Biscuits *en* America

Boldly acquiring an existing US production facility, Canadian-based Biscuits Leclerc invests in new equipment and product lines with abounding confidence.

BY STEVE BERNE

Since its beginnings in 1905, producing dry biscuits for ocean-going freighters calling at the Canadian seaport of Quebec City, Biscuits Leclerc has been all about entrepreneurship. "We are not afraid of taking chances, and we are survivors," said Denis Leclerc, great-grandson of founder Francois Leclerc and president and c.e.o. of Leclerc Foods USA. Launched in his home kitchen and a $300 loan to buy a horse and buggy for distribution, Francois Leclerc's family business persevered through two world wars, economic strife, plant fires and even earthquakes. It has also taken advantage of a century of innovation to arrive at its 100th anniversary with five production facilities and annual revenue of more than $245 million (US$198 million).

"We have three production plants in Quebec, Canada, producing hundreds of varieties of granola bars, cereals and cookies, as well as most of the components for the bars including crisped rice and granola." said Mr. Leclerc. "Our fourth Canadian facility, in Ontario, produces cereal bars, crunchy bars and chocolate chip cookies."

In Canada, the Leclerc brand is very strong, although most of its cereal production is private label. For the past 30 years, the company also exported products into the United States, selling nearly nationwide. Nearly 90 years after the company established itself, it faced a dilemma. It had reached capacity at its Canadian facilities for export production, and it was time to decide future strategy.

As with most successful family-run companies, a strong visionary outlook is one of the key reasons for the company's success. Jean-Robert Leclerc, the 67-year-old

▲ Key managers and long-time plant employees George Ottenmiller (center), production manager, and Jim Haag (right), plant manager, assist Denis Leclerc in maintaining quality and efficiency in all plant operations.

c.e.o., father to Denis and his four siblings, and "the boss," exploited his visionary outlook when he tasked Denis to expand the company's horizons. "At the time, I was responsible for company expansion — moving the company to the next level," Denis Leclerc said. "We looked at our export situation in Canada and determined we had capacity issues as well as escalating fuel and transport costs. It was time we expanded production operations into the US — a rapidly growing private label market for us."

Pennsylvania offered good proximity to its Canadian operations and could easily cover East Coast demand, according to Mr. Leclerc. "While we initially looked for a suitable cookie facility to acquire in the US, we again decided to expand our vision and started looking at other opportunities. What we learned in 2001 was that while most cookies were trending down, bite-size, convenience and good-for-you were on major upswings."

READY, SET, LEAP. Opportunity knocked at Biscuit Leclerc's door in 2002 when it discovered and purchased Buckeye Pretzel, which at the time was struggling to make a success of its 75,000-sq-ft facility in Montgomery, PA, built in 1997. "The plant had one fully automated organic pretzel line and was designed with room for two more," Mr. Leclerc noted. "Unfortunately, pretzels — and organic even more so — are a tough business to rely upon solely, with very narrow margins and many industrial players. This left Buckeye in a very tough situation."

Pretzels were not the reason for the acquisition, according to Mr. Leclerc, but they fit with the current trends of bite-size and convenience. "The plant is situated on 18 acres, and we have major capital plans in the works based on a multiyear vision of our US expansion." That vision includes warehouse, distribution and capacity expansion over and above the 45,000-sq-ft packaging room addition constructed in 2002, not only at the Montgomery location but west of the Rockies as well, according to Mr. Leclerc.

The company is well suited for its US growth and for the next generation of management. While Denis is responsible for the Montgomery facility and all US sales and marketing, his two sisters each manage the company's Hawksbury, ON, and Quebec City, QB, biscuit and cracker facilities, while a brother operates the St. Augustine, QB, operations. St. Augustine not only produces cereal but also granola, crisped rice, jams and caramel items used in finished products at each of the company's other plants. Mr. Leclerc's other brother oversees sales and marketing for all Canadian-sold products.

As the plant readied itself for its new owners, Mr. Leclerc spent weeks at a time in Montgomery and finally moved his family, including his 15- and 17-year-old sons, to the US. "I understood that this was the only way to get true ownership of operations and the US expansion," he noted.

He retained two key managers from Buckeye Pretzel — Jim Haag, plant manager and an employee of Buckeye since 1971, and George Ottenmiller, a production manager with Buckeye since 1985. Currently, the plant operates with only 35 employees to run the 3-line facility for two 10-hour production shifts and one 4-hour sanitation shift four days per week. Friday is designated for major cleaning.

"We saw huge potential in Montgomery," Mr. Leclerc said. "Employees in this area have a strong work ethic and are very dedicated. In addition, the design and ready capacity of the plant were very enticing."

Granola and cereal bars have been major product lines for Leclerc, and the company quickly installed a Sollich bar line after purchasing the plant in 2002. The line mimics its

▲ Automated ingredient handling systems feed the 1,000-lb capacity mixer on the granola bar line.

▶ Protruding plastic fingers gently incorporate mix-ins such as chips and marshmallows before final pressing of the granola mass.

Canadian operations with the potential to produce filled and enrobed items. This is the company's fifth bar line and is fully automated with feedback control from packaging to depositing. "We strongly believe in automation, whenever it makes sense and there is a clear return on labor, consistency and flexibility," Mr. Leclerc noted.

When the company sought to fill the third production bay at Montgomery, it again opened its vision to other items — this time to crackers and mini-sandwich varieties. "We found a high interest level from private label and contract manufacturing customers such as Wal-Mart Canada, Aldi and Target," Mr. Leclerc added. "We installed the line last April. This was completely new territory for us; however, with the expert help of the equipment supplier Spooner-Vicars and the support of our customers, we see great potential and growth opportunity here in the US as well as to export products back into Canada."

RISE AND SHINE. Through the years, Leclerc inherited business philosophies from previous generations, and it continues to stand behind them. First, quality in equals quality out. There is no skimping on ingredients, equipment, people or packaging, according to Mr. Leclerc. Second, control is critical to success. Thousands of little things go into the quality equation. Only automation makes this goal possible. Third, do not to be afraid of capital expenditures as long as the end justifies the means. Other than safety or regulatory issues, the current company goal is that with every expansion or purchase, it maintains a $350,000 book value per employee.

As a family company that does not shy away from capital projects, Leclerc USA currently is looking into building a high-rise, fully automated raw material and finished goods warehouse adjacent to the Montgomery plant. "Like our warehouses in Canada, it will function with two cranes, using bar code technology," Mr. Leclerc said. "Not only will it assure efficiency of operations, it will also help maintain separation of potential allergen sources from nonpotential ones, retain a perpetual inventory, automate the reordering process for certain raw materials and maintain a first-in, first-out rotation system."

The company has two such warehouses in Canada. One has capacity for 28,000 pallets, while the second holds 12,000 skids with rack support. "We expect to complete the Montgomery warehouse by mid to late 2005," Mr. Leclerc said. The warehouse, with automated cranes, is expected to have a capacity of 12,000 pallets with the ability to move 100 skids per hour. The system will include two cranes, several automatic guided vehicles and full computer control. "We're obtaining permits now," Mr. Leclerc noted. "Currently, we use public warehouses for finished products and plant space for raw materials. Our plans for the space freed up in the plant? Bars!"

Wrapping capacity on the granola bar line is 800 per minute, according to Mr. Leclerc. "Our SIG Packaging system was designed to have three wrappers feeding off the cooling conveyor. Initially, we had room for only two of the three possible packing lines. Now with the expansion of the packaging area, we will install the third packaging line and increase our throughput to 1,000 bars per minute."

Leclerc USA also plans to construct a rice processing plant on its 18-acre site to produce and pneumatically transfer crisped rice to the bar line on an as-needed basis. "It will not only reduce ingredient costs but also will help satisfy ingredient consumption needs as new co-packing contracts begin," Mr. Leclerc noted. "We should have it in

◀▲ Seven-layer lamination for whole-wheat cracker dough begins the sandwich cracker process, while Paula Cantin and Denis Leclerc monitor downstream oven settings.

place by mid-2005 as well."

Annual production volume at the plant is expected to exceed 1.5 million lb of product this year with anticipated annual growth of 8% for the next few years. The current 120,000-sq-ft plant includes 60,000 sq ft for processing, 35,000 sq ft for packaging and 20,000 sq ft of warehouse space. The three production and five packaging lines output 50 different SKUs, and the company's branded and private label products are distributed mainly to retail outlets, although approximately 10% of its output goes to club stores and 5% to food service customers.

STICKS AND KNOTS. At the time of the acquisition, only the pretzel line was installed, including a 10,000-sq-ft mixing area that now shares space with bar and cracker makeup. The pretzel line employs a combination of KB Systems indoor and outdoor silos, and an Exact Mixing automated minor ingredient supply and continuous mixing system. Dry and liquid ingredients are fully incorporated within the continuous mixer, and the dough is kneaded to proper development as it travels along the auger-like system. At the end of the mixer, the system extrudes the finished dough and "chunks" it onto a conveyor leading to the Reading Bakery Systems DoughBot depositing system that feeds the dough pieces into a 5-compartment pretzel extruder. A pneumatically actuated dump gate eliminates dough hang-ups, and a "smart screen" computer terminal next to mixing and forming operations allows full access and control over the system. The Reading line consists of an inclined dough feeding conveyor, dough distribution system, 5-hopper extrusion system, proofing conveyor, pretzel cooker and a combination oven and kiln.

"It is a very versatile system that can produce short and long sticks of various dimensions, knots or other extruded shapes," Mr. Leclerc said. "The line is running exclusively organic products and is fully automated and integrated up and down the production line." The 2-tiered direct gas-fired oven bakes pretzels on the top tier after which the products slide down to the lower half where they travel in the opposite direction through a kiln-type chamber and dry to approximately 2% moisture. They are then discharged to cool on ambient belt conveyors before being transported to two Hayssen Ultima vertical form/fill/seal baggers.

For stick products, continuous dough ropes are extruded, proofed for a short time before traveling through a caustic bath, as do all pretzel products, to give the crust its characteristic dark brown color, then baked on the upper tier of the oven.

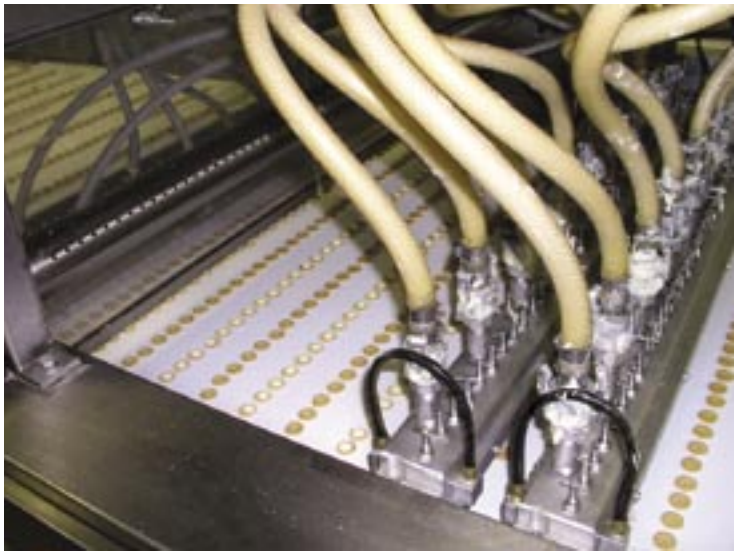
PRESSED AND FORMED. The granola line uses a Peerless Group 1,000-lb mixer fed by an in-house-designed ingredient handling system that pneumatically adds all major and minor ingredients, including the granola, crisped rice and syrups received in totes from the plant's sister facilities in Canada. Once its rice operation is complete, the Montgomery plant will pneumatically transport its own crisped rice into the mixer directly from the adjacent operation.

After mixing, the mass of granola is dumped and conveyed up a flighted conveyor to a hopper that feeds a Sollich depositing system consisting of twin rollers that put down a relatively flat layer of product across the belt. These wheels define the density of the final granola layer and incorporate feedback control from the packaging area. Online weighing systems and sensors at the end of the line integrate back to the depositing wheels adjusting the density of the layer to maintain proper bar weights.

A pressure wheel compresses the granola mass,

▲ Smart conveyor technology used on the two bar packaging lines precisely spaces granola bars prior to overwrapping.

◀ Moving faster than the camera shutter speed, delta robot arms pick and place six wrapped bars into the infeed of the cartoning machine.



▲ Traveling depositor heads portion filling on every other row of baked crackers before a set of vacuum cups (left) picks and places the corresponding top cracker to complete the sandwich.

defining the dimensions. After the bars set in a controlled-atmosphere tempering tunnel, circular roller knives cut the mass into individual ribbons and an ultrasonic blade divides the ribbons into individual bars.

Additional plans for the bar line include an enrobing system that will be installed on a sliding track that currently holds a stand-alone transfer conveyor. The chocolate melter and enrober, already in-house, were scheduled to be installed by the middle of November. "When we produce enrobed products — bottom only or fully enrobed — we will simply slide the existing conveyor out of the way and move the enrober into place." Additionally, the company is investigating equipment to horizontally slice the bars into an upper and lower half. Fillings such as creme, jam or caramel would be placed on the lower half and capped by the upper half, forming a 3-layer product.

The granola line was added earlier this year, and production fit snugly into the existing structure, with some modification to walls that isolate the pretzel and cracker ovens from the center bar line's refrigerated tempering system. The company's 45,000-sq-ft packaging and material storage area houses an ultra-modern, fully automated SIG Packaging setup.

The packaging system incorporates several SIG components including a Sapal product accumulating conveying system, two Systegra wrappers with smart conveyors and dual Demaurex delta robotic pick-and-place systems. The robots, each running 400 bars per minute, take two sets of three bars and place them into pre-opened top-loaded cartons off a Bradman Lake former and closer system. The cartons are then sealed and packed 12 per case. An ABF carton erector forms the shippers and twin Fanuc Robotic systems load the cases, mimicking the human motion of bending back the shippers' four flaps before loading the boxes.

The packaging system currently has two wrapping lines feeding off the cooling conveyor following the online Safeline checkweigher/metal detector. A third wrapping line, scheduled for installation early next summer, will act as backup to the other two and will take up any slack during peak production, according to Mr. Leclerc. "It also will give us more flexibility during scheduled changeover or unscheduled maintenance on another wrapping line."

To help speed start-up of both the cracker and bar lines, Mr. Leclerc temporarily transferred two key people from the company's Canadian operations. "My goal ultimately is to focus exclusively on US sales and marketing and turn over operational control to Jim and George and their staffs. Lemoine Lemoena and Paula Cantin will help speed this transfer."

Mr. Lemoena, senior vice-president of Canadian operations at Leclerc, came back with the packaging employees and is stationed in Montgomery as a specialist to assist in the continuing ramp-up and new product introductions. He has been with Biscuits Leclerc for more than 25 years. Ms. Cantin is with the company's R&D group. She is in charge of R&D and product implementation at Montgomery.

CRANKIN' OUT CRACKERS. The cracker line was added in 2003 within the existing plant space. The line is a complete Spooner-Vicars fully automated, fully integrated production system. Leclerc USA uses the 48-in.-wide line to produce bite-size sandwich crackers, although the system has the capability to produce non-sandwich mini or larger-sized crackers as well.

"This was a totally new venture for the company," Mr. Leclerc said. "With completely different dough characteristics, we sought a system with a high degree of automation. This line is fully automated from mixing to cooling. It requires only one person to watch the line."

To expedite ramp-up once installed, the bakery sent its operations team to Spooner-Vicars' test center in Manchester, England, for pre-installation testing, and the supplier helped tweak final formulations. In addition, four times per year, the equipment supplier sends a technician to Montgomery for additional employee training and machine maintenance.

Cracker doughs are mixed on a mezzanine above the laminating and sizing rollers. The mixer is a unique design that includes a static sprag, or spike, in the bowl that acts to significantly reduce mixing times — by as much as 40%, according to the supplier. Incorporated into the spike is a temperature probe that allows the operator to monitor dough temperature in the center of the mixing dough vs. the edge of the mixing bowl,

for more accurate readings. The sprag also allows the company to use a smaller mixer, in this case a 550-kg (1,200-lb) capacity unit, taking up less floor space but producing the same throughput per hour.

Batches are dumped onto a feed conveyor that allows tempering time for doughs containing enzymes. For products such as whole-wheat crackers that are not made with enzymes and require no tempering time, the conveyor is sped up and used only as a feed belt. The end of the conveyor holds a guillotine that chunks the dough into the vertical laminator.

The Spooner-Vicars SF (small footprint) lamination system is extremely flexible and enables Leclerc USA to produce crackers ranging from standard saltine-type crackers and sandwich crackers to European-type biscuits with a very light airy texture. The laminator has the capability of producing between seven and 20 laminations depending on formulation and is servo-controlled for precise lamination placement.

The laminator has the smallest footprint in the industry, according to the supplier, using vertical space to incorporate three gauge rollers, two reduction rollers and the sheet-type lamination mechanism. The final gauge roller diameter is 16 in. Position, speed, knife and all other settings are PLC-controlled. Process parameters for all formulas are preprogrammed into the control software, and an operator simply presses one button to change all settings.

Laminated dough is reduced to the proper thickness and die-cut into any number of different shapes depending on the die used, from short sticks to animal shapes and traditional rounds. Crackers are baked in a Spooner-Vicars 180-ft hybrid oven — two-thirds direct gas-fired and one-third indirect-fired.

"The hybrid oven gives us greater flexibility and control over product baking parameters," Mr. Leclerc noted. "Not only is it fully automated, but a unique feature of the oven is its sensor that recognizes large gaps between products caused by product changeover or mechanical downtime. The oven automatically reduces power to the burners and convection fans to maintain proper temperature and prevent flash burning once production resumes."

Products exit the oven and receive a light oil spray before cooling on an inclined conveyor that moves the crackers to a second mezzanine. Here, filling and capping steps use a Machine Builders & Design system. Infeed rates are up to 330 rows per minute. At two rows per sandwich and 20 lanes of crackers, capacity is 3,300 sandwiches per minute.

Base product is transferred from the oven through ambient cooling and directly into the capper without stacking or vibratory feeders. The layout is simplified due to it's in-line design, and the capper can handle a wide variety of shapes and sizes — round, square or rectangular shapes, from 25 mm to 100 mm (1 in. to 4 in.) in diameter. The traveling depositing heads allow accurate filling positioning for cheese, peanut butter, creme, jam, marshmallow, chocolate, caramel, etc.

Crackers feed into a lane system that flips every other row via a reciprocating arm that drops the row of crackers off a ledge, leaving them bottom-side up. This row and the subsequent right-side-up row are aligned horizontally. The upside-down row gets a deposit of filling and the preceding row is lifted by suction and placed on top of the filled cracker half and cooled again.

Packaging for crackers is currently done with a horizontal-motion bag filling system followed by a side-load bag-in-box cartoning system that is manually intensive. "We will soon switch over to a top-loading system similar to the bar line that should eliminate many if not all the packaging issues," he added. "We are just waiting on equipment delivery."

Leclerc USA's motivation to install the best equipment available to minimize human intervention lets its employees become functional line operators monitoring product quality and consistency instead of focusing on manual labor functions. "We have the best employees, the best equipment and the best plan that will take this company and its products across the US market," Mr. Leclerc said. "We are not afraid of capital investments, when we see the return not only on the initial investment but also on improved product quality, consistency and innovation. That is what we are all about." ■

▶ The straight-line 3-stage reducing system (pictured) used for sandwich crackers fits neatly into the plant's third production bay because of the small-footprint vertical laminator and mezzanine-level mixing area.