

ENVIRONMENTAL

The Career

MANY HAVE PROCLAIMED THE 1990s as the "Decade of the Environment," and nowhere is this more evident than in the field of engineering. "There is such a demand for people in environmental engineering that it is wide open to women, and they are holding their own in both technical and managerial positions," says William C. Anderson, executive director of the American Academy of Environmental Engineers (AAEE).

How can you get into this timely and rewarding field of engineering?

While there are approximately 130 graduate programs in environmental engineering, only a small number of undergraduate degree programs exist, although many schools offer courses or options through other engineering departments," according to Anderson.

"The preferred circumstance today is to get a BS degree in civil, chemical, or some other engineering specialty, and then to earn a master's degree in environmental engineering," he notes. Another approach is to get a BS in science and then complete the essential engineering courses while getting a master's.

"My counsel to students, depending upon how much time and resources they have, is to take three years of liberal arts and two years of engineering courses to get a BS degree, followed by one year for a master's and three years for a PhD," Anderson continues. "The person who follows this plan will leap to the head of the profession before she is 40 years old."

Anderson recommends some liberal arts training because it helps engineers to do their job better when they understand what makes people tick. He says the master's is important because there has been an information explosion, and, at the same time, a decrease in the number of credit hours required for a BS degree.

After working in the field for eight years and passing the Professional Engineer (PE) exam, an engineer can become certified in environmental engineering by passing an additional exam. Those who pass remain board-certified as long as they continue to practice environmental engineering, maintain a current engineering license, and keep their skills up-to-date by attending courses and workshops and by authoring books and papers.

Other boards that offer certification in environmental engineering areas include the American Board of Industrial Hygiene, the Board of Certified Safety Professionals, and the Institute of Hazardous Materials.



There Is A Great Deal
In This Rewarding Career

BY HOLLY BIGELOW

AL ENGINEERING

Of The '90s



Demand For People
ding Profession

GELOW MARTIN

WASTE MINIMIZATION AT AT&T BELL LABS

WILMA JANCUK, senior staff engineer at AT&T Bell Laboratories' Engineering Research Center (ERC) in Princeton, NJ, is licensed as a professional engineer in two states and is certified in industrial hygiene, safety, hazardous materials management, and hazard control management. After getting her BS degree in chemical engineering at Ohio State University in 1967, Jancuk worked for Goodyear Tire and Rubber Company in Akron, OH, for two years. She then moved to Chicago to work for Western Electric, which is now part of AT&T. Later, she was transferred to ERC.

"My first five or six years at AT&T were devoted to waste minimizations, though it wasn't called that then," she says. "We tried to find different ways to make the product so that we generated less waste in our finishing, painting, and plating processes. In those days, we did it because it was profitable to decrease waste."

Jancuk acts as a staff consultant for anyone at AT&T needing help in the environmental area. Because she is licensed, she is often called on to seal documents, such as process drawings for waste treatment plant designs and structural drawings for underground storage tank installations.

About a year ago, Jancuk served on a committee to come up with ideas on waste minimization that ERC can implement two to five years down the road. "My role was to help the committee understand the environmental laws, like the Clean Air Act, so they know what they have to do to make our processes and products more environmentally sound for the future."

Jancuk says the first versions of the Clean Air Act and the Clean Water Act were written 20 years ago, but are being revised with more stringent requirements and fines to force people to comply with them. Along with stricter regulations has come more public awareness. "The first Earth Day was a small event, and on its 20th anniversary last year, it was as if Rip Van Winkle had woken up," she says. "Now people are saying, 'We should do something.' I'm not saying we couldn't do better — anyone could — but a lot of larger corporations such as AT&T have been doing this type of work all along."

Although people are often surprised to learn of an envi-

"In the environmental field, there's a feeling that you're doing something, not just for your company, but for the world," says Jan Sekutowski (left), a supervisor in AT&T's ERC's Environmental and Materials Technology Department, Princeton, NJ. With her is Leslie Guth, a distinguished member of Technical Staff at ERC, who has become the acknowledged expert in chlorofluorocarbons at AT&T.

ronmental engineer working for AT&T, Jancuk tells them, "We want to keep on top of everything and make sure our products and processes are environmentally sound."

Jancuk's work has been recognized both inside and outside the company. She has won AT&T's Technical Achievement Award, as well as the Tribute to Women in Industry (TWIN) award given by the New Jersey YWCA.

Taking advantage of an AT&T fellowship program, Jancuk went to night school for a master's in chemical engineering at Illinois Institute of Technology, then got a separate master's in environmental engineering, though she says her chemical engineering background has probably helped her more than the environmental engineering graduate work. "Some people get into this field with no background whatsoever and get trained as they're working in it," she observes. "If you enjoy math and science and you want to help, environmental engineering is definitely the way to go."

While the field is growing, it's also changing. "Overnight, the environmental business went from being a nice, quiet job to a very demanding job where you have to deal with the public," Jancuk concludes.

IN THE PUBLIC SPOTLIGHT

ONE ENVIRONMENTAL ENGINEER who has thrived in the public spotlight is Leslie Guth, a distinguished member of Technical Staff at ERC. In a short time, Guth has become the ac-

knowledge expert in chlorofluorocarbons, or CFCs, at AT&T.

In college, Guth wanted to major in art. Because she decided to go for a more practical major, however, she ended up getting a BA in physics at the University of North Carolina. She went on to earn a PhD in materials science and engineering at the University of Pennsylvania in 1984. Though her studies didn't focus on environmental engineering, the materials science and engineering field has broad applicability in many areas.

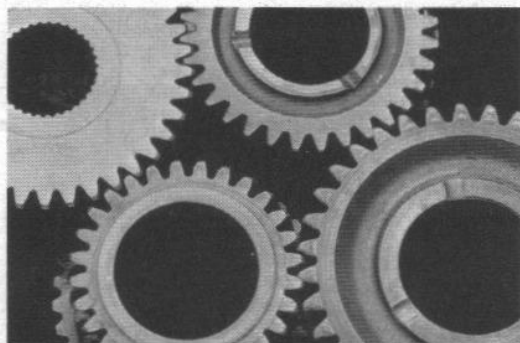
Guth came to ERC because she wanted to do work that had benefits in real applications. Her first assignment was in the Soldering Process group, which is now called the Environmental Materials and Processes group. "To solder components onto circuit boards, we use a soldering flux to prepare the metal surfaces of the board and the leads of the component," she explains. "CFCs are used to clean flux off circuit boards after soldering."

Many scientists believe that CFCs deplete the ozone layer, which protects human beings from harmful ultraviolet rays. "To help combat the problem of using CFCs, flux vendors developed a new family of fluxes with a lower solids content, which you don't have to clean off after soldering," Guth reports. "At ERC, we tested and found that if you use too much of this low-solids flux, you get corrosion and leakage currents between leads or

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metal traces on the board, making the product unreliable. But we saw so many benefits to totally eliminating cleaning that we decided to develop a piece of equipment that would control the quantity of flux."

Soon, Guth and her colleagues had a working model of their low-solids fluxer in one of AT&T's plants. In the spring of 1989, they made it public. "All of this came at a time when there was a growing emphasis on environmental issues, which is why we decided not to keep this a proprietary technology, but to tell others about it, too," says Guth.

After AT&T's low-solids fluxer was announced, Guth was mentioned and quoted in *The Wall Street Journal*, several trade journals, and the local *Trenton Times*. "If I were the type of person who could only talk to lab instruments, I wouldn't be able to do what I'm doing now," she says. "Working with the press is time-consuming, but it's also gratifying that people are interested in my work. I can say, 'I work on materials to replace CFCs that are depleting the ozone,' and anyone I talk to, whether a friend or a stranger, is interested."

About three years ago, Guth was chosen as AT&T's representative on an ad hoc working group of material and equipment users and vendors. The group was put together with the help of the United States Environmental Protection Agency (EPA) to devise alternatives for CFCs.

Because of her contacts in the working group, Guth was selected to be one of 12 people from all over the world to serve on a United Nations Environmental Program (UNEP) committee to review the options for solvent alternatives to CFCs. Guth was the only woman and one of the youngest members of the committee.

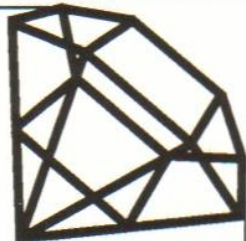
"Our committee reported that there were alternatives to using CFCs for solvent cleaning, and that we could even phase out CFCs totally — not simply put a 50% freeze on CFC usage, which was the original plan," she notes. Partly as a result of their report, UNEP representatives met in June 1990 to draw up an agreement to completely phase out CFCs by the year 2000.

THE MANAGEMENT TRACK

ANOTHER CAREER PATH for environmental engineers is the management track. Jan Sekutowski, a supervisor in ERC's Environmental and Materials Technology Department, has a BS in chemistry from Kent State University, and a master's and PhD in inorganic chemistry from the University of Illinois. Recently, she was asked to manage ERC's environmental research program.

"In my group, we have the luxury of looking longer term to try to determine some of the environmental issues that will impact us in the future," Sekutowski says. "My current focus is what I call 'design

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for environment.' Often a product is designed, the manufacturing process is developed and implemented in the factory, and then the environmental engineer gets called in to deal with the air, liquid, or solid waste problems.

"We decided to develop guidelines for designers to address the issue of waste up front. For example, lead is used as a stabilizer in some of our plastics. EPA just changed the test for lead, so a lot of solid wastes that used to pass the test no longer do now, and they must be disposed of in a hazardous waste landfill. In designing for the environment, we have to ask ourselves whether we can use a different type of plastic, one that doesn't contain lead, to manufacture this product."

With regulations tightening, the costs associated with environmental issues are going up dramatically, according to Sekutowski. "Because of this factor, in manufacturing companies especially, I think there is a big future in environmental engineering."

Sekutowski says environmental protection is an important focus within AT&T. "Our management is determined to be the number one environmental

"We want to keep on top of everything and make sure our products and processes are environmentally sound," reports Wilma Jancuk, senior staff engineer at AT&T Bell Laboratories' Engineering Research Center (ERC) in Princeton, NJ.

company in the world," she says. "I feel great about the support we get within the company."

While she welcomes the new public awareness, Sekutowski says much of it may not be based on accurate information and might get people unnecessarily concerned. "Certainly, we're not anywhere near as bad off as Eastern Europe," she says. "But we want to make sure we don't overcompensate the other way, either."

Sekutowski says that women who want to get into environmental work should read as much as they can in trade magazines and journals. "I think it's key to start following the policies, decisions, and regulatory issues because those guide what you're going to be working on," she states.

"In the environmental field, there's a feeling that you're doing something, not just for your company, but for the world," Sekutowski says. "I know that sounds hokey, but I really do feel that way."

Interested students can get general information about the field, along with a list of colleges and universities offering accredited programs in environmental engineering, from AAEE, 130 Holiday Court, Suite 100, Annapolis, MD 21401; 301/266-3311. ♦