FORMULATING THE FUTURE

BY LISA LUPO

WORLD FAMOUS DIPPIN' DOTS ICE CREAM POSES SOME UNIQUE QUALITY ASSURANCE CHALLENGES.

COO Connie Ulrich and Production Supervisor Robby Heisner inspect production of the cryogenically processed Dippin' Dots ice cream. (Photos: Lance Dennee)

Flavor is undoubtedly important to the popularity of any food or beverage, but the feature that generally attracts new customers to Dippin' Dots is its *Ice Cream of the Future* uniqueness. Tiny, multi-colored balls of "the world's coldest" ice cream which new customers often think are the toppings and ask as they glance through the display of flavors, "Where's the ice cream?"

Though its uniqueness is an asset in sales and marketing, this same characteristic can create distinctive challenges when it comes to quality assurance and processing. "There really was no model — and there still is no model out there — of how to do things," said Dippin' Dots' COO Connie Ulrich.

"We had to re-image what ice cream is all about," adds Terry Reeves, corporate communications director, with re-imaging geared not only to the customer but to in-

spectors, employees and suppliers as well.

To make the dots, an ice cream mixture is run through a liquid nitrogen tunnel in a cryogenic process which flash-freezes it, and is then output into tiny patented balls. With temperatures in the processor running as low as -355°F, and the resulting dots needing storage temperatures of -50°F, it is this incredibly low temperature that creates much of the quality assurance complexity during both production and post-production.

QUALITY CHALLENGES – PRODUCTION

Inspections – "Because what we are doing is unconventional, [the inspectors] have had to change their thinking too," Ulrich says. The first time the process was inspected, it took some extra thought and communication from both sides because it didn't fit normal patterns, she explains. The company has had to educate inspectors to its product and the peculiarities of the cryogenic process.

One example is in inspection of the company's retail establishments. Some states or even cities have ordinances, such as that of Portland, Ore., requiring that "dispensing scoops and dippers for ice cream, frozen confections or desserts are kept in a dipper-well with running water between servings, or in any other manner that will prevent bacterial growth." However, wetting the scoop between servings is not viable with Dippin' Dots ice cream, as it causes the dots to stick together, ruining the product. "In all but a few states, we've done a good job educating the inspectors," she says. But the real lesson is learning to work with inspectors, figuring out what makes the most sense for the product and how to adapt to the best interest of the product while keeping the spirit of the regulations intact.

Dippin' Dots works to maintain top quality and satisfy regulations and inspectors by being proactive. The company is regulated by the Kentucky Milk Safety Branch, follows the guidance of USDA and FDA and has kosher-certified products. In addition, it invites the USDA into its facilities and welcomes the bi-annual no-notice inspections, says Robby Heisner, production supervisor. The company has never had the hint of a recall, but every inspection provides the opportunity for improvement, with inspectors noticing things that do not require a write-up or point deductions, but could lead to improvements, Heisner said. "We go by the letter of the law — and then some."

Storage – Having to store its product at temperatures well below standard freezer temperatures means that Dippin' Dots had to purchase customized equipment and even build many of its own storage systems. Its 200,000-gallon capacity walk-in freezer, which averages temperatures below -50°F, is believed to be the largest of its type in North America. The storage, though, is not just a challenge at the plant, but also during transportation and at its retail outlets — which is the reason that original Dippin' Dots are not sold in grocery stores and can't be stored in residential freezers.

Packaging – When Dippin' Dots first began commercial production, it packaged its product in cartons very much like those of any other ice cream. Until the day they ran out of cartons, "and I was literally going through my mother's kitchen," to find something in which the dots could be packaged, Ulrich recalls. "What about Ziploc®?" she asked. So they bought out all the bags the local grocery had in stock. "By necessity, we had to come up with something else," she says. Though there were a number of issues with these bags — including sourcing

industrial-strength bags and the inability to affix a label ("Nothing sticks when you're putting something that cold in it!") — the concept of using bags became a permanent practice for Dippin' Dots.

Today almost all the dots are packaged in pre-printed bags, with the packaging material still evolving, says Heisner. The company went through several types of materials before selecting the bags it now uses. "Even today, there are only a handful of films that will stand up to the temperatures," he says, explaining that to test the strength of packaging films, they will literally dip the bag into liquid nitrogen. If it doesn't hold up, it won't hold the dots.

Automation – Much of the Dippin' Dots process is still conducted manually — but it is not completely by choice. The plant has tried to increase its automation in the bagging area, but it is difficult to find equipment, particularly sealers, that can withstand the frigid temperatures for any period of time. This is, however, an area at which the company is continuing to look for improvements in the future.

Safety – The frigid temperatures at which the process is run also increase the safety equipment needed by operators. As the finished dots flow out of the hopper they are dispersed at a temperature of -180°F, with liquid nitrogen still clinging to them. Thus the operator who bags the dots from the shoot must wear safety glasses, and, as Reeves learned when working the position for a day, tall boots to deflect the frigid air from flowing into the bagger's shoes.

Self-checking – Despite the increased challenges, the characteristic of the dots do provide it with an innate self-check — a quality on which the company is still educating inspectors and its retail outlets: "If the dots are free-flowing, the temperature is OK," Reeves says. Once the dots warm above -20°F, they will begin to stick together. Once stuck together, they don't unstick — even if returned to lower temperatures. If only slightly stuck together during handling, the dots can be "massaged" apart. If a complete meltdown occurs, the ice cream will not be used.

(story continued on page 16) (see sidebar on page 14)

DIPPIN' DOTS AT A GLANCE

Type of Business: Privately held

Headquarters: Paducah, Ky.

Year Founded: 1988

Products: The "world's coldest" ice cream, flavored ice, yogurt and sherbet.

Number of Locations: 1,462 locations in 50 states

Web Site: www.dippindots.com

DISTINCTIVELY DIPPIN' DOTS

Founder and CEO Curt Jones

Starting literally in the founder's kitchen, Dippin' Dots history as a family business has been as unique as its product – building its success on invention rather than convention. "When you go into a territory that's never been defined, you have to be open to whatever crazy idea is out there!" says COO Connie Ulrich, the founder's sister.

- **Its name:** The family was having a difficult time deciding on a name for its ice cream beads, so during a party which founder Curt Jones was giving in his hometown to get feedback on the product, he asked that everyone submit names for the product. In reviewing all the submissions, one woman threw out the phrase Dip and Dots. But Jones heard "Dippin' Dots," and that, he felt, so perfectly described what the product was, that the name was born.
- **Facilities:** With its first cup of Dippin' Dots ice cream produced with a pipette and a Styrofoam® cup, the company began operations in founder Curt Jones' kitchen. When it established itself as a company in 1987, it operated from Jones' garage, moving to a former liquor store in Paducah, Ky., after selling its first amusement park account: Opryland U.S.A in Nashville, Tenn. The company used the liquor store's drive-through window for loading of its product. Today, the company's corporate office remains in Paducah, with a 52,000-square-foot production facility. Its second plant – and still its only other processing facility – is located in South Korea, which serves markets in Asia and eventually Australia.
- **Production:** At its peak, Dippin' Dots has produced 29,000 gallons of ice cream in a single day. Standard production, though, is 5,000 per day/per processor of which the plant has four. In the slower winter months, only two of the processors are generally run each day, while all four operate during the peak summer months of June, July and August.
- Pre-packs: Processed and packaged on a smaller line, the machine can consistently produce and package 67 bags per minute. These packs are used mainly in vending machines.
- **Temperatures:** Dippin' Dots:
  - run through the cryogenic tunnel at -355°F.
  - come out of the processor at -180°F.
  - must be stored at temperatures no higher than -20°F to maintain its free-flowing consistency.
  - can stand at room temperature for 45-50 minutes without a significant rise in temperature.
- **Employees:** Dippin' Dots employs about 200 year-round, full-time people, 30 of whom work in production. In the summer, production doubles as does its number of workers.
- **Flavors:** Customer favorites are:
  1. Banana split
  2. Chocolate, by only 1,000 gallons over
  3. Cookies 'N Cream

  A bit less successful were attempts at:
  - Pumpkin spice – Though great in lab tests, the flavor became a lesson learned. "What's made in the lab does not necessarily convert to production," says Communications Director Terry Reeves.
  - Tabasco – Recommended by an employee, it never got past internal testers.
  - Bourbon – Created for a trade show, the flavor was interesting, but a bit more tasty when re-mixed with chocolate.
- **Additives:** Producing Cookies 'N Cream requires four tons of Oreos per week. In order to create both regular and pre-pak products, the Oreos must be purchased in two sizes: regular and mini. Chocolate is the only flavor which is purchased pre-mix, as the plant uses 7,000-8,000 gallons of chocolate mix in a single day.
- **Storage:** Four raw milk silos hold 65,000 gallons of milk (three are 20,000-gallon silos, one is 5,000) which is then pumped into the pasteurizing tanks. The plant's new freezer has a 200,000-gallon capacity, and had a temperature of -57°F on the day of our visit. Constructed in 2003, it is believed to be the largest minus 50°F walk-in freezer in all of North America.

COO Connie Ulrich

- **Awards:** Dippin' Dots has been recognized with:
  - Inc. magazine's Inc. 500 in 1996, 1997
  - Kentucky World Trade Success Award as one of the state's top globally competitive companies (1997)
  - Ernst and Young's Entrepreneur of The Year Award given to President Curt Jones in 1995
  - Entrepreneur magazine's 2002, '03, '04 and '05 Franchise 500 list, Fastest Growing franchise (69th) and was listed as Top New Franchise Company.
  - IDFA's Best in Show at its Achieving Excellence Awards in 2005. Dippin' Dots also was presented with top categorical awards for Best New Frozen Novelty Products for Dippin' Stix, Best Frozen Novelty Package Design for the Dot Delicacies cake box and Best Ice Cream Package Redesign for the single serving pre-packs.
  - The No. 1 spot on Franchise Times magazine's Fast 55 list of fastest growing young franchises in the nation
- Entrepreneurial Fame – The story of Curt Jones' founding of Dippin' Dots is scheduled to be featured in a new Chicken Soup book to be published in September, 2006: *Chicken Soup for the Entrepreneurial Soul*.
- The question most often asked of Dippin' Dots – Why, after more than 25 years, is Dippin' Dots still logoed as "The ice cream of the future"? It is a conventional ice cream made in a futuristic way, says Reeves. "Maybe 'modernistic' is a better word, but … no one else is doing this yet!"

QUALITY CHALLENGES – POST-PRODUCTION

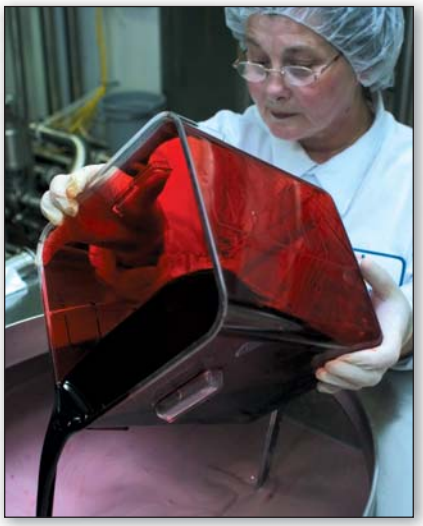
Transportation – Dippin' Dots are delivered to domestic accounts in insulated containers that utilize liquid CO_2 for refrigeration. The units are built onto stainless steel pallets and hold up to 360 gallons of ice cream. Until recently, Dippin' Dots' international shipments were kept cold during transportation with layers of dry ice and CO_2 snow. With the advances of technology, though, the company is now able to use refrigerated containers which can achieve the low temperatures needed.

Retail – Taking your product direct to the consumer adds an entirely new dimension of challenge for a processing plant, which, for Dippin' Dots, goes well beyond standard sales and marketing dilemmas. So much so, that the plant has an entire facility for kiosk production. "We have to build them from the inside out because of the custom refrigeration requirements," Reeves says. Dippin' Dots builds some of its units "from scratch," while others are partially outsourced; but all require some degree of customization.

The company, for instance, tried several types of vending machines for individual servings but, Reeves said, most conventional machines either could not keep the dots cold enough, or lowering of the temperature caused the mechanical parts to freeze up. Finally they found a chest-freezer style that stays closed until a selection is made, at which point the freezer lid opens and a robotic arm reaches down, picks up the package and drops it into a chute.

Whether it's shipping or at the retail level, the company's concern for quality doesn't end at its loading docks. "You can do everything in the world to make the product perfect when it leaves Paducah, but then you have to put your trust in people at the retail level, whether it's at a park, stadium or franchise store location," Reeves said. Because any breach in quality control — up to the moment the product reaches the customer's hand — will reflect back on the company and product perception, the company conducts regular site evaluations and has developed quality training manuals and videos for its franchise establishments. The videos are focused primarily on customer service, but also explain the uniqueness of the product and how to educate customers.

Dealing with quality challenges has not been a bad thing for the company. Following its original business development philosophy of innovation, the challenges have forced Dippin' Dots to seek inventive solutions, and have contributed to increased efficiencies through the years, which also have enabled the company to keep price increases to a minimum — having had to institute its first increase in seven years last year when



Lana Thurmond adds strawberry flavoring for banana split Dippin' Dots.

the cost of milk soared. "When you go into a territory that's never been defined, you have to be open to whatever crazy idea is out there," Ulrich says. "It's hard for us to think conventionally!"

"We are always reevaluating," Heisner adds. "You can do the same thing you did 17 years ago, but it's not going to be as valuable." Nor is it necessarily going to stay exactly the same if you don't keep a check on the quality, he says, explaining through the example of the flavor of the original Dippin' Dots. The management group regularly "taste tests" its products for flavor and consistency. One day, one of them noticed that the flavor, though okay, seemed to have changed from its original quality flavor. In thinking back, they realized that something had shifted with the change of their syrup or flavor supplier, and they hadn't even noticed it. "You've got to keep reevaluating everything you do," Heisner says.

QUALITY CHECKPOINTS. Although (or perhaps because) Dippin' Dots faces unique challenges, working through the idiosyncrasies has become a part of doing business and lead to an in-depth system of product checks.

The day begins at 6:00 a.m. with a 1- to 1½-hour quality check by two full-time operators. Each is responsible for a separate section of the plant and runs through a checklist of SOP, GMP and HACCP points, running both visual and computer checks to ensure compliance checkpoints such as: stainless steel lines are free of nicks; no mix or flavor residuals remain in the equipment; the proper pump and augur speeds and mix flows are set; and, in general, the equipment and ingredients are set and ready for the day's run.

Once the process begins to flow, operators then follow a Seven-Point Quality Check, taking regular samples from seven points along the production lines. A sample is taken and tested:

1. upon receipt of the bulk tankers of raw ice cream mix
2. from the mix stored in Dippin' Dots silos
3. when the mix is pumped into the flavoring holding tanks from the silo
4. after the flavoring is added
5. as the flavored mix goes into the cryogenic process
6. if the run is more than 1,500 gallons — at a mid-process point
7. after it emerges as finished dots

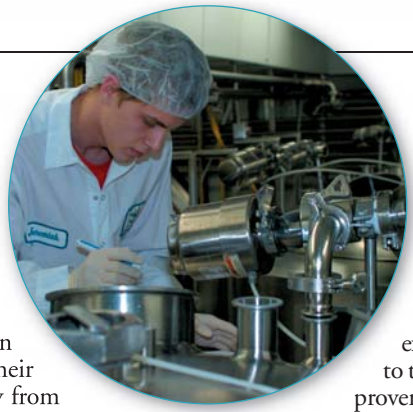
Samples are transferred to gel plates and standard plate counts are taken, such as coliform, *E. coli*, *salmonella*, as well as yeast counts if the run is designated as international.

"By having so many sampling points, we are able to isolate where the problem might be," says Lab Manager Glen Thompson. Testing as many points as possible also adds to overall food safety and security, particularly in relation to the uniqueness of the plant's cryogenic processes. Even with zero tolerance for *salmonella*, *shigella* and coliform, Thompson says, results come back negative "next to never."

Besides taking samples throughout the process, a metal detector is utilized at the beginning of each run. If there is any problem with the machines, Heisner says, it will show up in the first bags. "So we always run the first two bags through the metal detector." The first bags are also run through quality checklists, both electronic and visual, covering items such as broken beads, color ratio and weight, and the pre-production crew stays on the line for the first 15 to 20 minutes to correct any problems.

On the day that I visited, the plant was producing banana split dots on one line and root beer float on the other. At one point on the root beer line, the dots were being put

into buckets instead of the standard bags; with flavor usage being measured every five minutes, the monitor had detected too much vanilla in the mix, so the dots produced before the lines were readjusted were set aside to be later remixed in the proper ratios. Although this specific run was detected electronically, with the number of long-term employees, it could just as well have been caught visually — with a worker noticing that there were just too many white dots as compared to brown.



Jeremiah Burgess inspects equipment prior to the first run of the day.

HISTORY. Since its founding in 1988, Dippin' Dots' evolution has been about trial and error. Businesses are often started by founders who worked for a similar company then broke off to begin their own related company from what they learned there. As the company grows, employees who come from competitors then bring additional ideas and experiences which can add to the company's process improvements. Dippin' Dots did not follow this standard, rather its product and process were unique right from the start. And in a business where you are the only producer of your type of product, "You have to invent things as you go, and experiment as you go," Ulrich says, adding that the company still works that way.

Dippin' Dots started in Curt Jones' kitchen with an ice cream maker, some dry ice, a pipette and a Styrofoam® cup. He did bring ideas from another company, but that company is not exactly a competitor — Jones had previously worked for Alltech, a biotechnology company, where he researched freezing techniques for large-scale preservation of bacteria and enzymes. As Alltech's President Dr. T. Pearce Lyons related in a Dippin' Dots 10-year anniversary corporate video, "It's been only 10 years since you came here to work with Alltech with the idea of microencapsulating bacteria. And frankly, we thought you were crazy. We thought you were equally crazy when you had the same idea for microencapsulating ice cream. Ice cream, for heaven's sake. Ice cream doesn't get microencapsulated!"

The first month there was a lot of discussion in the family about whether the ice cream presented a real business opportunity, whether there was a commercial application for it, and whether people would actually buy it — and eat it. Then the discussion and work turned toward the technical — how would the dots actually be made in quantities that could be sold? "Temperatures were a major issue because we were dealing with a cryogenically frozen product which had never been done before," Ulrich says. As they tested different mixes with different levels of butterfat, each of which got different results, they began to wonder if it was indeed a viable business idea. "Is this something that we can make money at? Because it still is an extremely expensive product to make — and it was even more so then."

Although the first few years were very lean for the Joneses — who were living on credit cards, selling their possessions, and even were evicted from their apartment because they couldn't pay the rent — their perseverance paid off, with Dippin' Dots now having received numerous recognitions and awards and Jones himself being name 1995 Entrepreneur of the Year by Ernst

and Young.

The company's first major breakthrough was in 1990 when Opryland (a now-defunct theme park in Nashville) allowed Dippin' Dots to erect a booth in the park. Although its original placement in front of the roller coaster did not lead to a great deal of success, once the park moved the location and took over selling of the product, it began to catch on.

Growth continued with Dippin' Dots' realization that the product would stay frozen for 15 days when packed in dry ice and CO_2 snow, thus international shipping was viable. The company moved into the Asian market, where it has continued to be a strong seller.

In the early 1990s, the company went into a growth phase of about 100 percent a year, so in 1995, it broke ground on facilities on a 15-acre lot on the west side of Paducah — the area it still occupies today. Since that time though, the company has seen continual evolution and expansion, which is continuing today and being planned into the future.

BUSINESS SUCCESS. Though it was the novelty effect that Dippin' Dots saw as its primary business opportunity, the fact that the product "tasted good right from the start" is what would help keep the product selling. Even now, Ulrich says, "There are still people who haven't heard of them, so it still has that excitement as new people try it. We just have a very unique product. Curt just came up with an idea — it might have been a little crazy at the time, but it's just been well received. It's a fun product."

With flavors such as banana split, bubblegum, strawberry cheesecake yogurt and tropical tie dye, Reeves says, "We've turned taste into fun."

And that taste is a result of the cryogenic process. "The faster you freeze something, the smaller the ice crystals are and the smoother the texture," Reeves says. This feature becomes particularly favorable in ice cream, where smoothness is associated with high quality, but generally requires high levels of butterfat to attain. Dippin' Dots is able to achieve the flavor quality and rich texture of premium ice creams with only 10 percent butterfat.

THE FUTURE. So what is the future of the ice cream of the future?

Currently the company is testing a new product, Dots 'n Cream, in an eastern-based grocery-store chain, which answers the company's second most-often-asked question "Can I take this home?" *(See Distinctively Dippin' Dots on page 14 for the #1 question.)* "Frozen from the inside out," it is an ice cream into which, as its name implies, the dots are blended. The result is a version of the original Dippin' Dots product which needn't be stored at the super low temperatures and can, thus, be sold through regular retail channels and stored in home freezers.

"I feel like we are at a pivotal point with our size," Ulrich says. A point at which the plan is to "take a good look at how we are running the company," determine the potential for Dots 'n Cream and other possible new products, continue the facility expansion which is in progress, develop greater brand recognition, and potentially leverage the brand into other related areas. "We're pretty well focused on taking the company to the next level — and defining what that means," she says.

With defining next steps in uncharted territory nothing new for Dippin' Dots, the company is continuing to move into a world of possibilities with a past of innovative success as its guide. A guide perhaps best expressed by Alltech's president Lyons in lessons he learned from Dippin' Dots success: "If you have an idea … go for it!" **QA**

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