

A Snapshot of ORTEC in 1967 by Dale Gedcke

(As published in *The Oak Ridger's Historically Speaking* column on January 9, 2012)

The response to the *Historically Speaking* series on the early history of Oak Ridge Technical Enterprises Corporation (ORTEC) by Hal Schmitt caused me to look for someone else who could share their impression of ORTEC history. Dale Gedcke has done just that.

Dr. Dale Gedcke joined ORTEC in October 1967. In his 38-1/2 years with the company, he moved through many functions, including Electronics Design Engineer, X-ray Products Development Manager, Senior Scientist, X-ray Applications Laboratory Manager, and Product Manager. Since retiring from full-time employment in 2006, he has operated as a part time marketing and technical consultant, specializing in corporate acquisitions, patents, evaluation of new technology, marketing, advertising and technical writing. He has been a resident of Oak Ridge, TN, since arriving in 1967.

Here are Dale's recollections of ORTEC in what is obviously a favorite "snapshot" in his memory.

"In early 1967, as I was finishing my PhD program in nuclear physics at the University of Alberta in Canada, I interviewed with four companies, Nuclear Chicago, RCA (Montreal), Canberra (Connecticut) and ORTEC. I received employment offers from all four.

"But, I chose ORTEC because of the positive impression its employees made during the visit to Oak Ridge for the interview. Everyone in the company exuded a culture of excitement about the innovation and growth that was endemic to the young venture. That perception was a harbinger of the great opportunities that ORTEC was destined to offer over many ensuing decades.

"When I reported for duty in October 1967, ORTEC was experiencing a rapid rate of growth that was well beyond the wildest dreams of its founders. The venture had long since outgrown the capacity of Building 1.

"Building 2 had been erected behind the first building, and connected with an enclosed breezeway. Already, management was looking for additional space beyond Building 2 to handle the growing resources. Over the next several years my office location changed about every six months, as the operation expanded and moved.

"Building 1 had been relegated to the upper management functions, including the President and General Manager (Tom Yount), Vice President and Technical Director (John Neiler), Accounting (Sam Rose), Personnel (Bill Lewis), Marketing and Sales. Electronics R&D had settled into the front of Building 2 on the side closest to South Illinois Avenue. Detector R&D occupied the rear of the building, behind Electronics R&D. On the side of Building 2 nearest to the railroad track, Detector Manufacturing filled the back end, while Electronics Manufacturing consumed the front of the building.

"By 1967, the silicon surface-barrier detector product line for charged particle spectrometry was in routine production. As I recall, Bob Boshart was still in Detector Manufacturing when I arrived, but shortly thereafter he transitioned into a sales role.

"The innovators had realized that the new lithium-drifted germanium detectors for high-resolution gamma-ray spectrometry represented the next big opportunity, and manufacturing of those devices was well under way. The early Ge(Li) detectors utilized the "planar" geometry consisting of a disk of germanium sandwiched between electrodes on the front and back sides of the disk.

"These detectors had a very low detection efficiency for the higher-energy gamma rays. It was not long before the "coaxial" geometry was introduced to improve detection efficiency. In this geometry, diffusing lithium from the outer surface of the cylinder left a p-type core along the central axis of the cylinder.

"That core forms one electrode, while the other electrode is the outer surface of the cylinder. This permitted a substantial increase in the volume of the detector while minimizing the capacitance between electrodes. Minimizing the capacitance reduced the noise contribution of the preamplifier responsible for collecting the signal, and this was vital for achieving an excellent energy resolution.

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“The energy resolution of these early germanium detectors was in the range of 0.3% to 0.6% at the 662-keV energy of gamma rays emitted by a radioactive ¹³⁷Cs source. That was a huge improvement over the 10% resolution that was typical of the well-established NaI(Tl) scintillation detector. But, compared to a 3-inch diameter by 3-inch thick NaI(Tl) detector, the detection efficiency of the Ge(Li) detector was small, the efficiency of the Ge(Li) detector being about 10% to 20% of the NaI(Tl) detector efficiency.

“Over the period from the early 1970s to the turn of the century, that relative efficiency would eventually be improved to circa 100%, largely due to the development efforts at ORTEC. Today, the germanium detector is the preferred standard for gamma-ray spectrometry, in spite of its requirement to be cooled to the boiling temperature of liquid nitrogen during operation.

“In 1967, John Walter was in charge of Detector R&D, and he was the prime engineering resource for the silicon surface-barrier product line. Rex Trammell had been hired to provide the continuous development of the germanium detector products.

“Somewhere around this same time, management concluded that there was an expanding market in X-ray spectrometry for the high-resolution, lithium-drifted, silicon detector. Consequently, they hired Murf Murray to develop that product line. Later, Murf married Rex, and today she is affectionately referred to as Murf Trammell.

“Management had hired two individuals from General Electric. George Burkhart was assigned to manage Detector Manufacturing, and Dick Ellis was put in charge of overall manufacturing. By 1967, ORTEC had acquired the electronics assembly operation known as INFABCO, and the owner, Herman Hurst, came with that team to manage Electronics Manufacturing.

“One of the ORTEC founders, Tom Emmer, had been associated with another small start-up company in Oak Ridge known as RIDL. This operation had developed a new multichannel pulse-height analyzer utilizing transistors. The product was branded the Nanolyzer.

“By 1967, several former employees of RIDL had joined ORTEC. Bill Franklin and Dave Ramsey entered the Manufacturing Engineering department. B. J. Moore joined Electronics R&D to design counters, timers, ADCs and multichannel analyzers, and Doyle Cole became a senior electronics technician.

“In 1967, Tom Emmer was the manager of Electronics R&D at ORTEC. He remained in that position until about one year after ORTEC was acquired by EG&G. Then, Tom took his buy-out money and moved to Florida to manage a real estate investment.

“Tom, with the help of B. J. Moore, was working on developing a nuclear data acquisition system based on a Honeywell Mini Computer. This reflected the realization that on-line computers were revolutionizing nuclear physics research.

“It turned out that the Honeywell was an unpopular choice, and ORTEC would have to switch to the more popular DEC PDP-8 and PDP-11 mini computers in later years.

“In Electronics R&D, Joel Ayers was the resident low-noise preamplifier engineer. Kelly Milam was designing a new series of spectroscopy amplifiers for use with silicon and germanium detectors. Chuck Williams had joined ORTEC from ORNL to develop electronics for scintillation detectors to precisely extract the arrival time of the nuclear events.

“Already, he had implemented a product line of photomultiplier tube bases, time extraction electronics and time spectrometers. Upon arrival I (Dale Gedcke) launched into designing a product line of Constant Fraction Timing Discriminators derived from my developments at the University of Ottawa and the University of Alberta.

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“Two electronics technicians from 1967 were memorable because of their unique character: Junior Roddy and Gene Breiner. I have lost track of Junior, but I bumped into Gene in the ORNL Credit Union in the Fall of 2011. Both made strong contributions to the development of electronic products.

“The strategic planners at ORTEC noticed that Dave Coffey had successfully founded a small company, called The Nucleus, to make inexpensive nuclear instrumentation for undergraduate physics laboratories in colleges and universities. By this time, ORTEC had the dominant market share in nuclear instrumentation for low-energy nuclear research.

“Consequently, they were looking for adjacent markets to expand into for additional growth. A project was launched to develop an inexpensive product line of nuclear electronics modules for the educational market, with Bob Scroggs as the design engineer.

“Eventually, Jerry Duggan of ORAU wrote the AN34 series of Experiments in Nuclear Science. Those experiments specified ORTEC products wherever possible. The idea was to familiarize undergraduate students with ORTEC products so that they would be inclined to buy from ORTEC in post-graduate employment.

“The AN34 series of experiments is still available today, with the most recent updates completed by myself (Dale Gedcke) in 2010 through 2011. It should be noted that Dave Coffey eventually progressed to be general manager of the conglomerate composed of The Nucleus, Tennelec and Waltec. Dave Coffey is probably more widely known for being a Tennessee State Representative a few years ago.

“By 1967, the load in Sales and Marketing had increased to the point where dedicated resources had to be applied to those functions. Harold Carter was handling the sales function, with Bill Weiss providing marketing and sales support for the detector product line. Advertising and exhibiting at trade shows had become time consuming tasks, and Jerry Kohl was in place to handle those functions.

“The next few decades were an exciting period of growth for ORTEC, as the company continued to expand in the basic low-energy nuclear research market, and launch into adjacent markets for additional growth. There are many more stories to be told about those later ventures that are interesting and instructive about how entrepreneurial businesses succeed.

I hope you enjoyed that snapshot of ORTEC history by Dale Gedcke.



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ORTEC Building 1 and covered walkway to the expansion Building 2



View inside the detector laboratory showing the large volume of instruments being produced at ORTEC