

Today's engineers—Caretakers of the environment

by Jim Ridler, P.Eng.

Engineers have a recognized duty to protect and preserve the world we live in. From air quality to reforestation, environmental concerns remain in the public eye, subjecting engineering work to scrutiny.

Engineers use the materials and forces of nature wisely and economically to satisfy human needs. The product of their effort is a higher standard of living, evident in our society's infrastructure, resources, manufacturing and telecommunications strengths.

What elevates engineering to a profession is its duty to safeguard and serve the public ahead of personal and employer or client interests. From this flows our role as caretakers of the environment. We have a larger social responsibility. We can no longer limit ourselves to designing, implementing and soundly managing within our disciplines.

Let's go back to the basics of our profession to understand why not. We possess highly specialized knowledge and skills, making us essential to the public that trusts and relies on us. We have even been allowed to have a self-regulating monopoly for our profession. This power, which leaves the public vulnerable to abuse, brings with it special obligations and higher standards to be met. These are best summarized by the statement that our duty to public welfare is paramount. In fulfilling that duty, we are expected to play the role of advocate for safety and, increasingly, the environment.

The caretaker role

Over the last 40 years, engineering and society have gone through three phases related to the environment and its care. The first phase was the "age of innocence." Environmental impacts were seldom questioned, and obvious problems were treated in a rudimentary way or hidden. For example, my first three jobs were in a paper mill, a chemical plant and an oil refinery. The public and engineers accepted the air pollution at each location as the "smell of money"—the price to be paid for jobs and community prosperity.

The second phase was the "black and white" phase. It became clear that engineering and economic suc-

cesses were leading to environmental "overload." Major new concerns arose connected with human-made problems, such as mercury, DDT, dioxin, acid rain and nuclear waste disposal. The environment was now a top political and engineering concern.

For example, that "sweet" smell in the air at the chemical plant where I worked years ago was vinyl chloride monomer (VCM). VCM was later found to be a carcinogen that selectively killed people. As a result, extraordinary precautions were designed by engineers to minimize exposure to VCM, and employees with potential exposure were monitored regularly. (So far, I've escaped any consequences of my exposure to VCM.)

During the black and white phase, engineers began to assume responsibility for the environmental aspects of projects and operations, as part of protecting the public. Environmental engineering became a recognized specialty.

We have now entered phase three of environmental care: "shades of grey." From the certain risks of VCM and mercury, engineers and the public are now grappling with greyer environmental issues, such as global warming, waste incineration and zero risk versus acceptable risk. No longer is the "right" way obvious. As complexity has escalated, the various options available are often unattractive, and the interpretation of data becomes more and more difficult. Engineers are finding that their views are no longer automatically accepted by a more critical public. Some environmental groups are using emotional appeals to lobby

for public support, making it especially challenging for engineers working in environmental fields. The public still wants the facts, but is confused by disparate views and lacks the engineering expertise to interpret the facts fully.

Your environmental responsibilities

In reaction to these developments, PEO has extended the long-established responsibility of professional engineers for pro-

tecting the life, health, property, safety and welfare of the public. Since public welfare is now interpreted by PEO to include our environment, the definition of professional misconduct and the Code of Ethics apply directly to practising engineers with respect to the environment. Sections 72(2) (b), (c) and (d) of Regulation 941, which are offences for which professional engineers may be found guilty of professional misconduct, now apply to the environment. These sections direct

engineers to safeguard the environment, to correct or report a danger to the environment to the appropriate authorities, and to comply with all laws and other standards related to the environment.

Similarly, the emphasis that the Code of Ethics puts on public welfare as paramount (in section 77(2)(i) of Regulation 941) is also understood to include the environment. Section 77(8), which outlines the engineer's duty to expose unethical conduct by another practitioner, also includes environmental concerns.

In 1996, PEO published a revised guideline for professional practice that expanded on engineers' responsibilities for protecting and preserving the environment. Nine new environmental guidelines for practising in Ontario were included. (See sidebar on this page for a summary of the guidelines, with some additional commentary.)

The ethics test

The following test may be helpful in decision making related to environmental engineering. When making an important decision in an environmental context, ask yourself:

◆ Is it honest? Have I obeyed all of the applicable environmental laws, codes and other standards?

◆ Is it fair and balanced? Who shares the gain, and who shares the environmental pain?

◆ Does it fit the mission of my organization and my conscience? Am I following my and my organization's environmental values?

◆ Can I justify it publicly? How will the others involved perceive my decision?

◆ Have I walked the ethics talk? Am I being consistent with engineering's role as caretaker of the environment?

If you can answer yes to all five questions, you can probably feel confident that your decision is environmentally sound. If not, perhaps it is time to develop another option to address your remaining environmental concerns. ◆

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PEO's environmental guidelines

- 1 Develop and maintain an understanding of environmental issues related to the engineer's field of expertise. Be clear about potential environmental impacts and how to avoid them. Ignorance is not an acceptable excuse.
- 2 Seek out and use the expertise of specialists to assess the environmental implications of engineering activities. Recognize individual competence limitations and the interdisciplinary nature of issues, and treat environmental specialists as professionals.
- 3 Apply professional and responsible judgment to environmental considerations. Include environmental sustainability evaluations throughout the planning cycle, recognizing the importance of public involvement and social, cultural and economic values.
- 4 Ensure environmental planning and management are integrated into engineering activities. Basically, be proactive. Identify concerns, include prevention in design. Reduce, reuse and recycle.
- 5 In the economic evaluation of an engineering project, include the cost of environmental protection for the project's lifespan, including its final closure. Recognize technical feasibility, economic viability and environmental protection as essential to project viability. Develop options to deal with risks.
- 6 Strive to implement pollution prevention at the production source, and manage wastes appropriately. Analyze waste sources, and minimize volumes and risks through design and process options.
- 7 Cooperate with public authorities and respond to environmental concerns in a timely fashion. Be proactive and honest with regulatory authorities and clients or employers about adverse environmental impacts. The PEO guideline *A Professional Engineer's Duty to Report* may be helpful here. It outlines the engineer's duty to report to the appropriate parties situations that may endanger public safety or welfare, including environmental concerns.
- 8 Comply with environmental legislation and, where feasible, consider additional environmental protection. Be sure to understand environmental legislation and provide appropriate and full documentation. You are personally responsible for the actions you take and any omissions you may make. Do not be limited by legislation. Go for excellence.
- 9 Work actively with others to improve environmental knowledge and practices. Recognize your responsibility to share your expertise and to bring research by other disciplines into engineering practice.