

of your first job. You are invited to interview with a research division of Philip Morris that is about to begin research to develop the Accord. Would you have any reservations about accepting such a position? Discuss.

- If you have some reservations, would the fact that this job pays \$10,000 more per year than any other

offer you have convince you to take the Philip Morris offer?

- Assuming you took the job, what kinds of ethical concerns might you have about how the device should be designed? For example, would you agree that it should have a locking device?

CASE 38

Software for a Library 104

A small library seeks a software system to catalogue its collection and keep records of materials checked out of the library. Currently, the records of who has checked out what, when materials are due, and the like are kept in a file drawer behind the check-out desk. These records are confidential. Patrons are assured that these records are not accessible to anyone other than library personnel. But, of course, drawers can be opened when no one is looking. What assurance is there that the software systems under consideration will provide as much, if not greater, security? Assuming that no one in the library is a software

specialist, the library has no alternative but to place its trust in someone who presumably has the requisite expertise. How concerned should that expert be (again, bearing in mind that even the best system is not completely sleuthproof)? Furthermore, what assurance has the library that it is not being oversold or undersold in general? To what extent should software specialists be concerned with determining precisely what the various needs of the library are—and to try to meet those needs rather than offer more than is necessary in order to secure greater profit or less than is needed in order to come in with a lower bid?

CASE 39

Sustainability

Scientists, engineers, and the government are publicly expressing urgent concern about the need to address the challenges of sustainable scientific and technological development. Global warming, for example, raises concern about glacial meltdown and consequent rising ocean levels threatening coastal cities. A related concern is the lowering of levels of freshwater in the American West as a result of lowered levels of accumulated mountain snow. In Joe Gettner's "The Future Is Drying Up," Nobel laureate Steven Chu, director of the Lawrence Berkeley National Laboratory, is cited as saying that even optimistic projections for the second half of the 21st century indicate a 30 to 70 percent drop in the snowpack level of the Sierra Nevada, provider of most of northern California's water.¹⁰⁵ Gettner goes on to discuss other likely freshwater problems that will have to be faced by Western states as a result

and demands of an increasing population. He also outlines some of the efforts of engineers to address these problems aggressively now rather than wait until it is too late to prevent disaster.¹⁰⁶

We noted in Chapter 9 that most engineering society codes of ethics do not make direct statements about the environmental responsibilities of engineers. However, in 2007 the NSPE joined the ranks of engineering societies that do. Under section III. Professional Obligations, provision 2 reads, "Engineers shall at all times strive to serve the public interest." Under this heading, there is a new entry, d: "Engineers are encouraged to adhere to the principles of sustainable development in order to protect the environment for future generations." Footnote 1 addresses the conceptual question of what is meant by "sustainable development": "Sustainable development" is the challenge

industrial products, energy, food, transportation, shelter, and effective waste management while conserving and protecting environmental quality and the natural resource base essential for future development."

Although this definition of sustainable development leaves many fundamental conceptual and value questions in need of further analysis (e.g., What are human needs? What is meant by "environmental quality"?), it provides a general framework for inquiry. It also identifies a variety of fundamental areas of concern (e.g., food, transportation, and waste management). Of course, responsibilities in these areas do not fall only on engineers. Government officials, economists, business leaders, and the general citizenry need to be involved as well. Thus, a basic question relates to how those who need to work together might best do so and what role engineers might play. We offer three illustrations for discussion. The first is an early effort to involve students from different disciplines in a project that supports sustainable development. The second is the recent proliferation of centers and institutes for sustainability on college campuses throughout the country. The third is service learning opportunities in support of sustainable design and development.

RENEWABLE ENERGY¹⁰⁷

Dwayne Breger, a civil and environmental engineer at Lafayette College, invited junior and senior engineering, biology, and environmental science students to apply to be on an interdisciplinary team to design a project that would make use of farmland owned by Lafayette College in a way that supports the college mission. Twelve students were selected for the project: two each from civil and environmental engineering, mechanical engineering, chemical engineering, and Bachelor of Arts in engineering, plus three biology majors and one in geology and environmental geosciences. These students had minors in such areas as economics and business, environmental science, chemistry, government, and law. The result of the project was a promising design for a biomass farm that could provide an alternative, renewable resource for the campus steam plant.¹⁰⁸

Professor Breger regards projects such as this as providing important opportunities for students to