STAFF REPORT

REGULATION OF FOOD PROCESSING WASTE DISCHARGES TO LAND

Solid and liquid wastes from food processing industries contain significant quantities of organic matter, nutrients and salts. In the Central Valley Region, these wastes have traditionally been disposed of by discharge to land. Regional Board regulation of these discharges has focused mainly on allowing reuse of these wastes as a source of irrigation water and soil amendments, while preventing nuisance conditions. However, significant groundwater quality impacts have occurred at many larger sites where these wastes have been applied. In order to correct existing problems and to prevent future water quality impacts, Board staff has developed a proposed regulatory strategy for food processing waste discharges to land. Staff is bringing this item to the Board to obtain direction on changes needed to our regulatory programs as they apply to food processing waste discharges to land.

Baseline Situation – Water Quality Impacts from Irrigated Agriculture

Degradation of groundwater quality by salt and nitrate continues to be one of the greatest threats to beneficial uses of groundwater within the Central Valley. The Basin Plan for the Sacramento River and San Joaquin River Basins describes salt management as critical to preventing severe degradation of basin groundwater. The Tulare Lake Basin Plan identifies salinity in groundwater as the greatest long-term water quality problem facing that basin and indicates that the problem could ultimately eliminate beneficial uses of water resources. The overall goal of Regional Board's agricultural regulatory activities has been to minimize the rate of salt impact.

Even without considering the reuse of waste, irrigated agriculture causes groundwater quality impacts. All irrigation water, other than direct rainfall, contains salt. Importing irrigation water from one area to another, e.g. from the Sacramento-San Joaquin Delta via the Delta-Mendota Canal, also imports the salt contained in that water. Evaporation from the soil and transpiration from the crops concentrates the salt within the soil. As more irrigation water is applied, salts build up in the soil and, if unchecked, will reach levels that harm the crops. The effect is more severe in arid and semi-arid climates, such as the Central Valley of California, where there is insufficient rainfall to naturally leach salts from the soil. As a result, more irrigation water must be applied to leach the salt below the root zone where it will not harm crops. Inorganic salts are not degradable. Many are not significantly retarded in their movement through soil, migrating with soil moisture and eventually reaching groundwater. Surface waters often have the capacity to assimilate and transport away a significant quantity of salt without resulting in degradation. However, groundwater in most areas has little or no assimilative capacity, due to its slow migration rate, laminar flow pattern and limited vertical mixing. For these reasons, it is virtually impossible to irrigate land in the Central Valley that overlies high quality groundwater without causing some groundwater quality impacts from the salt inadvertently applied with the irrigation water.

The rate of salt impact from irrigated agriculture is affected by the quality of irrigation water and the amount that is applied to the soil. These factors are addressed through market forces and education on best management practices (BMPs). Fertilizer use is another aspect of agricultural practice controlled in this manner. If not carefully controlled, the application of fertilizers can cause additional groundwater quality impacts. Nitrates not kept within the root zone to be absorbed by the crop will migrate to groundwater along with salt. Except for support agencies involved in advisory roles and occasional grant opportunities to facilitate derivation and implementation of BMPs, the effects of irrigated agriculture on groundwater quality are normally out of Regional Board control. But the effects of non-

point sources on groundwater quality must be considered by the Regional Board when authorizing discharges by point sources, such as wastewater treatment plants and food processing plants.

Salts and Nitrate Threatens Beneficial Uses

Salt and nitrate pose significant threats to beneficial uses of groundwater resources. Salinity affects the palatability of drinking water for domestic use. California drinking water standards include a recommend limit of 500 mg/L (ppm) of total dissolved solids and an upper limit of 1,000 mg/L. The State Department of Health Services requires water delivered to consumers to meet these limits. Individual salt components can also adversely affect human health. Sulfate levels above 500 mg/L cause diarrhea in sensitive individuals. Salinity also affects the use of water for agricultural irrigation supply, reducing the ability of plants to uptake water from the soil and causing desiccation of leaves. Irrigation water containing over 450 mg/L of total dissolved solids causes sensitive crops such as strawberries, carrots and beans to begin to suffer reduced yields, when irrigated by sprinklers.[1] Nitrate in drinking water can be toxic to humans, especially to infants, by limiting the ability of the blood to carry oxygen (known in infants as the potentially-fatal condition, "Blue Baby Syndrome.") The California primary drinking water standard of 45 mg/L nitrate (expressed as nitrate; equal to 10 mg/L as nitrogen) was developed to prevent this health effect.

Attachment A contains a detailed list of common constituents of concern found in food processing wastes, as well as constituents that can be leached from soil due to the discharge of these wastes to land, and provides the recommended water quality limits that, if exceeded, indicate impairment of the municipal, domestic, and/or agricultural supply beneficial uses of groundwater.

Food Processing Waste Discharges Cause Additional Impacts

Solid and liquid wastes from food processing industries—including canneries, packing houses, cheese manufacturing and wineries—contain significant quantities of organic matter, nutrients and salts. Organic waste materials from fruit and vegetable processing naturally contain salt. Additional salt enters the waste stream through the use of cleaning and processing chemicals. The Regional Board has found through experience that almost every food processor generates saline waste, whether or not a brining process is involved.

In the Central Valley Region, food processing industries generate large volumes of waste, only some of which is discharged to publicly owned treatment works (POTWs). The majority of these wastes have been treated and disposed of by discharge to land under the concepts of land treatment and reuse. In the theory behind land treatment, food processing wastes are applied to fields where organic matter degrades on and within the soil, and enhances the soil character. The nutrients, if not consumed by bacteria in the decomposition process, are taken up by crops grown on the fields where the wastes are discharged. Soil microorganisms also remove nitrate through denitrification. The food processor realizes a significant cost saving with land discharge, as compared to treating wastes prior to land application or discharging wastes to a POTW.

The reuse of wastewater to irrigate crops potentially reduces the demand on groundwater and surface water supplies, an important consideration given the swelling population of the Central Valley and the steadily rising demand for high quality drinking water supplies. When combined with current and

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[1] Ayers, R. S. and D. W. Westcot, *Water Quality for Agriculture*, Food and Agriculture Organization of the United Nations, Irrigation and Drainage Paper No. 29, Rev. 1, Rome (1985)

projected needs for agricultural water supplies within the region, exports to municipalities outside of our region, and a growing awareness of water needs for in-stream beneficial uses, there is increased pressure to reuse wastewater to the extent practicable. Wastewater reuse supplements or replaces existing surface and underground water supplies.

At the same time, salt and nutrient impacts from the land application of wastewaters for reuse or disposal has the potential to create pockets of pollution over and above impacts caused by irrigated agriculture. The results of groundwater monitoring at many larger food processing waste discharge sites demonstrates significant groundwater quality impacts from salts and nitrogen in the wastes and from minerals leached from the soil by overloading of organic matter. Similar impacts have also been observed where confined animal facility wastes and treated municipal wastewaters are discharged to land. Salts not taken up by crops grown on the disposal fields are not degraded within the soil and are available to migrate to groundwater. If too much waste is applied, nitrate and other nitrogen compounds are not completely taken up by plants nor consumed by soil microorganisms and also migrate to groundwater. The decomposition of organic matter forms weak organic acids. Over-application of organic matter to soil causes oxygen depletion and reducing conditions. These conditions tend to mobilize iron, manganese, calcium, magnesium, arsenic and other soil constituents, which leach to groundwater. Continued growth in food processing industries, and the subsequent overloading of wastewater to land, has the potential to significantly increase the footprint of these groundwater quality impacts. If the application of waste is not carefully controlled, reducing conditions also cause significant odors and vector breeding, which may result in nuisance conditions and complaints from neighboring property owners.

Prior to land application, liquid food processing wastewater is sometimes stored in impoundments (ponds) that either have no liners or have liners that provide minimal or incomplete containment. Traditionally, the primary regulatory focus for these impoundments has been to keep these wastes from entering surface waters and from creating nuisance conditions. These impoundments constitute a concentrated application of waste to soil under constant hydraulic head. Groundwater quality impacts are likely to be more pronounced under impoundments than at locations where wastewater is used just for crop irrigation.

Past Practices and Regulatory Focus

In the Central Valley Region, discharges of food processing waste to land have historically been regulated under the Waste Discharge Requirement (WDR; formerly Non-Chapter 15) Program, and have been considered to be exempt from the full-containment, monitoring, financial assurance and corrective action requirements of the Title 27 regulations.[2] These exemptions are predicated on conformance with

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[2] Title 27, California Code of Regulations (CCR), Division 2, Subdivision 1, *Consolidated Regulations for Treatment, Storage, Processing, or Disposal of Solid Waste*, §20005, *et seq*. Discharges of food processing waste to land must comply with the Title 27 regulatory requirements unless one of the following applies:

(1) The discharge is specifically exempted pursuant to one of three subsections of §20090
   (b) Discharges of nonhazardous wastewater to land under WDRs, reclamation requirements or a waiver and which comply with the applicable Basin Plan,
   (f) Use of nonhazardous decomposable waste as a soil amendment pursuant to best management practices,
   (i) Waste treatment in fully enclosed facilities, such as tanks, or in concrete-lined facilities of limited areal extent;

(2) The waste is classified as "inert", i.e., it does not contain hazardous waste or soluble pollutants at concentrations in excess of applicable water quality objectives, and does not contain significant quantities of decomposable waste.

the applicable Basin Plan, including policies adopted by the State Water Board, as implemented through the adoption of either waste discharge requirements or conditional waivers.

The focus of Regional Board regulation of these discharges has been to ensure that wastes are applied to fields at reasonable rates, such that organic matter is broken down, nutrients are taken up by crops or consumed by soil microorganisms, and nuisance (odor or vector) conditions are prevented. The primary assumption behind the regulation of food processing waste discharges to land was that, when properly managed, the practice would not cause groundwater degradation or nuisance conditions. Where a discharge might otherwise result in degradation, it was assumed that proper waste management practices would minimize degradation by optimizing the land treatment processes. This allowed dischargers to avoid or reduce application of conventional treatment technology, considerably lowering their cost of waste management. As this practice was expected to preclude degradation, and particularly water quality objectives to be exceeded, it could be found consistent with the Basin Plan and exempted from Title 27. Little emphasis was placed on assuring conformance with all of the required elements of the State Water Resources Control Board Resolution No. 68-16, *Statement of Policy With Respect to Maintaining High Quality Waters In California* (hereafter Antidegradation Policy), which is incorporated by reference in the Basin Plan. Waste discharge requirements have allowed wastewater storage and percolation-disposal from unlined or poorly-lined impoundments and application of wastewater to cropland at "agronomic rates" for the nutrients contained in the wastewater. Management measures were largely focused on prevention of nuisance conditions (e.g., stillage guidelines from the wine industry) without test plots or other direct demonstration that they would be effective in preventing unreasonable degradation of groundwater quality.

The emphasis for some food processors appears to have been focused on the need to dispose of their waste materials at lowest cost, rather than to optimize conditions for reuse. For these dischargers, land treatment and disposal, including reuse for agricultural irrigation, presented the least costly method of disposal. Minimal justification has been presented by dischargers for the effectiveness of land treatment in protecting groundwater quality, and for the benefits derived from such practices. In some of these cases, crops grown on land irrigated with wastewater appear to have little commercial value, as the crop yields appear to be of little importance to the over-all operation.

Little emphasis was placed on implementing feasible treatment and control practices to remove salt and other potentially harmful constituents prior to land discharge. The Regional Board has placed great trust in food processing dischargers to be prudent in their application of organic matter and nutrients to soil for treatment and reuse as a soil amendments, and in their periodic updating of and adherence to waste management plans. Requirements to monitor the waste itself, the soil within the land application areas, and the underlying groundwater have generally been minimal, in part to keep costs down for the typical food processing discharger, and in part because it was believed that the water quality impacts from these discharges were negligible.

Although required by the State Board's Antidegradation Policy, dischargers have not been required to implement "best practicable treatment and control practices" ("BPTC"; i.e., the best of treatment or control practices that have been demonstrated to be technologically practicable and economically feasible) to ensure that any affect on groundwater quality was the minimum reasonably achievable.[3]

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[3] The Antidegradation Policy, State Water Board Resolution No. 68-16, requires that existing (as of 1968) high quality waters not be permitted to be degraded until it has been demonstrated that such degradation is "consistent with maximum benefit to the people of the State, will not unreasonably affect present and anticipated beneficial uses of such water and will not result in water quality less than that prescribed in the policies" (e.g. not violate any water quality objective).

Prescriptive and performance standards of the Title 27 regulations (e.g., pond liner systems, monitoring), reverse osmosis salt removal technology, and U.S. Environmental Protection Agency (USEPA) technology-based effluent standards are typically not evaluated as alternatives in the WDR Program, even though they are usually practicable. Little or no monitoring has been required to demonstrate that groundwater pollution has not occurred (i.e., to demonstrate compliance with water quality objectives in the basin plans) or, if it has occurred, that the requirements of the Antidegradation Policy have been satisfied. Where significant groundwater impacts were found, dischargers have been required to modify their waste management practices to prevent future impacts. However, investigation and cleanup of groundwater, in accordance with State Water Board Resolution No. 92-49, *Policies and Procedures for Investigation and Cleanup and Abatement of Discharges Under Water Code Section 13304* (Cleanup Policy), has not often been required.

Regulatory Reevaluation – Sunset of Waivers and Consistency Initiative

The Porter-Cologne Act provides for the regulation of waste discharges either through the adoption of waste discharge requirements (WDRs) or a conditional waiver of WDRs where such a waiver is not against the public interest. In the past, under the prior statute, waivers typically resulted in significantly less oversight of the discharge and used lower Regional Board staff resources to implement. Before the year 2000, most waivers required no monitoring and lasted indefinitely. Historically, many of the smaller food processing waste discharges were regulated under conditional waivers of WDRs—where a waiver was viewed as not against the public interest—or, for the many larger operations, by individual WDRs. However, Section 13269 of the California Water Code, as amended in 1999 (SB390), caused all Regional Board waivers that were in effect as of 1 January 2000 to expire on 1 January 2003. Formal Regional Board action was required, including a public hearing, to continue any waiver after that date. Further, all renewed or newly adopted waivers now automatically expire every five years and must require monitoring to demonstrate compliance with waiver conditions. Section 13269, as amended, requires the Regional Boards to re-evaluate how food processing and other wastes are being managed under waivers.

In mid-2001, then Regional Board Executive Officer Gary Carlton ordered a partial staff restructuring, creating the Program Support Unit with the mission of evaluating program consistency both throughout the three Regional Board offices and with State Board directives. This was partially in response to recent program-specific audits conducted by the State Board. With management approval, the Program Support Unit began the Regional Board's Consistency Initiative, with the goals of (a) improving consistency within and between Regional Board programs and with plans, policies and statewide activities, and (b) identifying consistency-related problems for management consideration and resolution. To accomplish this task, a working team called the Consistency Advisory Group (CAG), consisting of the Assistant Executive Officers, Program Managers, other Section Supervisors in all three Regional Board offices and the Senior Attorney assigned to the Central Valley Region, was formed. Program Managers were given primary responsibility for consistency within their programs region-wide and began holding round table meetings to discuss program-specific issues and to raise those issues that could not be resolved within their individual programs to the CAG.

Discharges of waste to existing high quality waters are "to meet waste discharge requirements which will result in 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."

One of the first issues raised under the Consistency Initiative was the WDR Program's approach to implementing the Antidegradation Policy with respect to groundwater impacts and a comparison with how the management of similar wastes was regulated under the Title 27 (Land Discharge) Program. It was clear that the evaluation of factors required to allow groundwater degradation under the State Board's Antidegradation Policy were not being thoroughly conducted prior to the adoption of waivers or adoption of WDRs within the WDR Program. This issue was also not consistently handled in Board orders developed by the three Central Valley Region offices.

Under Title 27, wastes that have the potential to cause groundwater pollution are required to be fully contained in Class I or Class II waste management units if they are discharged to land for treatment, storage or disposal. The Title 27 regulations include prescriptive standards and performance goals for liners, leachate collection systems, monitoring, closure, post-closure care, financial assurance and corrective action for releases from a waste management unit. Title 27 land treatment units do not require engineered containment systems; however, they are required to completely degrade, transform or immobilize all waste constituents within a treatment zone extending no more than five feet from the original land surface.

Even before the Consistency Initiative, staff had brought this issue to the Regional Board as the information item, *Effective Regulation of Discharges of Food-Processing Waste,* at the 16 March 2000 regular meeting. The motivation was the mounting evidence of groundwater pollution from land application of food processing waste and evidence of the need for improved regulation and sound waste management practices. The agenda item was partly in response to a request by the California League of Food Processors (CLFP), which questioned both whether a problem existed, and the basis and need for limits imposed in WDRs on food processing wastewater land application sites. CLFP requested Regional Board staff cooperation in developing guidelines and criteria for beneficial reuse of food processing wastewater that ensure protection of the environment, including water quality.

In 2000, Ronald Crites of Brown and Caldwell, a consultant working for the food processing industry, developed the *Rational Method for Management of Organic Loading for Land Treatment Systems*. He submitted to Regional Board staff customized versions for three specific food processing dischargers. While a step forward in establishing scientific rationale for land application, staff determined that the proposal was insufficient to mitigate problems described to the Regional Board in March 2000. This was due, in part, to its lack of: laboratory or field verification, safety factors, site-specific testing, or monitoring.

Beginning in 2001, in response to regulatory requirements proposed by Regional Board staff for a number of facilities, the CLFP began working on a set of guidelines, entitled *Manual of Good Practices for Land Application of Food Process/Rinse Water*, that proposed use of the Crites' method to design land application systems with appropriate waste loading rates. At the same time, the Wine Institute began working separately on a two-year field study and report, *Land Application of Winery Stillage and Non-Stillage Process Water Study Results and Proposed Guidelines*. Staff commented on drafts of these reports suggesting that they include the need to maximize soil treatment and minimize groundwater degradation as criteria for evaluating the effectiveness of land treatment. In particular, only the Wine Institute document addresses potential controls and neither document seriously addresses best practicable treatment and control of salt constituents. In comments on the final versions of these reports, staff noted that many recommendations provided by staff as important for groundwater protection had not been incorporated. In 2004, the Wine Institute requested that the Regional Board amend the Region's Basin Plans to incorporate the final version of its guidelines if a panel of independent scientists contracted with the State Board determines that the guidelines are scientifically sound for ensuring the

effective protection of groundwater. Staff is currently reviewing State Board's instructions for requesting an independent review panel and developing questions for the panel.

Problems from Past Practices and Regulatory Methods

The tables in Attachment B summarize basic information for food processing facilities within the Central Valley Region. There are approximately 331 active food processing facilities known to staff. Of those facilities, 119 discharge their process wastewater to a POTW, 209 have active WDRs for land discharge, two have active NPDES permits, two are regulated under both the Title 27 and NPDES programs, and two do not have WDRs.

Food processors that discharge process wastewater to POTWs typically pay fees that are directly related to organic and suspended solids mass loadings, as well as flows. These fees can represent a significant cost, which food processors discharging to private land may not bear. Additionally, POTWs may impose pretreatment standards that require the generator to remove BOD or suspended solids, adjust pH, and/or remove other deleterious constituents. In contrast, many food processors that discharge to private land perform little or no treatment of the waste.

Of the 224 food processing facilities that discharge to land or surface water (including nine recently closed facilities), 47 percent monitor groundwater quality and 39 percent monitor soil chemistry. Approximately 47 facilities have completed an evaluation of background groundwater quality, and groundwater degradation or pollution has been confirmed at 42 facilities. Groundwater degradation is suspected in another 126 cases. Most (64 percent) of these facilities have a history of enforcement action by staff and/or the Regional Board. These statistics do not include all closed facilities, and many closed facilities were never required to monitor groundwater quality.

As shown in the table in Attachment B, the majority of the food processing facilities which are required to conduct groundwater monitoring clearly show, or are suspected of showing, degradation or pollution of groundwater by salts, nitrogen compounds, and minerals released from soils due to organic matter overloading. These impacts demonstrate that a change of direction is needed in the Regional Board's regulatory efforts for these waste discharges. Recently adopted WDRs, and monitoring programs that have been revised outside of the WDR renewal process, have required that groundwater monitoring be initiated or increased. Where water quality impacts have been found, the discharger is or will be required to demonstrate that "best practicable treatment or control" of their discharge is being implemented, pursuant to the Antidegradation Policy. However, dealing with groundwater quality impacts only after they have occurred results in unnecessary and long-term impairment of beneficial uses. Additional measures are needed to be able to prevent unnecessary degradation and pollution of groundwater and to require investigation and cleanup when it has occurred.

The following case studies provide examples of the issues faced when regulating food processors. It is noted that these facilities do not represent exceptional cases. A brief discussion of the four facilities follows; more detailed information on each of these sites may be found in Attachment C.

Vegetable Processor in the Tulare Lake Basin

This facility processes potatoes and corn and discharges up to 1.3 million gallons per day (mgd) of processing wastewater and 30,000 gallons per day (gpd) of disinfected secondary treated domestic wastewater via center-pivot sprinklers to about 350 acres of farmland on which forage crops are grown. Depth to groundwater is about 130 feet below ground surface. Applied wastewater contains about 900 mg/L biochemical oxygen demand (BOD_5); 1,200 µmhos/cm electrical conductivity (EC); and 50 mg/L total nitrogen. Annual nitrogen loading exceeds agronomic

uptake. The discharger developed a model to predict the volume of wastewater percolating below the root zone and its nitrate concentration. The model estimates nitrogen removal through crop uptake and assumes 15 percent of applied nitrogen is removed via soil treatment processes. The model predicted the nitrate-nitrogen concentration in application field soil solution would always be less than 11 mg/L. In lieu of groundwater monitoring, the discharger installed suction lysimeters in the application fields and one set in a landscaped area near the Plant to serve as background. In time, concentrations of nitrate-nitrogen in soil solution increased steadily to over 220 mg/L, while background values remained consistently below 1 mg/L. The discharger dismissed the lysimeter data as it exceeded model predictions. Staff notified the discharger that the monitoring data jeopardized the discharger's Title 27 exemption and directed it to install groundwater monitoring. The resulting data show groundwater degradation from nitrate and salinity constituents.

Winery in the San Joaquin Valley

A discharger applies up to 1.5 mgd of winery wastewater via flood irrigation to 300 acres of farmland, portions of which have received wastewater since the 1940s. The wastewater contains about 3,500 mg/L BOD_5; 2,800 mg/L total dissolved solids (TDS); and 100 mg/L total nitrogen. Soils are sands and silty sands. Groundwater occurs at about 120 feet below ground surface. On a rotational basis, wastewater is applied to some of the fields, while seasonal crops (barley and wheat) are grown on other fields not receiving wastewater applications. In the early 1990s, the discharger installed a groundwater monitoring well network. Background wells monitor groundwater passing under typical farmland. Evidence indicates the discharge has caused EC to increase from 500 to 2,300 µmhos/cm. Mineral and salinity constituents indicate organic overloading and the effects of highly saline waste discharges. While the discharger has recently installed center-pivot sprinkler systems to apply wastewater more uniformly, lysimeter data suggest the soil column is saturated with waste constituents that will continue to leach to groundwater.

Vegetable Processor in the Sacramento Valley

During the 2004, this large facility processed approximately 570 tons of tomatoes per hour throughout its 90-day season (which varies from mid-June through late September). Tomatoes are received in trucks, transported into the facility by flumes, and are then processed into tomato paste. Wastewater is generated in three major areas: the transport of tomatoes through the flumes, the evaporation system, and during equipment cleaning. The WDRs allow a discharge of 4.3 million gallons per day (mgd) of flume water into the settling pond, and a discharge of 58 mgd of evaporative water into the cooling water pond. Cleaning water is discharged directly into the irrigation supply. According to the 1995 WDRs, wastewater is to be applied to 670 acres of cropland and will be used as irrigation supply. Tailwater runoff from the fields discharges to a large tailwater return system, and is pumped for re-application to the fields. Groundwater is found at 6 to 10 feet below ground surface.

At this processor, the main compliance issues include: discharges of process water to surface waters; an inability to maintain a 1.0 mg/l dissolved oxygen level in the process water pond, thereby creating nuisance odor conditions; a lack of compliance with the Monitoring and Reporting Program; suspected groundwater degradation; the over-application of process water, nutrients, and salts to cropland; the planting of late-harvest crops and then failure to utilize that land for wastewater disposal because doing so would prevent the harvest of the crops; and the inclusion of high salinity waste streams within the process waste stream. The discharger's

monitoring reports clearly show that it was applying more nitrogen (1,250 pounds per acre) and salt (24,600 lbs/ac) to cropland than could be consumed by the crop (maximum of 300 lb/ac of nitrogen and 1,000 lb/ac of salt) or assimilated by the soil. Staff prepared a draft Cleanup and Abatement Order to address these issues, and the Discharger has asked that the order be heard before the Board.

Winery in the Sacramento Valley

This winery processes up to 2,000 tons of grapes per year, discharging up to 11,000 gallons per day of wastewater. The winery wastewater is known to contain high concentrations of TDS (up to 2,700 mg/L), BOD (up to 9,000 mg/L), and nitrogen. The waste is treated by screening out the solids, then stored in unlined ponds and finally disposed of on a pasture. The groundwater underlying the ponds is very shallow, and monitoring wells show that it has been polluted with salt constituents. Several years ago, the discharger applied for updated WDRs so that it could irrigate additional pasture. The updated WDRs, adopted in 2003, state that because groundwater has become polluted from the storage and disposal of the winery waste, the discharge must be classified as "designated waste" and is subject to the requirements of Title 27. While the discharge cannot continue as it has been, the Board determined that it is reasonable to allow the Discharger a period of time to remedy its deficiencies by either upgrading the ponds to comply with Title 27 or altering the character of its wastewater to qualify for an exemption from Title 27. The Discharger has recently submitted a report of waste discharge describing a proposed treatment system under which designated waste will be segregated and stored in Title 27 ponds while the remainder of the waste will be treated and applied to land with a Title 27 exemption. The Discharger states that the treatment system should reduce BOD concentrations to 150 mg/l, TDS to 410 mg/l, and total nitrogen to less than 10 mg/l. While the proposal is very encouraging, staff have not yet formally reviewed or commented on the report of waste discharge.

Long-Term Vision

The recycling of food processing waste onto land can be beneficial to soil and crops, but it must be done correctly in order to realize that benefit without unreasonable cost to the environment. Correcting problems in the regulation of food processing waste discharges to land will require changes by both the Regional Board and the regulated community. An overall vision for this effort, a strategy for achieving the vision, and consistent implementation of the strategy will be necessary. Staff does not propose that this vision can be achieved immediately. For existing discharges, it is appropriate to use a phased approach to implementation; this approach is presented in a later section of this paper.

Staff proposes the following overall vision for the regulation of food processing waste, composed of three parts:

1. ***All food processors are good neighbors and good stewards of the environment.***
   Food processors manage their wastes by implementing best practicable treatment and control measures that minimize environmental and water quality degradation and ensure no pollution or nuisance.
2. ***Food processing wastes are either:***
   a. ***Clean enough for release or reuse***
      Food processing wastes are suitable for percolation from unlined impoundments, treatment on land, or reuse as irrigation supply without causing pollution or unreasonable water quality degradation. Water quality impacts due to the reuse of food processing

wastewater for crop irrigation should be no greater than that caused by good agricultural practices with clean irrigation water, a degree of degradation that should be considered consistent with the Antidegradation Policy.

or they are

b. ***Isolated from the environment.***
In cases where food processing waste discharges have the potential to cause groundwater pollution or degradation that is inconsistent with the Antidegradation Policy, such wastes should be contained consistent with Title 27 regulations.

Changes Necessary to Achieve the Vision

To achieve the above vision for the effective regulation of food processing waste discharges, several principles should guide implementation. A fundamental concept in effectively regulating food processing waste discharges (or any other waste discharge to land) is to conservatively estimate impacts on the groundwater body, using sound scientific practices to make the determination. To assure regulatory credibility, dischargers must be held accountable for restoring water quality when the assimilative capacity has been abused, resulting in pollution. Consistent principles and processes should yield predictable outcomes in application of policy.

The approach proposed by staff considers applicability of the Antidegradation Policy, Title 27, the Basin Plan and the Cleanup Policy to food processing waste discharge sites, and the scientific evaluation of the data necessary to apply these plans, policies and regulations, to be the key to consistency in regulation and outcome. Staff is not proposing that all or even most land discharges of food processing waste be required to comply with the Title 27 regulations without an opportunity to first demonstrate, using sound scientific principles, that a waste discharge qualifies for exemption from Title 27, either with or without source control and/or practicable pre-treatment measures. However, compliance with applicable plans, policies and regulations, including conditions for granting exemptions from Title 27 and consequences for causing unreasonable water quality degradation is necessary.

Dischargers do have options for coming into compliance with existing regulations, plans and policies. A waste may clearly qualify for one of the Title 27 exemptions without any special treatment or control, or it may qualify after application of source control, waste reduction measures (in the volume and/or strength), and/or practicable waste treatment technologies. Granting an exemption should be based on one of the following demonstrations, consistent with principles of the Antidegradation Policy:

1. The discharge will not cause degradation of groundwater quality over baseline conditions, or
2. Best practicable treatment and control measures are in place to ensure that consequent groundwater degradation is quantified, below water quality objectives, and consistent with maximum benefit to the people of the State.

If one of the above conditions is met, the discharge would continue to be regulated under the WDR Program. Only if neither of the above conditions is able to be met would the discharge be required to meet the Title 27 regulations. In general, these factors will determine how a waste discharge should be regulated. Of course, the Regional Board will consider each case on a site-specific basis. Each potential release point from a facility (e.g., a pond, a sump, an application to cropland) must be evaluated individually. Situations may arise where one discharge (e.g., irrigation reuse of lower-strength wastewater) is regulated under terms of the WDR Program, while another discharge from the same

facility (e.g., storage of saline wastewater in an impoundment) is more appropriately regulated under Title 27.

For a discharge to remain in the WDR Program, it must either be exempt from Title 27 or the waste considered inert.[4] Two fundamental assumptions underlie the Title 27 exemptions – that the discharge is and will remain in compliance with water quality objectives and that the requirements of the Antidegradation Policy are met. To prevent adverse water quality impacts, a more thorough evaluation is needed than has been required of most food processing waste discharges in the past. The responsibility for providing sufficient information to support these determinations rests with the discharger.

Dischargers must demonstrate whether its discharge has the potential to degrade groundwater quality and whether its waste poses a threat of causing groundwater pollution should it be improperly managed. The results of these demonstrations will determine the appropriate level of regulation necessary to protect water quality. These demonstrations must rely on a set of comparisons, which can be outlined in a stepwise manner.

A. Characterize Potential for Groundwater Degradation and Pollution

The first step in the process is to determine the constituents of concern in the waste, whether the waste discharge would cause groundwater to be degraded over baseline water quality, and whether the waste poses a threat of causing pollution (i.e., violation of any applicable water quality objective) should it be improperly managed. The information necessary to perform this evaluation includes waste characterization (identification and quantification of constituents of concern), a baseline water quality evaluation of the groundwater that may be affected by the waste discharge, and appropriate water quality limits to apply water quality objectives as determined by the Policy for Application of Water Quality Objectives and the Controllable Factors Policy.[5] The details of these evaluations are enumerated below.

1) The discharger must fully characterize the concentrations of all constituents of concern at potential points of waste release, including waste treatment and storage units and land application areas.

    1) "Constituents of concern" include all waste constituents, byproducts of the waste and constituents leached from soil due to waste application, physical changes, etc.

    2) A waste is "released" when the discharger no longer has full and absolute control over the waste or its constituents.

    3) Concentrations of constituents of concern must take into account both

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[4] "Inert waste" is defined by §20230 of Title 27, CCR as "that subset of solid waste that does not contain hazardous waste or soluble pollutants at concentrations in excess of applicable water quality objectives, and does not contain significant quantities of decomposable waste." Few food processing wastes are expected to meet this definition.

[5] Found in the Implementation Chapter of the Basin Plans for both the Sacramento River/San Joaquin River Basins and the Tulare Lake Basin, the Policy for Application of Water Quality Objectives requires that numerical water quality limits in Board adopted orders comply with both numerical and narrative objectives and provides a process to translate narrative objectives into numerical limits. Where natural background concentrations exceed these limits, the natural background concentrations are to be considered to comply. Pursuant to the Controllable Factors Policy, where natural background concentrations or concentrations that result from factors that may not be reasonably controlled exceed water quality objectives, additional controllable water quality factors, such as the discharge of waste, are not allowed to cause further degradation of water quality.

i) Concentrating affects caused by evaporation and transpiration from treatment and storage impoundments and from irrigation methods on constituents in leachate,

ii) Buildup of waste constituents in the soil, and the saturation of attenuative mechanisms in the soil over time.[6]

4) If the discharger chooses to claim credit for waste constituent attenuation that occurs after release to the vadose zone (including for crop uptake), it must provide design parameters, demonstration test results, operating procedures and controls, and characterization of all constituents of concern that may leach from the vadose zone. Credit for attenuation, based on crop uptake, degradation and transformation of applied constituents, shall not exceed what can be consistently achieved within the crop root zone.[7] Temporary storage of a constituent in the unsaturated zone is not considered removal.

5) Attenuation must be evaluated irrespective of, or without regard to, engineered containment.[8]

2) To the extent practicable, the discharger must estimate baseline water quality (pre-1968)[9] of underlying groundwater for all constituents of concern. If current conditions are greater than baseline groundwater quality, the discharger should identify other sources of the waste constituents and other factors affecting the concentrations in groundwater subsequent to the baseline period.

3) The discharger must use the procedures set forth in the Basin Plan to determine numeric water quality limits for all constituents of concern that apply all narrative and numeric water quality objectives for a constituent. Where the baseline groundwater concentration exceeds this value, the baseline concentration shall serve as the water quality limit, consistent with the Basin Plan.

If at a potential release point the concentration of any constituent of concern exceeds its baseline concentration in groundwater, then the waste is considered to have the potential for groundwater degradation. If the concentration of any waste constituent of concern exceeds its water quality limit at a potential release point, then the wastewater is assumed to pose a threat of causing pollution, should it be improperly managed.[10] Application of source control and waste reduction measures and feasible waste treatment technologies (see below) can be evaluated at any point and this determination reevaluated.

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6 As waste constituents build up in soil, binding sites for additional waste constituents are lost. Eventually, all binding sites in the soil may become saturated with waste constituents, such that additional waste constituents are no longer bound or retarded in their migration below the treatment zone and to groundwater.

7 This is consistent with the performance goal for land treatment unit evaluation under Title 27.

8 Consistent with waste classification and waste management principles of the Water Code and Title 27, the degree of water quality threat posed by a waste determines its classification and the classification of the waste determines the minimum level of containment that is required. To allow engineered containment to be used in the evaluation of a waste's potential for water quality impacts would circumvent this process.

9 State Water Board Resolution No. 68-16 was adopted on 28 October 1968. This date is pertinent to the evaluation of what constitutes "high quality waters," the baseline for determining degradation.

10 Dilution of the wastewater intended only to avoid this result is not permissible.

B. Determine Appropriate Regulatory Approach

Discharges that have the potential to cause groundwater degradation are subject to the requirements of the Antidegradation Policy. This finding triggers the need for dischargers to evaluate and apply "best practicable treatment or control" (BPTC) measures to reduce water quality impacts. Whether a discharge has the potential for groundwater degradation, and whether a discharged waste poses a threat of causing groundwater pollution should it be improperly managed, will determine whether the Antidegradation Policy and/or Title 27 apply to the discharge, thereby determining the appropriate regulatory approach.

The appropriate regulatory approach should be determined separately for each potential point of release. For example, storage of the wastewater in an impoundment may need to be regulated differently than the application of the wastewater to cropland for reuse.

If the waste is determined to pose a threat of causing or contributing to groundwater pollution should it be improperly managed, the discharge should be regulated pursuant to Title 27 unless either it qualifies for an exemption or the discharger establishes to the satisfaction of the Regional Board that a particular waste discharge could not cause violation of any applicable water quality objective.[11] A discharge qualifies for an exemption if:

1) It is non-hazardous, decomposable[12] waste used as a soil amendment pursuant to best management practices where there is a true benefit to doing so; or

2) The waste is confined in fully enclosed facilities (i.e., they are demonstrated not to leak) of limited areal extent.

The benefit of applying a soil amendment to land should be demonstrated so as to clearly differentiate reuse from mere waste disposal. The demonstration that a waste discharge could not cause violation of any water quality objective or that the soil amendment exemption applies must be based on sound scientific principles and may require test plots or other physical demonstrations and sufficient monitoring (for example, to determine the maximum loading rate of organic matter to a particular soil type that would not mobilize soil constituents in concentrations above water quality limits).

If the waste is determined not to pose a threat of causing or contributing to pollution should it be improperly managed, then the discharge would continue to be regulated under WDR Program as follows:

1) If the concentrations of all wastewater constituents of concern are less than or equal to the baseline groundwater quality, then the discharge is not expected to cause groundwater degradation. The Antidegradation Policy does not apply to the discharge, so there is no requirement to implement BPTC. Waste management limitations will be based on the technology and controls proposed by the discharger and groundwater limitations will not permit degradation. The main regulatory emphasis will be to prevent discharges to surface waters and to prevent nuisance conditions.

2) If the concentration of any wastewater constituent of concern is greater than the baseline groundwater quality, but all concentrations are less than or equal to their respective water

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[11] Based on §20200(a)(1) of Title 27, CCR.

[12] Salt and metals are not decomposable.

quality limits, then the discharge is expected to degrade groundwater quality, but not to threaten pollution. The Antidegradation Policy applies, so the discharger must demonstrate and apply BPTC measures. Effluent and groundwater limitations will reflect the capability of BPTC and groundwater limitations will be less than or equal to the water quality limits.

3) If the concentration of any wastewater constituent of concern is greater than its water quality limit or the expected degree of groundwater degradation above baseline groundwater quality is not consistent with maximum benefit to the people of the State, then the discharge either threatens pollution, or the degree of degradation cannot be justified pursuant to the Antidegradation Policy. Title 27-style waste containment should be required or the discharge should be prohibited. For business enterprises reusing wastewater for crop irrigation, the degree of groundwater degradation caused by good irrigation practices may be considered consistent with the maximum benefit to the people of the State.

4) The effect of other sources of waste constituents must be considered in evaluating the potential for degradation or pollution from a specific discharge. If the ambient concentration of a constituent of concern in groundwater exceeds the water quality limit, the effluent limitation for that constituent cannot exceed the water quality limit.

5) Title 27-style monitoring should be required at all sites, except where the concentrations of all wastewater constituents of concern are much less than baseline groundwater quality (i.e., there is little potential for groundwater quality degradation). As part of this monitoring, the discharger should be required to characterize the potentially-affected underlying groundwater for all wastewater constituents of concern, both at appropriate points of compliance and at locations out of the influence of the discharger's waste management activities (background).

6) Dilution of wastewater simply as means to reduce waste constituent concentrations and thereby avoid implementing BPTC measures, or to meet effluent limitations, should not be allowed unless the demand of the crop for irrigation water exceeds that supplied by the application of wastewater.

The discharger should be responsible for calculating effluent or discharge limits and waste application rates based on the above principles.

When a discharger is determined to be responsible for degrading groundwater in excess of water quality limits (i.e., causing pollution) or in a manner that is inconsistent with groundwater limitations developed as indicated above, the discharger should be required to undertake investigation and corrective action consistent with State Board's Cleanup Policy and the Title 27 regulations, as follows:

1) Investigate the nature and extent of the problem;

2) Contain or treat and control the source, consistent with measures discussed above; and

3) Cleanup and abate the problem to extent feasible.

C. Dischargers Have Options for Appropriate Waste Management

As mentioned above, staff is not proposing that all or even most food processing waste discharges be required to comply with Title 27 regulatory controls. Dischargers have several options to avoid an effect on water quality that would trigger the need for such controls. For discharges that have the potential to degrade groundwater quality, the Antidegradation Policy requires that the discharger apply "best practicable treatment or control" of the discharge. While conformance with

Title 27 is one option for applying BPTC, there are others. Dischargers will need to consider these options to determine what constitutes BPTC for their wastes.

One possible option would be to avoid any waste discharge to land. Instead, wastes would be pre-treated and discharged to a publicly owned treatment works (POTW). As shown in the table in Attachment B-2, numerous food processors in the Central Valley Region currently use this option for one or all of their waste streams. Treatment and discharge to surface waters may be another option, where there is no nearby POTW and an appropriate receiving water body exists. Discharges to surface waters would be required to comply with NPDES permits, which includes complying with best available technology standards promulgated by the USEPA.

Waste segregation should be examined by virtually all food processors. A smaller volume of high-strength waste may be managed more efficiently if separated, allowing the remainder to be appropriately managed under the WDR Program. The smaller volume high-strength waste may be able to be treated more economically than a combined waste stream. After treatment, it may be appropriate to blend the treated waste back in with other wastes prior to land discharge under the WDR Program. Alternatively, the smaller volume high-strength waste could be managed consistent with the Title 27 regulations, for example in a Class II surface impoundment. While providing Class II containment would be costly for the entire waste stream, it may be more economical for a small, high-strength portion of the waste stream.

Waste minimization is another appropriate tool in evaluating BPTC. Changes in facility operation can reduce either the volume of waste that must be managed or the strength of the waste or both. For example, one food processor in Solano County reduced its volume of wastewater by sweeping, rather than using water to wash down floors. Practices such as this have been outlined in USEPA technology-based effluent limitation guidelines for various industries. Less harmful chemicals may be substituted for those that contribute problem constituents of concern to the waste stream, such as substitution of potassium-based for sodium-based hydroxides in cleaning solutions. Dischargers should be required to assess the possibility for reducing the use of harmful chemicals and salts in their food processing operations.

Success Stories – It Can Be Done Right!

There are dischargers in the Central Valley Region who are already implementing appropriate treatment and control measures and are managing their wastes so as to minimize water quality impacts, while realizing the benefits of waste application to land for reuse. The following case histories provide a brief summary of the treatment and control technologies implemented by three different dischargers; more detailed information on each of these sites may be found in Attachment D.

Soy Product Producer in the San Joaquin Valley

This facility processes rice and soy into various food products, and has grown substantially since it began operation in 1985. It now discharges approximately 240,000 gallons per day (gpd) to cropland and 60,000 gpd to the local wastewater treatment plant. The wastewater is characterized by high concentrations of organic matter and solids. In 1999, the Discharger began operation on a pretreatment facility to reduce the organic load in its process wastewater. Treatment of process wastewater now consists of a holding/recycle tank; pH control; a dissolved air flotation (DAF) clarifier; a 45-foot diameter, 26-foot high trickling filter; an aerated skimmer; and a combination centrifuge and rotary screen to dewater the solids from the skimmer and the DAF units. Solids are contained in bins, transported off-site, and used for animal feed. The Discharger optimized the

treatment system equipment in 2001, resulting in significant reductions in the BOD concentration of wastewater applied to land. The Discharger has also taken a number of steps to reduce the salinity in its discharge, including installing a reverse osmosis system for the boiler feed water, using more "plant friendly" chemicals in its equipment cleaning, and recycling its caustic clean-in-place solution. The treatment process results in the following constituent reductions: biochemical oxygen demand (BOD) is reduced from an average of 2,205 mg/l in the untreated wastewater to 151 mg/l in the treated wastewater; total dissolved solids are reduced from 2,190 mg/l to 1,093 mg/l; and total nitrogen decreases from 49 mg/l to 16 mg/l.

Winery in the Tulare Lake Basin

A winery in the Tulare Lake Basin discharges up to 0.5 mgd of winery wastewater to 100 acres via sprinkler irrigation on forage crops. A winery has operated at this site for about 100 years. Groundwater 40 feet below ground surface is of high quality (EC ranges from 200 to 600 µmhos/cm). Groundwater gradient is relatively flat. Past discharge caused groundwater to contain elevated concentrations of total dissolved solids, ammonia, total organic carbon, iron, and manganese. Bottling plant wastewater, spent ion exchange regenerant and boiler blowdown from the winery are now discharged to a Title 27 surface impoundment. The discharger is conducting a pilot test to evaluate the effectiveness of irrigating poplar trees with wastewater and impacted groundwater for removal of decomposable and mineral constituents.

Poultry Processor in the San Joaquin Valley

Following pretreatment for solids removal, processing water from a major poultry processor is discharged to a municipal industrial wastewater treatment plant (IWWTP), which features unlined facultative lagoons, then to a 120-acre farmland application area owned and operated by the processor. The IWWTP and its discharge caused groundwater to contain nitrate, iron, and manganese in excess of the MCLs. The processor has since been put on notice by staff, aggressively researched solutions to its wastewater treatment and disposal problems, and identified a biological nitrogen removal treatment technology that is capable of reducing total nitrogen to below 6 mg/L. The processor is expected to provide the municipality with up to $20 million to complete construction of a new IWWTP by September 2007. Effluent disposal will continue to be via percolation and recycling on area farmland.

Unless all or most food processors are doing what they can to generate cleaner wastes and to manage them properly, those who do perform well find themselves under a competitive disadvantage. Consistent application of the regulatory changes recommended by staff will alleviate this problem.

Phased Approach to Move Toward Vision

As shown on Attachment B, there are approximately 223 food processors within the Central Valley region that are regulated by individual WDRs, and an additional 36 small food processors enrolled under Waiver Resolution No.R5-2003-0106. In addition, there are a number of facilities that had been covered by the expired waiver Resolution No. 82-036 (and are therefore not currently regulated), and another 300 which are currently in operation but never applied for WDRs or a waiver. There are probably many more unregulated food processors, especially small seasonal facilities and seed washers, of which staff is unaware and are therefore not included above count.

In light of the existing Regional Board staff caseload and resource limitations in the WDR Program, staff has prepared the following phased approach to better regulate food processing dischargers. Staff

will attempt to prioritize the sites to first work on those with the highest strength waste, largest volume of waste, or for which complaints have been received.

A. Dischargers currently regulated under WDRs

Monitoring and Reporting Programs (MRPs) are an integral component of WDRs, not just for food processors, but for any entity which discharges waste to land. A well-written MRP specifically states the location, type, and frequency of monitoring (for example, weekly monitoring of the effluent for nitrate, BOD, TDS, and other waste-specific constituents) and specifically states the frequency of submittal of monitoring reports and what must be contained in those reports. The MRP is necessary to determine compliance with the discharge limitations of the WDRs, and to document whether the waste is being discharged in a manner that is protective of groundwater quality, prevents odor/nuisance conditions, and prevents discharge to surface waters.

Unfortunately, the majority of our food processors are regulated under WDRs that were written some time ago, and the MRPs are inadequate to fully determine waste characteristics, how the waste is being treated, where the waste is being discharged, and whether the discharge is protective of water quality. The first step in better regulating food processors is to update each individual MRP to current standards. While each MRP will be site-specific, based on the type of waste streams, how the waste is treated, and where it is discharged, the MRPs would generally require the following types of monitoring:

- Influent;
- Effluent;
- Flow;
- Pond;
- Land application (both pre- and post-application);
- Vadose zone (soil and/or soil solution); and
- Groundwater (upgradient and downgradient of ponds and land application areas).

The discharger would be required to submit monitoring reports on a monthly basis (describing routine monitoring results), quarterly basis (describing groundwater monitoring results), and on an annual basis (describing annual monitoring – e.g., soil results, as well as overall performance for the year). In most cases, after eight quarters of groundwater monitoring had been completed, the discharger would be required to submit both a background groundwater study and a groundwater degradation analysis. These reports would evaluate the groundwater data collected to date, and then (a) propose background groundwater concentrations for the site, and (b) evaluate whether groundwater beneath the facility and land application areas has been degraded. The MRP would require that these reports be updated on a yearly basis. The MRP would also require that a wastewater management plan be submitted on an annual basis. This plan would describe the crops to be planted and how the wastewater will be managed on the land application area for the next processing season.

Staff will review the MRPs for all food processing facilities and, for any sites that contain outdated programs, prepare draft revised MRPs. A draft MRP will be sent to the discharger and interested parties for a review period of approximately 30 days. Staff will resolve any comments to the extent feasible prior to the Executive Officer issuing the final revised MRP.

The second step in the regulatory process is to review the data generated by each MRP to determine whether the discharge has the potential to degrade, or has degraded, groundwater quality. Some dischargers are already conducting their monitoring programs under updated MRPs, and sufficient data may already be available to make the necessary determinations. In other cases,

it will take time to collect sufficient data to characterize discharge quality, quantify waste loading rates, evaluate the extent to which, if any, the ongoing discharge has affected the soil profile, and evaluate the effect of past discharge on groundwater.

A review of the data will find one of two situations. Staff will concur with some dischargers' groundwater degradation analysis that no degradation has occurred. In this case, staff will simply monitor the facility for compliance with the WDRs, and will review the groundwater degradation analysis and wastewater management plans on an annual basis to assure that there has been no change to water quality.

However, it is anticipated that staff's review of a significant number of dischargers' groundwater degradation analyses will determine that groundwater has been, or has the potential to be, degraded or polluted. If groundwater is slightly degraded (i.e., within a range that may conform with policy), additional evaluation and site modifications may be performed on an informal basis. However, in most cases and, in particular, where there is groundwater pollution, staff will prepare a Cleanup and Abatement Order (CAO). In general, the draft CAO would be sent to the discharger and interested parties for a 30- to 45-day review and comment period, followed by issuance by the Executive Officer (an authority which has already been delegated by the Board). The CAO would be site-specific and its provisions would vary based upon the work already completed by the specific discharger as well as upon the presence or threat of groundwater pollution. But, in general the CAO would require the following items by specific deadlines:

1) *Characterize the Waste.* Provide a detailed characterization of constituents in each specific waste stream (i.e., process waste, ion exchange, boiler blowdown, equipment wash, etc.), including an assessment of the seasonal variations of each waste stream.

2) *Define Impacts to Groundwater.* For each potential point of release, provide a comparison of the character of the waste stream against baseline groundwater quality. In the event of release, evaluate underlying geology, and the magnitude and extent of groundwater degradation.

3) *Define Impacts to Soil.* Where land treatment of waste has been part of the discharge operation, provide a description of past land application practices, an evaluation of the affect of those practices on crop production (if cropped), and an assessment of the buildup of waste constituents within the first five feet of soil as well as within the deeper vadose zone.

4) *Evaluate and Select Treatment and Control Methods.* Provide an evaluation of "best practical treatment and control" (BPTC) methods for each waste constituent that has degraded, or has potential to degrade, groundwater at each potential point of release. This evaluation includes, but is not limited to, salinity treatment and control measures such as source control, reuse, recycling and treatment. The potential release points include at a minimum all sumps, wastewater storage and treatment ponds, and land application areas. The feasibility study will culminate in a list of proposed site improvements, including the scientific basis for the proposed design and control parameters. For each improvement, the discharger must evaluate whether the resulting waste and/or waste management method qualifies for exemption from Title 27 or must be regulated under Title 27.

5) *Design and Construct Improvements.* The discharger will submit a design report and timeline to construct the improvements proposed as a result of the treatment and control methods evaluation. If the improvements will result in significant changes to the facility, then,

consistent with the Water Code, a Report of Waste Discharge must be submitted. Depending on the proposed improvements, the RWD would request coverage under either the Title 27 Program or under the WDR Program. Some dischargers may need to submit a RWD for each program (e.g., a high strength waste stream may be segregated for management under Title 27 while the remaining waste can be applied to land under the WDR Program). WDRs, and possibly an accompanying enforcement order, will be prepared to require that the improvements be completed under a formal timeline.

6) *Submit a RWD*. Whether modifications have been made informally, or formally under a CAO, the end result will be the revision of the WDRs to reflect the physical and management changes which have taken place, such that the facility complies with the Basin Plan, the Antidegradation Policy and, if necessary, Title 27. To update the WDRs, the Discharger will submit a RWD containing a technical report showing that each discharge has been designed to comply with the above plans and policies. The report will also include proposed groundwater quality limits based upon Basin Plan water quality objectives and implementation policies and factors related to such determination within CWC §13263.

7) *Groundwater Cleanup.* Where groundwater pollution has been identified, the discharger will be required to investigate the extent and feasibility of cleanup, and will be required to implement remedial measures consistent with the State Board's Cleanup Policy.

The technical reports and tasks may be phased, but in all cases will terminate in submittal of a Report of Waste Discharge. Upon receipt of the RWD, staff would take the final step of preparing updated WDRs for Regional Board consideration. The updated WDRs would include site-specific effluent and groundwater limitations that ensure that the waste is treated and discharged in a manner consistent with the Antidegradation Policy. Where additional time is needed to terminate a discharge, upgrade containment, or upgrade the treatment and disposal process, an accompanying Cease and Desist Order will likely also be prepared and scheduled for consideration. Where a technical assessment of degradation or pollution indicates that cleanup or containment of groundwater is appropriate, a revised CAO will also be prepared with a schedule for implementation. In this final step, the Regional Board formally establishes what degradation it accepts as reasonable from ongoing discharge and after any necessary restoration, and formally approves a schedule for getting there.

Staff anticipates that, for even the most willing dischargers, it will take several years to work through the process described above. This was recognized as necessary and reasonable when the Regional Board altered regulation of municipal discharges to ensure conformance with the Antidegradation Policy, and the same applies here. Staff has found that once the requirements, process, and goals were clear, municipal discharges as a group have proceeded with the necessary tasks systematically; producing decision documents at a rate staff has had difficulty matching. Staff remains hopeful that the food processing industry as a group will respond similarly, and that enforcement action beyond the formal roadmap to resolution described above will prove necessary for only a few exceptions.

B. New or Expanding Dischargers

Any proposed new food processing discharge, or any existing food processing discharger that wishes to expand or modify its process so as to trigger the need to submit a RWD, must submit a RWD that:

1) Thoroughly characterizes the waste, treatment area soil, and background groundwater quality;

2) Provides scientific justification that treatment processes and loading rates reflect BPTC;

3) Includes a program for monitoring the effectiveness of treatment components and management controls, and measures the affect on soil and groundwater quality;

4) Demonstrates whether the proposed discharge has a reasonable potential for complying with the Antidegradation Policy;

5) Proposes effluent and groundwater limitations consistent with the Basin Plan and the proposed treatment and control; and

6) Commits to periodic re-evaluation of loading rates as a BPTC measure.

The discharger must plan ahead and commit to providing the necessary information in a timely manner; staff will not prepare tentative WDRs until the data and information necessary to assure consistency with policies has been submitted.

C. Existing Unregulated Dischargers

As time permits, staff will require submittal of a RWD from each of the existing unregulated food processors. We will attempt to prioritize these requests based on size of discharge or strength of waste, but it is recognized that this information may not be available to staff until after the RWD has been submitted.

It is anticipated that a number of the small food processors, and quite a few of the wineries, will be granted a waiver pursuant to Resolution No. R5-2003-0106, the *Waiver of Waste Discharge Requirements for Small Food Processors, Including Wineries, Within The Central Valley*. The Regional Board adopted this waiver resolution in July 2003. It applies to any food processor that tanks and hauls its waste for disposal off-site, and to any food processor that generates less than 100,000 gallons of waste per year and applies the waste to cropped land at agronomic rates. The waiver contains a simple monitoring and reporting program, in which the food processor must submit an annual report detailing whether it has complied with the waiver. The waiver expires in July 2008. In order to apply for coverage under the waiver, the discharger must submit a simple RWD and a one-time filing fee. Approximately 36 facilities have already voluntarily submitted RWDs and have been enrolled under the waiver. Staff has compiled a database of the approximately 300 unregulated wineries, and in the last few months, has been requesting RWDs from a number of these facilities.

Similarly, those dischargers of agricultural commodity waste and food processing waste that qualify for a waiver because they pose little or not threat of degradation of State waters and little or not threat of nuisance will be processed pursuant to Resolution R5-2003-0008, the Regional Board's general waiver policy.

D. Work with Industry Groups

Throughout the years, staff has worked with various food processing industry groups and intends to continue to work with these organizations and their members. In meetings with individual dischargers as well as presentations to and exchanges with industry groups, staff consistently explains Regional Board policy and information needs. However, much skepticism remains in the

regulated community as to documented cases of groundwater pollution, level of proof required to prepare WDRs, and applicability of State policy, plans and regulations to agricultural sources.

Certain industry groups have taken a leadership role in helping their members solve common issues, including the abovementioned CLFP guidance manual and the Wine Institute study. Most food processing WDRs adopted in the last few years require that each discharger propose and implement a salinity reduction study, although they do not specify the maximum concentration of salt allowed in the discharge to comply with State policies. The two abovementioned documents do not address details of, or the necessity to, control salt to prevent unauthorized groundwater degradation. Similar sources of salt exist in many food processing operations (i.e., boiler blowdown, ion exchange reject, clean in place solutions, other equipment cleaning solutions), and similar controls and treatment options apply to most situations. Therefore, this would be an area where industry associations could relieve the burden of members and help achieve consistency and water quality goals by developing and providing guidance.

The technology for the conventional treatment of food processing waste (i.e., screening, dissolved air flotation units, anaerobic digesters, aerobic polishing) has been available for decades and is continuously improving. Technology for salt removal (e.g., reverse osmosis and ultrafiltration) has also been available for decades and is also continuously improving. Such technology has been employed by a few food process dischargers within this region as a waste treatment method and is employed in other regions for treatment of waste and treatment of polluted groundwater. The industry associations could also assist their members by compiling the available treatment information so that each individual discharger need not research each potential BPTC measure and does not find itself in a situation that requires cleanup.

To reduce the cost to individual dischargers, who at this time are each making their own waste load determinations, food processing industry groups and the university extension programs may be able to develop guidelines that can be adjusted as appropriate for each site-specific project. Such guidelines must be based on sound scientific principles and take into consideration site-specific differences in waste type, soil type, climate, and other factors. An integral component of these guidelines must be the ability to quantitatively predict groundwater quality impacts so as to prevent conditions of pollution and nuisance and unreasonable degradation. Test plot demonstrations at representative sites and with representative wastes may be appropriate to clearly show the success of the guidelines without the need for such demonstrations at every discharge location.

Staffing Needs for Program Success

Staff's current reliance on dischargers utilizing best management practices and our low-intensity regulatory oversight has been largely dictated by the resource constraints of the Regional Board's WDR Program. A three-year period of doubled resources (from 15% to 30% of what the State Board estimated would be required to sustain a program significantly less involved than currently) that ended in late 2002 was insufficient for staff to address all WDRs in need of update. The workload demand has increased considerably since implementation of a phased strategy for municipal sewage WDRs (time to review technical reports and to make decisions required as a result of the reports) and since staff began requesting additional monitoring and technical reports from food processing waste discharges. Workload now includes developing site-specific groundwater quality limitations for each facility, critiquing technical documents prepared by consultants for a specific industry as well as individual sites, and managing and statistically evaluating significantly increased amounts of groundwater monitoring

data. Increased workload demands were also created by legislative requirements for improved regulation of septic systems and increased accountability for granting and tracking waivers of WDRs. Increased numbers of dischargers entering the WDR Program from extending oversight into these areas and others, such as to small wineries, makes the resource situation worse than stated. Growth in the Central Valley has also contributed to an increased the workload in the WDR Program.

State Board is not currently proposing any addition to the WDR Program staff resources. To change course and effectively protect water quality as envisioned by the proposal outlined above, the Regional Board must have sufficient resources. The current multi-month delays experienced by municipal and industrial discharges, due to insufficient staff resources, can only grow worse with increased burdens of properly implementing a more rigorous food processing waste regulatory program. Possibilities to increase staff resources, leverage staff resources, and improve efficiency in use of staff resources include the following:

1) Dischargers within WDR Program provide resources through permit fees. The Regional Board receives most of this revenue. Though fees were reviewed and increased in each of the last two years, the objective of the State Water Board has been to sustain baseline resources, not to meet workload demand or to necessarily conduct an effective program, in short, because no staff augmentation would likely be granted.

   Permit fees are determined by the discharge's rank on both the "Threat to Water Quality" (TTWQ) and Complexity scales. In general, food process waste discharges that release high-strength waste and are regulated in the WDR Program are appropriately classified as a TTWQ category 1 and Complexity category B or A. Instead, many are classified as TTWQ category 3 (could degrade but not exceed water quality objectives) and Complexity category C (definition refers to best management practices and land disposal), which is the most innocuous (and last expensive) classification. Only four sites in the Region are currently classified as 1A. Given the workload demand and the association between fees and resources, most food processing waste discharges should be reclassified and the Regional Board should request position augmentation authority commensurate with the increased revenue. Even if no staff augmentation occurs, it is appropriate and equitable relative to other dischargers within the program that members of the food processing industry pay fees in proportion to their true threat and complexity. The Board should then request that the State Board augment positions in the WDR Program to the extent resources allow.

2) Cleanup and abatement orders should include provisions for reimbursement of staff time spent resolving the threat, including time spent reconciling the WDR. In addition, when worthwhile and as an increased incentive for beleaguered program staff, recovered staff costs from ACLs imposed for noncompliance of a discharger within the WDR Program should return to that program.

3) Staff has expended considerable time with individual dischargers and organizations trying to communicate the concept that numeric and narrative water quality objectives and basin plan procedures determine the maximum water quality limitations that can be adopted in Board orders. Further, staff must derive limitations based on stringent interpretation of water quality control plans, policies and regulations unless the discharger provides site-specific data to support less stringent interpretations, such as qualifying for exemptions or allowing degradation consistent with the Antidegradation Policy. Some dischargers are not motivated by staff opinion on this. If the Regional Board reaffirms this concept as outlined in this staff report, dischargers will have less reason to delay matters and to argue the point. Dischargers can instead spend their efforts and resources working toward a well-designed discharge that neither threatens nor causes pollution.

4) A misperception prevails in the food processing industry in general that its waste management and disposal practices are exempt from Title 27 regulations regardless of consequences. In reality, the regulations pertain to land disposal of all but three kinds of waste—sewage, fertilizer, and radioactive waste.[13] Exemption from Title 27 requires a scientific rationale based upon objective review of waste constituent and water quality data. The quality of documentation and rigor of analysis by dischargers would likely improve, and this would in turn decrease burden on staff and resulting delays in resolution of issues, if the Regional Board affirmed that it will require Title 27 containment where a scientific basis cannot be established for exemption of the discharge.

5) A misperception prevails in the food processing industry in general that its members have a right to discharge their waste and that groundwater pollution must be positively identified by the Regional Board before changes are need. Responsiveness of dischargers to identified deficiencies might increase if the Regional Board affirmed that it alone has the authority to permit the discharge of waste and that permits or WDRs will be adopted only after the discharger provides the information necessary for staff to be able to assess potential water quality threats and impacts, as well as control measures needed to prevent or reduce such threats and impacts.

6) When unauthorized discharges and discharges that have caused pollution do not result in Regional Board orders for investigation and cleanup, business decisions become biased in favor of noncompliance. Compliance would be significantly increased by Regional Board affirmation that compliance with the State Board's Cleanup Policy will be required in all instances where a discharge of food processing waste has either polluted groundwater or caused unauthorized groundwater degradation.

Staff proposes that the Regional Board expresses its intent to support staff and industry in reconciling practices and policies through the above described resource augmentation and efficiencies.

Summary

Staff asks that the Regional Board concur with the above-proposed approach to better regulate waste discharges to land from the food processing industry. Staff's approach emphasizes the following:

1) The discharge of food processing waste to land has the potential to degrade and/or pollute the underlying groundwater. Data submitted to the Regional Board clearly shows that pollution has occurred at a number of facilities.

2) It is appropriate and necessary to require that a food processing discharger submit detailed information regarding its waste discharge. At a minimum, this includes a full characterization of its waste at each release point, groundwater characterization, and a reliable prediction of potential groundwater impacts due to the discharge.

3) It is appropriate to update existing Monitoring and Reporting Programs and Waste Discharge Requirements to the level of detail described above.

4) If a discharge has degraded, or has the potential to degrade underlying groundwater, then "best practicable treatment and control" (BPTC) measures must be evaluated and implemented to minimize degradation to that allowed by the State Board Resolution No. 68-16, the Antidegradation Policy.

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[13] California Water Code §13172.

5) If a discharge cannot be treated and/or managed in a manner to prevent groundwater pollution, then it is subject to regulation under Title 27 of the California Water Code. Alternatively, the discharge may be prohibited.

6) If a discharge causes groundwater pollution and/or unauthorized degradation, then the discharger is subject to enforcement action, which would include requirements to implement changes to prevent pollution or unauthorized degradation in the future, and to remediate the groundwater impact in accordance with State Board Resolution No. 92-49, the Cleanup Policy.

7) To address the critical lack of staff resources: the State Board should be requested to augment resources for this program; food processing facilities should be reclassified into the appropriate threat/complexity rating such that they pay annual fees commensurate with the true impact/threat to water quality; and enforcement orders should contain a provision to recover staff costs.

Attachments

Attachment A. Water Quality Limits to Protect Beneficial Uses
Table of limits for constituents of concern with limits applying narrative water quality objectives using method in Policy for Application of Water Quality Objectives

Attachment B-1. Summary Table of Food Processing Waste Dischargers in the Central Valley Region. Table identifying all known food processors which discharge waste to land, the product processed, method of regulation, whether groundwater or soil monitoring is conducted, whether background groundwater quality has been characterized, whether groundwater has been degraded/polluted, and whether any recent enforcement actions have been taken..

Attachment B-2. Summary Table of Food Processors that Discharge to a Publicly Owned Treatment Works.

Attachment C. Case Summaries of Four Food Processors With Water Quality Issues

C-1: Vegetable Processor in the Tulare Lake Basin

C-2: Winery in the San Joaquin Valley

C-3: Vegetable Processor in the Sacramento Valley

C-4: Winery within the Sacramento Valley

Attachment D. Case Summaries of Three Food Processors That Have Implemented Treatment and Control Measures

D-1: Soy Product Producer in the San Joaquin Valley

D-2: Winery in the Tulare Lake Basin

D-3: Poultry Processor in the San Joaquin Valley