

THE TECHNICAL W



WORKFORCE CRISIS

**We must train new experts
to replace a retiring
generation of engineers,
scientists, mathematicians,
and technicians.**

By Gregory A. Sedrick

Within the next five years, we will realize a national workforce crisis that will be especially devastating to the Tennessee Valley Corridor. There will be a severe shortage of engineers, scientists, mathematicians, and technicians including trade craftspersons. It will be a challenge to keep the technical machinery running.

The current workforce is aging and, with an improving economy, is willing to cash in its 401ks and retire; there are not enough replacements for these retiring workers either in the existing workforce or in the next generation, and we are not capturing the knowledge of these retiring experts so that we might pass their experience on to the next generation.

The good news is that labor, management, and key elected officials are partnering to address the issues.

Workforce and Quality of Life

Ironically the Tennessee Valley Corridor is located in the heart of the Appalachian region, home of one of the nation's lowest income and highest underemployment rates. This region has the nation's lowest percentage of people pursuing a higher education and lowest rates of those pursuing engineering, scientific, and technical careers.

The Tennessee Valley Corridor has a median income that is eight to 12 thousand dollars a year lower than the national

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median but has a lower unemployment rate than the national average (U.S. Census 2000 data). This supports the case that it is underemployment, not unemployment, that afflicts the Tennessee Valley Corridor.

Apparently underemployment cannot be explained by a low high school graduation rate that is higher than the U.S. average. Therefore, the problem potentially lies in a lower pursuit of higher education, six percent lower than the nation's average.

Additionally, technology in the workplace does not require just scientists, engineers, and trade craftspersons. All workers in the new economy need technical competency.

Alabama is a participant in the "new economy" of the 21st century, where economic wealth and job creation are increasingly driven by ideas, innovation, and technology. This does not mean that most firms are manufacturing technology or delivering technology services—such firms accounted for about 11 percent of U.S. GDP in 1999. Rather, most firms are organizing their work around some aspect of technology. Investment in information technology is a major factor in enhancing business operations and increasing productivity throughout the U.S. economy (www.alabama.gov).

The Issues

Issue 1: An Aging Workforce

Every 60 seconds a "baby boomer" turns 50 (www.bbhq.com/bomrstat.htm). Seventy-six million "boomers," born between 1946 and 1964, were at their peak earning potential in 1996. Now the demographic is heading toward retirement. First glance would say that in 1971 another boom generation to replace them would appear as the boomers had children. Boomers delayed or decided not to have children. This has spread new births more evenly across the years, resulting in a plateau of population growth.

Specifically, the federal engineering, science, and technology workforce will soon be retiring. More than 30 percent of engineers, scientists, and technicians in our federal facilities are now over 50 years of age. More than 20 percent of the federal workforce in these critical skill areas will be retiring within the next five years (NASA Workforce Data for Scientists and Engineers, Department of Energy's response to OMB Bulletin 01-07, Workforce Planning and Restructuring, Tennessee Valley Authority Director Bill Baxter's speech at the October 2003 Corridor Summit).

Graduation and enrollment in these career fields are in decline. Projected graduation rates will not cover the retirement rate, much less the projected increased demand. The number of bachelor's degrees awarded in engineering began declining in 1987 and has continued to stay at about the same level through much of the 1990s. The total number of graduates from engineering programs is not expected to increase significantly over the projection period (Bureau of Labor Statistics 2002).

The existing workforce is also not a solution. Anecdotally we have found the same shortage of science, engineering, and technical trade crafts workforce in private industry. With lower salaries in federal facilities, the workforce will not and should not be lured from the private sector.

The strategy of importing our skilled workforce has flip-flopped. Technical and skilled work is being outsourced overseas. Additionally, technologists immigrating to the United States are not eligible for federal positions until they acquire U.S. citizenship (*Time*, October 2003).

Issue 3: Knowledge Preservation

Vital technical knowledge is being lost. The knowledge is generally undocumented, known to few workers, and not available in procedures and training. This tacit knowledge represents up to 80 percent of an organization's valuable knowledge, and its loss has serious consequences for companies' operations and financial performance. Principal areas of concern include loss of undocumented knowledge related to design changes, organizational history, and systems engineering (www.trainingdimensions.com/agingworkforce.htm). Formerly, new hires were linked to their senior colleagues until they acquired similar knowledge and skill. Now that senior colleague has retired or is no longer available for consultation.

The Response: Lighting a Candle in the Dark

Labor management and key elected officials have partnered to address these issues in the Tennessee Valley Corridor. One such comprehensive response is the Workforce Aging Management Program Initiative. This initiative is a partnership of the U.S. Department of Labor, Chattanooga State Technical Community College, the Appalachian Regional Commission's Southeast Development District, and labor represented by IBEW (International

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Brotherhood of Electrical Workers) and AFL/CIO (American Federation of Labor/Congress of Industrial Organizations).

The Workforce Aging Management Program Initiative assists in ensuring that the Tennessee Valley Corridor maintains a readily available technology workforce while contributing to the economic improvement of the Appalachian region.

Response 1: Training

The initiative integrates and coordinates delivery of the curriculum designed by educational partners to upgrade the skills of mid-career engineers, scientists, and technologists for federal agencies and their contractors within the corridor. An estimated 510 students will receive this training in 2004. So far, critical skills and certification packages identified include project/program management, engineering management, and licensure preparation and technical certification for program logic controllers, fiber optic cabling, nano-technology manufacturing, wireless technologies, tool dies and machining, MIG (Metal Inert Gas) Welding, RADTECH (radiologic technology), Microsoft, Novell, and so on.

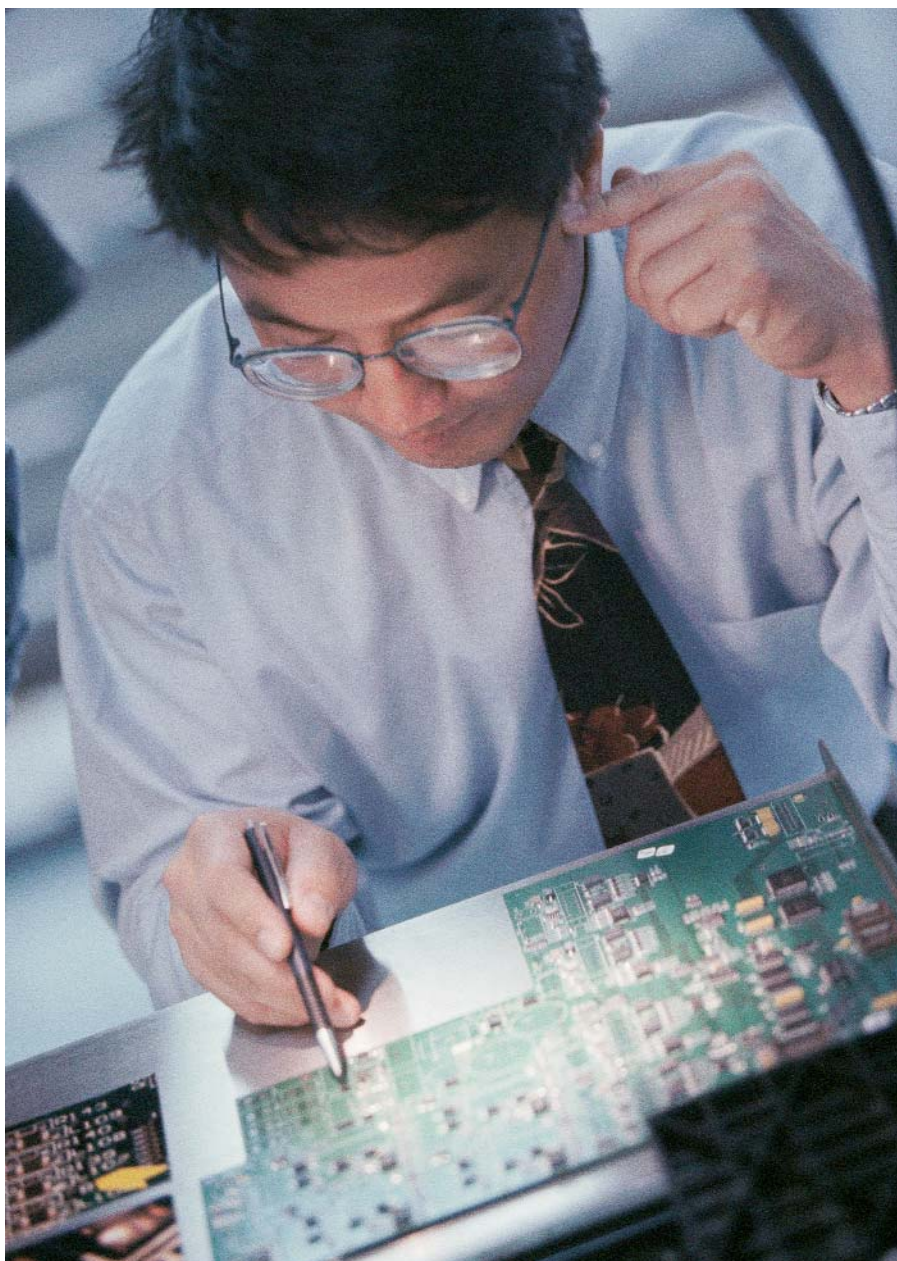
The critical skills identified are matched against existing courses offered by 35 educational partners via the next-generation distance learning technology. When a desired course does not exist for this delivery system, the existing traditional curriculum will be converted.

Response 2: Placement

The initiative assesses unemployed, displaced, and underemployed clients of the corridor's one-stop career centers for entry into engineering, scientific, or technical career fields. An estimated 335 students will be trained and referred for technical careers in 2004.

Response 3: Recruitment

The initiative will actively recruit the next generation into technical career fields. The initiative will train and match mentors (retired or soon-to-retain engineers, scientists, or technologists) with interns currently in or planning on entering engineering, scientific, or technology-based degree programs. This team of mentors and interns will promote new-economy career fields through job fairs, career counseling, job shadowing, and other events to encourage the next generation to pursue engineering, scientific, or technical careers. An estimated 305 students, mentors, and interns will be involved in recruitment and retention events in 2004.



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Response 4: Economic Development

The initiative will assist in placing unemployed or displaced workers in new-technology jobs through entrepreneurial training in developing new products using advanced technology developed in federal activities. Sixty technical entrepreneurs will be offered business development training courses on how to develop new products and services by working with intellectual properties discovered at federal laboratories that are available for licensing.

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