CV-SALTS Subcommittee Meeting

Central Valley Management Practice Subcommittee

When: Tuesday, January 24, 2012 from 11:00 AM to 12:30 PM

Location: Conference Call only

Conference #: (218) 339-4600 Participant Code: 927571#

Agenda

1. Welcome and Introductions Co-Chairs Rob Neenan/Parry Klassen and Linda Dorn
2. Subcommittee
3. Approach to Review of Practices (see Chairs recommendation on Page 2
4. Overview of Practice Nominations received by 1/18/12 and preparation for Reviews
    a. Dairy – Paul Martin
    b. League of Food Processors – Rob Neenan
    c. Wine Institute – Chris Savage
    d. What is the schedule for the others in Pilot Pg 10 Att 2?
    e. Identify and prioritize other needs
5. Next Meeting/Call January _____ at _____

We would like to offer some suggestions regarding how to structure the process for reviewing CV-SALTS management practice nominations. Although a thorough review of proposed BMP's is warranted, it will be important to recognize that that the BMP Subcommittee, Technical Committee, Executive Committee, and stakeholders have limited time and resources to devote to reviewing and commenting on nomination forms. It seems to be the consensus that the toolbox will expand and improve over time, but we need to get *something* in the toolbox to get the process rolling. The committee chairs will have to strike a fine balance between understanding the details of a proposal and clarifying every possible detail. Regarding the approval process, we have the following suggestions:

- Approval by the BMP subcommittee requires a simple majority of the members present and voting.
- Approval by the Technical Committee will require a majority of the members present. In most cases, the committee should render its decision within 30 days of receiving the nomination form.
- Approval by the Executive Committee requires a simple majority of the members present and should be taken as a consent item unless there are well defined objections which must be communicated to the Executive Committee Chair in advance of the meeting. The objective here is not to revisit the same issues in three separate venues. The Executive Committee should trust the Technical Committee to have done its job. In most cases, the committee should render its decision within 30 days of receiving the nomination form. The toolbox will be presented to the Regional Board for approval.
- When reviewing nominations regarding BMP manuals (e.g. Wine Institute, CLFP, other) we suggest that the key issue is whether the *approach* should be viewed as a validated BMP. While the manuals include a large number of individual practices that may evolve over time, a holistic approach to managing wastewater essentially will not. Some of the practices may be viewed as validated or developing, however, the approach should be viewed as validated if it has been vetted.

Rob Neenan
California League of Food Processors

CV-SALTS Management Practice Nomination Form

This Nomination Form includes limited instructions for the completion of the form. Initial reviewer instructions are included the Subcommittee Screening Document and will be further developed in future work. The nominator of the practice will provide all available information for the practice and may include estimated information to be verified if noted in the text. Should additional information be required to complete the review it will be requested.

In the pilot phase additional standardization of requested information on the management practices will likely be developed. Additionally review of the practice implementation and effect on overall salinity and nitrate management in the Central Valley may be further assessed at a future date. Submittal of management practices for inclusion into the toolbox should answer the following questions with the best information available to the submitter. **Please annotate responses with references and source documents, list these under Question 7.**

A. Is this nomination for a plan or programmatic activity as opposed to a field implementation practice or technology? ☐ YES XXX☐ NO

if yes, complete the following sections as appropriate, if no proceed to question 1.

1. **Title – Please provide a short descriptive tile for the practice**

   Reducing salts in dairy rations

2. **Description – Please provide a short (1-2 paragraphs) description of the practice/technologies to summarize the practice, industries and important information**

   Dairy animals of all ages and stages of production and reproduction have a certain need for salt in their diet. The requirement will vary depending on the status of the animal and is published by the National Research Council (NRC) Committee on Animal Nutrition, Nutrient Requirements of Dairy Cattle: Seventh Revised Edition, 2001. However, some dairy producers feed more than is truly needed by the animal, especially Sodium Bicarbonate and Sodium Chloride as those two salts may often be offered to the animals in a free-choice fashion. Therefore, if a producer were to limit salt feeding to that recommended by the NRC and avoid free-choice feeding, he would be able to quantify exactly how much supplemental salt was being added to the salts delivered to the animals naturally in the feed ingredients. He should be able to quantify the actual reduction by comparing purchases before and after.

   The same will hold true for nitrate reductions, albeit not as directly. Protein requirements of dairy cattle are also published by the NRC. Nitrogen is a key ingredient in the protein molecules, so controlling the feeding of protein to the NRC guidelines can reduce the nitrogen excreted in the manure and therefore less N will be available for conversion to nitrate. Protein is one of the more

expensive feed ingredients; therefore, while ensuring the animals get the proper amount of protein, feeding close to the NRC recommendations can be a win-win control measure

3. **Constituent Salts or Nutrients Managed** – Identify the primary and secondary constituents (EC TDS, Nitrates other nutrients etc) that are treated, reduced or managed by this practice and how they are reduced or managed.

   Nitrate, Sodium Chloride, Sodium Bicarbonate (Bicarb)

4. **Applicability –** Describe the documented application of this practice, where how and how extensively the practice has been implemented what conditions or circumstances limit the application of this practice. Industry specific application and limitations may be developed and show as Attachment A. Such limitations may include industry, region, soil type, media or other limits.

   The practice of feeding close to NRC recommendations, especially for protein, is practiced by most dairy producers, but is not currently applied from a salt management standpoint. Since the dairy water regulation limits the amount of N that can be applied to soils to 1.4 times the plant uptake and implementation of the new rules is underway, opportunity for reductions exists. On the other hand, the free choice feeding of Bicarb is very strongly advocated by those who believe in it. It is widely used as a rumen buffer to avoid acidosis in today's high producing cows. Bovine antacid if you will. It will be difficult to change the practice and professional animal nutritionists will be needed to avoid adverse animal impacts – as well as to convince producers to use this strategy.

5. **Practice Benefits and Impacts –** Describe the documented benefits of implementing the practice (what does it do) including any negative impacts of implementation (including cross media/air/energy/supply etc)

   THIS SEEMS VERY SIMILAR TO #4 and #5

   The practice eliminates the excretion of excessive salts and nitrogen

6. **Effectiveness Documentation** – 6 a. Describe the documented effectiveness of implementing the practice on the target constituents. Whenever possible quantify the effeteness of the practice as completely as possible. 6 b. Summarize and critical factors or limitations to effectiveness. If documentation of a cost benefits study please reference it below in 7.

   a. Less deposition is documented by less purchases of salt and Bicarb.

   b. Additionally, the balancing of salt and N using feeding software will show the effectiveness of the mitigation measure.

c. Producer acceptance is the critical control point

7. **Supporting studies, Research and Source Documents** – List all documents referenced in responses above or other documents that provide information evidence or background on the technology or practice and electronic availability.

National Research Council (NRC) Committee on Animal Nutrition, Nutrient Requirements of Dairy Cattle: Seventh Revised Edition, 2001

http://www.nap.edu/openbook.php?isbn=0309069971

8. **Implementation**

8.1 **Costs** - Summarize and document costs for implementation of this practice both Capital and Annual operations and maintenance costs. If possible, express in industry relevant units of $/acre foot or $/million gallons, $/ton or etc. to allow comparison with other practices.

Costs can be calculated by pricing out the feed ingredients. This is a normal feature of the ration building software. The elimination of free-choice feeding will be a direct reduction in cost – depending on how much is no longer being used. Current price for Sodium Bicarbonate is $12.38/50 lbs.

8.1.1 **Status and Potential** – Describe the Historic and current level of implementation, at the level know. List any information known on the potential full implementation of this practice

Most dairy producer do or have done for them by a consultant, a formal ration building specific for the various animals they own. Most could reduce the Bicarb being used and could manage protein more closely. See # 4 for the same answer here.

8.1.2 **Monitoring Documentation** – Describe the level of monitoring and documentation available to support the practice. If known, what additional monitoring is needed? If known what level of monitoring will be needed at implementation.

The monitoring of salt, bicarb and protein in the dairy ration can be monitored by presentation of the "feed sheets," which are the documents used by the producer to measure out the various feed ingredients. The elimination of free-choice feeding will be visible from an inspection of the facility.

9. **Other Regulatory Approvals or Requirements –** Has this practice been approved or required by any other government agency or independent standard setting body, if so summarize this and any information you may have on the process and status of approvals**.** Indicate what level of review if required for that regulatory requirement or guidance?

Dairies are required to prepare and implement a Nutrient Management Plan to hold the Nitrogen application to a limit of 1.4 times plant uptake. They must test their manure, soil and plant tissue. A universal salt management plan has been prepared and producers are offered a menu of practices to choose from. This practice (Reducing salts in dairy rations) is selected from that menu).

I THINK WE COULD GET THIS DONE BY ANSWERING THE 4 QUESTIONS IN THE STANDARDS – THIS FORM SEEMS QUITE REPITIOUS TO ME.

Standards and information repeated for the Nominator from the Subcommittee screening document.

4 Standards

Screening of practices to include in the toolbox requires the review of practices for effectiveness in reducing salt and nitrate in the system. The Screening tool uses the following standards as documented by the proposer of the practice for screening.

4.1 Technical Effectiveness – does it work?

Demonstrating technical effectiveness is critical for a management practice to be implemented and accepted by industry or communities. Evidence of technical effectiveness is demonstrated by lab, pilot and demonstration studies and evaluation of the studies. Does the documentation indicate strongly that the practice removes, destroys, manages or otherwise reduce any negative impacts to beneficial uses associated with its presence and assist with compliance or improvement of the waters of the valley.

4.2 Implementability – can it be used broadly?

Implementability includes both feasibility as well as well as broad applicability. In most cases, satisfactory implmentability is demonstrated by documentation of the use of the management practice by a significant portion of the sector and considers other issues related to cost and efficiency covered in other sections. Implmentability of management practices may consider cross-media impacts, and look for management practices that reduce any detrimental effect to other media while achieving the goals of the management practice. These should be identified and any impact quantified if possible.

4.3 Cost effectiveness – is it economic to implement today?

Cost effectiveness is critical to being an effective best practice. Low efficiency costly practices are not likely to be broadly implemented. High value practices will likely be implemented with minimal regulatory requirements. The assessment of effectiveness related to cost is not always a simple as dollars per ton of salt or pound of nitrate, often costs include a technically trained workforce to implement, operate and maintain the practices. Additionally, this may vary across industry and across regions. The cost effectiveness should strive to take into account all benefits to the entity implementing the practice as well as direct and indirect cost of implementation. In other words not just the technology but the impacts on quality of the product or preparation or disposal of wastes and other potential cross media impacts. These costs should evaluate life cycle benefits and costs of implementations and societal and environmental benefits and costs, when possible.

4.4 Monitoring – proving it works?

Both the ability to monitor as well as the length and breadth of the monitoring history will be reviewed as a part of screening. Monitoring during the implementation stage may be greater in developing practices than fully validated practices that have already completed it.

Nomination Form Attachment 1

Applicability checklist by Industry, Processes or Region

The following industries, processes and regions may have specific screening requirements that the Subcommittee will develop in the future.

Industry or Process	***8. San Joaquin***	***9. East Valley***	***10. West Valley***	***11. Tulare Lake***	***12. Sacramento***	***13. Lake/Foothills***
1. Agriculture						
2. Food Processing						
3. Manufacturing						
4. Wine Industry						
5. WWTP						
6. Water Supply Management						
7. Water Treatment						
14. OTHERS						

CV-SALTS MANAGEMENT PRACTICE NOMINATION FORM

Submitted by the California League of Food Processors,
Sacramento, CA, January 2012

1. TITLE

Manual of Good Practice for Land Application of Food Processing/Rinse Water, Prepared by Brown and Caldwell and Kennedy/Jenks Consultants for the California League of Food Processors, March, 2007.

A complete copy of the document is available at no cost on the California League of Food Processors web site, www.clfp.com

2. DESCRIPTION

The purpose of the Manual is to provide a state-of-the-knowledge resource for designing and operating a land application system for food processing/rinse water. Specifically, the Manual was developed to establish and explain the scientific, agricultural, and engineering basis and methods for good practice as necessary to achieve regulatory compliance and foster environmentally and economically sustainable operations.

The Manual was prepared to serve as a reference for use by members of the California League of Food Processors (CLFP), regulators, and consulting engineers involved in planning, designing, evaluating, and operating land application systems. The focus of the Manual is on slow rate land application systems where hydraulic loading rates are generally similar to agricultural irrigation rates. Although many of the topics and discussions of chemical and physical properties are technical in nature, the guidance elements of the Manual were intended to be accessible and useful to a broad industry audience. The Manual includes design examples, decision trees, and sample worksheets to aid in the practical application of the principles.

The Manual is not just a collection of best practices. It provides a holistic science-based approach to the long-term management of a land application site. The topics covered in the text include (but are not limited to) an overview of pertinent regulations, water quality analysis, chemical constituents of concern, land application site characteristics, soil analysis, hydrogeology, crop selection, hydraulic and nutrient loading rates, wastewater pretreatment and source control, irrigation systems, and site monitoring and data analysis. The information is based on the best and most current data and studies available, but no original research was conducted to develop new data for the Manual.

The Manual was prepared by the environmental consulting firms Brown and Caldwell and Kennedy/Jenks, in collaboration with Central Valley Regional Water Board and State Water Board staff, CLFP staff, a number of technical experts and practitioners from the food processing industry, and other engineering consultants and stakeholders. The interdisciplinary team included soil scientists, engineers, environmental scientists, economists, growers, and food processors.

3. CONSTITUENT SALTS OR NUTRIENTS MANAGED

The focus of the Manual is on the proper management of salinity, nitrates, and BOD at food processing wastewater/rinse water land application sites. The volume and concentration of these constituents and the total volume of wastewater discharge may vary significantly between locations.

4. APPLICABILITY

The Manual can be used by any food processor, including small operation, that discharges wastewater to a land application site. The document is designed to address differences in soil type, climate, irrigation method, crop, or other site specific characteristics. Regulatory agency staff and environmental consultants can use the document to obtain technically sound information that can be applied to a wide range of discharge permits.

5. PRACTICE BENEFITS AND IMPACTS

The Manual includes a number of specific practices designed to effectively manage wastewater, but does not take a prescriptive approach. In most cases, the best approach will vary based on local conditions and the makeup of the wastewater. The text provides an approach for assessing how to apply principles and techniques to specific situations, and how to evaluate potential risks. For example, the section regarding organic loading rates provides technical background and calculations to demonstrate how much BOD can be applied to a site, and also general levels of risk to groundwater for different loading rates and groundwater depths.

However, the strength of the Manual is that it focused on developing a site-specific long-term comprehensive program to manage waste constituents. To effectively manage wastewater each of the major components (loading rates, irrigation method, crop selection) must be integrated into a holistic plan with the ultimate goal of protecting groundwater. This approach will clearly be more effective than a piecemeal assembly of practices.

In regards to salts, the Manual provides technical details on the measures of total salinity, the major contributing ions, and considerations with respect to each major ion. Salinity loading, soil effects, management, regulatory considerations, and monitoring are addressed in detail. The salinity related information is provided in a logical and coherent manner for use in proper planning, design and operation of land application systems.

CLFP sponsored the development of the Manual so food processors, consulting environmental engineers, and regulatory officials would have a common starting point for managing, monitoring, and regulating land application sites. It is critical that all of the parties involved work from a common set of facts, scientific principles, and economically sound best practices to ensure that the protection of groundwater can be accomplished in a fair and consistent manner across the region and the state. CLFP believes that the Manual provides that common and defensible basis for developing waste discharge permits. Adding the Manual to the CV-SALTS toolbox will provide interested parties with the necessary tools to manage land application sites.

6. EFFECTIVENESS DOCUMENTATION

The approach described in the Manual is based on the best available research and analysis selected from dozens of professional publications. The effectiveness of this approach is clearly demonstrated by the widespread use of the Manual by food processors and Regional Board staff. CLFP believes that, even though the Manual is not currently a regulatory guidance document, in most cases the Regional Board would not issue a permit to a land application site, at a minimum, if the general principles articulated in the Manual were not integrated into the management plan.

The final version of the Manual was released in March, 2007, and a workshop was conducted to present the results and encourage industry to use the document. CLFP does not have site-by-site monitoring data to demonstrate the effectiveness of the overall approach of the Manual because at many sites (particularly those with legacy issues) it may take many years to detect significant changes in groundwater quality. However, it seems intuitive that if the application site managers diligently apply all of the principles and practices described in the Manual it should be entirely consistent with protecting and improving ground water quality.

Experience with new permits subsequent to the Manual's release has been that both consultants and regulatory staff are making use of the Manual. BMPs in the Manual are cited by Regional Water Board staff in the findings for new Waste Discharge Permits.

7. SUPPORTING STUDIES

The data, analysis, and recommendations in the Manual are based on over 80 published studies and industry reports from U.S. and international sources. Key references included:

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8.1 COSTS

The practices recommended in the Manual are cost-effective in terms of minimizing salinity impacts and nitrate impacts to groundwater. For example, switching from chlorine to peracetic acid for sanitation reduces the salinity of the process water and avoids the formation of trihalomethanes. The result is lower impact to groundwater from salinity and trihalomethanes and the reduction of groundwater monitoring requirements for trihalomethanes.

Another example is the product substitution of potassium hydroxide for sodium hydroxide. While the potassium product is more expensive, it has the benefit of substituting a fertilizer for a salt, which reduces the impact of salinity on the groundwater. Potassium also helps the crop's yield, which increases the nitrogen uptake and reduces nitrate leaching to groundwater.

In addition to the detailed recommendations for minimizing salinity and nitrate impacts in the Manual, the overall practice of land application for food process/rinse water is very cost and energy efficient. The use of natural aeration, soil filtration, and crop uptake over a large area requires far less energy use and less resultant generation of indirect pollution than conventional wastewater treatment systems, contributing to more sustainable overall processes.

8.2 STATUS AND POTENTIAL

The practices in the Manual have been used successfully in Washington, Oregon, Idaho and Minnesota as well as throughout California. Staffs of the Regional Water Boards have been using the Manual regularly since its publication in 2007. The approach outlined in the Manual, if widely adopted, have the potential to significantly improve the management of land applications sites and ground water quality.

8.3 MONITORING DOCUMENTATION

The Manual has an entire section dedicated to the proper monitoring and documentation of the practices recommended. No additional monitoring is required.

9. OTHER REGULATORY APPROVALS OR REQUIREMENTS

The Idaho Department of Environmental Quality used elements of the CLFP Manual in developing a similar document for food processors in Idaho.

CV-SALTS MANAGEMENT PRACTICE NOMINATION FORM

Submitted by the Wine Institute,
Sacramento, CA, January 2012

1. TITLE

Comprehensive Guide to Sustainable Management of Winery Water and Associated Energy, Prepared by Kennedy/Jenks Consultants for the Wine Institute, 2008.

Companion/support documents include:
Land Application of Winery Stillage and Non-Stillage Process Water study Results and Proposed Guidelines, Prepared by Kennedy/Jenks Consultants for the Wine Institute, 2004. (Original science on land application of winery process water)
Process Water Characterization and Waste Minimization Manual, Prepared by Kennedy/Jenks for the Wine Institute, September, 2007

A complete copy of the *Comprehensive Guide* document is available at no cost on the Wine institute web site, www.wineinstitute.org/winerywaterguide

2. DESCRIPTION

The *Comprehensive Guide to Sustainable Management of Winery Water and Associated Energy* was developed by Kennedy/Jenks Consultants on behalf of the Wine Institute and American Vineyard Foundation, in association with the National Grape and Wine Initiative (NGWI), to provide wineries with tools to evaluate and modify their water use practices in all aspects including land application practice that improve salt and nitrate managment. Due to the embedded energy in water management, these changes can also result in lower energy demand and a reduction in greenhouse gas emissions. The Comprehensive Guide was designed with a goal of enabling wineries of all sizes, geographic locations, and levels of staff experience to enhance the sustainability of their operations. The do-it-yourself orientation is particularly suitable for small- or medium-sized producers, who are often very interested in sustainability but may not have an engineer on staff or resources to hire a consultant. The orginal scientific work behind the land application guidelines provides technical strenghth as well.

The Comprehensive Guide is organized around a five-step process that begins with planning and goal setting. Next, the winery gathers existing data and collects additional data as needed to characterize individual wastewater streams in the winery. Using these data, in the third step the winery can identify activities that use the most water and discharge the most wastewater and/or wastewater with the highest constituent concentrations. This step also includes matching possible improvement options to the targeted activities. Improvement strategies can range from simple procedural changes to capital intensive projects. In the fourth step, the winery evaluates the most promising options in detail for technical and economic feasibility. This is the basis for defining a prioritized plan to best meet the goals established by the winery. The final step is to implement the plan, including an ongoing monitoring program to track results.

The Comprehensive Guide and companion/support documents provide a state-of-the-knowledge resource for planning and designing a process water characterization, water conservation and waste minimization (organics, salts and nutrients) program for a winery. The documents also provide a resource for planning, designing and operating a land application system for winery process water. Specifically, the Comprehensive Guide and companion/support documents were developed to establish and explain the scientific, agricultural, and engineering basis and methods for good practice as necessary to achieve regulatory compliance and foster environmentally and economically sustainable operations.

The Comprehensive Guide and companion/support documents serve as a reference for use by the wine industry, regulators, and consulting engineers involved in planning, designing, evaluating, and operating process water management and land application systems for wineries. The Comprehensive Guide includes several guidelines and many water conservation and waste minimization and design examples, and sample worksheets to aid in the practical application of the principles.

The topics covered in the Comprehensive Guide and companion/support documents include (but are not limited to) an overview of pertinent regulations, water quality analysis, chemical constituents of concern, land application site characteristics, soil analysis, hydrogeology, crop selection, hydraulic and nutrient loading rates, wastewater pretreatment and source control, irrigation systems, and site monitoring and data analysis. The information is based on the best and most current data and studies available, and it includes some original research conducted to develop new data on land application of winery process water and characterization of various process water streams within a winery. When taken together all three documents provide a practical working basis to reduce water and salt use in the wineries as well as greatly reduce the opportunity for nitrate formation in the land application area.

The Comprehensive Guide and companion/support documents were prepared by the environmental consulting firm Kennedy/Jenks, in collaboration with Central Valley Regional Water Board and State Water Board staff, Wine Institute staff, and a number of technical experts and practitioners from the wine industry. The interdisciplinary team included soil scientists, engineers, environmental scientists, and winery operational staff.

3. CONSTITUENT SALTS OR NUTRIENTS MANAGED

The focus of the Comprehensive Guide and companion/support documents is on the proper management of salinity, nitrates, and BOD at winery process water land application sites. The volume and concentration of these constituents and the total volume of wastewater discharge may vary significantly between facilities and locations, but the fundamental approach described applied to all.

4. APPLICABILITY

The Comprehensive Guide and companion/support documents can be used by any winery that discharges wastewater to a land application site. The document is designed to address differences in soil type, climate, irrigation method, crop, or other site specific characteristics. Regulatory agency staff and environmental consultants can use the document to obtain technically sound information that can be applied to a wide range of discharge permits.

5. PRACTICE BENEFITS AND IMPACTS

The Comprehensive Guide and companion/support documents include a number of specific practices designed to effectively manage wastewater, but does not take a prescriptive approach. Instead it uses a five-step approach as outlined below.

Step 1: Planning and Organization

This first step sets the stage for successful outcomes. The winery is encouraged to establish and communicate internally that the owners or top management are committed to implementing a winery water and energy program and are prepared to provide necessary resources and leadership to make it effective. Support from management is critical not only in financial terms, but also for promoting and incentivizing cultural changes in their operations. For example, staff may resist procedural improvements that require them to do things differently than they have been done in the past.

When the winery is ready to move forward, they are advised to identify a project team with representation from all parts of their organization. The team will begin to formulate specific goals to reduce water use, decrease wastewater generation and strength, and reduce associated energy use. These goals may be refined as additional information is collected and baselines for current use are determined. Some wineries may defer goal-setting until more information on potential opportunities is obtained in Steps 2 and 3. While every winery's goals will be unique, the industry is moving toward developing key metrics that are normalized to production, such as water used per gallon of wine produced.

Step 2: Winery Self Assessment

In the assessment step, the winery will collect data to determine how much water is currently being used in each discrete production operation, as well as how much is used to run building systems. For example, their operations may include crushing, storage, blending and bottling, and most buildings have heating and cooling systems. Guidance is provided on how to monitor the influent (or effluent, if feasible) flows associated with each operation in order to develop a water balance. The chemistry of each of the wastewater streams is also assessed in this task by collecting samples for laboratory analysis.

The Comprehensive Guide provides extensive information to support this task, including recommendations for appropriate sample types and monitoring methods for each process stream. If winery staff have never installed a flow meter or collected a water sample before, they can turn to a more detailed reference section of the guide. In addition, a case study illustrating winery wastewater characterization activities and results is provided for reference. Data from the case study, which was previously conducted at several large wineries on behalf of the Wine Institute (companion documents), show which winery operations use the most water and which are significant sources of high-strength

wastewater. If a winery is unable to collect their own characterization data, they may able to identify useful improvements by correlating the case study findings with their operations.

The Comprehensive Guide includes worksheets that can be used to develop an inventory of existing data, plan for flow monitoring and sampling activities, and compile collected data. Regardless of winery's size and configuration, the basic self-assessment process described in the guidebook will still be applicable, and the associated worksheets can be readily adapted and used. Alternatively, if a winery has their own preferred data collection formats or an existing database format, these can be substituted for the worksheets in the guidebook without detracting from the assessment program.

Step 3: Data Evaluation and Option Identification

With a compiled set of data on their operations (either direct measurements or estimates), wineries will begin to see patterns and should be able to identify certain processes and waste streams that are the largest contributors to the total facility effluent, in terms of discharge volume and/or constituent loading. BOD, total nitrogen and salinity are three primary areas of focus. These activities and sources can be targeted for improvement. In some cases, wastewater streams can be sorted into reuse categories, ranging from good quality water that can be used in place of source water, to water that is essentially not reusable without significant, costly treatment and will most likely require offsite disposal. These categories will make it easier to identify the "low-hanging fruit" for immediate action. The guide includes lists of improvement options that will be applicable at many wineries. Generalized screening criteria are included with the options so that wineries can identify those projects that may be the most promising to meet their needs.

The compiled data will also provide a baseline of current operations and use rates, so that after changes are made, the improvement can be measured and communicated. Measurable results are critical for justifying the winery's investment in any new equipment, and will help them decide whether they have done enough to reach their goals or need to undertake more aggressive changes.

Step 4: Feasibility Analysis

After a set of potential improvement options has been identified, this step entails more detailed screening and feasibility evaluation to determine preferred solutions. The feasibility evaluation includes both technical and economic components, with worksheets provided for this task. The winery can then prioritize the best options, considering available funding, and prepare an action plan for implementation. The action plan may include both near-term and long-term steps and should consider the impact of any known/planned changes in facility configuration or production volume.

Step 5: Implementation

The scope of implementation will be different for each winery; therefore, the instructions for the final step are limited. However, any change, whether equipment or procedural in nature, should be accompanied by a monitoring program that is launched at the time the option is put in place. As noted above, this is critical to determining whether the changes are leading to the desired results. If not, the approach calls for the winery to cycle through the sequence of steps for data evaluation and option identification again to define additional feasible improvements until acceptable levels of progress are evident. Implementation should also include communicating changes and results to staff to build interest and ownership in the outcomes.

In most cases, the best approach will vary based on local conditions and the makeup of the wastewater. The text provides an approach for assessing how to apply principles and techniques to specific situations, and how to assess the potential risks.

However, the strength of the Comprehensive Guide and companion/support documents are that they focus on developing a site-specific long-term comprehensive program to manage waste constituents with the ultimate goal of protecting groundwater.

In regards to salts, the Comprehensive Guide and companion/support documents provide technical details on the measures of total salinity, the major contributing ions, and considerations with respect to each major ion. Salinity loading, soil effects, management, regulatory considerations, and monitoring are addressed in detail. The salinity related information is provided in a logical and coherent manner for use in proper planning, design and operation of winery process water management and land application systems.

The Wine Institute sponsored the development of the Comprehensive Guide and companion/support documents so wineries, consulting environmental engineers, and regulatory officials would have wine industry specific data and a common starting point for managing, monitoring, and regulating winery process water management systems and land application sites. It is critical that all of the parties involved work from a common set of facts, scientific principles, and economically sound best practices to ensure that the protection of groundwater can be accomplished in a fair and consistent manner across the region and the state. Wine Institute believes that the Comprehensive Guide and companion/support documents provide a common and defensible basis for developing waste discharge permits. Adding the Comprehensive Guide and companion/support documents to the CV-SALTS toolbox will provide interested parties with the necessary tools to manage land application sites.

6. EFFECTIVENESS DOCUMENTATION

The approach described in the Comprehensive Guide and companion/support documents are based on the best available new research and analysis and research and analysis selected from dozens of

professional publications. The effectiveness of this approach is clearly demonstrated by the widespread use of the Comprehensive Guide and companion/support documents by wineries and Regional Board staff. Wine Institute believes that, even though the Comprehensive Guide and companion/support documents are not currently regulatory guidance documents, in most cases the Regional Board would not issue a permit to a land application site if, at a minimum, the general principles articulated in the Comprehensive Guide and companion/support documents were not integrated into the management plan.

The final version of the Comprehensive Guide was released in, 2008, and since then 10 workshops have been co-sponsored by the Wine Institute/California Sustainable winegrowing Alliance and PG&E in the various winegrowing regions of California and one workshop each in New York and Washington has occurred. The workshops have been conducted to present the five-step approach, share results and encourage industry use of the Comprehensive Guide. Wine Institute does not have site-by-site monitoring data to demonstrate the effectiveness of the overall approach of the Comprehensive Guide because at many sites (particularly those with legacy issues) it may take many years to detect significant changes in groundwater quality. However, during the many workshops, participants share results and develop action plans for improving winery process water management and many have demonstrated significant improvements in how process water is or will be managed. As a result, it seems intuitive that if the application site managers continue to diligently apply all of the principles and practices described in the Comprehensive Guide it should be entirely consistent with protecting and improving ground water quality. Some specific examples of improvements are provided below.

As mentioned: A series of workshops on how to use the guide is now being co-hosted by the California Sustainable Winegrowing Alliance (CSWA) and the Pacific Gas & Electric Company in winegrowing regions throughout the state. The first workshop, conducted in June 2008 in Paso Robles, was well attended and received. Evaluation forms completed immediately following the workshop indicated people understood the approach and garnered ideas about how they would get started in their facility. In response to one question, “based on today’s workshop, what specific immediate actions are you likely to take for water management and energy efficiency?” participant answers included: fixing leaks, adding low-flow nozzles, making changes to a pond system, mapping out total process, posting data for staff information, forming a water committee, reducing use of high-volume hoses, and reconsidering standard operating procedures.

Approximately five months after the workshop, a follow-up survey was offered to participants online. Based on a limited number of responses (just over 10 percent of attendees), results suggest the guidebook is having an impact. For example, the respondents indicated that since the workshop, they had installed flow meters to monitor individual processes, collected wastewater samples and implemented changes. They reported improving cleaning and sanitation procedures, reducing or eliminating water softening, switching to high-pressure barrel washer, upgrading pumps/motors/controls, and reusing process water for landscape or crop irrigation.

For the coming year, respondents planned to establish, update or follow standard operating procedures more consistently, modify cleaning and sanitation procedures, migrate to a CIP system in the cellar, and identify and repair leaks.

Wine Institute distributed a news release and link to a pdf guide to nearly 1,000 winery members, and the publication has also been mentioned in numerous trade publications. To date, CSWA has received

more than 75 requests for the guide from many international wine regions, including Argentina, Australia, Chile, France and Spain, and from many states throughout the US.

7. SUPPORTING STUDIES

The data, analysis, and recommendations in the Comprehensive Guide and companion/support documents are based on over 70 published studies and industry reports from U.S. and international sources. Key references included:

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8.1 COSTS

The five-step process and practices recommended in the Comprehensive Guide and companion/support documents are cost-effective in terms of minimizing salinity impacts and nitrate impacts to groundwater because they first focus on prevention, then minimization and optimization. For example, switching from chlorine to chlorine dioxide or peracetic acid for sanitation reduces the salinity of the process water. The Guide takes the winery through the steps necessary to evaluate the effectiveness of such an switch to their operations.

Another example is the product substitution of potassium hydroxide for sodium hydroxide. While the potassium product is more expensive, it has the benefit of substituting sodium for a salt that can double as a fertilizer. This change reduces the impact of salinity on the groundwater. Potassium also helps the crop yield, which increases the nitrogen uptake and reduces the potential for nitrate leaching to groundwater.

In addition to the detailed recommendations for minimizing salinity and nitrate impacts in the Comprehensive Guide, the overall practice of land application for winery process water is very cost and energy efficient. The use of natural aeration, soil filtration, and crop uptake over a large area requires far less energy use and less resultant generation of indirect pollution than conventional wastewater treatment systems, contributing to more sustainable overall processes.

8.2 STATUS AND POTENTIAL

The practices in the Comprehensive Guide have been used successfully in Washington and New York as well as throughout California. Kennedy/Jenks and staffs of the Regional Water Boards have been using the Comprehensive Guide and companion/support documents to develop new and modify existing permits regularly since the publication of Land application guidelines in 2004 and the Comprehensive Guides' publication in 2008.

8.3 MONITORING DOCUMENTATION

The Comprehensive Guide has an approach and an entire section dedicated to the proper monitoring and documentation of the practices recommended. No additional monitoring is required.

9. OTHER REGULATORY APPROVALS OR REQUIREMENTS

The New York and Mid-West wine industries have accepted the approach and plan on using it as the basis for future regulatory discussion.