Chapter 17

Light Engineering, Optitek, TBI & LSC

After the bankruptcy of Candescent I was left unemployed as were all the other ex-employees of the company. One day I was talking with Marco Slusarczuk and he remarked that he had seen a newspaper press release of a new type of motor. He said the motor was using amorphous metal, probably the met- glass that I had worked on at Allied Chemical. Ray Caamano was the inventor of the motor.

I contacted Ray. Marco Slusarczuk and his wife joined me in a trip to the countryside south of San Jose. There we found Ray and his wife in a house that they were just in the middle of building. It had a large workshop where Ray was doing all the work in putting together an electric motor for a motorcycle. Ray is an interesting guy; he is hyperactive, has minimal formal education, and he had a fascinating design concept for this motor.

His concept of an electric motor indeed utilized the very low loss magnetic material that we had developed at Allied

Chemical. I was intrigued enough to see if I could raise some money to start a company to exploit this idea. I thought of two sources of money. The first was an investors group put together by Carol Sands that did early source investing of a hundred thousand dollars or less. The second was Carl Berg. Even though Carl had lost tens of millions of dollars in Candescent, he owned an electric car company based in Mexico City. This company had never made any money but Carl liked the concept. He also owned a lithium battery company and was very interested in electric motors and batteries for automobiles. In retrospect, Carl had invested in two technologies which were to become extremely valuable in the future. He was too early. He also did not have the immense wealth and drive for something on the scale of Tesla.

I made presentations to both Carol and Carl and to my surprise, both invested in the the motor company we called Light Engineering. This was short for lightweight engines. While Ray was developing his concept of electric motors, he was making his living doing construction work, running a Bobcat and similar heavy equipment.

This construction ability soon involved our house at 11850 Upland Way, Cupertino. While we were raising money for Light Engineering and getting the technology started, we had major spring rains that flooded the hillside below our house and it started to slide downhill. There are more details in the chapter on the Upland house.

Meanwhile, work gradually started at Light Engineering. We first had a small office in Cupertino and then moved to larger

facilities south of San Jose near Gilroy where Ray lived. We were making progress and were running short of money, as always seems to happen with my companies. I went into talk to Carl Berg about this and he agreed to invest additional funds to keep us going. I remember him calling to the office manager in the back room and asking which account had the most cash. She told him the name of the account and he called to her and said write Light Engineering a check for $1 million in that account. She wrote the check, handed it to me and I walked across the parking lot to our bank and deposited it to our Light Engineering account.

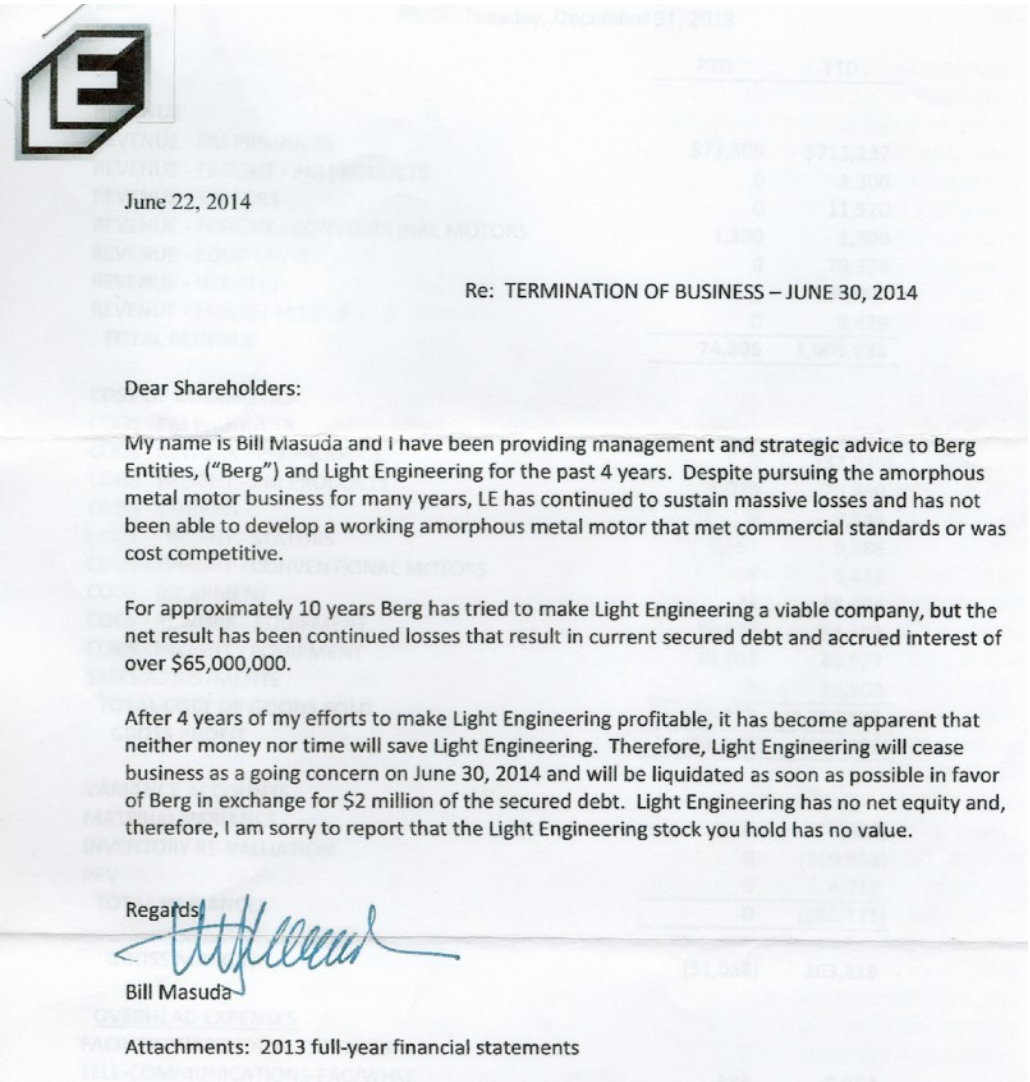
Carl, by this time, was the major investor in Light Engineering. Ray felt that he should be running the company and be the owner of any intellectual property. This ended up in a lawsuit where I was somehow in the middle of a court room in San Jose where the judge ruled for Carl and against Ray. By this time, I was the Chairman of the Light Engineering Board and we had hired a full-time engineering manager.

Light Engineering continued over the next few years to design, build and test a series of specialized electric motors, primarily aimed at the automobile industry. Carl continued to fund the company when it moved to larger facilities near Sacramento and developed a prototype electric truck. The company won a contract from the state that helped it grow to some 30 people and a large facility. We showed our motors at a few shows.

Light Engineering never developed an electric truck that was competitive with those coming online from the major manufacturers. They tried to partner with a Chinese company

to reduce manufacturing costs, but basically just transferred the technology to China and finally closed the company. I never saw the final accounting, but I believe Carl wrote off a little more than $50 million.

The final final closure. Once again Carl had supported a new technology that would not come to fruition until Tesla. Supporting all of my ideas cost Carl about one hundred



June 22, 2014

Re: TERMINATION OF BUSINESS – JUNE 30, 2014

Dear Shareholders:

My name is Bill Masuda and I have been providing management and strategic advice to Berg Entities, ("Berg") and Light Engineering for the past 4 years. Despite pursuing the amorphous metal motor business for many years, LE has continued to sustain massive losses and has not been able to develop a working amorphous metal motor that met commercial standards or was cost competitive.

For approximately 10 years Berg has tried to make Light Engineering a viable company, but the net result has been continued losses that result in current secured debt and accrued interest of over $65,000,000.

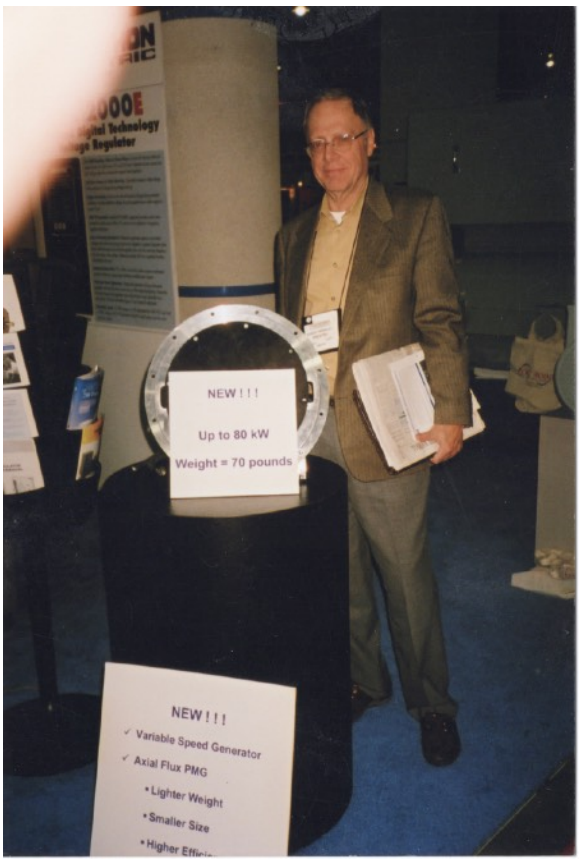
After 4 years of my efforts to make Light Engineering profitable, it has become apparent that neither money nor time will save Light Engineering. Therefore, Light Engineering will cease business as a going concern on June 30, 2014 and will be liquidated as soon as possible in favor of Berg in exchange for $2 million of the secured debt. Light Engineering has no net equity and, therefore, I am sorry to report that the Light Engineering stock you hold has no value.

Regards,

Bill Masuda

Attachments: 2013 full-year financial statements

million dollars. (but they were excellent ideas!)



Light engineering ended with this simple letter.
I did actually demonstrate our prototype products at a motor show. We did not attract much interest. Again for Carl, its was the right idea, but not enough money in a major field

It needed hundreds of millions, not tens.

I did work on a few more technical projects.

Optitek

My involvement with Optitek started as a technical conversation with Bert Hesselrink about the possibility of accomplishing very high density data storage using a laser and a bulk holographic storage approach. Bill Phillips, whom I had worked with at RCA labs was already working there.

Bert said he was having trouble making a proper financial presentation for his proposal to enable him to justify the

required funding. I mentioned to him that John Phillips and I had developed the complete financial computer system using an Excel spreadsheet.

John and I have been friends since our sons were in high school together. John had been a CFO for several large companies. He was afflicted with post polio syndrome and a while back, was forced to retire from the technical company he was then working for.

I had casually shown him the relatively simplistic program we were using at XMR and suggested that since the had nothing to do for a while, he might make this program into a proper financial package. A couple years and a few thousand hours later, he indeed had made this program into a beautiful financial package. I worked with him on the structure, mainly on the input section, and we spent many hours debugging the program. John said that having a project during the year after he had been forced to quit his regular job probably kept him from becoming an alcoholic.

I used this financial program with several companies over the years. It was so complete that it was never challenged by the financial advisors to any potential investors.

I showed this program to Bert and we inputted his views on cost of a product and what the product could be. After one long afternoon we had completed a financial business plan. He showed this plan to the potential investors with whom he discussed the project. They invested.

I ended up on the Opttitek Board of Directors.

The Optikek technology was actually successful, but its use required a major modification of the existing input and output logic that was already in existence for digital storage on a disk or a chip.

This existing storage technology just kept getting better year after year and ultimately the advantage of the Optikek approach was not enough for him to obtain additional funding. They quietly closed down.

TBI

My middle daughter, Mary, met and married Jay Vyas a co-worker at Barra, a high tech software firm. Dr. Girish Vyas, Jay's father, is a professor at UCSF and had done some major scientific work on a cure for Hepatitis B.

He had a novel concept for fighting the Aids virus. His concept was to use sterilized Aids virus to inject in rabbits and later humanize their resultant immunigen. I know nothing about the medical field, but the logic of his approach was attractive and I both invested and joined him on the TBI board of doctors.

We raised about $1 million and started the experiments in cooperation with UCSF. The initial results were encouraging, but not sufficient to the extent that we could raise the several millions that would be needed for ongoing experiments

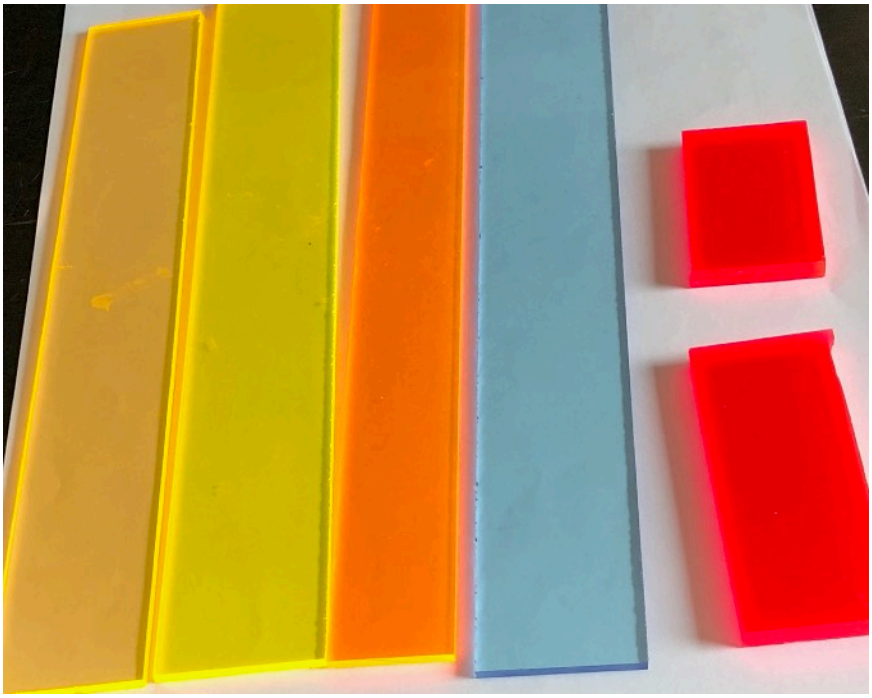
We formally closed the company, but Girish continues the research on his own. Girish is a consummate scientist.

Solar - N

Let me start this chapter with a little bit of the reason why we became interested in doing something in the solar energy field. My technical friend, Jerry Torrence, and I have been working together on various consulting projects since he retired from his job at IBM laboratories. We had both been following the advances in solar energy and became convinced that there was one type of solar energy collection that was not being investigated.

This was called Luminescent solar collectors. (LSC) Let me give you a primer and why we thought this was possibly a good approach.

Luminous solar collector samples



Sunlight strikes the earth with an intensity of some 1000 W per square meter. To be useful in generating electricity this must be intercepted by solar cells, which indeed convert the light to electrical energy. These cells, however are quite expensive. It would presumably be very efficient to somehow collect the sunlight on far fewer solar cells and obtain the electricity at a lower cost. This had been attempted with mirrors and lenses, but these systems all require expensive movable elements to keep the sunlight on the solar cell.

There was one system that did not require movable elements. This was called a luminous solar collector or LSC. In LSC, the sunlight is absorbed in a thin plastic layer containing organic materials which would fluoresce in all directions. A majority of this fluorescence can be captured in the plastic material by total internal reflection and will end up coming out the edges of the material. It will be far more intense on the edges and would require fewer solar cells to generate the

same amount of electricity. We did some quick calculations and decided we should do some experimental work. We called this company Solar-n.

There are many fluorescent dyes available in plastic sheets. They are mainly used for advertising signs. But they do accomplish the energy collection. When the sunlight hits the plastic, some of the light is reflected from the surface, some of the light is transmitted through the plastic without being absorbed, but some of it is absorbed by the dye in the plastic. This admits photons of a certain color, some of which escape through front and back surfaces of the plastic, but most will propagate by total internal reflection of the larger sheet of plastic, the more fluorescent energy will be concentrated on the outer edge of the sheet. This edge can be quite thin and therefore the intensity can be much higher than that of the sun hitting the surface.

Jerry Torres that I started a few experimental investigations in 2007- 2008 timeframe and purchased some sheets of plastic with various colored dyes. The red plastic turned out to be the most efficient as it absorbed more of the solar radiation and admitted efficiently. A plastic sheet that absorbed the full visible and emitted in the infrared would be better, but no manufacture was producing a fluorescent shape that no human could see.

It is important to protect the surface to obtain efficient total internal reflection and optimal location seem to be between the two panes of a dual pane window. We could balance the dyes to have great absorption and put photocells around the edges to fabricate a window which would generate electricity

while still letting in a good bit of the light. We went so far as to contact a patent attorney and invest a few thousand dollars starting an application. Eventually we decided the idea was not valuable enough to complete the patent application due to the various objections our fairly inept patent attorney raised.

About this time an old friend from RCA labs named Istvan Gorog became enthused about our project and contributed a large number of measurements and theoretical calculations to determine what the efficiency limits might be and what kind of cost projections could we make.

Conventional solar cells are rated by their cost in dollars per watt. The best and most reliable come from a company called Sun Power and they are the order of two dollars per watt. We did many calculations with different configurations and different diets and detectors and were convinced we could make a system twice as efficient.

Eventually we looked at the cost reductions being made by conventional silicon solar cells as they continue to improve their manufacturing techniques and decided that it was very unlikely that we could get funding for what was essentially a niche market. We wrote a couple of applications to the military for specialized uses and cowrote a proposal with Michigan State University to the National Science Foundation.

Nothing was funded, but we still have some beautiful fluorescing plastic sheets. Jerry has retired from technology and is traveling in Scandinavia when not in Palo Alto. Istvan is

spending time in Hungary and the United States. I donated all of our material and data to MSU which has some interest in the field.

There were a couple more startups that don't deserve a write up, but I like the look of their stock certificates.

Benzing Technology was a semiconductor processing company and Angstrovision was a computerized machine tool company started by Lev Dulman, a crazy Russian friend.

These were the last of my scientific projects.

So far!