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Managing Innovation at Nypro, Inc. (A)

Gordon Lankton, president and majority owner of Nypro, Inc., one of the world's leading makers of precision custom injection molded plastic parts, paused at the entrance to his Clinton, Massachusetts, plant, and put on his plastic hair cap and safety glasses. Passing a line of large Nestal molding machines, he entered a closet-sized room housing a single prototype molding machine—a machine that might represent Nypro's future. Lankton watched as a technician changed the mold in a minute flat, compared to the several hours necessary to change a mold on the Nestal machine, Nypro's main production equipment. NovaPlast—the revolutionary molding machine which could mold a broad mix of low-volume precision parts without the cost penalty generally incurred in frequent machine setups—immediately started filling the magnetically clamped mold.

As Novaplast's servo screw pushed viscous plastic into the mold, he reflected on the past and speculated about the future of Nypro. He wondered how he should begin integrating the NovaPlast machines into Nypro's 21 plants that spanned the globe. How fast should they be rolled out? Should Nypro build one plant dedicated to NovaPlast molding machines, or should the machines be scattered across Nypro's plant network?

Background

Nypro's injection molding machines melted small beads of plastic material, then squeezed the material into a mold at high pressure, either with a hydraulically powered piston ram or screw operating inside a cylinder. Customers provided Nypro with detailed specifications for each product. Nypro's three divisions—consumer/industrial (32.2% of sales), health care (46.7%), and communications/electronics (21.1%)—logged 1994 sales of $165,983,000 and profits of $10,826,000, marking Nypro's ninth consecutive year of record performance (**Exhibit 1**).

The plastics injection molding industry historically had been populated by small, low-value-added molders—any person trained as a molder who could afford a molding machine could set up a business. Barriers to entry were low because there were few economies of scale. Differentiation was difficult. Nypro, founded as the Nylon Products Corporation in 1955, had been one of these small molders until Gordon Lankton, a Cornell-trained engineer, joined the company as general manager in 1962. Lankton followed a strategy of developing superior technology by focusing on large-scale molding jobs with demanding, technologically progressive customers. Through this focus, as the number of Nypro

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customers dropped from about 700 in 1980 to around 50 large, multi-national customers by 1995, its revenues per customer jumped from $60,000 to over $4 million.[1] Nypro was the fifth-largest plastics molder in the United States (the top four were devoted to the automobile industry). Before-tax profits averaged 17% of sales in an industry with a 4% average.

A key to Nypro's success was Lankton's view that maintaining a vigorous growth rate was not just the *result* of a successfully executed strategy, it was a key *input* in the formula for success. Lankton worried that if Nypro's growth stagnated, the best and most entrepreneurial people would leave the company. He explained:

> Innovative people like to go out and become entrepreneurs on their own. I want to create an atmosphere here that encourages them to stay. When growth slows, we get nervous because the entrepreneurial-types won't see opportunities here and will look elsewhere. A few years ago, we hit a revenue plateau at $50 million and we saw *lots* of people leave. I worry that as we get bigger, we can't keep growing at the same rate each year. How, then, can I maintain an entrepreneurial staff and facilitate innovation?

Lankton used a stock program to reward valuable employees.[2] To get into the program, an employee was selected based on a formula that measured years of service, pay level, and performance ratings (which were weighted most heavily). Four hundred employees were considered for stock ownership each June. Six to eight stockholders were chosen from this pool, from various levels within the company. Through retirement and attrition, the number of shareholders remained near 100. Stockholders chose the board of directors for Nypro.

Structuring for Innovation

Nypro's organizational structure facilitated aggressive internal competition and constant attention to performance statistics that compared groups within the company. Many attributed Nypro's success in innovation to this internal rivalry—what one executive called "progress through conflict." This competitive spirit originated from Gordon Lankton himself and was fostered by Nypro's plant location strategy and its use of project teams.

Gordon Lankton

Gordon Lankton was a competitive person. He fostered rivalry in everything with which he became involved. For example, at a yearly management retreat at Duke University's Graduate School of Management, a team-building exercise entailed taking small teams to the center of Duke University's forest with the challenge to work cooperatively within the team to find a way out. "The goal quickly disintegrated into 'beat everyone else'" recalled Brian Jones, president of Nypro's Clinton, Massachusetts, operation. "We were in the middle of the woods discussing the best strategy with his team when Lankton's group went running by. *All* of the teams then started running, abandoning any deliberate strategy or teamwork." In another example, Lankton consistently insisted on running with the Puerto Rico plant manager, Jim Goodman, whenever he was in town. Goodman was both a Marine Corps veteran and a marathoner, while 61-year-old Lankton averaged one 10-minute mile per day.

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[1]Thirty-five customers accounted for 80% of Nypro's business.

[2]Nypro was privately owned, so stock price was calculated at 12.5 times earnings.

Lankton felt he had to beat Goodman, though, and each time struggled until he couldn't stay with him any longer.

Organizational Strategy

Nypro's manufacturing strategy was to build plants near its customers in vital markets. Its slogan, "Nypro is your local source for custom injection molding . . . worldwide," emphasized its commitment to customer service. Nypro's 21 plants were identical—with 20 to 24 Nestal molding machines in dust-free clean rooms, fed by materials through under-floor piping systems. Nypro set its plants at this size because scale economies were essentially exhausted at that level; two 20-machine plants could produce at equal or lower cost to a single 40-machine plant. Plants were tailored to the markets and companies they served. For example, Nypro's plant in Corvallis, Oregon, served the needs of Hewlett-Packard, and the plant in Gurnee, Illinois, specialized in the health care industry of northwest Chicago (**Exhibit 2**). Nypro's 1994 Annual Report explained:

> Our global customers want us to be truly global—that means doing the exact same thing in Shenzhen, China, that we do in Cayey, Puerto Rico. They want us to use the same machines, same process control, same mold technology, same procedures, same CAD systems—regardless of where we make their products around the world. . . . Nypro provides local capabilities to our customers who share our global outlook. In adding value, we operate where our customers operate, delivering exactly what they need, exactly when they need it.[3]

This decentralized location strategy had its strengths, as well as weaknesses. Randy Barko, Nypro's vice president of sales, explained;

> We are all these separate little units all over the world. Our challenge is to be responsive, entrepreneurial, and internally independent, but to be viewed by the outside world as one company. We want people to know that any Nypro plant they go to, anywhere in the world, is still Nypro. We want customers to know that wherever they are, they are going to find the same technology; the same materials; the same capability. The challenge with this strategy, of course, is innovation. Achieving uniformity across plants is easy—you identify a set of processes and procedures that do the job well, and implement them with instructions not to deviate. But that precludes innovation. And if you encourage people to innovate, you can quickly lose your consistency across plants.

Nypro management strongly felt that innovation was a result of competition. For example, the Burlington, North Carolina, plant, which was considered one of the most innovative molding plants in the world, began using dedicated, labeled hoses hooked to each machine for each of the different plastics used, in order to avoid cleanup costs and impurities in early shots. Word spread, and the Burlington plant became deluged with visitors from other Nypro locations. Brian Jones explained the visits:

> It's competition. There were a lot of innovations at Burlington that people studied, but they focused on the hoses. There's a sort of competitive marketplace in the company for good process ideas, as the plants compete against each other for the top ranking. Good ideas get snapped up fast and nobody buys into mediocre ideas.

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[3]*Nypro Annual Report,* 1994, pp. 1, 7.

To keep information on innovations flowing, each Nypro plant was organized as a company, with a board of directors composed of managers from other facilities. An internal company publication stated, "The Board of Directors concept is designed to bring a variety of disciplines from Nypro's experienced and qualified employees to the support of the General Managers of Nypro companies and joint ventures." The following people, for example, are members of the Clinton plant's Board of Directors:

Clinton Board Member	Position	Other Boards Serving On
Alfonso Berrios	Info.Tech, Puerto Rico	
Rick Bourgeois	corporate controller	NP Medical
Frank Brand	outside director	Nypro Inc.
Rick Hoeske	vice president, engineering	Puerto Rico, Singapore
Dave Parker	salesman, northeast	
Paddy Woods	general manager, Ireland plant	North Carolina

A significant exception to Nypro's policy of decentralization was in sales. Randy Barko, corporate vice president for sales in the Clinton corporate headquarters, personally approved every new customer and every major new customer program in the company. At least one salesperson was resident in each of the Nypro plants, but all salespeople were responsible directly to Barko, with only a dotted line relationship to the general manager of each company.

Teams

Nypro managed its customer relationships by establishing teams that focused on the product development and process improvement issues for each customer-specific project. Each team was headed by a program manager who was part of the engineering organization. While the program manager specialized in a specific industry, the rest of the team was composed of people from various disciplines. A team could include a mix of tooling engineers, quality engineers, sales contacts, plant representatives, process engineers, manufacturing engineers, and automation engineers. "These people may have worked on five different projects in the last six months, so they are bringing different expertise from different projects," Randy Barko, vice president of sales, explained, "The program manager has the overall responsibility of keeping the project going in one direction, but the team members will give him or her input along the way, having had the experience from other projects to bring to it."

The original members of a team consisted of Nypro engineers and engineers from the client company. This group of people, known as the Development team, was expected to fully develop the new product idea and process innovations. Once engineering and development was done and the product was in production, the Development team was phased out and a new team was put together—the Continuous Improvement Team. Continuous Improvement teams comprised manufacturing, quality control, materials procurement, and marketing people. Representatives of similar functions at the client company, and frequently a representative of Nypro's suppliers, also joined the team. Because of this dual-team system, there was always a team of people responsible for every product Nypro produced, for as long as it was in production.

In one project, for example, the Continuous Improvement Team was still in existence even after 10 years of production at Nypro. That year, the team member representing Nypro's materials supplier suggested using a more expensive plastic that he felt might increase yields far downstream, in Nypro's *customer's* process. In just one year the customer's production cost fell by $25 million—a savings that dwarfed the total value of the plastic components the customer was buying from Nypro.

If a team became stagnant in its innovative strategy, Nypro management would change some of the people on the team to get a different perspective on the project. Brian Jones explained, "We get people on teams where they have to get out of their comfort zone. Teams are composed of a vertical and horizontal slice of the company. Each project group kept a constant watch over the others to monitor what other teams were coming up with. If one team innovated its process in a beneficial way, Nypro management would spread information about the success. Subsequently, in the "internal market" for innovations, other teams could use the same innovation in their own projects.

Gordon Lankton distributed performance results of all the divisions throughout the company. Internal corporate reports highlighted both the successes of the best plants and the failures of the worst (**Exhibit 3**). It was important to Lankton that comparisons were always made *between* plants or teams (which numbered almost 90)—never between individuals, or between a unit's present and past performance. Performance statistics were gathered on a quarterly basis, and results and plans for improvement were discussed at annual management meetings. Because the projects teams worked on vastly different projects, Nypro developed unique standards of performance. The following questions were asked by a business review committee in evaluating a Development or Continuous Improvement team:

- How well did you help the customer get its product to market?
- Was the *customer's* product commercially successful?
- Did you help the customer attack the market in a new and different way?
- Did the customer achieve its strategic goal?
- Did you get a contract as an exclusive supplier?
- Did you ink a long-term contract?
- Have you made steady and significant improvements beyond your original targets for margins, revenues, quality and cycle time?
- How are your financial, accounting, and profit/loss results?
- Can you make the product faster than you did at first?

Managing the Development and Adoption of New Technologies

Because Nypro's teams specialized in *custom* molding—making by contract parts which its customers designed—the company's scope for innovation was in process, not product. Most ideas for process improvement emerged as Nypro's continuous improvement teams worked to solve production and profitability problems for its customers. Nypro's far-flung network of close-to-customer plants made managing these activities challenging, and involved answering four questions: (1) what process innovations had actually occurred? (2) which of these innovations were important enough to be adapted in other plants? (3) how could the innovation be transferred from the team that developed it to other teams and plants? and (4) how could Nypro standardize the new way of doing things?

The following examples illustrate some of these challenges.

The Vistakon Project

Nypro's concept of continuous improvement teams was born when its engineers were challenged in a contract with Johnson & Johnson's Vistakon division to make molds for disposable contact lenses with substantially less variation in the degree of vision correction for lenses of a given power than Bausch and Lomb, Vistakon's leading competitor, was able to achieve. Nypro ultimately learned to make molds with a ±5µm variation—a 50x reduction in dimensional variability over the tightest that had been achieved in the industry until that time, and an achievement that reinforced Nypro's reputation as a capable specialty molder.[4]

Even though the product development effort had been successful, Nypro's parts were so critical in Vistakon's quality- and price-sensitive production process that Nypro had to keep its development team in place long after volume production had started. The ensuing efforts at improvement were so cooperation-intensive that the Nypro team found it necessary to integrate with Vistakon's team in order to exchange information efficiently. By sharing with each other on-line manufacturing data, the Vistakon/Nypro team dramatically increased production quality. Nypro and Vistakon personnel each could call up information on production rates, inventory levels, and production schedules, machine-by-machine, in each other's plants. Once the news of the success of Nypro's Vistakon team began to spread, other teams in the company started inquiring about the "Continuous Improvement Team" (CIT) system developed during the project, and began implementing integrated teams with their customers, also with successful results in efficiency and process improvements. Management then stepped in to standardize the CIT system. Thereafter, as a standard procedure, Nypro crafted an agreement with each new customer stating that the parties would establish a joint continuous improvement team to work together to reduce cost and improve profitability for both sides. Barko described the benefit:

> Customers in the past never talked to the injection molders about what the product was really used for, what the critical elements of it were. It was just, "Here's a print, here's a dimension—make it." The Vistakon project opened up a whole new thought process of how the product is used and what the critical elements of the products are.

Another of the Vistakon team's innovations that proved popular in Nypro's internal market for process improvements related to moldmaking. Making a mold for plastics injection molding is a significant cost which increases exponentially with the precision of the mold. Injection molders therefore traditionally only made molds as precise as the customer requested. However, Nypro's teams realized upon seeing the results of the Vistakon project that extreme precision in moldmaking was probably worth the cost. As other post-Vistakon teams began to explore ways they could improve, more and more of them began adopting the extreme standard of precision the Vistakon team had used in making its molds. Ultimately the cost and quality benefits of this practice became clear to management, and they established a new ground rule: if the tolerance requested by the customer was ± X, Nypro would design its molds as if the tolerance demanded were $\pm \,^{1}/_{2}$ X.

The Reach Toothbrush Project: Bi-Component Molding

In the early 1990s, Johnson & Johnson's dental care division contracted with Nypro's Puerto Rico company to mold Reach® brand toothbrushes. J&J wanted the brush handle made from two different plastic materials—a rigid plastic for the main structure, with a coating of soft, rubbery material on the top and bottom of the handle for a better grip. Nypro's Puerto Rico engineers figured out how to make the two-component handle in a single stroke or cycle of the molding machine. The technique, dubbed bi-component molding, proved critical to making the popular product to the customer's targeted cost, and the news of the Puerto Rican team's success spread throughout the company. Because Nypro's

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[4] *Molding the Impossible: The NYPRO/Vistakon Disposable Contact Lens Project*. Harvard Business School case No. 694-062 (November 23, 1994).

teams were evaluated on whether their customer's products were commercially successful, other CIT teams began proposing to *their* customers that bi-component molding could be used to give their next-generation products a better hand feel. Soft-handled products such as Crayola's Munchkin-brand baby spoons were the result. Transferring bi-component molding know-how kept the Puerto Rican team busy, but the recognition they received as winners in the internal team competition made it worthwhile.

Innovations in Plant Design

The clean-room manufacturing philosophy for which Nypro was famous also was a bottom-up innovation. Warren Brooks, a manager of a production facility in Clinton, decided to make his plant as clean as a hospital operating room in the late 1970s. Brooks was convinced that an immaculate production facility was crucial to efficient operation—not only visual cleanliness, but particle size, air circulation, air quality, and other exacting details. He presented the idea to Nypro management, which felt the idea was excessive. But because the divisions were run separately at the time, Brooks could glean resources from his division when the corporate staff wouldn't fund it. In 1979, he established Nypro's first clean room facility. Brooks filtered the air in the production facility to diminish dust, had workers wear gowns and plastic hair-coverings, cleared the floor of all extraneous obstacles, and installed piping under the floors to supply the viscous plastic material. It rapidly paid off in terms of product quality and employee productivity. The clean room structure was then adopted by the Puerto Rico plant manager. Over the next five years corporate management realized the advantage of clean parts molding and dictated that each plant built thereafter would be a clean room facility.

The visual factory—where each office, conference room, cafeteria, and other gathering place or working space at Nypro had a view onto the production floor—became a standard design through a similar process. Visual factory designs ensured that no one was removed from the "minute-by-minute urgency and immediate reaction times" that were essential to Nypro's success as a manufacturer, according to Brian Jones.

The visual factory grew out of the sales and marketing function at Nypro-Clinton, which found that customers who were untrained in molding could greatly benefit from seeing the production process so they could conceptualize Nypro's value as a supplier and molder. To obviate customers' having to don hair caps, safety goggles, shoe guards, and other safety equipment in order to view the production facility, they installed viewing windows around the Clinton's production floor. Soon it became clear that having everyone—employees and customers alike—in visual contact with the production floor was a great benefit to the entire operation. In 1985 the visual factory was adopted as a standard plant design.

MRP2 Systems

Some Nypro innovations were initiated by senior management, as was the case with Nypro's MRP2 production planning software. In 1995, Nypro management was in the fifth year of asking each of the plant locations to adopt a common MRP2 (manufacturing resource planning) software system. Nypro's MRP2 system integrated resource planning and capacity requirements with information technology, CAD/CAM, total quality management, and process control—bringing each of the Nypro plants together under one software system which would allow them to communicate about production planning, both inside Nypro and with the customer. The Puerto Rico plant was the first to accept the technology, in 1990. Other plant managers had been reluctant to implement the software, though. Each manager wanted a highly customized system which would allow his or her plant to best compete, as opposed to a standardized system.

To spur adoption, management established a special team, headed by Dan Gorman, to implement the MRP2 system. The team had a sales-type role—it was responsible for persuading each plant to accept the technology. Brian Jones stated, "The plants would tell you that the Clinton team has no authority, but it does. And it actually has a lot of capability in specializing design and making implementation easier."

After a few years of struggling to convince the plants to implement the system, Gorman's team decided to establish the system at Clinton and let the other plant locations observe its performance. Simultaneously, the MRP2 team began talking to customers about what the software meant and how it could be used, hoping the customers would demand the technology at their respective Nypro locations. Finally, by early 1995 the MRP2 system was beginning to gain momentum at Nypro: all domestic plants were in some stage of adapting the MRP2 system to their specific needs, though none of them had fully implemented it.

Dealing with a Shifting Basis of Competition

Nypro was once far ahead of its competitors in terms of the precision it could achieve in its molded parts. By 1995, however, several other molders had improved their processes to levels competitive with Nypro's ability—and those levels seemed more than adequate for the vast majority of customers at present.

Increasingly, Nypro's marketers found they needed to quote shorter delivery times in order to capture business, and to do this, Nypro had been forced to help its tooling suppliers reduce their lead times from an average of 20 weeks to 6 weeks. Randy Barko explained:

> Time is our focus today. It's the driving force of all current projects. One thing we always say is, "Lights work 24 hours a day." That doesn't mean you want everybody to work 24 hours a day, but it forces you to focus on not losing any productive hours. When you are saying it's going to take you four weeks to build a tool, you are saying it's four weeks times seven days times 24 hours. How much of that is nonvalue-added time?

"We have one customer now who wants parts from a sample mold within four weeks," Barko continued. "Eventually they are going to want it in two weeks, then one week. A mold in four weeks, even six months ago, would have been difficult to even fathom." To squeeze lead time, Nypro had begun sending the customer's CAD files to its toolmaker to initiate work on the mold, even while they were still finalizing what the mold would cost. "There just wasn't time to go through a whole big long quoting process and negotiating back and forth," Barko explained. "If they want it in four weeks, price isn't the most important thing. We trust each other. We know we're going to agree on the cost. So why hold things up for it?"

The NovaPlast Roll-Out

In 1990 on his annual trip around the world to observe new developments in the plastics injection molding industry Gordon Lankton saw a molding machine at a Japanese VCR and automotive parts manufacturing plant which he felt might address the market for low-volume, high-mix, quick-turnaround business—a market that Nypro historically had been unable to supply. Lankton was interested because as more and more companies began competing on bases of speed and variety, this segment of the molding business was growing rapidly. After his trip, Gordon gave an internal Nypro team, headed by Curt Watkins, the task of studying the machine, which Nypro dubbed NovaPlast.

Traditionally, high-volume precision molders such as Nypro had used very big, expensive equipment which required several hours in set-up time to change the molds used. These high fixed set-up costs made the low-volume, high-mix market unprofitable to them, and Lankton felt that the market was not well served by world-class molders as a result. Curt Watkins stated, "We never looked at low-volume, high-mix markets because we weren't competitive." When a customer had a small job with specialized molding needs, Nypro often would contract with an independent molder to provide the low-volume parts. When the volume reached a certain level, Nypro would shift production to its own facilities.

NovaPlast was a small machine in size and capacity. The size of the molds it could accommodate, and therefore the number of cavities NovaPlast could fill in one molding cycle was limited. However, the molds could be changed in a matter of minutes with minimal labor effort, as **Exhibits 4** and **5** show. Barko described how it worked.

> NovaPlast minimizes nonvalue-added activities with functions like magnetic clamping and automatic preheating. You can slide the mold into the machine, then just push the button and magnetically it's clamped into place. You have eliminated all nonvalue-added activity—messing with molds and mold clamps for hours.
>
> It's like a game show. NovaPlast opens three possible doors for Nypro, with a "prize" behind each. Door number one is typical of what NovaPlast was intended for—a short-run business, quickly timed and repeated small requirements for the next ten years. Behind door number two, NovaPlast is used for development-type projects where you need to get something to market in a short period of time. Maybe you build single cavity tooling to get it to market. Behind door number three, there are a lot of other jobs running at Nypro in bigger machines and in bigger molds that we can downsize. We can also use NovaPlast for long-runs and ultra-fine precision molding, as long as a new mold is made to fit the machine.

Nypro ordered a prototype high-precision NovaPlast machine from a custom builder, and by late 1994 it was in operation at the Clinton plant. Nypro had begun some projects on NovaPlast and was introducing the technology to customers. The NovaPlast development, marketing, and sales teams were centralized at Nypro's Clinton headquarters. Seeking early orders for parts compatible with the NovaPlast machine was critical to the development strategy, because Nypro needed to learn how the machine could be used.[5] These orders had begun arriving in early 1995.

In Nypro's experience there was a relatively steep and protracted learning curve associated with every new class of equipment. Understanding how settings for temperature, pressure and dwell time interacted with mold design to affect the dimensional variability in molded parts—and understanding how to control the factors that contributed to variability—were difficult problems that needed to be worked out on each new class of machine. Because NovaPlast machines were new to the industry, these issues promised to be particularly vexing.

The issue Nypro's management team needed to resolve was how and where, within Nypro's structure, to build this understanding of how to mold with NovaPlast machines, and how to leverage that capability in the marketplace. It then needed to determine how to disseminate the machines and that knowledge across the company. Three options had begun to emerge from discussions on the issue.

[5]Nypro would accept a NovaPlast project only if the customer's mold cavitation fit the machine.

The first option—and probably the most popular one with senior management—was to build a new plant that would employ *only* NovaPlast machines. The arguments for this were, first, engineering efficiency: all of the knowledge created about the NovaPlast equipment would best be concentrated in one place; and second, focus: the other systems for serving the high-mix, fast-response, low volume-per-part—systems such as bidding, order entry, toolmaking, production scheduling, and inventory control—were different enough from those required to sustain Nypro's mainstream business that a distinct organization needed to be established to focus on these unique tasks. Furthermore, Lankton felt that centralizing development would facilitate his and Watkins' personal oversight of the project.

The second option was to install two or three machines in each of Nypro's plants. The arguments supporting this option were, first, that the market was distributed across the territories served by each plant, and that close-to-customer manufacturing was particularly important in this segment of the market. Indeed, many of Nypro's high-volume customers also bought low-volume parts from other vendors. Second, this option would put many more engineers and marketers, in different competitive environments, to work on the problem of how to control and exploit the NovaPlast. With a larger variety of solutions investigated, it was possible that better technology would emerge than would be developed under the first option described above.

The third option would be not to roll NovaPlast out across the company at all, but to focus on making it successful at a single plant. If it emerged as a profitable addition to that plant's arsenal of competitive weapons, then Nypro's "internal market" for innovation would take over, and the effort would roll itself out, if it were judged to be commercially valuable. The logic supporting this option was that Nypro's internal market had a great track record at spotting winning innovations.

As Lankton watched his technician work with the NovaPlast, he sensed that the time for making his decision was near. The technology was advancing and the orders were arriving. This technology appeared to be the best bet Nypro had for maintaining the vigorous growth rate Lankton felt his $200 million company needed to maintain its vitality.

Exhibit 1 Nypro Financials

(dollars in 1,000s)	Year Ended July 2, 1994	July 3, 1993	June 27, 1992	June 29, 1991
Net sales	165,983	135,829	119,856	100,201
Cost of sales	126,512	104,810	93,832	78,215
Gross profit	39,471	31,019	26,024	21,986
Expenses:				
Selling	7,244	6,826	5,978	5,546
General and admin.	16,807	11,481	9,972	8,035
Research and development	2,705	2,415	1,793	1,005
	26,756	20,722	17,743	14,586
Operating profit	12,715	10,297	8,281	7,400
Other income (expense):				
Other income, net	1,699	1,001	1,114	1,616
Interest expense	(1,502)	(846)	(978)	(1,216)
Interest income	450	260	417	515
Equity in net income of unconsolidated affiliates	605	464	202	(864)
Minority interests in (income) losses of consolidated subsidiaries	(77)	(97)	(13)	152
	1,175	782	742	203
Income before taxes	13,890	11,700	9,508	7,603
Income taxes	(3,064)	(3,194)	(3,002)	(2,450)
Net Income	10,826	8,506	6,506	5,153

Exhibit 2 Nypro's Worldwide Plant Locations, Fiscal Year 1994

Nypro **_WORLDWIDE LOCATIONS_**

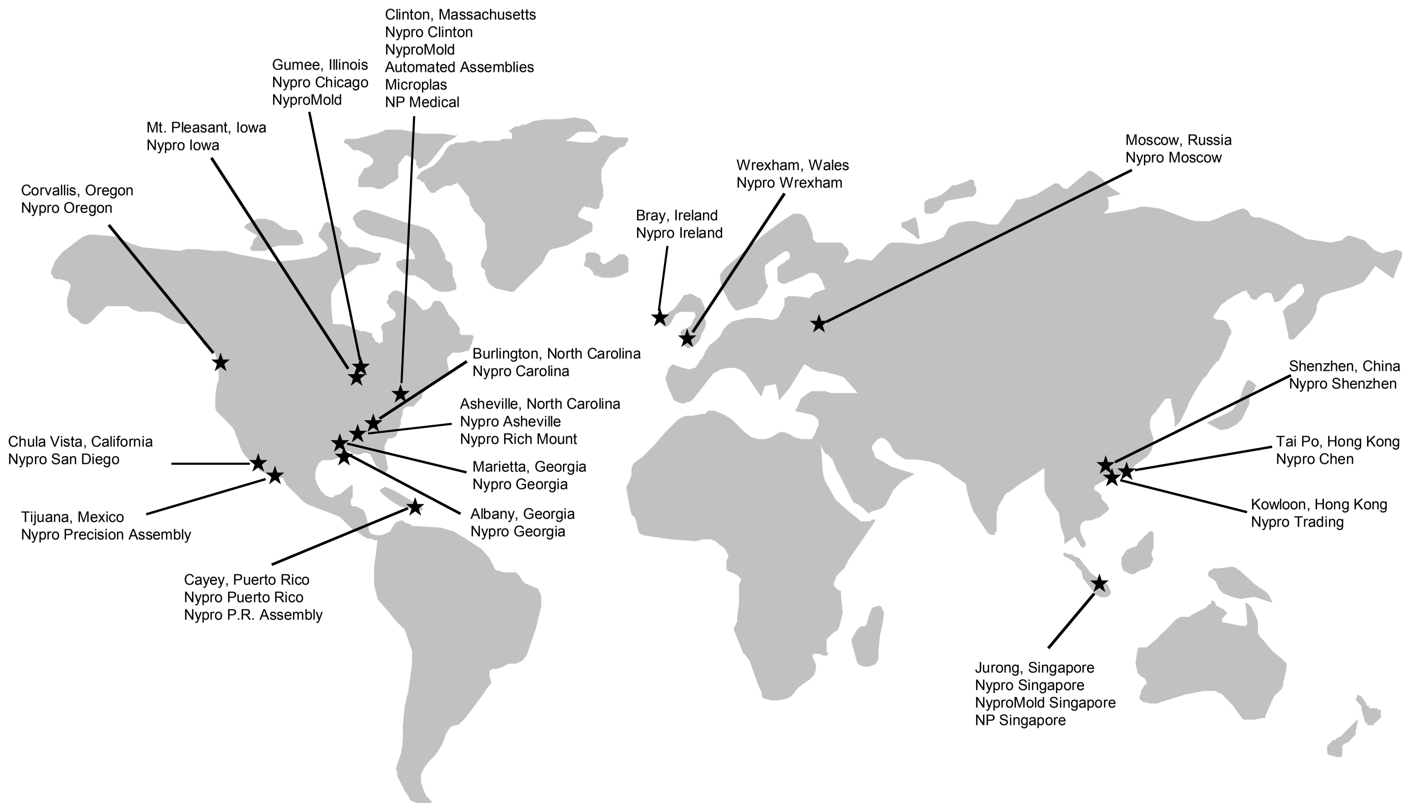

Exhibit 3 Examples of Statistics Used to Compare Plants' Performance

Nypro Plant	Machine Utilization	On-Time Shipments	Customer Return Incidents (per machine, per year)	Materials as % of Sales	% Sales Change, 1994-1995
Clinton	75%	92%	2	23.4%	13.8%
Puerto Rico	80%	97%	2.3	43.7%	-4.4%
Oregon	51%	100%	0	51.7%	NA
Georgia	70%	98%	1.4	49.7%	100%
China	65%	100%	NA	46.5%	NA
Singapore	69%	100%	.7	43.5%	10%
Chicago	49%	88%	.3	35.8%	NA
Ireland	72%	98%	.8	45.1%	21.8%

Exhibit 4 NovaPlast Characteristics (from an internal Nypro Publication)

•*What Is It?*

small machine molding

cost effective, short run, low-volume production

ultimate quality, high-precision injection molding

short lead time, low cavitation

production quantity specific

one minute mold changes

"lights out" operation

just in time deliveries

•*Scope*

prototyping, product development

market introductions

low-volume production

ramp-up to high-volume production

lower capital investment

concurrent engineering

•*Project/Product Criteria*

mold base sizes 4X5" and 6X6"

maximum cavitation = 4

1.75" maximum part height

minimum/maximum mold stack height = 5" to 10"

3-level design complexity

yearly production requirements = 1 million/year or less

material usage = 30 lbs./hour maximum

maximum part surface area = 2 to 8 square inches

Exhibit 5 Relative Costs of Nestal and NovaPlast, Indexed at 100

	Conventional Machine	NovaPlast
Capital cost	100	50
Tooling	100	25-30
Set up time	100	<1
Run time	100	50
Staffing	100	20