

## **National Jewish Medical Center Minimizes Vivarium Resource Consumption Through Strategic Management**

*Equipment and Personnel Changes Improve Vivaria Operating Efficiency*

Recent initiatives at the National Jewish Medical and Research Center (NJC) in Denver, Colo., are generating significant improvements in operating efficiency, especially in relation to water, energy, and labor—three major issues for vivaria operations. In the past year, the organization has been able to reduce water consumption by more than five million gallons per year, which will result in an estimated savings of more than \$60,000 in 2007 due to incentives from the Denver Water Department. The savings will average \$21,000 per year in the years following. Likewise, improved personnel management and scheduling initiatives have resulted in a 20 percent reduction in staff turnover in the past year.

NJC's research center specializes in respiratory, immunology, and allergenic research and treatment. The facility's vivarium houses approximately 7,000 mice cages, 90 percent of which are transgenic. In 2006, the Center was paying between \$1,000 to \$20,000 a month in water bill penalties levied by the Denver Water Department for excessive usage. The NJC also had a staff turnover rate of more than 50 percent, which increased the frustration and overtime costs of remaining employees. Consequently, the organization launched a series of initiatives to aggressively reduce water consumption and improve personnel management.

“One of the first things we did was look at some of the rebates that the Denver Water Department was giving. There was a program where you could get \$4,500 back as an incentive, for every acre foot of water that you saved over a one-year time period,” says Jori Leszczynski, director of the Biological Resource Center (BRC) at the National Jewish Medical and Research Center.

NJC management set out to replace the facility's aging, inefficient autoclave and cagewashing equipment in order to decrease water consumption and increase performance. To take advantage of the incentives the organization installed water meters on the equipment they were planning to replace in order to track usage for several months so they could report efficiency gains to the Denver Water Department.

“We considered five different autoclave companies, and part of the criteria was actually getting the autoclaves into the building because we didn't want to rip off the roof or come in through the side of the building, as this would have been costly,” says Leszczynski.

Ultimately the Center decided on placing two smaller sterilizers made by the Swiss company Belimed, which came with advanced water-saving features including an added heat exchanger and chilled water loop that allow it to operate without using domestic cold water to cool the chamber. Using two of the smaller machines instead of the one, older style large machine reduced consumption from 600 gallons per hour to an average of six gallons per hour.

“A typical sterilizing machine of the size we purchased currently on the market runs at about 125 gallons per hour, so we are seeing significant gain over a regular machine. Our water savings is going to be around five million gallons per year just by replacing that one piece of equipment with two smaller pieces of equipment. We also gain redundancy because now we have two autoclaves running and if one goes down, we can still keep our operation going,” says Leszczynski.

NJC estimates the new autoclave system will generate \$19,000 a year in water savings and the first year Denver Water Department rebate will max out at \$40,000.

“We’re going to pay back one of those two machines within six years just on the water savings alone,” says Leszczynski.

NJC replaced the previous rack washer, a large 20-year-old Girten that had been experiencing increasing mechanical issues, with a state-of-the-art water conserving model made by Schyler Machine Corporation (SMC).

“When we started looking for a rack washer solution, we focused on water saving technology and ultimately went with SMC because it was the only one that had a ‘quick wash’ option that was also a double-long model. It has a 25 gallon-per-load cycle, which is perfect for us because we run mostly carts and rodent caging through it,” says Leszczynski.

After surveying all of the other existing offerings, NJC managers determined the industry average was approximately 100 gallons per load, which translates to a savings of 300,000 gallons per year, and an estimated \$1,200 per year in water savings.

Another critical equipment upgrade was replacing the facility’s single bottle animal water delivery system with the Hydropac water pouch system by Lab Products. The Hydropac system—an automatic packaging machine capable of producing up to 600 water-filled Hydropac pouches an hour—significantly decreased labor costs and reduced water consumption from 5,000 gallons per month to 2,500 gallons per month. Another advantage of the Hydropac system is that water can be stored for up to a year and still be usable. This enables NJC to store at least two weeks worth of water for emergency at any time.

“If there’s a water crisis all of a sudden, we aren’t going to be in a situation where we don’t have water for the animals,” says Leszczynski.

### **Personnel Changes**

Two years ago, the vivarium department had a more than 50 percent turnover rate of technicians, and there was an average of 34 hours per week of overtime being worked.

“We discovered that part of the turnover and high overtime was due to decreased employee satisfaction and decreased equipment flow. Also, a lot of employees were new, so they weren’t working as efficiently because they weren’t trained,” says Leszczynski.

Investigators were demanding certain technical skills from the BRC employees. Researchers wanted technical staff to take over certain aspects of the breeding operation and conduct procedures like tail-vein injections.

“We had a few technicians who were skilled enough to do those things and the rest of them were just relegated to changing cages. We also had a few veterinary technicians on board who were frustrated because they saw those other technicians getting all of the interesting jobs while they were stuck cleaning cages. So, we decided to change how we were doing things,” says Leszczynski.

One of the first steps the department took to mitigate this problem was to begin hiring only people with previous animal experience into animal husbandry technician jobs.

“We felt those individuals came in not only with the animal experience, but also with the technical skills to do the type of work that we were going to expect,” says Leszczynski.

The department also initiated an intensive new-hire training program where senior technicians spend at least the first two weeks working with them exclusively. There is a three page individual task list that must be satisfied before the trainee is allowed to work on her own. Ongoing training also includes evaluations, written tests, and monthly audits. Technicians now handle all operational aspects of each room—from cleaning to cage changing to any technical procedure.

“We completely changed our training from a ‘sink or swim’ modality to having senior technicians work with the new hires until they are completely trained,” says Leszczynski.

### **Flexible Work Week**

Managers modified the work week options for lab technicians to increase responsibility and schedule flexibility. In addition to the standard 9-to-5, five-day work schedule, technicians can take advantage of a flexible daily schedule or a four-day schedule.

As part of the new personnel initiatives, technicians are now responsible for their entire room. Under the flexible work-week guidelines, they must arrive between 6:00 a.m. and 9:00 a.m. in the morning and leave by 6:00 p.m. at night. They must also work at least four hours per day and 40 hours per week. Another option is for employees to work 10-hour days, four days a week but with less flexibility.

“With the flexible schedule, if somebody’s child has a soccer game, they can leave two hours early one day and just make up the time in the rest of the week without needing to arrange it with management. It also means if they’re in a groove and just want to finish

something rather than having to stop, they can actually work an hour longer, finish what they're doing, and then leave an hour early later in the week," says Leszczynski.

The department decreased employee turnover to less than 20 percent and decreased overtime to an average of 9.5 hours per week with the change in scheduling. Technicians now handle all of the research requests. Equipment upgrades also accounted for a gain of 45 minutes per tech per week.

"If you're going to purchase new equipment, it's worth doing the homework to determine overall costs because you may find that a more expensive piece of equipment will cost less in the long run after you factor in the lifecycle water, energy, and labor savings," says Leszczynski.

**Biography:** **Jori Leszczynski**, DVM, DACLAM, is director of the Biological Resource Center at the National Jewish Medical and Research Center in Denver, Colorado. Leszczynski, who has been a Diplomate for the American College of Lab Animal Medicine since 2004, received her undergraduate degree in food science and technology and her doctorate in veterinary medicine from Ohio State University. Prior to taking on her present post in 2006, she spent four years as the associate director at the Cleveland Clinic.

This report is based on a presentation Leszczynski gave at the *Tradeline Animal Research Facilities 2007* conference held in November.

**For more information:**

Jori Leszczynski  
Director, Biological Resource Center  
National Jewish Medical & Research Center  
1400 Jackson St Room D011a  
Denver, CO 80206-2761  
(303) 398-1432  
leszczynskij@njc.org



National Jewish Medical and Research Center in Denver, Colo., is a research institute founded in 1899 that specializes respiratory, immunology, and allergenic research and treatment. The Center's vivarium facility houses approximately 7,000 mice cages, 90 percent of which are transgenic. (Image courtesy of National Jewish Research Center).

**RESOURCES****Belimed Autoclaves:**

Belimed Sauter AG  
 Zelgstrasse 8  
 CH-8583 Sulgen, Switzerland  
 41 71 644 85 00  
 info@belimed-sauter.ch  
 www.sauterag.com

**Hydropac Systems:**

Lab Products Inc.  
 742 Sussex Avenue  
 Seaford, DE 19973  
 (302) 628.4300  
 (800) 526.0469  
 info@labproductsinc.com  
 www.labproductsinc.com

**SMC Cage Washers:**

Schlyer Machine  
 814 Wurlitzer Drive  
 North Tonawanda, NY 14120  
 (716) 696-3171  
 (866) 867-7660  
 info@schlyermachine.com  
 www.schlyermachine.com



The NJC realized significant water savings by replacing its 20-year-old autoclave with two state-of-the-art units made by Belimed, of Sulgen, Switzerland, which offer advanced water conservation technology including an added heat exchanger and chilled water loop that allow it to operate without using domestic cold water to cool the chamber. *(Photo courtesy of National Jewish Research Center.)*



The Hydropac Water Pouch Machine, made by Lab Products Inc., is an automatic water packaging machine capable of producing up to 600 water filled Hydropac pouches an hour (10 per minute), using FDA grade pouch film and facility supplied drinking water. By replacing the Center's previous single bottle machine, NJC reduced water consumption from 5,000 gallons per month to 2,500 gallons per month. *(Image courtesy of Lab Products Inc.)*

Reprinted with Permission © April 2008 from **TradelineInc.com**, a registered product of Tradeline Inc., a provider of leading-edge resources to facilities planning and management through conferences, publications, and the Internet community. Visit [www.TradelineInc.com](http://www.TradelineInc.com) for more information.