforcement is an escalating series of actions that allows for the efficient and effective use of enforcement resources to: 1) assist cooperative dischargers in achieving compliance; 2) compel compliance for repeat violations and recalcitrant violators; and 3) provide a disincentive for noncompliance. Progressive enforcement actions may begin with informal enforcement actions such as a verbal, written, or electronic communication between the Central Valley Water Board and a Discharger. The purpose of an informal enforcement action is to quickly bring the violation to the discharger's attention and to give the discharger an opportunity to return to compliance as soon as possible. The highest level of informal enforcement is a Notice of Violation.

The Enforcement Policy recommends formal enforcement actions for the highest priority violations, chronic violations, and/or threatened violations. Violations of the Dairy General Order that will be considered as high priority violations include, but are not limited to:

1. Any discharge of waste and/or storm water from the production area to surface waters.
2. The application of waste to lands not owned, leased, or controlled by the Discharger without written permission from the landowner.
3. The discharge of wastewater to surface water from cropland.
4. Failure to submit notification of a discharge to surface water in violation of the Dairy General Order.
5. Falsifying information or intentionally withholding information required by applicable laws, regulations or an enforcement order.
6. Failure to submit a Design Report for any new or enlarged existing settling, storage, or retention pond prior to construction and/or Post Construction Report for such construction.
7. Failure to pay annual fee, penalties, or liabilities.
8. Failure to monitor as required.
9. Failure to submit required reports on time.

To date, the Executive Officer has initiated and taken a significant number of enforcement actions against Dischargers for failure to comply with the terms of the 2007 General Order. Such actions have included, but are not limited to issuance of: 770 Notices of Violation; 94 Water Code 13267 investigations; 71 Selective Enforcement Letters; 67 Administrative Civil Liability complaints (Wat. Code, §§ 13385 and 13323.); and 12 Expedited Payment Letters.