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The Value In EnWave's REV Dehydration Technology Is The Speed By Which It Can Dehydrate Food And Pharmaceuticals, Saving Time And Costs

Life Sciences - Healthcare
Food/Pharmaceutical Dehydration
(ENW-TSXV)

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John McNicol
Director, President and Co-CEO
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BIO:
Mr. McNicol is a senior executive with a proven track record of building high-growth companies from start up through to rapid sales growth. Prior to joining EnWave, Mr. McNicol was President and COO of Concert Industries Ltd., a global supplier of ultra thin absorbent materials for the personal hygiene market. Under his leadership, the company's annual sales increased from $12.8 million to $110 million, EBITDA increased from $2 million to $20 million, and market capitalization grew from $15 million to $300 million. Mr. McNicol also served as President and COO of Merfin International Inc., spearheading consolidated sales growth from $3.5 million to $100 million in eight years. Throughout his career, he has worked in corporate finance, the brokerage industry and the accounting profession. With a track record of financing start-ups, and building revenues, management teams and business partnerships, he has earned a solid reputation for his execution-focused management style.

Company Profile:
EnWave is an innovative health sciences R&D company developing a new industry standard for food and pharmaceutical dehydration. Our goal is to provide manufacturers with novel technology that is faster, more cost-effective, and produces a higher quality end product than freeze drying.

Our current technology dates back to 1996 with the development of the first Radiant-Energy Vacuum (REV) machine at the University of British Columbia for dehydrating food and nutraceuticals. Since then, we have gone on to produce a number of better, more efficient designs; tested them on a wide variety of food products; and developed a new, highly controlled machine to dehydrate liquid pharmaceuticals.

We now have three distinct divisions of the company: ***bio*REV** and ***freeze*REV** for liquid pharmaceutical dehydration; ***nutra*REV** for food dehydration; and ***powder*REV** for the dehydration food cultures such as probiotics and enzymes. Our ***bio*REV** and ***freeze*REV** technologies are undergoing prototype testing by a pharmaceutical partner to establish baseline data for comparison with freeze drying. Commercialization of ***nutra*REV** may begin as early as 2008 if our current commercial-scale testing proves successful. Our *powder*REV technology is currently in the proof-of-concept stage. Our goal is to become the "gold standard" for dehydration in both the food and biomedical sectors.

Interview conducted by:
Lynn Fosse, Senior Editor
CEOCFOinterviews.com

CEOCFO: Mr. McNicol, you have a long track record of building high-growth companies; what attracted you to EnWave?
Mr. McNicol: "I met Dr. Durance, who was working with the University of British Columbia on a technology that dehydrated medical materials. I had a lot of experience applying drying technology to create ultra-thin feminine pads and diapers for large companies like Proctor & Gamble and Kimberley Clark. We really created a new standard in those markets. When I met Dr. Durance and saw the technology he was developing, I came to believe that we could take the technology to the next level of success using my global commercial experience."

CEOCFO: Would you tell us a bit about the technology?
Mr. McNicol: "We call our technology REV, which stands for Radiant-Energy Vacuum. It is a microwave-assisted method for rapid dehydration inside a vacuum. It is designed for both the food and biomedical industries. Our vision for the company is to create a new global standard for dehydrating food and live

pharmaceuticals, and to replace the conventional method called lyophilization or freeze drying. Our strategic plan is centered around the creation of technology platforms to compete in the areas where freeze drying is used the most."

CEOCFO: What is the difference between the technology being used now and your technology?

Mr. McNicol: "Lyophilization has been around for fifty to sixty years, so it is a relatively old technology. Typically the materials are dried in large batch systems, which can take anywhere from one to five days of processing time. It is a very slow, expensive process: capital investment is expensive, as well as the energy costs of dehydration. Materials are dried in large batches so if you have a problem on the processing line, you can create a lot of wasted product. REV technology, on the other hand, is designed to allow for the preservation of nutritional value in food or bioactivity in live pharmaceuticals. Through extensive testing, we have also proven that REV can extend shelf life, reduce the cost of refrigeration, and process materials in a much faster timeframe. Processing using REV technology can be completed in minutes versus days, which significantly reduces the energy cost associated with dehydration. Additionally, our technology would run on a line which allows for continuous processing, not batches, and it has been designed for seamless plant integration."

CEOCFO: Will you explain dehydration in vaccines and antibodies?

Mr. McNicol: "Liquid vaccines generally have a very short shelf life at room temperature, a matter of hours in most cases. In order to maintain shelf life, constant refrigeration is required. In the pharmaceutical industry, this is known as the "cold chain", and it is a major cost and logistics burden. By dehydrating vaccines, shelf life can be significantly extended without the need for refrigeration. In this industry, freeze drying is being done to some extent, but it is a very expensive process in terms of energy consumption and capital outlay. Our latest tests indicate that the REV process can increase the shelf-life of a rotavirus vaccine to over five months at 37 degrees, where the only available freeze dried rotavirus vaccine lists a shelf life of one week at that same temperature."

CEOCFO: Where are you in the process?

Mr. McNicol: "We have three primary markets where we have developed our technology. The first is in the fruit and vegetable market with our platform called *nutra*REV. After perfecting a smaller batch unit at the University of British Columbia, we now have our very first commercially designed line in the CAL-SAN Enterprises, Ltd. blueberry facility in Richmond, British Columbia. This will be our first chance to test a continuous line capable of producing approximately 100 kilograms per hour of dried materials. We have gone through the first stage of providing a quality product at smaller scale production, so we are now modifying the equipment to move to the next stage of testing at a commercial level, with the goal of selling the equipment to CAL-SAN.

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Our second focus is in the vaccine and antibody market. We actually have two platforms. We have *bio*REV, our original platform, which dehydrates vaccines and antibodies above the freezing level using a combination of vacuum and microwave energy. We dehydrate the vaccines and antibodies typically between eight and fifteen degrees Celsius. Because the temperature remains above freezing, damage to highly sensitive materials can be avoided. We also have a technology called *freeze*REV, which we just announced. With this method, the vaccines and antibodies are dehydrated in a frozen state. It is a microwave-assisted version of freeze drying, but again it is much faster than conventional freeze drying. We are currently working with a partner in the United States called Aridis Pharmaceuticals from San Jose, California. They are experts in the science of vaccines and antibodies, and they have a number of their own products in development. We have been working closely with them to prove that our technology meets the pharmaceutical industry requirements. Our next goal is to look for commercial partners who wish to improve their operations with this type of technology, and to collaborate in building commercial scale technology that meets their needs.

The third platform is for probiotics and enzymes, which are basically bacteria and other proteins are used for enhancing the nutritional value of food. The biggest use of probiotics is in yogurt, where bacteria is added to improve the digestive system. These materials are part of a very large and growing market, and we have developed REV technology that can process probiotics and enzymes in a powder form. The early-stage of this technology is called *powder*REV and we are presently working on the first prototype. *powder*REV will use the same basic technology that we have designed for other platforms, but will deliver a bulk powder product conducive to this market. We have done some testing in this area as well and have had some very promising results in terms of the process. Our goal would be to find a partner in the industry who wants to take this to the next stage."

CEOCFO: Would you be actually selling the equipment or licensing the technology?

Mr. McNicol: "A combination. We make our prototypes and equipment and we will continue to do that. As we collaborate with more sophisticated partners in the pharmaceutical industry, for example, we will look at other parties to help us build the equipment. Overall, our primary future goal for revenue recognition is going to be through royalties on licensing our technology. We have a very comprehensive patent position. Some of our patents have been filed and some are pending on a wide range of technologies that apply to

both the processing method as well as the equipment. Our goal is to license the technology with the royalty stream and ultimately get a strategic partner to lower the costs of building equipment and meeting the needs of global customers."

CEOCFO: Why should companies be interested in your innovation?
Mr. McNicol: "First of all, in the food industry we have a partner that has invested significantly in his own facility to support the first *nutra*REV installation. He believes that our technology is the key to success in the dried berry market. The project will allow us to showcase our technology in a commercial setting, and to prove the benefits of *nutra*REV over freeze drying. In addition to having more controls on the look and feel of the final berry product, our early tests have indicated that operators could save up significant amounts in energy consumption.

Entry into the pharmaceutical industry is a medium-term prospect. However, we had some testing and discussions with a number of industry companies and it is clear is that no one in the industry is happy or satisfied with either the method or cost of lyophilization. We are not dealing with an industry that has a great system that everybody really likes. We are dealing with an industry that begrudgingly works with a lot of cost and effort. They are all very interested in learning about a method that can significantly reduce their cost and improve the speed of processing. So far, we have been very selective in the companies that we have approached because we want to proceed with this in a strategic way. So far I am pleased with the response."

CEOCFO: What is the financial picture like for EnWave?
Mr. McNicol: "We have been raising smaller quantities of money gradually over the years because we are still a small company with a fairly low stock price. Right now we have just under $1 million in cash from the financing completed this past June, and our burn rate now is pretty small; around $100,000 a month. We also have a grant that came in from the National Research Council of Canada and there are still a few hundred thousand dollars of that left that we are using in to develop the technology.

We are expecting to sell our first commercial *nutra*REV machine in the fourth quarter and that will mark the beginning of the company's revenue generation phase. We also have a number of other projects in the pipeline that we have been working. So over the course of the next one to three years we will be building cash flow from the food industry and developing revenues on the pharmaceutical side after that. As we build collaborations in the pharmaceutical sector, there are other methods of funding that we will look for."

CEOCFO: Will you elaborate on the energy factor?
Mr. McNicol: "The key for that with our technology is speed. You can process materials in minutes. Our food processing takes about fifteen to thirty minutes depending on the type of material, including a pre-drying step. A batch unit that you would have in a typical blueberry freeze drying operation would take about 24-hours. The speed of dehydration significantly reduces the energy required to process materials, and so your energy per pound of production is substantially lower. The same applies in the other area where there is a vaccine or a probiotic; you have very fast processing which will reduce the time required, and therefore energy, to dry the material."

CEOCFO: Are there regulatory agencies involved for the different industries you are with?
Mr. McNicol: "In the food industry, microwave technology has been used for years, so there are no new food regulatory requirements. In fact, we can produce and sell a berry right now that we have developed for CAL-SAN. In the vaccine area there would be requirements for FDA approval. We fall under an area called Good Manufacturing Practices. What happens is any company that is looking to bring in a new manufacturing process needs to prove to the FDA that this technology is not going to alter or damage the materials that they are processing. Obviously, if you alter the materials in any kind of significant way you may require additional testing of those materials. If you don't, then it would be a faster process to get through. That area is a step that would be taken after we establish some traction with a partner on the commercial side."

CEOCFO: In closing, why should potential investors take a look at EnWave?
Mr. McNicol: "In my experience, I have built large, successful companies from the early stage to $100 million in sales and a significant improvement in market capitalization. So, you have experienced management who have grown companies in the past. Also, EnWave has an excellent technical partner, the University of British Columbia. UBC is a highly regarded university and their resources have gone into EnWave`s technological developments.

Because we have several types of technology, we have access to multiple markets which allows us a diversification of risk. We are likely to see increases in EnWave's market value from selling our first commercial food technology, and from building collaborations with global manufacturing partners. If we have successful companies partnering with us, I think that will send a clear message to the market that this technology works and that it is capable of replacing freeze drying in our target markets."

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