# case 2 The Solar Feeder

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"I guess the first thing everyone wants to know is how we came up with the idea for a solar-powered bird feeder," Bo Haeberle remarked, smiling, as he stood in the noisy assembly area. In the background, Glen Thomas continued assembling feeders, undisturbed by Bo and his two guests. In the center of the large room, lines of bird feeders, in various stages of assembly, stretched across large tables. Along one wall, three shelves were filled with beta versions of the feeder—many showing the signs of weather and squirrel attacks.

Bo related that Ed Welsh, one of Bo's friends, actually had the idea for the solar-powered feeder. Six years earlier, Ed had been watching basketball with his brother, Richard, who was an avid basketball fan. While watching one particularly difficult game, Richard, who was already upset, glanced out his window to see a squirrel assaulting the bird feeder on his recently constructed deck. Besides eating the seed, scattering it all over, and loading up their cheeks with seed to take back to their nests, the squirrels also kept the birds away and often destroyed the feeders. Seeing his brother's frustration at both the basketball team and the squirrel, Ed vowed to do something about the age-old problem of squirrels attacking bird feeders.

Bo continued,

> Ed placed a car battery near the bird feeder and hooked it up to the feeder. He then ran a line inside the house to a switch that he installed near Richard's chair. When Richard threw the switch, a charge would build up in the feeder, and if a squirrel was on the feeder or got on it, the squirrel got a pretty good jolt. The shock did not hurt the squirrels, but they sure got off the feeder quickly.
>
> This sounds pretty neat, but squirrels are smart animals. It seems that when Richard threw the switch, there was a brief time lapse before the feeder was charged. The squirrels quickly figured out if Richard was in his chair (they could see him through the window) and if they saw him move to throw the switch, they would simply jump off the feeder. This led to hilarious episodes of Richard trying to hide or to throw the switch without the squirrels seeing him.
>
> This hide-and-seek process was too much for Richard, so he just started leaving the switch on. However, the squirrels seemed to know the switch was on and would stay away until the feeder lost its charge. Then, they were back.
>
> Then, I think it was in 1996, we came up with the idea of the solar cell. The solar cell would eliminate the need for the battery, at least that's what we thought. The squirrels,

The authors wish to thank SDI, Inc., for its cooperation in development of this case and the anonymous reviewers for their constructive suggestions to improve the case. The case is for classroom discussion purposes only.

however, figured out that they were okay if they ate in the early morning before the sun charged the cell or in the early evening after the sun had gone down. So, we put a battery in the unit to keep it charged on cloudy or rainy days and in the mornings and evenings. That electronics arrangement is pretty much what we have in the solar feeder today.

"This reminds me of the old saying about the better mousetrap," one of Bo's guests observed. "Perhaps the invention of the squirrel-proof bird feeder has become man's ultimate struggle over the rodent, replacing the search for the better mousetrap!"

"That's an interesting observation," Bo replied. "I seem to remember the quotation mentioned the world beating a path to your door. I hope that happens, but I've got to come up with a good marketing plan for our feeder that builds on what we've learned over these past few years. We are also going to need some help from investors, like yourselves, if we are going to be successful."

## BO'S INVOLVEMENT GROWS

Ed Welsh had developed the idea for the feeder while he was working for Bo at Visual Design, Inc., a Greensboro, North Carolina, firm Bo founded to design retail store interiors. Bo had become interested in the bird feeder project as he heard Ed describe Richard's saga. Bo realized how much time and effort his friend spent fighting squirrels and feeding birds. When Ed added the solar device, Bo took a more active interest in the feeder.

"At first, I saw the solar feeder as a challenge—a fun problem," Bo observed. "As you get more into it, however, you realize how clever and gifted squirrels are." Prior to the solar feeder project, Bo and Ed had often gotten together on Wednesday nights for a beer and a game of pool. As they got deeper and deeper into the challenge, they paid less and less attention to the game and talked more and more about the feeder. Bo and Ed also did a little market research by visiting some local stores that sold bird feeders and talking to the stores' owners. However, they really did very little market research.

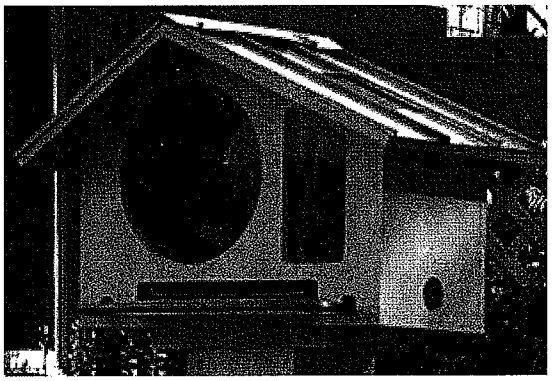
By fall 1997, things were really getting charged up. Ed took the feeder to a Habitat for Humanity auction. The feeder generated more interest than any other product at the charity auction and earned the highest price bid for any item! In early 1998, Ed took the feeder to the Bird Watch America trade show, the national birding convention. To everyone's surprise, the solar feeder won the award for the best new product.

On the basis of the product's success, Bo decided in October 1998 to begin to cut back on his other business and move towards devoting full time to the solar feeder. He joined forces with Ed, formed Squirrel Defense, Inc. (SDI) as an S corporation, and opened a small shop in Greensboro to begin production of the solar feeder so they could take orders for the product. Little did Bo know about the complexity of building bird feeders!

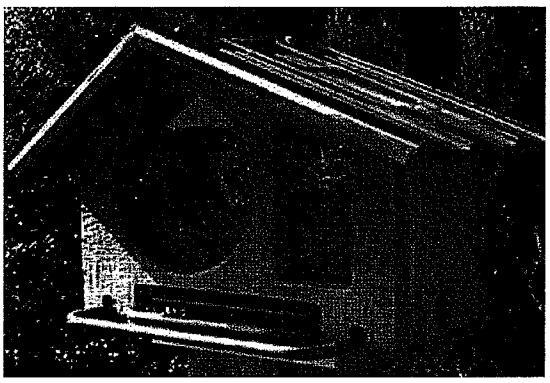
## THE SOLAR FEEDER—HOW IT WORKS

"We developed the product without an engineer," Bo noted as he showed his guests around the shop. "We've done it the way, you know, you make the thing and see if it works. And, you have to learn. If you are an engineer, you can skip a lot of steps because you know something won't work. So we've had to spend a lot of money on product development so we could move from a 'craft' manufactured item to a manufactured product that we can produce in high volume at low cost. This meant reducing our labor costs anywhere we could."

***exhibit 1*** Solar Feeder Models

Red Cedar Country Style



Town Style

The solar feeder was a unique twist on the typical bird feeder. It resembled a typical birdhouse, but it housed feed instead. Bo and Ed developed design possibilities for their product. With the help of a third partner, Scott Wilson, they decided to produce the solar feeder in two styles, "Town" and "Country" (Exhibit 1). The Country style was a western red cedar house with a copper roof. The Town style offered a contemporary appearance with its white finish and copper roof. They designed the Town style as a higher-end model for construction with Sintra, a material similar to PVC, which provided durability against the elements. The partners estimated that it cost them $90 to $100 to produce one Town solar feeder and $100 to $110 to produce one Country solar feeder. They projected that, at higher production levels, they could produce the Town feeder for as low as $50. However, the lowest production cost for the Country feeder could not be less than $85 at any production level because of the cost of the red cedar and the difficulty of working with that material.

To prevent squirrels from taking the birdseed, the solar feeder produced an electric shock. The feeder had two small copper tubes on either side that served as perches for the birds. A squirrel trying to get the birdseed would touch both of the tubes and/or one of the tubes and the copper roof. Once the squirrel completed the circuit, it received a mild electric shock and jumped from the feeder. The shock did not affect birds because their legs were made of cartilage, and they did not have sweat glands.

The copper roof had an area cut out of it that provided a place for the solar panel. Powered by the solar cell during the day and by a D-cell battery at night, the solar feeder's seed supply was protected around the clock. The unit also featured an on-off switch, so the owner could turn it off if he or she chose to do so.

"The biggest problem with the feeder," Bo noted, "is explaining how it works. We made a video that showed the feeder in action. But people don't understand that it doesn't hurt squirrels. It's friendly. Many people see the cooper tubes and the solar

panel and think there must be hot water in the tubes; therefore, the squirrels jump off because the tubes are hot."

Along with the two feeder styles, SDI produced three possible mounting options: the deck mount, patio kit, and yard kit. The deck mount allowed the owner to attach the feeder directly to the deck railing with a short post and mounting plate. The patio kit provided a longer post attached to a moveable base. The yard kit utilized a ground socket (like a very large screw attached to a post) to install the post and feeder in one's yard. This kit eliminated the hassle of digging holes to set up the feeder. The Country feeder offered one other mounting option, the planter box. It attached in the same way as the patio kit, but the base doubled as a planter box for flowers or other greenery. The mountings were available in two finishes: white, to match the Town feeder, and cedar, to match the Country feeder.

Commenting on the feeder's design, Bo pointed out,

> Sometimes people ask me why our feeders are mounted in some way versus the feeders that they have seen that hang from wires that run between two posts or two trees. We found that "squirrel-proof" feeders that are hung or suspended fail because of the squirrels' acrobatics. The squirrels jump onto those kinds of feeders, causing them to swing and send seed everywhere. We have actually seen squirrels swing these feeders until they dump all the seed on the ground.

The solar feeder came with a 30-day, money-back satisfaction guarantee and a one-year warranty on parts. Consumers had to send in a warranty card, however, to validate the warranty.

According to Scott, SDI had been "horribly back-ordered" for the last six months, to the point where the company intentionally slowed sales so production could catch up with demand. Scott commissioned a local manufacturer to perform some production tasks to reduce some of the pressure, but SDI still performed primary assembly. Even though the bird feeder was a relatively simple product, tolerances for cut or machined parts were very tight, and final assembly often involved having to make time-consuming adjustments to parts that were not in tolerance.

In addition to the difficulty of manufacturing the product, Bo learned that starting business in October caused other problems. The retailers to whom the company wanted to sell the bird feeders typically placed their orders for the year during the January through March period, using the money they had earned during the Christmas season. However, with an October start, SDI was not ready to fill large orders by the first quarter of 1999 and missed the ordering window for 1999. Therefore, the company limped along during most of 1999, filling small orders it generated here and there.

By November 1999, production had reached almost 115 feeders per month, and Scott hoped to push it higher to 200 or 300 feeders per week in the coming months. SDI sold the feeders at wholesale prices shown in Exhibit 2. Retailers set a retail price of $280 to $300 for the feeders. "Originally, I priced the feeders based on how much I wanted to make per unit—forget about what the market would pay," Bo observed. "I didn't care. If they buy it—they buy it. If they don't buy it, OK. But, if the interest and demand were there, I'd pursue the project. That was my attitude then.

"Now, my attitude is directed to what the market wants. Our Town feeder needs to sell retail at or below $150 to $160. This price is based on our competitors' prices, and how much we believe our customers will pay for a superior product. Stores want a 100 percent markup on their cost, our wholesale price. So, for a retail price of $160, I need to be able to sell the feeder to stores at $75 to $80 a unit to allow them to make a profit."

## *exhibit 2* SDI Price List and Terms

| Product | Recommended Retail | Wholesale Price | Drop-Ship Price |
|---|---|---|---|
| Original Solar Feeder | $229 | $138 | $117.30 |
| White Solar Feeder | 269 | 161 | 136.85 |
| Cedar Yard Install Kit | 47 | 28 | 23.80 |
| White Yard Install Kit | 47 | 28 | 23.80 |
| Cedar Deck Install Kit | 35 | 23 | 19.55 |
| White Deck Install Kit | 35 | 23 | 19.55 |
| Cedar Patio Kit | 58 | 35 | 29.75 |
| White Patio w/4×4 | 58 | 35 | 29.75 |
| Cedar Planter w/4×4 | 75 | 45 | 38.25 |
| White Planter w/4×4 | 75 | 45 | 38.25 |
| Cedar Mount | 13.50 | 8 | 6.80 |
| White Mount | 13.50 | 8 | 6.80 |
| Cedar 4×4×48 | 26.50 | 16 | 13.60 |
| White 4×4×48 | 20 | 12 | 10.20 |
| Cedar 4×4×72 | 43 | 26 | 22.10 |
| White 4×4×72 | 26.50 | 16 | 13.60 |

Terms and Conditions

Minimum opening order $350. No minimums on reorders.

New orders should be prepaid, COD, MasterCard, or Visa.

Our standard terms are net 30, with 1% discount if payment is made within 10 days. Terms are available after first order, with verification of references. Service charge of 1.5% per month on late invoices.

We ship UPS, FedEx, and commercial carrier. Shipping paid by buyer. Shipping charges are nonrefundable.

Damage claims must be made within 5 days of receipt of shipment.

25% restocking fee on all canceled orders.

Bo's primary responsibility was to generate interest in the product and find sales outlets for the solar feeder. The feeder won two more "best new product" awards in 1999. These awards contributed to the product's exposure and sales. For 1999, Bo reported that SDI sold 112 Town-style and 334 Country-style feeders. Bo estimated he sold about one mounting kit for each three feeders.

The partners promoted the solar feeder through trade shows to traditional and high-end birding stores, and through the company's website. They chose to promote the product to lawn and garden stores, as well as nurseries and birding stores, such as Wild Bird Center and Wild Birds Unlimited. They thought that other outlets, such as Lowe's and Home Depot, would eventually be interested if SDI could develop a cheaper model.

To distribute the feeder, SDI decided to work with several large companies that distributed garden supplies to retailers. Small retailers used these distributors' catalogs to place orders for everything from rakes to seeds. The distributors consolidated orders from one area and made deliveries, which allowed them to have delivery costs that were lower than UPS costs. The distributors had salespeople who called on the retailers to take orders and provide service.

Because SDI could not yet produce large quantities of the solar feeder, it took orders from the distributors and shipped the feeders directly to the retailers by using UPS. SDI charged about 10 to 12 percent for shipping. After SDI had shipped a feeder to a store, it billed the distributor. SDI had good relationships with the distributors and found that they paid SDI promptly.

Advertising consisted of a retro theme, with images of 1950s "mom-and-pop" people (Exhibits 3 and 4). SDI produced flyers and materials in loud oranges and greens, as well as psychedelic greens and yellows. Also, the partners created a video showing the effectiveness of the product; consumers could watch the video on the website.

"However," Bo noted, "the video doesn't download well and our website is not easy to use. We designed it for us, but we find that the typical person who buys the feeder is a 35- to 75-year-old affluent woman and typically on the higher end of that range. This person may not be handy with a computer. Thus, although our website has had good response, it's produced limited sales.

Bo believed some customers were purchasers of high-end products and were buying based on novelty and appearance. "We figured that our product would attract the bird enthusiast, preferably an older crowd of retired men and women. However, we also find that the product is attracting younger consumers who are homeowners, 30 years or older, and are typically housewives."

Bo noted that a student group from a local university had recently done some research for him. The group found a 1996 survey by the U.S. Fish and Wildlife Service and an American Birding Association (ABA) study that estimated that there were 50.4 million bird watchers in the United States. The most popular activity among residential wildlife watchers was feeding wild birds. A 1993 U.S. Department of Interior study estimated that consumers spent $843 million per year on feeders, baths, and nesting boxes.

Further, the students found that the average member of the American Birding Association was between 40 and 60 years old with an annual average income of $60,000. Sixty-five percent of the members were male, with women comprising 35 percent, up from just 25 percent in 1989. More than 80 percent of ABA members had a college degree. The five states with the most members were California, Florida, Pennsylvania, Texas, and Illinois, in that order. ABA membership had tripled in the 1990s, reaching 20,456 by 1998.

## COMPETITION

Even though SDI priced the solar feeder above some competitive products, in the partners' eyes there did not appear to be much competition. The only competition they had seen was a product called "WildBills." It was also electric-shock-based and had been dubbed the "squirrel-stinger." The feeder was dome shaped and came in two sizes, 8- and 12-port feeders. According to the

***exhibit 3*** Sample Solar Feeder Advertisement


*Source:* SDI, Inc.

***exhibit 4*** Sample Solar Feeder Advertisement


*Source:* SDI, Inc.

***exhibit 5*** Competition

WILDBILLS
squirrel-free bird feeder

As seen on TV! If you are tired of squirrels stealing bird seed, destroying your bird feeders and costing you money, a hi-tech WildBills Squirrel-Free Bird Feeder may be just the feeder for you. They electronically teach squirrels to go away and stay away. Power source—9 volt battery. We have two models available.

*Source:* Company website.

partners, it served functionality only, whereas the solar feeder offered appearance as well. WildBills was significantly cheaper, with a retail price of $89.95 to $99.95 (Exhibit 5).

Vari-Crafts manufactured a squirrel-proof bird feeder that fended off squirrels by utilizing a wire cage that permitted only small birds to enter and feed. It sold for approximately $75 (Exhibit 6).

The BIG TOP, created by Droll Yankee, had a dome top that prevented squirrels and other animals from stealing seed as well. It offered a lifetime guarantee and had a price of just $57.95 (Exhibit 7).

To the partners, these competitors did not appear to be viable opponents because the feeders were unappealing and did not offer the solar feeder's technology.

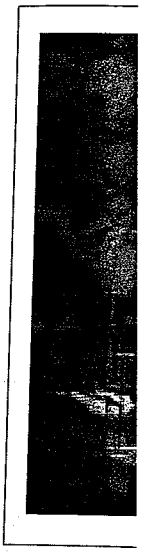
The student group had also done some research on competition. Students had visited a local specialty nursery, a large independent hardware/garden supply store, and a branch of a national home-improvement retailer. Exhibit 8 presents results of the group's research.

## LATER THAT DAY

After the guests left, Bo returned to his office. Sitting at his desk, he began to examine his financial statements (Exhibits 9 and 10), wondering how a little company like his could have all these best new product awards and orders, but no cash.

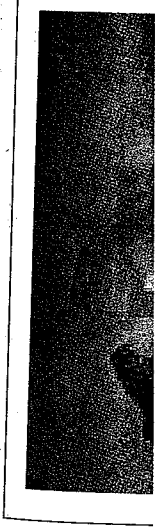
Bo heard a noise and looked up to see Ed Welsh walking into the office. Ed looked worried also. "Ed, we have a problem. Our cash flow is not where it needs to be. I don't understand it. We've more orders than we can fill, and we are still not breaking even. I need more feeders, and I need them to be cheaper."

***exhibit***



*Source:* Compa

***exhibit 7***



*Source:* Company

"I've beer
Ed responded.
else can I do?"
Scott Wils
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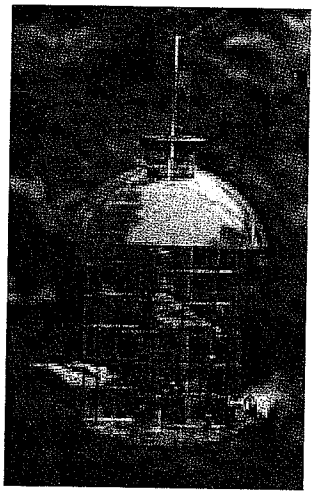
***exhibit 6*** Competition

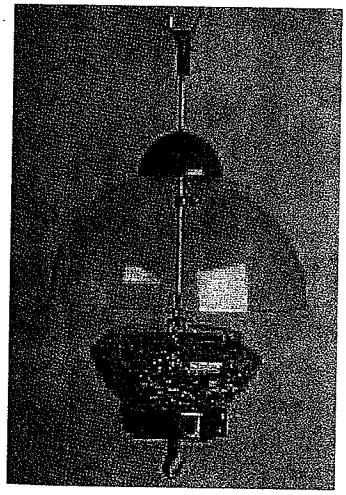


## Squirrel-Proof Bird Feeder, Vari-Crafts

Stops pesky gray squirrels from eating seed. Wire cage also allows only small songbirds access to feeding ports while excluding larger starlings, grackles, and jays. 18 lb. mixed-seed chamber requires only weekly filling for convenience. Features easy-filling screw-off top, vented seed chamber to eliminate condensation, and easy disassembly for cleaning. Small songbirds enter the wire mesh to feed at six ports. Interior tube is PVC. Hang or post mount. 60″ poll and ground socket included.

*Source:* Company website.

***exhibit 7*** Competition



## BIG TOP by Droll Yankee

The best squirrel-proof bird feeder. It is made of UV-stabilized polycarbonate, brass hardware, and die-cast metal hooks. A quality gift. A long-time favorite, the BIG TOP gives both weather and squirrel protection. The adjustable seed valve lets you offer any type of seed. By lowering the 15″ diameter dome, large birds are kept out. Hang a suet bag from the hook below. Rated #1 bird feeder by the Cornell Lab of Ornithology, "My favorite feeder is the BIG TOP by Droll Yankee." Scott Shalaway, columnist and radio show host of Birds & Nature. Lifetime guarantee.

*Source:* Company website.

"I've been looking at this feeder for six years now and have become pretty jaded," Ed responded. "At this point, I'm just putting them in boxes and shipping them. What else can I do?"

Scott Wilson walked in from the workshop just in time to catch the end of Ed's statement. "Let me guess. You are discussing our cash flow problems? Maybe we should consider the way we are taking this to the consumer. I have been working on

## *exhibit 8* Competition Survey

| Store | Manufacturer | Type | Squirrel Resistant | Lawn Appeal | Price |
|---|---|---|---|---|---|
| New Garden Nursery | Vari-Crafts | Cylinder | No | 5 | $44.99 |
| | | Caged | Yes | 4 | $79.99 |
| | Droll Yankee | Domed | Yes | 6 | $39.99 |
| | Duncraft | Caged | Yes | 4 | $74.99 |
| | K feeder | Dome guard | Yes | 4 | $22.49 |
| | Wildlife Wood Products | Classic wood | No | 6 | $42.99 |
| | ERVA | Post guard | Yes | 2 | $19.99 |
| | Heritage Farms | Classic | Yes | 5 | $91.99 |
| Fleet Plumber | Heritage Farms | Classic | Yes | 5 | $69.99 |
| | Wildlife Wood Products | Classic wood | No | 6 | $42.99 |
| | Hyde | Caged | Yes | 4 | $34.99 |
| | RubberMaid | Dome Guard | Yes | 2 | $14.99 |
| | Lazy Hill Farms | Custom | No | 8 | $299.99 |
| | | Custom | No | 9 | $549.99 |
| | Princess Jamica | Custom | No | 8 | $169.99 |
| | | Custom | No | 8 | $359.99 |
| | Other custom | Custom | No | 6 | $79.99 |
| | | Custom | No | 7 | $109.99 |
| | | Custom | No | 8 | $129.99 |
| Lowe's | Homestead | Classic | Yes | 4 | $29.96 |
| | Country Home | Classic cedar | No | 5 | $34.99 |
| | National Garden | Cylinder | No | 5 | $49.96 |
| | ArtLine | Classic plastic | No | 2 | $12.99 |
| | Others | Cylinder | No | 2 | $12.99 |
| | | Classic | No | 3 | $24.99 |
| | | Gazebo | No | 4 | $29.99 |
| Other competitive products mentioned in a *Wall Street Journal* survey published October 17, 1999: | | | | | |
| | L.L. Bean Absolute II | House | Yes | | $74.00 |
| | Smith & Hawken | Cylinder with cage | Yes | | $79.00 |
| | Good Catalog | | | | |
| | Infinite Feeder | Cylinder | Yes | | $139.00 |
| | Duncraft WildBill's 12 Port | Cylinder/ electronic | Yes | | $119.95 |

Survey as of April 2000.

Lawn appeal on scale of 1–10, with 10 being high. Represent surveyor's opinion.

*Source:* Student survey and *Wall Street Journal* article cited.

some ideas such as new brochures and advertising materials, but honestly, things just are not working in production. The feeders are expensive and time consuming to make."

"Who were those people I saw you with earlier, Bo?" Ed asked.

"A couple of potential investors I've been talking to. They're impressed with the product; but, like everyone else, they want to see a marketing plan. I told them I'm working on one.

"You remember those SCORE people (Service Corps of Retired Executives) I was working with last year?" Bo continued. "They also wanted me to write a business plan, but I really didn't know what to write. It's a little like the chicken and the egg: How can you have a plan before you have a business? A year and a half ago, I would not have been able to write a plan because I didn't know where all the problems were. Now, I know, and I think we are ready. It's time to implement our plan to increase our sales and production and to reduce our costs. These financials tell me that we don't have much time."

## *exhibit 9* SDI's Balance Sheet, 1998–1999

| | December 31, 1999 | December 31, 1998 |
|---|---|---|
| **Assets** | | |
| Current assets | | |
| Checking/savings | $ (7,308) | $ (701) |
| Loan receivable—Ed Welsh | 7,180 | 4,830 |
| Total current assets[a] | (128) | 4,129 |
| Fixed assets | 1,416 | 715 |
| Total assets | $ 1,288 | $ 4,844 |
| **Liabilities and equity** | | |
| Current liabilities | | |
| Credit card debt | $ 0 | $ (2,140) |
| Payroll expense | 2,418 | 0 |
| Total current liabilities | 2,418 | (2,140) |
| Long-term debt | | |
| Loan payable—Wayne Garrison | 2,500 | 0 |
| Loan payable—Scott Wilson | 10,000 | 0 |
| Loan payable—VID | 14,493 | 9,500 |
| Total long-term debt | 26,993 | 9,500 |
| Total liabilities | 29,411 | 7,360 |
| Equity | | |
| Capital stock | 10,473 | 9,473 |
| Retained earnings | (11,989) | 0 |
| Net income | (26,607) | (11,989) |
| Total equity | (28,123) | (2,516) |
| Total liabilities and equity | $ 1,288 | $ 4,844 |

[a]The balance sheet contained no entry for inventory.

## *exhibit 10* SDI's Income Statement, 1998–1999

| | December 31, 1999 | December 31, 1998 |
|---|---|---|
| Net Sales | $ 56,071 | $ 18,001 |
| Cost of goods sold: | | |
| Contract labor | 1,545 | 2,950 |
| Purchases | 21,170 | 8,128 |
| Total cost of goods sold | 22,715 | 11,078 |
| Gross profit | 33,356 | 6,923 |
| **Expenses** | | |
| Advertising | 5,334 | 1,353 |
| Automobile expense | 859 | 0 |
| Bank service charge* | 1,496 | 885 |
| Depreciation expense | 0 | 85 |
| Education | 149 | 0 |
| Equipment rental | 53 | 0 |
| Filing fees | 75 | 0 |
| Freight & shipping | 1,425 | 1,057 |
| Gross wages** | 19,285 | 0 |
| Payroll taxes | 1,574 | 0 |
| License & permits | 0 | 757 |
| Miscellaneous† | 2,925 | 0 |
| Payroll taxes | 1,574 | 0 |
| Postage & delivery | 408 | 0 |
| Professional fees | 1,654 | 3,425 |
| Rent | 7,274 | 5,230 |
| Supplies | 9,386 | 2,773 |
| Taxes | 548 | 0 |
| Telephone | 2,679 | 1,045 |
| Trade show expense | 2,788 | 2,015 |
| Travel & entertainment | 1,053 | 0 |
| Utilities | 979 | 287 |
| Total expenses | 59,963 | 18,912 |
| Net income | $(26,607) | $(11,989) |

*Bank service charges include credit card charges and interest charges.

**Gross wage includes wages for production workers.

†Miscellaneous charges include charges for miscellaneous materials and expenses.