

“Incident at Morales”

A Video/DVD "Case Study" in Professional Responsibility

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Abstract

The National Institute for Engineering Ethics (NIEE) previously produced *Gilbane Gold*, a video designed to support instruction in engineering ethics and professional responsibility. *Gilbane Gold* has been used extensively by universities in the United States and other countries as a "video case study." It has also been used for educational purposes in engineering firms and technical/professional societies, as well as discussions of business ethics. NIEE has produced a second video to support education in engineering professional responsibility. This paper will discuss the new video/DVD and how the video can be used in the classroom. The National Science Foundation as well as individual, corporate, and university donors supported the production.

Background: “Gilbane Gold”

Engineers in all areas of practice regularly address issues of professional responsibility. In fact, the nature of engineering dictates that issues of professional responsibility are unavoidable in engineering practice.^{1,2} Faculty have developed various approaches, courses, and materials to teach students professional responsibility in engineering.³ Some of the approaches, naturally, and effectively, involve case studies.

In 1989, the National Institute for Engineering Ethics (NIEE)⁴ and the National Society of Professional Engineers (NSPE) developed a case study titled "Gilbane Gold"⁵. Produced as a video by Great Projects Film Company of New York, “Gilbane Gold” has been used extensively in the classroom and by professional organizations.⁶ “Gilbane Gold” portrays an engineer in a corporation who faces a technical problem with ethical and legal implications.

Synopsis: *Gilbane Gold* (Source: *Gilbane Gold* Discussion Guide)
Gilbane Gold is the name given to dried sludge from the Gilbane Wastewater treatment plant. It is sold to farmers as a commercial fertilizer. The annual revenue generated saves the average family about \$300 a year in taxes. Several years ago the city of Gilbane established limits on the discharge of heavy metals to the sewers in order to protect Gilbane Gold

from the buildup of toxic materials that could end up in the farmer's soil. These limits are ten times more restrictive than Federal limits. However, the limits are based on the concentration of the discharge without restrictions on total weight of materials discharged.

Z-CORP is a computer components manufacturer which discharges wastewater containing small amounts of lead and arsenic into the city sewer system. By the current city test standards, the discharge usually meets the allowable levels for heavy metals. However, a newer test, known only to Z-CORP environmental people, shows the discharge exceeds the city test standards. An ethical dilemma arises within Z-CORP concerning whether to advise the city of the newer test. Acceptance of the newer test would require additional investment in clean-up equipment. Tom Richards is a Z-CORP environmental engineering consultant who was fired for advocating the new test. Thereafter, David Jackson, an engineer working for Z-CORP, "goes public" with his views. A television media investigation results.

Complicating the situation is the fact that Z CORP has recently received a contract for five times as many computer modules as they presently produce, albeit at a very thin profit margin. The increased production means five times as much waste will be produced. The discharge concentration can be kept the same by adding five times the amount of water, thus still meeting the existing city standards, The result, however, is that Gilbane Gold has five times the amount of heavy metals in it as before. The Z-CORP vice president is opposed to changing the test standards because that would require additional investment in wastewater treatment equipment. This could cause Z-CORP to lose money on the new contract. The vice president contends that Z-CORP's responsibility is to provide jobs and a payroll and that the city should worry about the environment.

“Incident at Morales:An Engineering Ethics Story”

Based both on the success of Gilbane Gold as well as the lessons learned from 12 years of experience using the video to assist in teaching professional responsibility, NIEE and Great Projects have produced a second case study dramatization involving engineering ethics and professional responsibility. The new production is titled “Incident at Morales.”⁷ The video was developed under a grant from the National Science Foundation and contributions from engineering societies, companies, universities, and individual donors.

Sponsoring Organizations:

- **National Science Foundation - Grant No. NSF SES-0138309**
- **Victor O. Schinnerer and Company, Inc.**
- **National Society of Professional Engineers**
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The new video project development and evaluation team consists of engineering and philosophy faculty from Texas Tech University (Jimmy Smith, project director and Fred Suppe), University of Texas at Austin (Steven Nichols), University of Illinois at Urbana/Champaign (Michael Loui), Illinois Institute of Technology (Vivian Weil), University of Arkansas (Walter LeFevre) and consultants from engineering industry (Phil Ulmer, Eagle River, Alaska and Carl Skooglund, former VP and Ethics Director of Texas Instruments, Dallas).

“Incident at Morales” Synopsis and Ethical Issues

The story in “Incident at Morales” is fictional but realistic:

Phausst Chemical manufactures Old Stripper, a paint remover that dominates the market. On learning that Phausst’s competitor Chemitoil plans to introduce a new paint remover that may capture the market, executives at Phausst decide to develop a competing product. To save money in manufacturing the product, Phausst decides to construct a new chemical plant at a site in Morales, Mexico. To design the new plant, Phausst hires a chemical engineer, Fred Martinez, who had been a consultant to Chemitoil. As the project starts, Phausst’s parent company slashes budgets 20% across the board. The vice president for engineering strongly encourages Fred to reduce construction costs.

Fred confronts several engineering decisions in which

ethical considerations play a major role:

- Whether to use expensive controls manufactured by Lutz and Lutz, which has an inside connection at Phausst
- Whether to line the evaporation ponds to prevent the seepage of hazardous substances in the effluents into the groundwater, although local regulations do not require this level of environmental protection
- Whether to purchase pipes and connectors made with stainless steel or a high pressure alloy as a safety precaution for the plant operators

- This story provides a number of opportunities for viewers to consider the resolution of difficult ethical issues: Does Fred have any obligations of confidentiality to Chemitoil even if he did not sign a non-disclosure agreement?
- What ethical questions does the procurement process raise when the in-law of a corporate officer works for the supplier?
- Is it proper for Fred to share his concerns with his wife, who works for the U.S. Environmental Protection Agency?
- Fred is inspired to make the couplings a maintenance issue, to specify that the couplings should be replaced regularly. Is it appropriate to convert design decisions into maintenance procedures without including operations people in the decision process?

As they examine these issues, viewers may learn the following lessons:

- ❖ Ethical responsibilities and obligations don't stop at the U.S. border.
- ❖ Ethics is an integral (and explicit) component of ordinary technical and business decision-making in engineering practice.
- ❖ Because their work affects people, engineers should be more concerned about people than objects.
- ❖ Technically competent, ethically sensitive, reasonable people may have different perspectives and can disagree when faced with complex ethical issues.
- ❖ Negotiations resolve some of the conflicts in the video, but some ethical conflicts remain unresolved. Ethical problems are sometimes resolved by rational methods and compromise.
- ❖ Codes of ethics from engineering societies and guidance from licensing boards are helpful in resolving ethical problems.
- ❖ Market stresses arise from competition with other companies, and from pressures to advance a design and construction schedule.
- ❖ It is sometimes necessary to make decisions under pressure with incomplete data, insufficient time, and insufficient information.

Notes and References

¹ Nichols, Steven P., and Weldon William F., *Professional Responsibility: The Role of the Engineer in Society*, Science and Engineering Ethics, Vol. 3, No 3, 1997.

² See for example, the special section of Science and Engineering Ethics, Practicing and Teaching Ethics in Engineering and Computing, Loui, Michael C., Guest Editor, Science and Engineering Ethics, Vol 3, No. 4, pp. 431-490, (1997).

See also,

Davis, Michael, *An Historical Preface to Engineering Ethics*, Science and Engineering Ethics, Vol 1, Issue 1, (1995). For an interesting examining if there is a profession of engineering, see Davis, Michael, *Is There a Profession of Engineering*, Science and Engineering Ethics, Vol. 3, No. 4, p.407-428, 1997.

Hollander, et al, *Why Teach Ethics in Science and Engineering?*, Science and Engineering Ethics, Vol 1, No. 1, p. 83 et seq, 1995.

³ For examples, see

Whitbeck, Caroline, *Teaching Ethics to Scientists and Engineers: Moral Agents and Moral Problems*, Science and Engineering Ethics, Vol. 1, No. 3, pp. 229-308. Whitbeck discusses an "agent-centered" approach to learning ethics.

Nichols, Steven P., *An Approach to Integrating Professional Responsibility in Engineering into the Capstone Design Experience*, Science and Engineering Ethics, Vol. 6, No. 3, pp. 399-412, 2000.

⁴ At the time, NIEE was part of the National Society of Professional Engineers.

⁵ *Gilbane Gold* (1989), National Institute for Engineering Ethics, Texas Tech University, P.O. Box 41023, Lubbock, Texas 79409-1023, USA (24 minute video).

⁶ For an example of the use of *Gilbane Gold* in a classroom setting, see Pritchard, Michael, and Holtzapple, Mark, Responsible Engineering: *Gilbane Gold* Revisited. Science and Engineering Ethics, Vol. 3, No. 2, ppg. 217-230, 1997.

⁷ *Incident at Morales* (2003), National Institute for Engineering Ethics, Texas Tech University, P.O. Box 41023, Lubbock, Texas 79409-1023, USA.