THE DAIRY PRACTICES COUNCIL®

GREENING OF THE DAIRY LAB

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Prepared by:

LABORATORY & QUALITY CONTROL PROCEDURES TASK FORCE

Patrick Healy, Director

Sharon Wilson, Lead Author

Contributors:

Ann Bauer	**Pat Boyle**	**Fritz Buss**	**Christy Dinsmoore**
Scott Franklin	**Robert Gilchrist**	**Pat Healy**	**David Herbell**
Bob Kiser	**Wendy Landry**	**George Mikolaj**	**William Northeimer**
Darryl Oliver	**John Pcsolar**	**Heather Primeau**	

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M Jeffrey Bloom, Executive Vice

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https://www.dairypc.org/catalog/guidelines

Greening of the Dairy Lab

ABSTRACT

This guideline offers concepts and ideas to consider for 'greening' your dairy lab. Greening laboratories will help to reduce the carbon footprint of your lab by utilizing recycling and other energy conservation techniques.

PREFACE

The first printing of this guideline was prepared under the leadership of Sharon Wilson, Weber Scientific. The inception of this idea originated at the 2009 DPC conference. The first draft was prepared by Scott Franklin, FMMA Dallas, David Herbell, FMMA Cleveland, Heather Primeau, Cappiello, John Pcsolar, QC Labs, Christy Dimsmoore, Michigan Milk, and Robert Gilchrist, Agrimark. With later input from Bob Kiser, UKY, Fritz Buss, Nelson Jameson, Pat Healy, FMMA Central, George Mikolaj, FMMA Cleveland, Darryl Oliver, FMMA Atlanta and Ann Bauer, FMMA Dallas. Final input from Wendy Landry, HP Hood, Patrick Boyle, Readington Farms, William Northeimer, US FDA.

GUIDELINE PREPARATION AND REVIEW PROCESS

The Dairy Practices Council (DPC) Guideline development and update process is unique and requires several levels of peer review. The first step starts with a *Task Force* subcommittee made up of individuals from industry, regulatory and educational institutions interested in and knowledgeable about the subject to be addressed. Drafts, called "*white copies*," are circulated until all members of the subcommittee are satisfied with the content. The final "*white copy*" may be further distributed to the entire Task Force; DPC Executive Board; state and federal regulators; educational and industry members; and anyone else the Task Force Director and/or the DPC Executive Vice President feel would add strength to the review. Following final "*white copy*" review and corrections, the next step requires a "*yellow cover*" draft to be circulated to representatives of participating Regulatory Agencies referred to as "*Key Sanitarians*." Key Sanitarians may suggest changes and insert footnotes if their state standards and regulations differ from the text. After final review and editing, the Guideline is distributed in the distinctive DPC "*green cover*" to DPC members and made available for purchase to others. These guidelines represent our state of the knowledge at the time they are written. Currently, DPC Guidelines are primarily distributed electronically in pdf format without colored covers, but the process and designation of the steps remains the same. Contributors listed affiliations are at the time of their contribution.

DISCLAIMER

The DPC is not responsible for the use or application of the information provided in this Guideline. It is the responsibility of the user to ensure that the information addresses their needs and that any action taken complies with appropriate regulations and standards.

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Introduction

"Laboratories Going Green"

Environmental sustainability, reduced carbon footprint, and greening are all catchy terms, but what do they mean as they relate to dairy laboratories? Dairy laboratories are full of opportunities for "greening." We test a variety of products that can easily be collected and reused as different products, from a food source for livestock to a nutrient source for compost piles. Regardless of its use, milk and milk byproducts provide multiple opportunities for reuse. We have an opportunity to encourage our employees to reuse, recycle, reduce and review their impact on our planet. We must start the process by leading by example in our laboratories. Allow technicians to spend time reviewing current policy and develop methods to minimize unneeded chemical and material use. Create committees to assist in making sound decisions on reducing waste and excess.

Cost of recycling may be higher on the front end but material savings over time will more than make-up for the initial cost. Regardless of cost, our need to create a sustainable planet is simply a responsibility shared by each of us. Finding cost savings may require some out front thinking and anywhere new ideas exist we will certainly find skeptics along the way. Skeptics will paint an image of a time consuming, endless money pit of implementation that will make no difference in the sustainability of our World. We must keep a positive message and not step down to our dissenters.

Recycling or reusing containers is a good place to begin. When possible, reuse vials and shipping containers. This is a policy that herd improvement testing programs have used for many years. Vials are washed, sanitized and allowed to dry in a clean environment. Vials can be reused several times for component analysis, thus reducing the total vials and plastic needed for testing. Reusing vials for bacterial testing is not feasible because the vials are no longer sterile, and to sterilize them would be costly and use additional resources.

If reusing vials is not an option, recycling is another alternative. A laboratory running 4000 two ounce vial samples per day, which is on the low side for a DHIA type laboratory but consistent with larger payment type laboratories, could rid landfills of approximately 160 metric tons of vial waste per year.

Shipping containers or coolers can be sanitized and returned for additional shipments. Shipping containers can be placed in a corrugated plastic box which is also reusable and extend the usability of the container indefinitely. Extending the usefulness of coolers reduces landfill waste and requires less raw materials for the manufacturing of new coolers

Recycle your milk or dairy product samples, by pouring them into a bucket or container throughout the day and keeping the product refrigerated. Non-preserved milk can be fed to livestock of many classifications. Chemically preserved milk can be used for fertilization of compost or we may want to look to see if there is actually a need to chemically preserve our refrigerated samples.

Limit the amount of printing. Not all results need to be printed and in most cases electronic documentation of results is preferred. Each lab should carefully examine the data printed and determine if the data could be electronically stored and/or published to save paper.

Reduce instrument energy use when possible. Try combining small sample batches into larger complete batches. A Kjeldahl block digester with 3 samples uses the same amount of energy that is required to digest a full 20 sample batch. Granted this is not always possible due to deadlines but being aware of this fact will help technicians make good decisions when planning run schedules.

Saving even a small amount of resources at a single laboratory may seem insignificant but when multiplied with other dairy laboratories, we make large savings across our entire industry. We as dairy laboratories owe it to our industry and our next generation to become as environmentally friendly as is possible. We cannot continue to ignore the cyclical waste of chemicals and materials in our laboratories or our employees' homes.

Throughout this directive you will find more detailed ideas to make "greening" of our dairy laboratories a much more tolerable endeavor. Environmental sustainability, reduced carbon footprint, and greening all are important catch words for the environmental debate. These terms do not mean nor do anything for the planet by simply saying them. When they become part of a sound and well thought out environmental action plan, they begin to give reason to our actions. Together, we can make a difference but we cannot wait for that difference to find us. We must search for and embrace environmental sustainability. Our future generations are depending on our actions today for their well-being tomorrow. I would encourage each laboratory staff member, whether management or technician, to step outside their comfort zone and help make our dairy laboratories the beacon by which other laboratories are judged.

Green Ideas

General

- Glass and plastic are easily recyclable
- Obtain reagents in amber glass which reduces the effect of photo-oxidation (light damage)s.
- Provide clearly marked receptacles for recycling
- Paperless – reporting/billing/etc.
- What options does your community offer for recycling; cardboard, paper
    - Some recycling companies pay to have your cardboard.
- Limit running water (connected to pieces of equipment)
- Survey your suppliers and compile a list of those that incorporate 'green' initiatives and encourage other suppliers to consider incorporating 'green' initiatives
- Consider green initiatives when creating layout & design of new or refurbished labs
- Request less and green packaging from suppliers
- When cleaning procedures for glassware allow, use filled sinks of water rather than continually running water. Review Standard Methods for Good Laboratory Practices (GLP) to ensure not contradicting another reference.
- Purchase recycled paper products
- Reusable shipping containers can be utilized for sample shipments; carboys, boxes, coolers
- Consider the use of 'green' cleaners that don't leave residuals on glassware
- Use online trade publications and catalogs in place of paper copies
- Utilize online ordering
- Buy locally whenever possible

Specific Product ideas

- Pipet tips – reuse racks, use lids for other applications or recycle
- Change from disposable pipets to the use of pipettors – tips are less waste
- Vials – reuse, recycle

- Many plastic consumables have less or thinner plastic options example: 100x10mm petri dishes
- Use mercury free thermometers
- Temperature monitoring systems (wireless) electronic records
- Replace KCL/AgCl electrodes with green conforming electrodes example: Thermo Scientific Orion brand free of mercury or lead.
- Reconsider calibration frequency and ways to stretch consumables
- Reduce sample sizes when possible
- Explore methods that have less environmental impact
- Utilize covers to minimize evaporation of chemicals
- Use insulation balls or other method to reduce evaporation and energy waste in water baths
- Use methodology that reduces chemical usage to minimal levels (DMSCC slide staining – flood)
- Send salvageable milk to farm(s)

Energy use

- When possible turn equipment off – hoods, elements, stirrers, hot plates, scales – anything that doesn't get used all day, every day and doesn't have to be reset
- Shut down computers and/or monitors nightly and on weekends
- Work with your finance department to monitor utility bill for unusual fluctuations
- Change to auto faucets, auto flush/low flush toilets
- Install programmable thermostats that includes lock out or only allows for one degree changes
- Standardize temperature of equipment such as Infra-Red and Cryoscopes to limit drift
- Utilize standing orders and bulk shipments to maximize energy efficiency.
- Purchase the highest energy star rating equipment available
- Consider changing laboratory lighting to light emitting diode (LED) and compact fluorescent light bulbs (CFB). Dispose of bulbs in an environmentally responsible and safe way
- Make sure cooler, refrigerator, incubator, and freezer doors are kept shut
- Check refrigerator and freezer door seals. If you can pull a piece of paper from the seal, the seal needs to be replaced or the door adjusted.
- Perform regular preventive maintenance on equipment examples: vacuum refrigerator coils, drain condensate, defrost freezer

- Use solar power whenever possible (calculators, etc)
- Motion detector lights that automatically shut off and turn on when needed
- Prepare in lab purified water, reagents, and media when possible in batches appropriate for shelf life.
- Attend Online training and webinars when offered
- Consider providing incentives for carpooling and the use of public transportation
- For energy efficiency install door sweeps, insulation and check gaskets, seals, and windows for leaks

Links

- 'Going Clean, Lean, and Green in the Lab', Dairy Foods Magazine, April 2011
- http://www.fishersci.com/thinkgreen
- USDA: http://greening.usda.gov/housekeeping.htm
- http://www.greening.usda.gov/purchasing.htm

Training/Education

Offered at most community and technical colleges.

- Building Operator Certification Training – Level I & II
  - To improve energy efficiency in buildings
- Green/Sustainable Training
- Trade journals & publications
- Continuing education opportunities