

## Experience Summary

Mr. Crites, Brown and Caldwell's Natural Systems Service Leader, has conducted numerous evaluations and designs of natural systems and constructed wetlands for water quality improvement and water reuse. He has managed a wide variety of projects including facility plans for wastewater treatment and biosolids management, constructed wetlands for pond upgrades, a recycled water assessment of groundwater impacts from emerging pollutants and a pilot groundwater recharge program. He is the author textbooks including Natural Wastewater Treatment Systems, Small and Decentralized Wastewater Management Systems, Natural Systems for Waste Management and Treatment, and Land Treatment of Municipal and Industrial Wastes. He was responsible for the planning and design of the award-winning Demonstration Constructed Wetlands for Sacramento Regional County Sanitation District. Ron was the recipient of the 2009 Water Environment Federation (WEF) Camp Medal for Applied Research in recognition of his 40-plus years of invaluable contributions in the areas of applied research, planning and designs employing green and sustainable technologies. His work has advanced the understanding and applications of land treatment, constructed wetlands and small-scale ecological treatment and reuse.

He has extensive experience in reuse and disposal of numerous types of industrial wastes including projects for vegetable and fruit processing, winery, brewery, meat processing and chemical wastewater. His expertise is in studies, designs, monitoring and operations advice for pretreatment, land application and reuse.

### Assignment

*Project Manager*

### Education

*Engineer's Degree, Sanitary Engineering, Stanford University, 1970*

*M.S., Sanitary Engineering, Stanford University, 1968*

*B.S., Civil Engineering, California State University, Chico, 1967*

### Registration

*Professional Civil Engineer No. 21532, California, 1972*

*Professional Engineer No. 13506, Oregon, 1987*

*Professional Engineer No. 7795, Hawaii, 1993*

### Experience

*45 years*

### Joined Firm

*1997*

### Awards

*2009 WEF Thomas R. Camp Medal for Basic Research Contributions to Wastewater*

### Relevant Expertise

- *Regional Water Quality Control Board permitting*
- *Industrial wastewater processing*

## Food Processing

### Manual of Good Practice for Land Application of Food Processing/Rinse Water, California League of Food Processors, Sacramento, California

**Project Manager.** Ron managed the development of a manual of good practice for land application of food processing/rinse water in 2007. He provided guidelines for design and monitoring of land application systems. He presented the new manual to food processors and regulators in a workshop.

### Report of Waste Discharge, Hilmar Cheese Company, Hilmar, California

**Peer Reviewer.** Ron conducted a peer review for another consultant on a beneficial use analysis of the groundwater near the effluent land application areas. The report of waste discharge was prepared for an additional 600 acres of crop land receiving treated effluent.

### Waste Minimization Study, Crystal Cream and Butter Company, Sacramento, California

**Project Manager.** Ron prepared a waste minimization study for a milk, cottage cheese and ice cream processing plant.

### pH Control, Knudsen, Visalia, California

**Technical Advisor.** Ron supervised preparation of feasibility report and final design of a pH control system for dairy wastewater.

### Land Application Design, Hilmar Cheese, Hilmar, California

**Project Manager.** Ron designed three expansions and the original 20-acre land application system to treat cheese processing wastewater. The 1995 expansion of 76 acres resulting in a capacity of 0.6 mgd was permitted and designed. Groundwater monitoring wells were designed and a comprehensive groundwater quality evaluation was conducted.

**Facilities Planning, Crystal Cream and Butter Company, Sacramento, California**

**Project Manager.** Ron supervised the report preparation and environmental planning for a new processing plant site including water supply and wastewater treatment.

**Alternatives Analysis, F&A Dairy of California, Newman, California**

**Project Manager.** Ron studied alternatives for pretreatment and land application for cheese plant wastewater.

**Report of Waste Discharge, Saticoy Foods, Santa Paula, California**

**Project Manager.** Ron managed the preparation of a report of waste discharge for the land application system treating pepper processing wastewater. The report justified the land application practice as meeting the antidegradation requirements with total dissolved solids being lower in concentration downgradient of the sprinkler application fields than in the upgradient (background) groundwater.

**Lemoore Monitoring and Report, Olam Tomato Processors, California**

**Senior Reviewer.** Ron is the Client Service Manager and senior reviewer for this 655 acre land application site. Ron provided advice on alternative sites for land application and permitted a 13-acre site for land application of biosolids from the aerated pond. (26879; Aug 2011 est; \$167K)

**Campbell Soup Septic/Leachfield, Campbell Soup Supply Co, LLC, Dixon, California**

**Project Manager.** This is a Design-Build project to complete the design and construction of a septic/leachfield system. Ron managed the design of a new septic tank and pressure-dosed leachfield for 3,000 gpd of domestic wastewater. Solano County permits and approvals were acquired and decommissioning and closure plans were prepared for the Regional Water Board. (26723; July 2011 est; \$68K)

**Land Application TDS Limits, Harter Packing, Yuba City, California**

**Project Manager.** Ron managed the preparation of a sampling plan and analysis of wastewater and background groundwater quality to determine an acceptable level for TDS or IDS in the applied process/rinse water for 2.2 mgd of tomato and peach processing.

**Boswell Corcoran Advice, J.G. Boswell Company, Corcoran, California**

**Project Manager.** Ron was retained by J.G. Boswell to review their new tomato processing cannery WDRs. The actual flows have exceeded the design and permitted values. Ron advised Boswell on how to correct the situation and keep the system operational. (SID 9537)

**Environmental Compliance, Patterson Vegetable Company, Patterson, California**

**Project Manager.** Ron provided services related to water supply monitoring and wastewater system monitoring. Standard operating procedures were supplied for each of these areas.

**Well Abandonment, Harter Packing Co., Yuba City, California**

**Project Manager.** Ron managed the well abandonment of eight monitoring wells around the former Harter Packing operation. A work plan was prepared for the County of Sutter and the Regional Board and the well abandonment process was completed with a summary report to the Regional Board.

**Campbell Soup Dixon RWD, Campbell Soup Supply Company, Dixon, California**

**Project Manager.** Ron managed the report of waste discharge to add a vegetable processing line to the tomato processing operation. The RWD expanded the land application area from 555 acres to 606 acres and the operating season from 90 to 140 days. Tailwater control over the surface irrigation system was improved to minimize storm runoff in the fall.

**SK Lemoore RWD, SK Foods, Lemoore, California**

**Project Manager.** Ron evaluated a new 2,600 land application site and obtained a permit for flows up to 4.5 mgd of tomato wastewater. Site evaluation included soil sampling analysis and interpretation, hydropunch sampling of groundwater and a network of monitoring wells.

**SK Lemoore Ponds, SK Foods, Lemoore, California**

**Project Manager.** Ron led the design of an emergency storage pond conversion to provide settling of grit from the tomato process water and equalization storage prior to pumping effluent to the land application site. Pretreatment for solids reduction improved the water quality in the processing.

### **Rio Pluma, Stapleton-Spence, Gridley, California**

**Project Manager.** Process wastewater from the processing of prunes and other juices is treated in an aerated pond and discharged to the City of Gridley's sewer system. The aerated pond system produces an excess of suspended solids, so the solids are removed by flotation. Ron led an investigation of alternatives for beneficial use of the prune solids and biosolids from the aerated pond.

### **Del Monte Land Treatment, Del Monte, Kingsburg, California**

**Technical Leader.** The Regional Water Board issued a notice of violation to the Kingsburg land application site for groundwater degradation. Ron directed a revised monitoring well network and developed a BOD loading rate study designed to evaluate sprinkler application at different BOD loading rates. A network of lysimeters was designed along with oxygen monitoring over a two year period. The results showed positive dissolved oxygen in the soil profile, which validated the model.

### **Relocation of Land Application Facilities, Colusa County Canning Company, Williams, California.**

**Project Manager.** Ron prepared a report of waste discharge for the treatment of 4.0 mgd of tomato canning wastewater on more than 800 acres of land. A monitoring well installation plan was prepared, accepted by Regional Board staff and implemented. A revised monitoring and reporting program was developed that covered monitoring of the quality of the effluent, soil and groundwater. A cropping and irrigation management plan was also prepared. New Waste Discharge Requirements were received and implemented in 2006.

### **Evaluation of Modesto's Land Application Ranch, Manufacturer's Council of the Central Valley (MCCV), Modesto, California**

**Project Manager.** Ron managed an analysis of the existing loading rates, soil conditions and groundwater conditions for the 2,530-acre City of Modesto land application system. The system is used during the peak canning season for direct land application of 20 mgd of food processing flow from the largest five industrial dischargers in the City of Modesto. Optimization opportunities for the system were proposed including conversion to sprinkler irrigation from surface irrigation.

### **Report of Waste Discharge, Prima Bella, Tracy, California**

**Project Manager.** Ron managed the evaluation of a fresh corn processor wastewater system with land application near Tracy, California. An aerated treatment pond was proposed along with a winter storage pond. A report of waste discharge was prepared along with a CEQA document to allow adoption of waste discharge requirements.

### **Advice on Land Application, Patterson Vegetable Company, Patterson, California**

**Project Manager.** Ron evaluated the land application system operated by Patterson Vegetable Company to determine if the current land application area was adequate or excessive for treatment and reuse. The 2.5 mgd system operates with two aerated ponds in series, a rapid infiltration system, a dedicated sprinkler irrigation system and a flood irrigation system that uses a combination of process water and canal water for alfalfa irrigation.

### **Site Remediation and Closure Plan, Harter Packing Company, Yuba City, California.**

**Project Manager.** Ron managed the evaluation of alternatives to determine the appropriate and cost-effective approach to closure of a land application site. The recommended approach included a combination of source control, capping, phytoremediation and groundwater attenuation. No offsite wells were required and one new upgradient well was recommended and implemented.

### **Pond Treatment Improvements and Waste Minimization, G.L. Mezzetta, American Canyon, California.**

**Project Manager.** Ron led the team that evaluated an existing aerated pond system for treatment performance and excess effluent suspended solids. The problem of excess sludge accumulation was determined and a sludge removal project was implemented. Interim measures for improvement included recycle of pond effluent, a rental of a dissolved air flotation unit, and relocation of the surface aerators. A waste minimization review was conducted and water conservation measures were recommended along with improved dry solids removal and training of sanitation crews.

**Report of Waste Discharge for Land Application Facilities, Culinary Farms, Suisun City, California.**

**Project Manager.** Ron prepared a report of waste discharge for the management of 4,000 gpd of tomato processing wastewater on 1.5 acres of land. An operations plan was submitted to the Regional Board staff. A revised monitoring and reporting program was developed that covered only annual flow monitoring of the effluent.

**Pretreatment Improvements for Tomato Processing Wastewater, Escalon Premier Brands, Escalon, California.**

**Technical Advisor.** Ron prepared an evaluation for Escalon Premier Brands of their process wastewater system of aerated treatment ponds operated by the City of Escalon. Increased production has led to a need to reduce both suspended solids and BOD. A dissolved air flotation unit was designed and installed for the 2004 processing season. For the 2005 season a pure oxygen aeration system has been selected to enhance the aeration capacity of the primary treatment ponds.

**Permitting and Engineering Reports, ConAgra Grocery Products, Oakdale, California**

**Project Manager.** Ron prepared a report of waste discharge and negotiated a new waste discharge permit for 1,200 acres of pasture land receiving 5.3 mgd of process/rinse water from the processing of tomatoes and beans. Engineering reports included certification of tailwater system improvements, long term storage, salinity control plan and annual monitoring.

**Evaluation of Monitoring and Management System, Campbell Soup Supply, Dixon, California**

**Project Manager.** Ron prepared an assessment of the existing permit, monitoring system and management plan for land application of 3.5 mgd of tomato processing wastewater on 550 acres. He updated the groundwater monitoring results for 2004 and 2005.

**Report of Waste Discharge, Salad Cosmo, Dixon, California**

**Project Manager.** Ron evaluated the existing permit, responded to a Notice of Violation and prepared a new report of waste discharge for a bean sprout operation.

**Groundwater Quality Data Evaluation, Del Monte Foods, Woodland, California**

**Project Officer.** Ron produced groundwater quality evaluation report required by the Regional Water Quality Control Board (RWQCB) to assess possible impact from Del Monte land application and to assist the RWQCB in writing waste discharge requirements (WDRs) for the next tenant of the land (currently owned by the City).

**Audit of Land Application System Operation and Monitoring, Frito-Lay Inc., Bakersfield, California**

**Project Manager.** Ron prepared and audit of the 17 year old sprinkler irrigation system used to treat potato and corn chip processing wastewater. The center-pivot system and the existing wastewater, soil, lysimeter and groundwater monitoring system was evaluated.

**Process Water Land Application System Upgrade, Del Monte Foods, Plover, Wisconsin**

**Technical Reviewer.** Ron fulfilled requirements for permit for the upgrade of an existing sprinkler land application system. The system treats plant wastewater through pivot sprinkler systems. The permit was complicated by wellhead protection ordinances for the Village of Plover and County of Portage.

**Salt Impact Evaluation, Manufacturer's Council of Central Valley, Modesto, California**

**Project Manager.** Ron managed the evaluation of the impact of fixed dissolved solids from five food processors on the land application of process/rinse water at the City of Modesto's 2,500-acre site.

**Evaluation of BOD Loading Rates, Confidential Client, Southern California**

**Project Manager.** Ron managed the evaluation of the BOD loading rates from a high-strength process/rinse water land application system using sprinkler irrigation making use of an oxygen diffusion and soil re-aeration model.

**Irrigation System Design, ConAgra Grocery Products Company, Oakdale, California**

**Project Manager.** Ron managed the design of facilities to expand irrigation up to 200 acres for tomato wastewater. The facilities included a pipeline, tailwater collection system and pond and pump stations. Permits were obtained from the County and the Regional Water Quality Control Board.

**Capacity Evaluation, Frito-Lay, Inc., Robersonville, North Carolina and Fayetteville, Tennessee**

**Project Manager.** Ron managed capacity studies for two land application facilities including loading rates, crop recommendations and storage volumes.

**Waste Discharge Evaluation, Atwater Canning Company, Atwater, California**

**Project Manager.** Ron managed the preparation of a report of waste discharge and operations manual for a land application system treating a combination of tomato and beans/hominy wastewater.

**Irrigation System Design, Frito-Lay, Inc., Bakersfield, California**

**Project Manager.** Ron managed the design of seven center pivot irrigation units for 1.3 mgd of potato and snack food processing wastewater. The project included permitting of 310 acres of irrigation area, construction management for pump station, pipeline and center pivot installation and installation of six suction lysimeters for soil-water monitoring.

**Waste Minimization Study, Campbell Soup Company, Sacramento, California**

**Project Manager.** Ron managed the waste minimization study of the tomato processing and soup manufacturing facility. Potential reductions in flow, BOD and suspended solids of 25 percent and more were recommended.

**Land Application Force Main Design, ConAgra Grocery Products Company, Oakdale, California**

**Project Manager.** Ron managed the preliminary design of a three-mile, 18-inch force main to deliver five mgd of tomato wastewater to a land application site.

**Reuse Alternatives Analysis, Maui Pineapple Company, Ltd., Kahului, Maui, Hawaii**

**Project Manager.** Ron investigated alternatives for treatment and reuse of 0.6 mgd of process and cooling waters from a pineapple cannery with selection and permitting of a reclamation reuse system involving drip irrigation of 500 acres of sugar cane.

**Land Application Evaluation, American Home Food Products, Vacaville, California**

**Project Manager.** Ron performed study of wastewater characteristics, pretreatment technologies and land application operations to improve the land application and efficiency and avoid nuisance conditions in the 240-acre site.

**Land Application Evaluation, Tri-Valley Growers, Modesto, California**

**Project Manager.** Ron evaluated the impacts on groundwater from the long-term application of tomato and other fruit processing wastewater. Monitoring well data, soil samples, soil-water samples and wastewater quality data were evaluated for the 96-acre site.

**Irrigation System Evaluation, Saticoy Foods, Santa Paula, California**

**Project Manager.** Ron supervised the evaluation of a sprinkler irrigation site and compared the results to the existing sprinkler irrigation of pepper processing wastewater. He prepared a work plan for a groundwater monitoring program.

**Pretreatment Alternatives Evaluation, Del Monte Corporation, San Jose, California**

**Project Manager.** Ron supervised the study of pretreatment alternatives that included anaerobic and aerobic treatment of 0.9 mgd of high strength fruit cocktail processing wastewater.

**Treatment System Design, Harter Pik'd Rite, Yuba City, California**

**Project Manager.** Ron supervised the study and design of internally fed rotating fine screen and dissolved air flotation system for treatment of 1.6 mgd of tomato and peach processing wastewater and improvements to land application.

**Treatment Alternatives Evaluation, Basic Vegetable Products, King City, California**

**Project Manager.** Ron studied the options for treatment improvement, pH and odor control for 2.4 mgd of onion and garlic wastewater.

**pH Control, American Home Food Products, Vacaville, California**

**Project Manager.** Ron investigated options for pH control and oil and grease reduction for a 0.8-mgd kitchen wastewater from processing chili and tomato products.

**Environmental Assessment, ConAgra Grocery Products Company, Davis and Oakdale, California**

**Project Manager.** Ron prepared an environmental assessment for two tomato canneries including water, wastewater, solid waste, noise and air quality.

**Site Evaluation, Frito-Lay, Inc., Bakersfield, California**

**Project Manager.** Ron analyzed potential land application sites for suitability to treat one mgd of potato processing wastewater. He assisted in permit acquisition and environmental impact assessment for the selected site.

**Waste Discharge Study, Rogers Foods, Livingston, California**

**Project Manager.** Ron supervised the preparation of a report of waste discharge and operating plan for land application of 0.9 mgd of onion and garlic processing wastewater.

**Pretreatment Evaluation, Pacific Coast Producers, Santa Cruz, California**

**Project Manager.** Ron provided operational advice and a report on the pretreatment of pear processing wastewater.

**Irrigation System Study and Design, Quality Assured Packing, Stockton, California**

**Project Manager.** Ron prepared an operations report and supervised improvements in the sprinkler irrigation system for tomato processing wastewater.

**Planning Assistance, Morning Star Company, Volta, California**

**Project Manager.** Ron provided advice on land application and cooling ponds for a new tomato processing plant.

**Design Review, Campbell Soup Company, Modesto, California**

**Project Manager.** Ron provided advice and design review for an activated carbon water treatment system for process water.

**Treatment Evaluation, Laura Scudder, Tracy, California**

**Project Manager.** Ron supervised preparation of a report on wastewater characteristics, identified areas of excess waste generation and recommended improvements for corn and potato processing wastewater.

**Irrigation System Evaluation, Gilroy Canning Company, Gilroy, California**

**Project Manager.** Ron prepared a report on operational improvements and cost savings for the sprinkler irrigation system.

**Treatment and Disposal System Design, Hilltop Cold Storage, Watsonville, California**

**Project Manager.** Ron prepared a report of waste discharge and supervised design of facilities for strawberry and fruit processing treatment and disposal by land application. He provided advice on expansion of facilities to irrigate adjacent land. He provided cost estimates and design for filtration followed by sprinkler irrigation of artichokes.

**Lagoon and Irrigation System Evaluation, J.R. Wood, Inc., Atwater, California**

**Project Engineer.** Ron prepared a report on upgrading an aerated lagoon and wastewater irrigation system for a 0.4 mgd flow from processing of fruit and vegetables.

**Feasibility Study, Frito-Lay, Inc., Summertown, Tennessee**

**Project Engineer.** Ron conducted a feasibility study of proposed overland flow treatment of wastewater from potato and corn chip operations.

**Technical Review, California Canners and Growers, Thornton and Merced, California**

**Project Engineer.** Ron reviewed two operating wastewater land application projects, recommending modifications in operation, soils monitoring and soil amendments.

**Feasibility Study, California Cannery and Growers, Merced, California**

**Project Engineer.** Ron prepared a report on the feasibility of land application of 4.0 mgd of peach processing wastewater and supervised the design of the land application system.

**Irrigation System Design, Contadina Foods, Inc., Hanford, California**

**Project Engineer.** Ron designed a 1.5-mgd irrigation system for a tomato cannery and prepared a report on the environmental impacts of wastewater and waste solids application to the land.

**Wineries**

**Chamisal Vineyards Wastewater System Evaluation, San Luis Obispo, California**

**Project Manager.** Ron evaluated the design of a vertical flow constructed wetlands for its current capacity to treat winery wastewater. Recommendations were made to add a septic tank for improved solids pretreatment, improve the system screening, and monitor the biological treatment performance of the vertical flow wetlands.

**Due Diligence, Confidential Client, Snell & Wilmer, San Luis Obispo, California**

**Project Manager.** Ron assisted in the analysis of a winery's wastewater system for capacity, performance and expandability.

(SID 8990)

**Bridlewood Winery Wetlands, Santa Ynez, California**

**Project Manager.** The client selected a combination of treatment ponds and subsurface flow constructed wetlands as a more cost-effective alternative to a membrane bioreactor. Ron provided a review of the basis of design and the expected capital costs for the pond-wetlands system. He also managed the 60 percent design for aerated ponds and constructed wetlands treatment.

**Engineering Feasibility Study, Louis Martini Winery, St. Helena, California**

**Project Manager.** Ron prepared an analysis of the existing and needed aeration capacity for an aerated pond at the former Louis Martini winery. The analysis included upgrade to the rapid infiltration system and the stormwater disposal system.

**Wine Stillage Guideline Update, Wine Institute, San Francisco, California**

**Project Manager.** Ron revised guidelines for the land application of winery stillage wastewater. He documented current practices, including hydraulic and BOD loading rates, nitrogen removal through denitrification and crop uptake and pH attenuation. He summarized impacts on groundwater quality and made recommendations to reduce impacts, collect more detailed data on groundwater and soil and isolate high TDS sidestreams for treatment or reuse.

**Franzia Winery Environmental Assessment, The Wine Group, Ripon, California**

**Project Manager.** Ron prepared a report of waste discharge and an initial environmental study for winery wastewater including a network of groundwater monitoring wells.

**Land Application Evaluation, The Wine Group, Tulare, California**

**Project Manager.** Ron evaluated an existing land application system designed for stillage disposal and permitted the site for winery wastewater without stillage.

**Land Application Management Plans, Major San Joaquin Valley Winery, Fresno, California**

**Project Manager.** Ron prepared the management plans for the land application of winery and winery stillage wastewater.

**Land Application Improvements, Golden State Vintners, Cutler, California**

**Project Manager.** Ron supervised the preparation of a report on land application improvements for winery wastewater, including groundwater monitoring wells.

**Stillage Report, Southern Ethanol Corporation, Barstow, Florida**

**Project Manager.** Ron prepared a report on the proposed design and nitrogen loading rates for an ethanol stillage land application system.

**Operations Review and Monitoring Program, Bronco Winery, Ceres, California**

**Project Manager.** Ron prepared monitoring program and provided operations advice for winery wastewater treatment and disposal. He prepared reports of waste discharge for two expansions of the land application system including groundwater monitoring wells.

**Improvements Plan, Turner Winery, Lodi, California**

**Project Manager.** Ron prepared a technical plan for improvements in the winery wastewater treatment and disposal system.

**Ion Exchange Study, Wine Institute, San Francisco, California**

**Project Manager.** Ron prepared a report from a statewide study on winery ion-exchange wastewater characterization, treatment in soil-column studies and effects of land application on groundwater quality.

**Rapid Infiltration System, Napa Valley Cooperative Winery, St. Helena, California**

**Project Engineer.** Ron was responsible for study and design of rapid infiltration system for winery wastewater.

**Stillage Study, Wine Institute, San Joaquin Valley, California**

**Project Manager.** Ron prepared guidelines for land application of winery stillage. He developed a monitoring program for the San Joaquin Valley to determine effects on soils and groundwater of land application of winery stillage wastewater and prepared a state-of-the-art report on design and operation of stillage land application systems. The guidelines were adopted as part of the Basin Plan by the Fresno Regional Board.

**Pretreatment Facilities Design, The Monterey Vineyard, Gonzales, California**

**Project Manager.** Ron supervised preparation of a report and preliminary design of pretreatment facilities for a land application system using a screened winery wastewater.

**Dairies**

**Report of Waste Discharge, Hilmar Cheese Company, Hilmar, California**

**Peer Reviewer.** Ron conducted a peer review for another consultant on a beneficial use analysis of the groundwater near the effluent land application areas. The report of waste discharge was prepared for an additional 600 acres of crop land receiving treated effluent.

**Waste Minimization Study, Crystal Cream and Butter Company, Sacramento, California**

**Project Manager.** Ron prepared a waste minimization study for a milk, cottage cheese and ice cream processing plant.

**pH Control, Knudsen, Visalia, California**

**Technical Advisor.** Ron supervised preparation of feasibility report and final design of a pH control system for dairy wastewater.

**Land Application Design, Hilmar Cheese, Hilmar, California**

**Project Manager.** Ron designed three expansions and the original 20-acre land application system to treat cheese processing wastewater. The 1995 expansion of 76 acres resulting in a capacity of 0.6 mgd was permitted and designed. Groundwater monitoring wells were designed and a comprehensive groundwater quality evaluation was conducted.

**Facilities Planning, Crystal Cream and Butter Company, Sacramento, California**

**Project Manager.** Ron supervised the report preparation and environmental planning for a new processing plant site including water supply and wastewater treatment.

**Alternatives Analysis, F&A Dairy of California, Newman, California**

**Project Manager.** Ron studied alternatives for pretreatment and land application for cheese plant wastewater.

## **Livestock Runoff**

### **Runoff Evaluation, Foster Poultry Farms, Delhi, California**

**Project Manager.** Ron conducted an evaluation of the potential runoff volumes of stormwater from the poultry rearing farms in Merced and Stanislaus counties. The containment volumes for various frequencies of wet winters were calculated for the farm locations. Recent regulations on runoff containment and separation of runoff from poultry waste storage areas were cited.

### **Runoff Treatment and Disposal, Foster Poultry Farms, Ellenwood, California**

**Project Manager.** Ron prepared an analysis and preliminary design of runoff treatment and disposal for hatchery site stormwater.

## **Meat Processing**

### **Boiler Blowdown, Foster Farms, Livingston, California**

**Project Officer.** Ron evaluated options for treatment and disposal of boiler blowdown water at various Foster Farms locations.

### **Treatment Evaluation, Foster Farms, Livingston, California**

**Project Manager.** Ron managed the evaluation of BOD and ammonia removal from the three mgd of chicken processing wastewater through the

### **Treatment Evaluation, Foster Farms, Merced, California**

**Project Manager.** Ron managed the preparation of water balance, wastewater treatment concept and analysis of environmental effects of land treatment and reuse of 0.3 mgd rendering plant effluent.

### **Facilities Improvement, Victor Fine Foods, Lodi, California**

**Project Manager.** Ron supervised studies and designs of improvements to the wastewater treatment and disposal facilities for 0.1 mgd of meat processing wastewater including biological treatment, filtration and deep-well injection.

## **Chemical**

### **Land Application Review, Pfizer Corporation, Mexico**

**Technical Advisor.** Ron supervised the review and analysis of a land application system for treatment and disposal of shampoo product wastewater.

### **Environmental Assessment, Vandenberg Air Force Base, Lompoc, California**

**Project Manager.** Ron prepared an environmental assessment for industrial wastewater discharges including heavy metals and toxic compounds discharged to the Lompoc Wastewater Treatment Plant.

## **Breweries**

### **Land Application Design, Anheuser-Busch, Inc., Houston, Texas**

**Project Engineer.** Ron supervised the design of a land application system for brewery high-strength liquid nutrient material, featuring self-propelled linear irrigators and 264 acres of turf grass.

### **Pilot Studies, Anheuser-Busch, Inc., Fairfield, California and Houston, Texas**

**Project Engineer.** Ron conducted pilot studies to determine design criteria for full scale land treatment systems to manage spent grain liquor from beer brewing for two breweries.

## **Manuals of Practice**

Nutrient Control, WEF

Design of Municipal Wastewater Treatment Plants, WEF

Natural Systems for Wastewater Treatment, WEF

Land Treatment of Municipal Wastewater, EPA

Constructed Wetlands and Aquatic Plant Systems for Municipal Wastewater Treatment, EPA

## **Memberships**

American Society of Agronomy  
American Water Works Association  
California Water Environment Association  
Water Environment Federation  
WaterReuse Association  
Central Valley Clean Water Association

## **Publications/Presentations**

## Selected Publications and Presentations

1. "Land Treatment of Cannery Wastes," Journal of the Water Pollution Control Federation, April 1979.
2. "Land Application of Winery Stillage Wastes," Industrial Wastes Magazine, January/February 1981.
3. "Land Treatment and Reuse of Food Processing Waste," Water Pollution Control Federation (now Water Environment Federation) Conference, October 1982.
4. "Site Characteristics," chapter in "Irrigation with Reclaimed Municipal Wastewater - A Guidance Manual," California State Water Resources Control Board, July 1984.
5. "Wastewater Reuse by Golf Course Irrigation in California," Water Reuse Symposium III, San Diego, California, August 1984.
6. "Land Use of Wastewater and Sludge," Environmental Science and Technology, May 1984.
7. "Handbook of Land Treatment Systems for Industrial and Municipal Wastes," co-author of textbook, Noyes Data, 1984.
8. "Crop Irrigation with Strawberry Processing Washwater," presented at the Conference on Environmental and Energy Engineering in the Food Processing Industry, XV, Santa Barbara, March 1985.
9. "Technology and Costs of Wastewater Application to Forest Systems," Forest Land Applications Symposium, Seattle, Washington, June 1985.
10. "Land Application Systems for Municipal Sludge," BioCycle, May/June 1985.
11. "Nitrogen Removal in Rapid Infiltration Systems," Journal of Environmental Engineering, ASCE, December 1985.
12. "Land Application of Sludge in San Diego," Journal WPCF, August 1987.
13. "Aquatic Treatment Systems for Wastewater Management," ASCE, July 1988.
14. "Spray Irrigation of Treated Septage on Reed Canary Grass," Journal WPCF, March 1989.
15. "Natural Systems for Wastewater Treatment," WPCF Manual of Practice, 1990.
16. "The Cost of Water Reclamation in California," California Water Environment Association, April 1990.
17. "Wastewater Reuse Experience in Northern California," AWRA, September 1990.
18. "Groundwater Impacts from Land Application of Food Processing Wastewater - Case Studies," proceedings of the ASAE National Conference, Chicago, December 1990.
19. "Odor Management for Land Application of Food Processing Wastewater," proceedings of the ASAE National Conference, Chicago, December 1990.
20. "Deep Well Injection of High Salinity Food Processing Wastewater," proceedings of the 18th Annual CWPCA Industrial and Hazardous Waste Conference, Sacramento, February 1991.
21. "Constructed Wetlands at Mesquite, Nevada," ASCE, July 1991.
22. "Evolution of Tertiary Treatment Requirements in California," Water Environment and Technology, February 1992.
23. "Design Criteria and Practice for Constructed Wetlands," proceedings of the International Specialist Conference on Constructed Wetlands, Sydney, Australia, December 1992.
24. "Biosolids Utilization by Land Application in Santa Rosa, California," proceedings AWWA/WEF Conference, Phoenix, Arizona, December 1993.
25. "Wetlands Put to the Test," Water Environment and Technology, January 1994.
26. "Land Application of Pineapple Process Water for Reuse," presented at the Hawaii Water Pollution Control Association Annual Conference, February 1994.
27. "Beneficial Reuse of Biosolids on Oat Hay," BioCycle, May 1994.
28. "Natural Systems for Wastewater Treatment," U.S. EPA National Technology Transfer Workshop, June 1994.
29. "Natural Systems for Waste Management and Treatment," co-author of textbook, McGraw-Hill, 1988, 2nd Edition in 1995.
30. "Removal of Metals and Ammonia in Constructed Wetlands," presented at the Water Environment Federation 68th Annual Conference, Miami, Florida, October 1995.
31. "Wastewater Filtration Alternatives in California: Past History, Current Performance, and Future Trends," Water Reuse Conference, AWWA/WEF, San Diego, California, February 1996.
32. "Two Birds with One Wetland: Constructed Wetlands for Treatment and Habitat," presented at the Water Environment Federation Annual Conference, Dallas, Texas, October 1996.
33. "Constructed Wetlands in the United States: An Engineering Perspective Based on Experience, Observations, and Performance at the Sacramento Demonstration Wetlands," International Conference on Ecological Engineering, Beijing, China, October 1996.
34. "Reclamation and Reuse Using Constructed Wetlands," presented at the PNPCA Conference, Seattle, 1997.

35. "Small and Decentralized Wastewater Management Systems," principal author with George Tchobanoglous, co-author. McGraw-Hill, 1998.
36. "Water Reuse by Drip Irrigation of Pineapple Process Water," Hawaii Water Environment Association Conference, February 1998.
37. "Decentralized Wastewater Systems: The Future of Water Recycling," California Water Environment Association Conference, Oakland, California, April 1998.
38. "Indirect Water Reuse by Groundwater Recharge," Hawaii Reuse Conference, September 1998.
39. "Costs of Constructed Wetland Systems," WEFTEC, Orlando, Florida, October 1998.
40. "Constructed Wetlands Remove Algae," Hawaii Water Environment Association Conference, March 1999.
41. "Land Treatment Systems for Municipal and Industrial Wastes." McGraw-Hill, 2000.
42. "Converting Ponds into Constructed Wetlands," presented at the California Water Environment Association Annual Conference, Sacramento, California, April 2000.
43. "Design of Constructed Wetlands—Lessons Learned," presented at the Conference on the Role of Wetlands in Watershed Management—Lessons Learned, Humboldt State University, Arcata, California, May 18, 2000.
44. "Trace Organics Removal by Soil Aquifer Treatment," presented at the Hawaii Water Environment Association Conference, Honolulu, Hawaii, June 7, 2000.
45. "Soil Aquifer Treatment of Municipal Wastewater," WEFTEC 2000, Anaheim, California, October 2000.
46. "Impacts of Salt Content of Food Processing Wastewater Land Application," WEFTEC 2000, Anaheim, California, October 2000.
47. "Applying Treated Wastewater to the Land," BioCycle, April 2001.
48. "Rational Method for the Design of Organic Loading Rates in a Land Application System," WEFTEC 2001, Atlanta, Georgia, October 2001.
49. "BOD Loading Impact on Land Application Percolate Quality", WEFTEC 2002, Chicago, Illinois, October 2002.
50. "Performance of Constructed Wetlands at Cle Elum, Washington", WEFTEC 2002, Chicago, Illinois, October 2002.
51. "Evaluation of Percolate Quality from Recycled Water Irrigation in Central Oahu," WateReuse Symposium, San Antonio, Texas, September 2003.
52. "Assessment of Recycled Water Irrigation in Central Oahu", WEFTEC 2003, Los Angeles, California, October 2003.
53. "EPA Land Treatment Manual Update" WEFTEC 2003, Los Angeles, California, October 2003.
54. "Upcountry Effluent Reuse – Percolation versus Irrigation," WEFTEC 2003, Los Angeles, California, October 2003.
55. "Agricultural Reuse of Food Processing Rinse Water" Proceedings of AWWA/WEF Water Sources Conference, Austin, Texas, January 2004.
56. "Santa Rosa Fine Tunes Its Flexible Biosolids Program" Proceedings of the WEF Conference on Residuals and Biosolids Management, Salt Lake City, Utah, February 2004.
57. "Removal of N-Nitrosodimethylamine and Estradiol through Recycled Water Irrigation", Proceedings of the 19th WateReuse Symposium, Phoenix, Arizona, September 2004.
58. "Mosquitoes and Mercury: Constructed Wetlands Issues in California", Proceedings of the WateReuse Association Conference, San Diego, California, February 2005.
59. "Results of Assessment of Recycled Water Irrigation in Central Oahu", Presented at the 2005 Annual AWWA Conference, San Francisco, California, June 2005.
60. "Water Reuse and Groundwater Protection in Central Oahu" Proceedings of WEFTEC 2005, Washington, D.C. November 2005.
61. "Constructed Wetlands for Landfill Leachate Treatment" Southwest Hydrology. January 2006.
62. "Recycled Water Impacts on Turf and Groundwater" Presented at the Annual CWEA Conference, Sacramento, California. April 2006.
63. "Recycling in the Tropics" Water Environment & Technology, May 2006.
64. "Incidental Runoff Control and Operational Strategies for Water Recycling" WateReuse Symposium, September 2006.
65. "Integrated Planning for Wastewater Treatment and Recycling for a Small Community Development" WEFTEC 2006. October 2006.
66. "Golf Course Irrigation with Recycled Water: Challenges and Opportunities" Hawaii Reuse Conference, November 2006.
67. "Decentralized Treatment and Distributed Reuse in Rural Communities" WEFTEC 2007, October 2007.
68. "Sustainable Land Application of Food Processing Wastewater" Proceedings of the 2007 National Conference on Agriculture and the Environment, November 2007.

69. "Design and Management Practices to Minimize Algae in Recycled Water Storage Reservoirs" CWEA Conference, April 2008.
70. "Integrating Beneficial Uses" Water Environment & Technology, August 2008.
71. "Constructed Wetlands Provide Water Reuse" WaterReuse Symposium, September 2008.
72. "Water Recycling in Small Communities" WEFTEC 2008, October 2008.
73. "Good Things from Small Packages" Water Environment & Technology, March 2009.
74. "Soil as a Treatment Medium" CWEA Natural Systems Seminar. May 2009.
75. "Fate of BOD and Nitrogen in Land Application of Food Processing Wastewater" ASABE National Conference, June 2009.
76. "Soil Aquifer Treatment for Microconstituent Removal" WaterReuse Symposium, September 2009.
77. "Ponds Provide Sustainable Treatment for Honoka'a" WEFTEC 2009, October 2009.
78. "Ponds Provide Sustainable Treatment for Honoka`a" Hawaii Water Environment Association Conference, Honolulu, Hawaii, March 2010.
79. "Regulatory Drivers and Impacts on Opportunities for Water Reuse in Small Rural Areas of the Central Valley of California" Proceedings of WaterReuse Symposium, WaterReuse Association, Washington, D.C. September 2010.
80. "Vernonia Natural Wastewater Treatment and Water Reuse" Proceedings of WEFTEC, New Orleans, Louisiana, October 2010.
81. "National Regulatory Trends in Water Reuse" Hawaii Water Reuse Conference, HWWA/HWEA, Maui, Hawaii, November 2010.
82. "Microconstituent Removal through Wetlands and Soil Aquifer Treatment" Proceeding of the California WaterReuse Conference, Dana Point, California, March 2011.
83. "Constructed Wetlands for Landfill Leachate Treatment" Waste Expo 2011, Dallas, Texas, May 2011.
84. "Decentralized Technologies for Rural Areas of Hawaii" Proceedings of WEFTEC 2011, Los Angeles, California, October 18, 2011.
85. "Effects of Tomato Cannery Water Forage Irrigation on Nitrogen and Carbon in a Clay Loam Soil" Geoderma 167, p. 310-318. 2011.
86. "When Water Recycling Becomes the "New Normal" Presented at the 34<sup>th</sup> Annual conference of the Hawaii Water Environment Association, Honolulu, February 7, 2012.
87. "Decentralized Wastewater Alternatives for Oahu's North Shore. "Presented at the 34<sup>th</sup> Annual conference of the Hawaii Water Environment Association, Honolulu, February 7, 2012.
88. "Nitrogen Removal by Coupling Recirculating Gravel Filters and Constructed Wetlands" Presented at the 34<sup>th</sup> Annual conference of the Hawaii Water Environment Association, Honolulu, February 8, 2012.
89. "Groundwater Recharge and Removal of Emerging Chemicals through Soil Aquifer Treatment" Presented at the Spring Conference of the California-Nevada Section, AWWA. Santa Clara, California, April 4, 2012.
90. "Wetlands and Water Reuse." Presented at the WaterReuse California Central Valley/Sierra Foothills Chapter Meeting. Davis, California, April 26, 2012.
91. "NDMA: Toughest CEC to Remove?" Proceedings of the 2013 California WaterReuse Association Conference, Monterey, CA. March 19, 2013.