



Chicago-Area Manufacturer Installs One-of-a-Kind Geothermal Energy System.

On Friday September 3rd, Multifilm Packaging Corp., in Elgin, IL celebrated the grand opening of its Geothermal Process Cooling & HVAC System. The dedication marks the completion of a project two years in the making that uses geothermal energy to an extent that has never been used before in North America, significantly lowering the company's energy consumption.

Multifilm is a manufacturer and converter of flexible packaging films for candy and snack foods. The company produces polypropylene and polyethylene films, and then prints, metallizes, and laminates the films and sends rolls out to food manufacturers in North and South America that pack anything from chocolate bars to coffee. The company specializes in twist wrap films for Starlight Mints, and the likes, and over 55% of the company's business is exported. The company was owned by a large Austrian packaging conglomerate since its foundation in 1982, but a management buyout in 2008 gave the company the opportunity to aggressively invest in some much-needed equipment upgrades. The volume of film produced has since increased substantially, putting a strain on the company's cooling capacity.

The processing equipment generates a lot of heat, and cooling is needed in virtually every step of manufacturing, from extrusion, to printing, laminating, and metallizing the film. Cooling comes from chillers, which work like large, energy-consuming refrigerators that contain Freon and compressors. Chillers cool water-loops, which in turn cool the machinery. Multifilm's 300-ton chiller was getting old and the logical step was to replace the old chiller with a new, more efficient chiller that consumes roughly half the energy of its predecessor, but the company wanted to go one step beyond.

"We had to get rid of the old chiller anyway," explains Olle Mannertorp, Multifilm's CEO, "and this was the perfect opportunity to try something different and to make a substantial impact on our energy consumption and our carbon footprint. Geothermal emerged as a much smarter solution." Mannertorp points out that while combinations of heat pumps and natural bodies of water in a closed-loop system has become relatively common, Multifilm's use of geothermal energy to cool processes and for HVAC purposes is probably unique in the country according to ComEd, the local utility (which provided grants for the system). "Of course, in an ideal world we would create a lake and put down coils and heat pumps, but we're a smaller company, with limited funds and property to work with," explains Mannertorp.

The basic process started in late 2008, with the hiring of European consultant Clive Maidment. With extensive experience in water and energy management on multiple continents, Maidment worked closely with Mannertorp and David Rohrschneider, the company's COO. Together, they outlined the company's needs and drafted a rough outline

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of the components needed. The design stage took several months, and with each iteration, the team realized more potential in the system than they initially thought. “At first, we were just replacing the chiller to cool our equipment,” says Rohrschneider. “But the more we thought about it, the more it made sense to cool and heat our plant as well.” The latter part is the unique aspect of the company’s system, which, in essence, is very simple: pump water out of the ground at a constant 52° F, use it to cool the plant and the machinery. In the winter, use the heat generated by the machinery to warm the plant. The water is pumped back into the ground, but completely untouched. “We pay for all this energy anyway – it makes no sense to waste it,” says Mannertorp.

The first physical step came in May 2009 with the drilling of an exploration well to look for water. “With our close proximity to the Great Lakes, we knew there was water on the property, we just didn’t know at what depth,” explains Maidment. “We drilled a 365 foot test well, and hit the aquifer at about 280 feet.” Several tests confirmed that Multifilm had a flow of about 400 gallons per minute (gpm), more than plenty to proceed with the system. More wells were drilled over the next few months, and all in all, the company ended up with three production wells that supply the water, and four rejection wells to pump it back into the ground. The wells are on the opposite ends of Multifilm’s property so as not to interfere with each other and create a balanced loop. The wells were initially 6” in diameter, but once the air-conditioning phase was added to the design, an 8” production well was drilled to assure that enough water could be abstracted.

Groundwater management is an important aspect of a system like this, and Maidment’s expertise became crucial in the aquifer evaluation stage. “Even though it is a closed-loop system, the manner in which we abstract and control the aquifer is very important,” explains Maidment. “Water quality also in something to check closely - too much sediment will constantly clog the system, and the presence of certain parameters, like sulfur and iron bacteria, will cause problems for the system very quickly.”

The design phase of the system took several months of translating needs and ideas into a workable blueprint. This was a great learning opportunity for Multifilm, and the chance to tweak the design of the system. Rohrschneider explains: “Initially, we ‘thought small’, but started ‘thinking bigger’ as we developed the blueprint. Geothermal can be so flexible, you can basically make it do whatever you want.”

The blueprint for the system was translated into a physical reality by local service company. Heat exchangers, pump motors, filters, valves, and airhandlers were connected by thousands of feet of copper piping throughout the plant. This process lasted close to four months, and was probably the most challenging part of the installation. “With limited resources and a finite space, we had to come up with some creative installation solutions to make it all fit,” explains Rohrschneider.

The loops were completed in April 2010, and tested and tweaked extensively to make sure that the water flow and temperatures were adequate. One by one, the machines were disconnected from the old chiller and connected to the Geothermal system, starting with the extrusion equipment and finishing with the printing presses in mid-June. Initially, the

system ran in manual mode, but a month later, the logic had been optimized enough for the process to run automatically.

So far, the numbers on the energy savings look impressive. The initial estimates indicated a savings of up to 40% of total energy consumption, and close to 80-90% on the chiller process alone. "Preliminary numbers from July seem to indicate that we are exceeding our estimates," explains Mannertorp.

While the initial numbers are beginning to look impressive- the up-front costs are not insignificant. "The initial cost estimates for the system were about three times the cost of just replacing our old chiller," explains Rohrschneider, "but those costs must be looked at in association with reduced maintenance, significantly lower energy costs, and all the benefits brought about by changing a system throughout the plant which had reached its end of life".

Close to 25% of the cost of the system will be given back to Multifilm in form of Federal grants, as well as grants from the local utility, ComEd. In addition, maintenance costs are significantly lower.

"In theory, the system should last indefinitely," explains Rohrschneider. Anything that will eventually fail, such as pumps, valves, and heat exchangers, can be easily replaced. Unlike a traditional chiller system, with Geothermal there are no big-ticket items that can break and cause the company to abandon the system. "All in all, we are looking at a 5 year return on investment," says Mannertorp. The company is also growing, which further helps cut the ROI estimate. Additionally, being a pioneer is never cheap and easy, and Mannertorp suspects that a similar installation could be done quicker and more economically with the knowledge that the company gained from the experience, which they are happy to share. "Green initiatives like our Geothermal system help protect both our industry and the U.S. economy," says Mannertorp. "We are not secretive about the project and encourage other manufacturers to learn from us and also reduce their carbon footprint. In the long-run, everybody benefits."

Looking back, Rohrschneider and Mannertorp believe they made the right decision, and not just from a sustainability standpoint. "Of course, we have drastically reduced our carbon footprint and cleaned up our process significantly," says Mannertorp. "But that's not the whole story – this makes sense environmentally and economically. We have lowered our costs, which makes us more competitive and increases profitability, which encourages investments, which safeguard the future of our company, our employees and their families. In retrospect, I can't see how we could have afforded to not install this system."

Sidebar:

The ribbon cutting was handled by Illinois Congressman Bill Foster (14th district), and Ed Schock, the Mayor of Multifilm's hometown of Elgin. Olle Mannertorp, Multifilm's President, started the Grand Opening by saying that "Manufacturing is, in my eyes, the backbone of our country, and the key to success is simply to do things better, smarter and cheaper than your competitors. That in turn requires investments in people and equipment to constantly

improve productivity and lowering of cost and energy conservation is, and will be, an important tool for American manufacturing to stay ahead of the game.”

After the ribbon cutting, the Congressman Foster and guests (which included local and national customers, suppliers, and members of the press) got a detailed tour of the facility.

Congressman Foster, a keen supporter of industry and environmental causes, at the conclusion of the tour said “As a scientist and businessman, I am pleased to see this innovative company setting the bar for energy efficiency for other manufacturers by embracing geothermal energy. This technology will lower their operating costs and minimize their environmental impact, helping Multifilm to better compete in the global marketplace.”

Mannertorp agrees, concluding that “ecology and economy go hand in hand.”

For more information, visit www.multifilm.com.