

# WOLF KOCH:

## Developing Minds and Patents Through Creative Problem Solving

BY LORI D. DENTON



In 1995, Wolf retired from Amoco and founded Technology Resources International (TRI). TRI is a consulting business that deals in technology planning and expert witness work.

**T**o Wolf Koch, engineering means solving problems creatively. And, after pursuing a career with Amoco, serving a stint in the Air Force, developing nine patents and teaching thousands of prospective engineers, Wolf has experience in creative problem solving.



Wolf just after a visit to a coal mine located 3,500 feet below ground.

He began working for Amoco Chemical Company in 1977. Two years later, he transferred to Amoco Oil Company for his last 16 years with the company. While there, Wolf became involved in what was then the “hot area” of synthetic fuels technology. “We developed plans for an open-pit tar sands mine at a 12,000-14,000 foot elevation with a capacity of 500,000 tons per day. One of our studies included putting a process plant into a valley. We developed plans to take what was in the mine and send it on switchback conveyors to the valley below, generating power on the way down. Just to give you an idea of how ambitious that was, the biggest open-pit mine in the country was located outside of Salt Lake City. In its hey day, it was producing 350,000 tons a day—on level ground, not up on a mountain top like the plant we were planning.”

In 1986, oil prices plummeted and Amoco put the project on the back burner, along with other projects in shale oil, coal and natural gas processing. In retrospect, Wolf says he views these mining projects as “a misdirected effort in reaction to the national hysteria over the possibility of running out of oil. When I look objectively at energy sources, I have to say, ‘Don’t mess with Mother Nature.’ Don’t try to turn gases or solids into liquids; use them as they are.”

In 1986, Wolf moved from the synthetic fuels effort to supervise the Engineering Research area. “This group was responsible for researching all the ‘stray cats and dogs’ that didn’t fit into a particular neatly-defined area such as product development (gasoline products and gasoline quality), refining processes or environmental projects. We tackled a lot of fun technical projects supporting marketing and refining.”

While Wolf was leading Engineering Research, he and his employees worked on projects that included artificial intelligence, smart card technology, environmental instrumentation, computational fluid dynamics and systems associated with gasoline distribution and retailing.

“Sometime in the late 1980s, one of my engineers attended a meeting on smart card technology. During a speech at the meeting, an executive of MasterCard estimated that probably 25 percent of MasterCards issued would have an inoperative magnetic stripe after six months. A large percentage of customers with cards without functioning magnetic stripes would translate into many dissatisfied customers.

“Amoco was just installing card readers into dispensers. Because we issued our own cards, encoded them and cleared all the transactions, we had control over the entire system. I had an engineer and a technician study credit cards, credit card encoders and the process of making quality magnetic stripes. We learned all about card readers and worked with a number of manufacturers to design changes for card readers. We also worked with standard-setting organizations such as ANSI and ISO to develop future specifications for better magnetic stripes. Within three years, we took the Amoco credit card population from a significant misread rate to almost no misreads.



Left: Wolf Koch at his fourroom loft office in Batavia, Illinois. Wolf shares the office with his wife, Linnea, who operates a graphics studio.



Right Wolf and his wife, Linnea, outside their home in Batavia, Illinois.

“This was the typical evolutionary process for projects within our group. We often initiated projects on the basis of outside inputs. After studying the issues with other groups, in this case the Marketing Research group, we estimated the effect of non-functioning cards on customer loyalty. Then we approached the Marketing Department for project funding to improve the card technology that Amoco was purchasing.

“Typically, we would work three or four years on a project, then move on to other things after the problem was solved and the solution implemented. The most fun we had with any project was the development, certification and commercialization of the first assist vapor recovery system for Amoco’s St. Louis market in the late ‘80s. In addition to overcoming the usual technical hurdles, my engineers and I learned to work closely with regulators and testing organizations in establishing procedures for certifying new technology.”

### Leader of the pack

Wolf was born in Oberwinter, Germany in 1945. Though the economy was in shambles and food was scarce, Wolf says that it didn’t ruin his childhood.

“In those days, people stood in line for hours just for a jug of milk. Even money couldn’t buy things because there was nothing to be bought. People traded goods. However, we didn’t see it as a handicap. After all, if you don’t know any better, it’s a normal way of life.”

Wolf, the oldest boy in the family, says his small town education probably allowed him to learn more than students today.

“We had public schools with four grades of 40 kids in a room. The school consisted of two rooms. Even in the small town of Oberwinter, there was the Protestant school and the Catholic school. I went to the Protestant school. We probably learned more than kids do today because there was more discipline. I had the same teacher who taught my mother and most of my aunts and uncles. Nothing happened in the town without the teacher being involved. Corporal punishment was a daily event.

“We didn’t have the educational material that students have today. We had a math book and a German book; that was it. All other learning was based on memory. We were taught various

subjects during the morning. The assignment in the afternoon was to write a composition about what we had been taught in history, geography, science or whatever. That’s how we learned.”

When he was 15, Wolf left Germany and came to the United States. “I didn’t get along with my stepfather, so I took a drastic step and left the country. I had an uncle in Cleveland. When I came over to visit him, I ended up staying with him and his wife and completed four years of high school.”

During high school, Wolf learned to speak English, since he knew only German and some French when he first arrived in the United States. However, learning a new language did not intimidate him. “When you are immersed in a language, you don’t have a choice. It all depends on what your priorities are. My priority was to get along and learn the language. By my second year, I won a major statewide essay contest.”

After finishing high school, Wolf went to New Jersey to attend Rutgers University and study chemical engineering. “Deciding to become an engineer was an evolutionary process. During my high school days, I got involved in many extra-curricular activities that involved technical things. For instance, I worked with one of the science museums in the Cleveland area on a satellite-tracking program in the early 1960s. That experience eventually led me to pursue engineering. I could have chosen astronomy, but I wanted something a little more practical.”

While attending college, Wolf earned his way through school by working at the University library, tutoring athletes and clerking in local stores. During his junior and senior years, he conducted environmental assessments for the University. In addition to his part-time jobs, he founded and ran the Judo Club at the University, and practiced judo two or three nights a week. He also participated in the Air Force ROTC program.

After receiving his Bachelor’s Degree in Chemical Engineering from Rutgers, Wolf attended the University of Cincinnati to pursue a Master’s Degree. “While there, I joined one of the

early programs in biomedical engineering. In the late 1960s, I worked with a gentleman at the medical school in Cincinnati who pioneered in work on blood substitutes and blood oxygenators.

"In 1968 and 1969, we worked on government contracts, primarily for the Army, looking at ways to supplement blood supplies. We studied inert fluids that would have the same oxygen-carrying capacity as blood, basically a technical problem. Later we collaborated on the early instrumentation process for monitoring patients and actually helped train surgical teams on heart transplant operations."

### Sheep to the slaughter

While completing his Master's Degree, Wolf was notified that the Air Force canceled his educational deferment and called him to active duty.

"I had a commission as lieutenant in the Air Force. The Vietnam War was on, and the Air Force decided it needed me more on active duty than on military-related research.

"The Air Force chose to send me to an ammunitions officers-training school. I became an expert in explosives and explosives safety. After that, I was assigned to one of the largest US Air Force bases in Germany. I then spent almost four years in the Air Force as the officer in charge of the ammunitions operations."

Wolf describes his time with the Air Force as a "love/hate" experience. "Any job can be worth your while if you approach it properly. Working in the military as an officer, in and of itself, can be a mindless activity.

"One of my favorite sayings is, 'What is the difference between the Boy Scouts and the Army? The Boy Scouts have adult leadership.' However, in the Air Force, I also learned more about people than in any other job I have ever had. For instance, I learned first hand about *malicious compliance*. You can order somebody to do something and that person will do exactly as you have specified—no more, no less—and the job will be a failure most of the time.

"That's how the military, and much of industry, is structured and operates. If you want the job done right, you must motivate people by developing 'win-win' situations. For example, our munitions compound was a high-security area that the local grass-cutters weren't allowed to enter. At the time, my troops were returning from their second tour of duty in Vietnam and didn't care much for cutting grass when they had just been fighting a real war. So, I made arrangements with a local shepherd to have his 100 sheep take care of the grass. During that time, my troops were out playing ball. Then every spring, in return for providing free grazing, we would get four or five lambs from the shepherd."

After serving more than four years with the Air Force, Wolf left the military to join two German engineers in a consulting business for metal finishing.

"I did that for about a year, then decided it was time to get back to the US and finish the Ph.D. that I had begun. I returned in 1975 and started a corporation doing the same thing I had done with my two German partners. At the same time, I worked as a part-time instructor in the chemical engineering department at the University of Cincinnati and as a reservist/consultant for the Air Force Intelligence Service.



In 1987, Wolf joined a group of scientists and helped found the Science and Technology Interactive Center (SciTech), a hands-on museum in Aurora, Illinois. Wolf is still a member of the SciTech Board.

"I also worked on a few projects of my own to make my house more efficient—like designing heat exchangers for my fireplace—the kinds of things now commercially available."

### Moonlighting

In 1978, Wolf started teaching chemical engineering at Midwest College of Engineering in Lombard, Illinois.

"In 1977, I was close to finishing my thesis and looking for other alternatives. After working 18-hour days, I thought it was time to do something that didn't require as much effort.

"I accepted an offer from Amoco, but became bored by the corporate routine. While I was looking for other things to do, I joined the Midwest College of Engineering, a small engineering school that offered weekend and evening programs. It gave me something to do in the evenings, and I especially liked teaching and university life."

In 1981, Wolf was appointed the Graduate Dean of the school. In this role, he directed the graduate engineering program and continued to teach. In the mid 1980s, the school obtained full accreditation. In 1985, Wolf became the Academic Dean in charge of all the academic programs. In this position, he helped to make a decision that would shape the future of the college.

"In 1985, Illinois Institute of Technology (IIT) announced that it intended to open a campus in the western suburbs of Chicago. I helped persuade our trustees to explore possible options to get the two schools together. My reasoning was this: if a big name school like IIT came into the area, there would be little reason for us to exist. The merger process started in 1986. And that's how Midwest College became the Rice campus of IIT in Wheaton, Illinois."

While managing artificial intelligence projects at Amoco, Wolf participated in teaching a course at MIT for engineers and scientists in the industry. For four consecutive summers, he participated in the one-week continuing-education course in expert systems.

Wolf says he finds teaching very enjoyable. "You work with many people. I particularly enjoyed teaching at Midwest College where the average student age was close to 30. Their priorities were very different than the typical undergraduate. Because the students were more mature, they were also more motivated."



Wolf and Linnea have been sailing Lake Michigan for the last 10 years. They also take three or four vacations during the year to collect Native American art.

About the time that Midwest College merged with IIT, a group of scientists primarily from Fermi Lab, initiated a program to start a hands-on museum, in the western suburbs of Chicago. Wolf joined the scientists to become one of the founders.

"In 1987, we formed the organization under the name of SciTech (the Science and Technology Interactive Center). Because SciTech already had numerous scientists developing exhibits, Wolf tackled some of the more mundane projects, like money management, that weren't adequately covered by other staff.

"SciTech's first home was in downtown Naperville, Illinois. In 1990, we moved to the old Post Office building in downtown Aurora, Illinois, which has been our home ever since. What makes SciTech unique is that everything at the museum is hands-on and interactive. During the day, SciTech is primarily visited by school groups. In the evenings and on weekends, a lot of families visit."

Wolf remains a Board Member of SciTech.

### Alternative strategies

In 1995, Wolf left Amoco and founded Technology Resources International, Inc. (TRI) in Batavia, Illinois, where he shares a four-room loft office with his wife Linnea, an artist who has operated a graphics design studio for almost 20 years.

"Working together has been quite different from our previously separate professional interests. When I am in the office, one of my extra jobs is to keep the computers running. In return, I have all the resources for promotional materials and my website."

TRI is a consulting business that deals in technology planning and expert witness work. Wolf assists smaller companies in strategic planning, developing new products and equipment and certification of that equipment.

"In the last three years, I have worked with clients to develop technology that will solve the interaction problem between Stage II and the new vehicle ORVR. I have also represented numerous clients with regulatory agencies, such as the California Air Resources Board (CARB), in an area I call regulatory advocacy.

"Currently, I'm developing strategies for future needs in alternative fuels technology. Once I have developed those strategies for myself and have thought out what needs to be done, my next marketing effort will be to assist other companies in these new areas."

Wolf says that the future of alternative fuels is promising and even necessary to the environment.

"I think it depends on a number of factors. It's inconceivable to me that the economies of developing countries such as China, Russia and India—countries with very large populations—can grow and develop using fossil fuels as we have in the US and Europe. If they do grow and develop, whatever concerns we currently have about the Greenhouse Effect and global warming will be nothing compared to what we actually will face.

"As a society, we must look at developing alternative sources of energy. Ultimately, we need to reduce the amount of energy that we use in our developed economies and help emerging economies leap-frog current standards to implement future systems without the burden of establishing current infrastructures.

"I don't like marketing things that I haven't really thought out properly myself. It's not cost-effective for clients to pay for my learning when I should be getting paid for solving problems. Very often the problems we end up solving are not the problems we are originally hired to solve; often, problems are misidentified. That's part of a good consulting service—to make sure that the proper problems are addressed." ■

Circle Number 51



Wolf and Linnea enjoy collecting Native American art, especially wolves.