

New Life

FOR AN

Old Lab

Commercializing a DOE Laboratory

The story of McLinc, which grew from a support laboratory at Oak Ridge to an employee-owned, commercial, applied research and materials testing laboratory offering services to both government and commercial clients.

By Barry A. Stephenson

On April 1, 1998, Materials and Chemistry Laboratory Inc. (McLinc) began business as an employee-owned, commercial, applied research and materials testing laboratory offering services to both government and commercial clients. The laboratory had previously been a support laboratory to the U.S. Department of Energy's K-25 gaseous diffusion plant in Oak Ridge, Tenn. When the DOE halted uranium enrichment at the site, the laboratory was expanded to an environmental demonstration center and served from 1992 until 1997 as a DOE environmental user facility.

In 1997, after declaring the laboratory surplus, the DOE made it available to the employee group who had operated the laboratory for DOE as a government-owned, contractor-operated facility. The employee group

established the business with some success. Lessons learned and changes they made could facilitate future attempts to make similar transitions.

A DOE LABORATORY

Building K-1006 was historically used as a multiprogram laboratory facility, providing technology development and operations support to the uranium enrichment process at the Oak Ridge Gaseous Diffusion Plant (K-25). In the mid-1980s, the site mission at K-25 changed from isotopic enrichment to supporting environmental restoration and waste management activities for the DOE. At that time (approximately 1985), a two-story addition to the building was completed. The first floor of the addition was specifically constructed to house electron mi-



croscopes. Completion of the addition created a physical plant with a total floor space of approximately 25 000 square feet, with 28 individual laboratory spaces. The laboratory procured specialized equipment, including electron microscopes and X-ray analysis equipment, to accomplish its new mission.

In 1997, the DOE announced the closing of the laboratory located in Building K-1006. A new site contractor was to replace Lockheed-Martin, and the new contractor was not being asked to continue operation of the laboratory.

REINDUSTRIALIZATION

In 1996, the Community Reuse Organization of East Tennessee (CROET) began a partnership with the DOE called "reindustrialization." The objective of the reindustrialization effort was to improve the regional economy by promoting and facilitating the cleanup and creation of new private sector jobs at the former K-25 site—now known as East Tennessee Technology Park.

In 1997, 19 employees of the laboratory located in Building K-1006 formed a corporation and declared their interest in leasing the building and equipment for operation as a commercial laboratory. The DOE and its operating contractor, Lockheed-Martin, gave the staff an opportunity to investigate the business feasibility of becoming a privatized laboratory and pursuing a memorandum of understanding with the DOE and CROET to

effect the facility lease. A study exploring commercial viability of the idea acknowledged several marketable services offered by the group and identified three crucial needs: a business leader with commercial laboratory experience, additional customers for the laboratory's services, and additional investment capital.

THE BUSINESS PLAN

McLinc was chartered as a technology firm providing applied research and development (R&D), materials and process characterization, and technology development. The corporation's first employee was a veteran laboratory director with 28 years of experience operating commercial environmental analytical laboratories. The new director spent approximately nine months developing sales materials, negotiating a lease for equipment and facilities, establishing client agreements, and arranging for transfer of security clearances. The new company had made a decision to retain the ability to work with radiologically contaminated materials and to be able to handle DOE-classified materials.

During the nine months of business development, no salaries were paid, because the laboratory employees continued as Lockheed-Martin employees and the new director was working for equity. The modest expenses of the corporation were paid through a loan that several of the founders secured with a personal guaranty. Because no bridging funding was to be provided, it was clear that

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once a transfer to private operation was made, additional financial support would be required. The company had made some progress establishing sales contracts with commercial clients, and negotiations to sell their contracts to a large midwestern research firm with a desire to locate in Oak Ridge began. The sale provided the first 13 months of funding for operational expenses and resulted in 10 percent of the company's ownership being sold to the firm. After 13 months, the employee-owners resumed ownership of the business. Sales efforts had produced contracts that sustained the operational needs for the business. Operations have henceforth been cash-positive.

THE COMMERCIAL LABORATORY

As a commercial applied research laboratory, McLinc offers services in specialty environmental analyses, applied research problem solving pertaining to chemical process operations, and industrial forensics. Characterization is provided through use of advanced instrumentation on a wide range of radiological and nonradiological materials,

including air particulates, ceramics, composites, soils, sludges, other process residuals, and metals. Surface and bulk measurements are used in combination to gain comprehensive knowledge of a material's elemental composition, chemical associations, and physical nature (for example, morphology and particle size). This information is used to guide risk assessment, address health and safety concerns, support compliance response, and facilitate the selection of appropriate and cost-effective cleanup technologies.

The laboratory also conducts applied R&D in the area of waste management; materials development; environmental restoration; nanotechnology; catalyst development, evaluation, and regeneration; alternative fuels; and decontamination and decommissioning. Customers include prime and subcontractors with the DOE's Oak Ridge Operations, DOE and U.S. Department of Defense operations at other sites, and commercial clients throughout the nation.

During its operation over the past 10 years, the laboratory has added new capabilities, hired professional staff to replace approximately half of the founding group who



The 10th Anniversary Open House, October 2008



Center: McLinc's 10th anniversary celebration in October 2008 included addresses by Tennessee's Third District congressman, Zach Wamp; DOE Oak Ridge office manager, Gerald Boyd; and CROET president, Lawrence Young, plus laboratory tours for customers and visitors.

Upper Left: McLinc senior chemist Michele Sanders points to business awards received by the company for

its strong support of community activities in Oak Ridge.

Today, the long-term fate of the building remains an issue to be resolved. The company is requesting transfer of Building K-1006 and associated land under regulations detailed in 10 CFR 770.

retired or left the company to pursue other endeavors, purchased new equipment, and refurbished major equipment items that the DOE eventually transferred to the company.

Services offered are grouped into three primary areas: specialty environmental analyses, chemical process optimization, and industrial forensics. Specialty environmental analyses often address difficult matrices that require method development or modification of published methodology. Tasks such as speciation of metals, transport studies, identification of unknowns, or explosivity testing may require equipment that routine environmental testing laboratories do not have. Sometimes the methods required are published environmental test methods, but the samples require special handling because they contain radioactive and/or classified materials.

Chemical process optimization includes any chemical process for which a bench scale experiment can be built and tested. McLinc has applied this expertise to the solution of a broad array of problems ranging from chemical manufacturing processes to optimizing and demonstrating waste treatment technologies prior to field deployment.

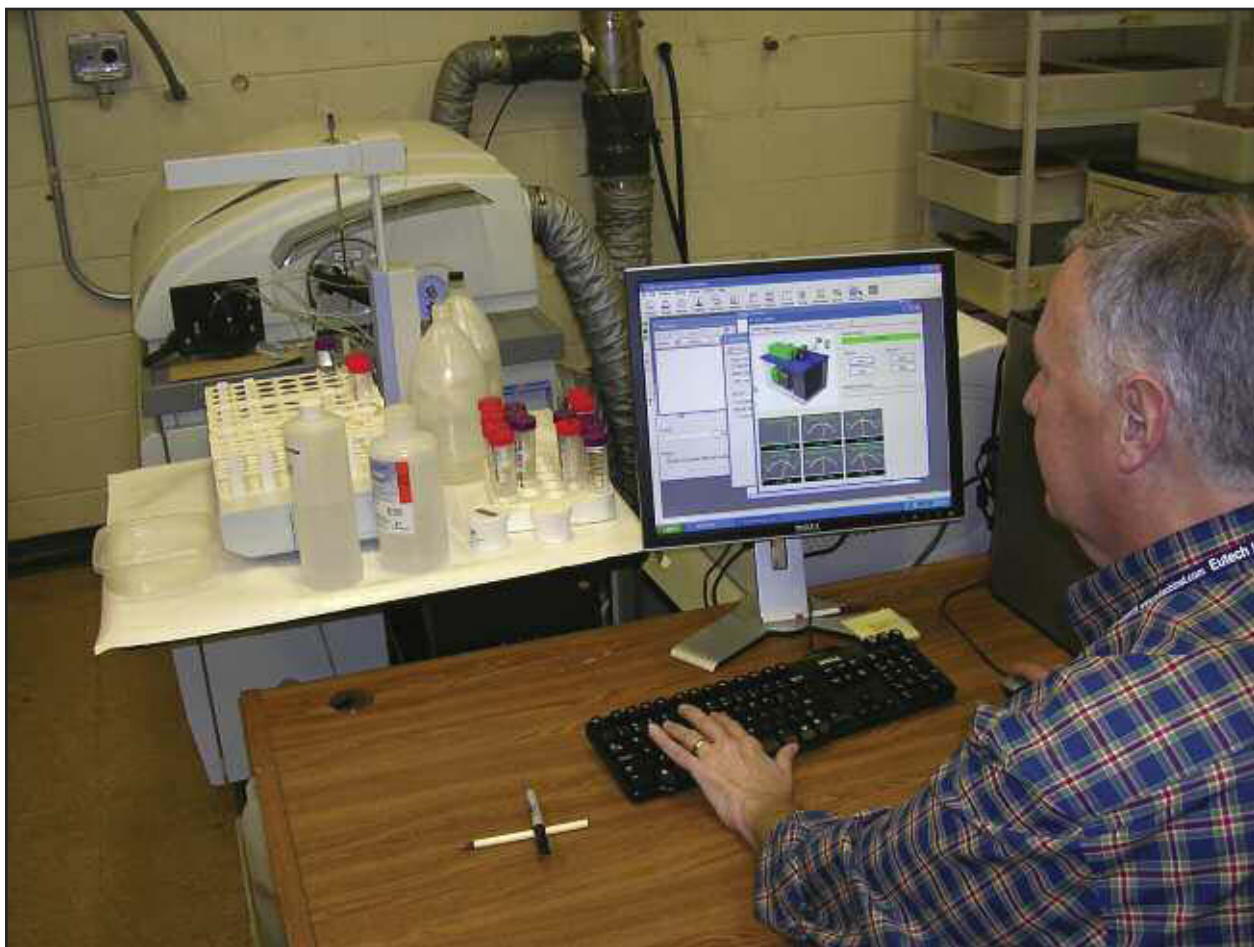
Chemical accidents have been investigated by building

a benchmark model of the process and driving it to failure in an environment where the failure mechanism can be observed safely. The list of applications is extensive and has included treatability studies for hazardous, radioactive, and mixed waste materials; accelerated corrosion studies; and from bench to pilot studies for innovative technologies.

McLinc's industrial forensics experience has often involved use of one of its five electron microscopes. This department of the laboratory houses scanning electron microscopes, a transmission electron microscope, and X-ray photoelectron spectroscopy. Each of the electron microscopes is equipped with energy-dispersive X-ray spectroscopy. McLinc investigators are able to establish elemental associations at magnifications up to one million. These powerful investigation tools, along with X-ray diffraction, X-ray fluorescence, ion-chromatography, ultraviolet/visible spectroscopy, gas chromatography, Fourier transform infrared spectroscopy, inductively coupled argon plasma spectroscopy/mass spectrometry, and a wide variety of wet chemical test methods, equip investigators with the technology required to solve problems with diverse origins. A complete capabilities listing and several



McLinc microscopist/chemist Sam Travaglini operates one of the company's five electron microscopes. McLinc is



example project descriptions are available at McLinc's website, www.MCL-inc.com.

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A GUIDE FOR OTHER REINDUSTRIALIZATION

As with any business venture, operation over time has revealed that some actions taken by the laboratory founders have contributed to its successful operation, while others were not so insightful. We offer observations in hopes that lessons learned might suggest actions that will facilitate future attempts to make similar transitions.

First, the decision to vest significant ownership of the business in the core group of professionals operating the business is key to its success. New employees joining the firm are likewise encouraged to invest and become owners. Employee-owners of the laboratory have consistently provided a high level of service to its customers while conducting business in a cost-efficient manner.

Second, an early decision to keep business support services in-house rather than purchasing them from support contractors onsite has proven cost-effective. Laboratory employees do multiple tasks and perform overhead tasks in addition to their chargeable technical responsibilities.

Third, assessment of technical capabilities in view of market needs and a decision to offer these capabilities as a niche market contributed to success. The niche was further defined by preservation of the ability to handle samples contaminated with radiological materials and those with classification concerns. These decisions enabled early marketing plans to be built on existing clientele and formed an identifiable group to which future marketing could be expanded. The company has continued to reinvent itself in forms of services offered.

However, there is a continuing focus on services that utilize core competencies and experience of the group. For example, the group's expertise in uranium chemistry was instantly viewed as valuable to decontamination and demolition activities at formerly used uranium processing facilities. That initial assumption has proven to be correct. In today's marketplace, with a resurgence of interest in nuclear energy, there are additional applications for uranium chemistry expertise including strong participation in uranium enrichment activities and nuclear power plant operational concerns.

Finally, recruitment of key players with commercial laboratory experience proved to be a major factor in success. This experience base was valuable in avoiding early mistakes in the laboratory startup phase and developing some connection to a commercial client base. As the business has grown, the company has recruited professionals with commercial laboratory experience and offered ownership in the business as an incentive for joining the group.

Utilization of retired professionals as consultants and/or part-time employees has proven to be successful. Often these individuals have provided a rich source of knowledge about processes that were not, for various reasons, well documented. In addition, the situation allows flexibility in staffing levels—a means of cost control that is essential for the business.

If the process were to be repeated, early involvement of an individual with commercial sales experience would be helpful in broadening the base of commercial clients. An increased emphasis on research funding such as funding received from Small Business Innovative Research sources would be used to form a portion of the economic base for the business. More partnerships with businesses whose services complement those of the laboratory would expand available client base. If a business partner were chosen to contribute capital in exchange for ownership, greater care would be taken to choose a partner whose interest was supportive in terms of building client base and business infrastructure. More flexible staffing arrangements would be negotiated early on as a cost-control measure.

Candidates for reindustrialization must be chosen by matching services to be offered to market needs. The most important factor is to have customers willing to purchase the services. Implementation is best accomplished by entrepreneurs who personally profit from a successful operation of the business.

In conclusion, the reindustrialization concept can be successful. In October 2008, McLinc celebrated its 10-year anniversary. ■

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