

Eichrom Technologies: Lessons learned from a successful high-tech startup

According to the U.S. Small Business Administration, about 60 percent of new companies fail within six years. One that has succeeded and grown is Eichrom Technologies LLC, founded in 1990 to commercialize chemical separation technology developed in the Chemistry Division at Argonne National Laboratory. The story of the company's founding and early travails provides insight into key issues faced by high-tech start-ups and illustrates resources available through U.S. Department of Energy (DOE) laboratories, such as Argonne, that can help smooth some of the bumps.

Key to success is the need to solve customers' problems. Eichrom's initial products grew out of a problem Argonne faced in the mid-1980s: The need to find a faster way to perform urine and fecal analysis for employees who worked with actinides, the heaviest metallic elements. A portion of Argonne's research, then as now, deals with the nuclear fuel cycle and involves separating actinide elements for recycling and to reduce the volume and toxicity of nuclear waste.

"At the time, bioassay results could take months to be completed due to lengthy procedures and a large backlog of samples waiting to be analyzed," said Phil Horwitz, whose research led directly to Eichrom's first products. Horwitz worked for Argonne for decades. Retired from Argonne, he now works part time for Eichrom.

Because of his nationally recognized experience in actinide chemistry, Horwitz was named to a committee Argonne formed to investigate faster bioassay methods. He and his team had recently developed a successful actinide separations process, called TRU EX, to help remove the long-lived actinides from high-level wastes at the U.S. Department of Energy's Hanford Site.

"After some discussion," Horwitz said, "it became obvious that the TRU EX process already contained all the necessary basic chemistry for rapid bioassays. We just needed to modify it to use a chromatographic method."

Chromatography is a common method used in analytical labs around the world. In a typical



RESIN BEADS – Chemist Phil Horwitz (left) and Mike Fern, president of Eichrom Technologies LLC, display the raw resin beads that are turned into the company's flagship products, chromatographic columns used around the world for rapid bioassays.

chromatographic analysis, a liquid containing a mix of chemicals is poured into a glass or plastic column filled with resin beads. As the mixture flows down the column, chemicals attached to the beads extract specific chemicals from the mixture.

Horwitz hired a summer student — Mark Dietz, who today is a scientist in Argonne's Chemistry Division — to help develop the process. The result was TRU Resin. "TRU Resin can determine all the actinides in a sample," Horwitz said. "It proved so fast and effective that it saved Argonne millions of dollars in labor costs."

In addition to TRU Resin, Horwitz's team also developed Sr Resin and UTEVA[®] Resin. These three resins offered significant breakthroughs in the analysis of actinides and radioactive strontium. "Sr Resin was so effective and so superior to other methods," Horwitz said, "that Argonne's analytical lab wouldn't use any other method for strontium analysis."

Word of these resins spread quickly through the national laboratory system. Soon other DOE

laboratories began to request the materials, and Argonne began to supply them. "But we weren't funded for manufacturing," Horwitz said. "As demand grew from labs around the DOE system, we had to find another way to produce them."

Aware of the resins and the growing demand, ARCH Development Corporation, Argonne's technology transfer arm at that time, recognized that all the key elements were in place to found a new company. The result was Eichrom Technologies.

"The company name," said Eichrom President Michael Fern, "is an acronym that Phil Horwitz created: Extraction Ion exchange Chromatographic Materials."

Fern has been with Eichrom since its founding. He was named Eichrom president in November 2006. He offers the following advice to entrepreneurs who plan to build a business around new technology: "Raw inventions are usually not ready for prime time. It's your job to get them ready. You have to develop and test prototypes, round off the rough edges and make them user-friendly."

In radiochemical separations, he said, Argonne's inventions were a big breakthrough. Eichrom's first customer was Argonne's bioassay laboratory, which had already applied the resins to bioassay problems. Argonne knew how to use them, but most potential customers didn't.

"We had useful products," Fern said, "and our potential customers saw their value, but the customers had to figure out for themselves exactly how to use them. Sales didn't really take off until we made the commitment to develop and validate specific methods and procedures for customers to use our products. We had to make the process turn-key for the customer."

To develop the necessary procedures, Eichrom formed a cooperative research and development agreement (CRADAs) with Argonne. CRADAs are joint research agreements in which participating organizations contribute resources – some combination of funding, staff time, access to equipment or facilities, etc. – to conduct research in which all parties have an interest.

The CRADA helped Eichrom develop a series of ready-to-use methods for the separation and analysis of actinides, fission products and toxic metals. Eichrom rented and equipped laboratory space on the Argonne campus, where Eichrom scientists developed the

protocols with Argonne's Dietz serving as consultant. The U.S. Department of Energy (DOE) provided about \$500,000 in support funding, and the resulting procedures have since saved DOE laboratories many times that amount in faster, more efficient and less costly analyses and bioassays.

"The analytical resin products," Fern said, "have been profitable almost from the beginning. Sales in 1990, our first year, were about \$26,000. By 1995, sales were over \$1 million. In 2006, revenues exceeded \$6 million."

"The resins Phil and his team developed are still our flagship products," said Fern. "We've also improved our quality and customer service quite a lot over the years. Today we estimate that more than half a million analytical procedures are carried out annually using at least one Eichrom product."

Since then, Eichrom has established its own development and testing laboratory and moved to the forefront of new product development and commercialization in the areas of radiochemistry, geochemistry, hazardous metals analysis and environmental screening for dioxins and related compounds. The company has been 100 percent owned by investment company GCI since 1998.

Today, Eichrom's product and service offerings have grown well beyond the original resins. The company has about 30 employees, split fairly evenly between the United States and Europe, where the company sells radiochemistry products, manufactured in Illinois, and operates a laboratory in France to analyze radioactivity in drinking water. Eichrom is also introducing a new product for the rapid analysis of dioxin in the environment and other samples.

"Eichrom continues to grow," Fern notes. "We have added significant new products and services to our initial line of resins. But we know we wouldn't be where we are today if Argonne and the Department of Energy hadn't been there for us in the beginning."

For more information, please contact:

Eleanor Taylor
Phone: 630-252-5565
E-mail: etaylor@anl.gov

July 2007



UChicago
Argonne LLC



Argonne National Laboratory is a U.S. Department of Energy laboratory managed by UChicago Argonne, LLC