Safety & ethics in ACS and major engineering societies: A gap analysis

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The ACS Chemical Professional's Code of Conduct treats safety in lukewarm fashion, denying it the emphasis it enjoys in major science & engineering societies.

Ethical basis for safety

Nonmalificence: "Do No Harm"

Respect for Persons: the "Golden Rule" or human-rights approach

Criteria for including safety in codes of ethics

1. Ethical basis: non-harm, not regs
2. General applicability
3. Priority/conflict resolution
4. Statement strength
5. Disclosure requirement

ACS Chemist's Code of Conduct

To the Public:

Chemical professionals have a responsibility to serve the public interest and safety and to further advance the knowledge of science. **They should actively be concerned with the health and safety of co-workers, consumers, and the community**. Public comments on scientific matters should be made with care and accuracy, without unsubstantiated, exaggerated, or premature statements.

Representative engineering & scientific codes of ethics

ASME

Fundamental principles: "Engineers ...[use] their knowledge and skill **for the advancement of human welfare.**

Fundamental canon 1: "Engineers **shall hold paramount the health, safety, and welfare of the public** in the performance of their professional duties.

Similar to but slightly less comprehensive than AIChE, below. Criteria 1–4 present, but lacks a whistleblower clause.

ACM

General moral imperatives: "As an ACM member I will..contribute to society **and to human well-being**.

"The principle of quality of life of all people affirms an obligation to protect fundamental human rights...**An essential aim of computing professionals is to minimize the negative consequences of computing systems, including threats to health & safety.**

Criteria 1, 2, and 4 are similar to the ASME Code; 3 is conveyed by its position at the top of the document rather than by explicit statement and so is weakened. The ethical basis is particularly well-explained.

AIChE

Preamble: [Chemical engineers shall use] their knowledge and skill **for the advancement of human welfare**.

First bullet: [Chemical engineers shall] **hold paramount the health, safety, and welfare of the public** in the performance of their professional duties.

Second bullet: [Chemical engineers shall] formally advise their employers or clients (and consider further disclosure, if warranted) if they perceive that a consequence of their duties **will adversely affect the present or future health or safety of their colleagues or the public**.

This is the best model for ACS. Criteria 3–5 are clearly stated, 1 is stated in a positive sense in the preamble, and 2 is implicit in the engineering definition of "the public," which is "anyone other than your employer, the corporate entity."

How does ACS stack up?

The ethical basis is weak, since it is juxtaposed with "advancing science." Safety is one of many responsibilities in the ACS Code, without rank order of importance. Strength of the statement is *lukewarm*, lacking the starkness of other codes, and there is no positive duty to take action, even if one is "concerned." In general, the treatment of safety in the Code lacks the central importance found in the codes of other scientific and engineering societies, a significant ethical weakness.

Case study

Professor Utonium begins synthesis of Chemical X in a Parr bomb. There is concern that the reaction mixture may explode during the synthesis.

Under the Chemist's Code of Conduct:

- Prof. U. "should actively be concerned" with other lab workers' safety.
- Nothing is actually required.
- Spirit of the CoC is satisfied by verbal warning.

Under the AIChE Code of Ethics:

- Prof. U. has **positive duty** to consider safety above other factors.
- Active risk-reduction efforts, such as signage, placing a blast shield, or installing pressure relief protection are **required**.

Recommendations

1. Communicate safety as first priority.
2. Justify priority through human rights and non-harm.
3. Make a strong, separate statement based on ethical justification.
4. Place statement to apply equally to all.
5. Introduce a positive duty to disclose problems.

Proposed new code text

Chemical professionals **shall hold paramount the health, safety, and welfare of the public: co-workers, consumers, and the community as a whole, including the environment. They shall serve the public interest in a manner consistent with the above in application and advancement of the chemical sciences.** They shall formally advise their employers (and others, if necessary) if they believe their work or that of others creates a threat to life, health, or property.

Move the clause on public comments to the next section "To the Science of Chemistry."

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Everyone has the right to life, liberty, and security of person.
Universal Declaration of Human Rights (UN, 1947)

Persons are treated in an ethical manner not only by respecting their decisions and protecting them from harm, but also by making efforts to secure their well-being.
The Belmont Report, Part B: Ethical Principles--Beneficence (1979)