Practical Environmental Ethics:
Is There an Obligation to Tell the Whole Truth?

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The Issue of Environmental Professional Ethics

Does the engineer, scientist, or other technical individual who works on issues of impacts of chemical contaminants on public health or the environment, have a fundamental ethical and professional obligation to tell the whole truth? The obvious and undeniable answer is "yes, of course." Why, then, this paper?

The role of engineers, scientists, and other technically educated/trained individuals in project-advocacy and adversarial proceedings on behalf of clients or employers has increased dramatically in the environmental field over the past decades. In the authors' arenas of activity (transport, fate, impacts, and control of chemical contaminants in water and soil systems), many of the issues being addressed have significant long-term public health and environmental quality ramifications, but many of those ramifications may not be expected to be manifested in the near-term. Technologies being considered and adopted are often untested in real-time experience, but rather through "models" and other means to estimate what may happen over the longer term of decades or more. Issues of present cost-savings and the overall near-term economic climate and profitability are of pressing concern to companies and the public. In serving as an advisor/consultant or employee, the engineer/scientist is often faced with a thinly veiled conflict of interest. By training and published codes of ethics for engineers and other professionals, these individuals should know to present the most reliable, technically valid, complete picture of the issue at hand, and to outline significant deficiencies and information inadequacies, independent of the position, interests, and goals of the client or employer. Unfortunately, this is often not being done today.

The field of environmental quality evaluation and management has become immersed in the adversarial (legal) system for "resolving disputes" among parties with different interests. In many cases, in the balance is protection of public health; resolution of "disputes" often is tantamount to "negotiating" the degree of public health protection that will be provided. The traditional engineering/scientific approach and the adversarial system approach toward addressing complex environmental issues are significantly different. In the adversarial system it is the responsibility of "one side" to present only the strongest possible technical discussion on behalf of the client; it is left to the "other side" to bring out and discuss the weaknesses in the opponent's technical position. While that approach is considered appropriate in the courtroom, the problem that has developed today is that it is routinely being followed by engineers and scientists in proceedings outside of the courtroom that are quasi-judicial in nature, such as appearances before regulatory

boards in support of or opposition to proposed projects. Despite the requirements for or appearance of disinterested reviews, many of the engineering and environmental issue reports developed or required by law (such as Environmental

Impact Statements/Reports, and project design documents are fundamentally project- or client-advocacy documents, prepared as though for litigation. It is common that engineering and other technical reports today do not present a disinterested discussion of the technical issues and information available.

An important clarification needs to be made with regard to the nature of a technically credible, disinterested review and what some define as a "balanced" review. Some claim that to be a "balanced" review, none of the available alternatives should be strongly favored or disfavored, and the positive attributes of all be presented "equally." That concept of "balance" is not a prerequisite for a technically credible, disinterested review, and in many instances is inappropriate in the presentation and review of technical information used for public health and environmental quality management decisions.

How does the engineer or scientist - with a responsibility to tell the whole truth complete with caveats, qualifiers, uncertainties, and unanswered questions - participate in such proceedings? The responsible, competent engineer/scientist presents the "whole" story to the client/employer. He/she then may well be faced with the situation in which the client or employer wants only certain "positive" project-supportive information revealed to the public, and other "detracting" information omitted. If the technical information is to be useful to the client/employer, the "expert" engineer/scientist must testify or otherwise make authoritative presentation of those selected facts and information in technical reports, at hearings, or at other proceedings before review boards. Is it ethical for the engineer/scientist to knowingly present partial truths, and not mention technical deficiencies and limitations, etc. in public review, non-courtroom arenas? Some professionals justify doing so on the basis that they have to "play the game" according to the adversarial system rules, even in the non-courtroom arena. All too often, the needs and realities of maintaining a client, securing future work, holding and advancing in one's position in a firm, and inadequate funding to conduct quality and necessary work, compel some engineers and scientists to exaggerate, diminish, mold, or otherwise manipulate the presentation of the "whole truth." However, as discussed below, the Codes of Ethics of the National Society of Professional Engineers and the American Society of Civil Engineers, for example, emphasize the importance of full disclosure on matters of public health and safety.

Ethics On the Edge & Over the Edge: Experiences

In their work over the years, the authors have been witness to some very disturbing non-courtroom practices of professionals in the environmental quality field. Well-educated professionals have been seen to support their clients' positions by the partial quotation of published work, selectively eliminating strong qualifying and limiting statements made by the cited authors. By elimination of the qualifying statements, the meaning has been significantly altered, at times to the opposite meaning of the whole text from which passages have been extracted. The words were quoted properly ... but was the whole truth told?

A number of other ethics concerns can be illustrated by practices encountered today in the permitting of landfills. It is recognized that wastes disposed on land are a threat to the groundwater resources hydraulically connected to the disposal area. To address this situation, regulations for landfills typically contain two types of standards. One is the performance standard that must be achieved by the design (such as the prevention of impairment of groundwater quality/use for as long as the wastes represent a threat); the other is minimum design requirements (prescriptive standards) that must be incorporated (such as the thickness and permeability of a soil liner). The prescriptive standards are not presumed by the regulations to be sufficient to meet the performance standard in all instances at all locations. The California Chapter 15 regulations governing land disposal of wastes explicitly state the performance standard of protection of groundwater quality from use-impairment for as long as the wastes represent a threat. Those regulations also established minimum prescriptive standards for landfill liners of one foot of soil compacted to achieve a maximum permeability of $1x10^{-6}$ cm/sec. The regulations do not state that the minimum prescriptive standard will allow achievement of the performance standard. It is obvious from a simple Darcy's Law calculation and the chemical characteristics and aquatic chemistry of municipal landfill leachate components that a minimum-design liner will be breached by leachate in a few months; the inadequacy of that type of liner for preventing groundwater pollution by municipal landfill leachate has been known in the technical field for many years.

The need and regulatory requirement to provide protection of groundwater quality for as long as wastes/chemicals represent a threat leads to additional questions of ethics in the description of the degree of protection being provided by a particular engineered system. Few responsible engineers will claim that a structure or engineered function out of reach for inspection/repair (such as a landfill's plastic sheeting or clay liner buried under hundreds of feet of garbage) can maintain design integrity, much less conceptual function, forever. However, professionals have been found to claim on behalf of landfill project proponents that a particular engineered waste management structure will, without question, be "protective" of groundwater quality. Careful review of the words selected by such individuals shows, however, that they typically are not claiming that the groundwater will be protected from impact forever - just for some undefined, subjectively described "long term." By saying that a structure or function will provide "protection," or provide protection for a "very long time," but not indicating the duration (when *perpetual* protection is required), is the whole truth being told about the degree of protection being provided? Are such project-advocacy practices ethical?

Some professionals try to skirt the ethical problems of this type by limiting their evaluation or discussion to consideration of whether or not the letter of minimum design standards in regulations has been met by the proposed project or report, tacitly presuming that the regulations are sufficient to protect public health and environmental quality. Surely it could be considered to be the "whole truth" if an engineer or scientist simply states that the letter of the prescriptive (e.g., design) requirement of the pertinent regulations has been fulfilled, or even exceeded ... or is it? Those familiar with the development of environmental regulations know that regulatory requirements adopted are often compromises that incorporate political and other nontechnical considerations. Furthermore, provisions of public health and environmental quality regulations often lag technical advances and levels of understanding by many years - or decades or more in controversial, or politically or economically sensitive areas. A professional engineer or scientist

involved in such issues should be aware of current technical understanding and information, and understand their implications for the adequacy of current regulations (e.g., prescriptive standards). Is it professionally ethical to simply limit testimony or consideration to whether or not a project meets the prescriptive requirements, or to make loaded statements about the project's going **beyond** what is required by regulations, when proper consideration of the regulatory requirements and the project shows them to be deficient for providing protection of public health or environmental quality for as long as the wastes or conditions remain a threat? Even with the known deficiencies in the current California prescriptive standards, project proponent engineers and consultants have presented "expert" statements that a particular liner design "exceeds" that required. All they are really saying is that their design is better than something that is known not to work. Is it ethical to make misleading implications on the justification that the words are true?

Significant problems have developed today in solid waste management because technical staff of regulatory agencies have in many cases lost sight of the purpose of the requirements (protection of public health and environmental quality) and have focused on the design elements such as a liner system with inadequate regard for how well the system will protect public health and environmental quality; they allow construction of landfills that meet minimum prescriptive requirements but that obviously will not meet the performance standards. It has been statements made by engineers and scientists on behalf of landfill applicants attesting to the compliance of a particular landfill design with prescriptive standards, and ignoring the performance standards, that has allowed this to occur. This, in turn, as evolved out of the desire of landfill applicants to provide the simplest, cheapest system that will get by the regulatory agency staff; the public health and environmental consequences will likely not be manifested for decades or more.

The appropriate design of a landfill containment system must include a critical, in-depth, disinterested review of the ability of the proposed system to protect public health, groundwater quality, and the environment for as long as the wastes/chemicals represent a threat. Is it ethical for an engineer or scientist to support the desire of a client, a private landfill company or a public agency, to advocate the construction of a landfill that will not meet the performance standard? What is the responsibility of the engineer or scientist if the performance standard is not adequate to protect public health or environmental quality? Should he/she report on the inability of a regulatory acceptable design to protect public health, or groundwater or environmental quality?

Ramifications

The services and counsel of professional engineers and scientists, and other technically trained people are essential in addressing public health and environmental quality protection issues in arenas that present ethical quandary, including client/employer support, and regulatory and adversarial proceedings. Personal professional integrity, the integrity of the engineering and science professions, as well as the protection of public health and environmental quality, all suffer when the whole truth is stifled in matters of environmental quality assessment and management. The professions are significantly damaged when engineering and science professionals refrain from telling the whole truth.

The authors have seen numerous instances in which layperson regulatory agencies and authorities, and judges discount technical information in matters before them because they perceive the differences in technical information being presented to be legitimate "disagreement among experts." They are not in the position to be familiar with and understand the technical literature, or to discern the partial truths and cleaver wording; relative "demeanor" of "experts" is often the deciding issue. In most environmental quality issues, conclusions that can legitimately be considered "disagreement among qualified experts" are few, and deal with subtleties and details, not fundamental principles of engineering and science. Proper peer review of the information presented is the manner in which the engineering and science professional communities evaluate the credibility of technical positions and findings. The regulatory arena today does not in general promote proper peer review, and in some instances precludes peer review of complex issues.

While the public commonly perceives the problem of "ethics" among engineers and scientists to be largely associated with "industry," "waste generators," landfill companies, or other entities with economic interest, the problem is also prevalent among professionals in "environmental groups" and on regulatory technical staffs. The authors have been witness to proceedings in which technical information has been distorted or misrepresented by representatives of environmental activist groups and regulatory agency staffs, and in which the results of unreliable studies have been used to promote particular environmental "causes" or pre-developed conclusions by such groups or individuals.

Codes of Ethics

The Code of Ethics for Engineers of the National Society of Professional Engineers (NSPE, 1992) and the Code of Ethics and the Guidelines to Practice of the American Society of Civil Engineers (ASCE, 1993) address the types of ethical conduct issues raised above. Selected principles outlined therein are quoted below:

NSPE (1992):

Rules of Practice

> "1. Engineers shall hold paramount the safety, health and welfare of the public in the performance of their professional duties.
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> > a. Engineers shall at all times recognize that their primary obligation is to protect the safety, health, property and welfare of the public. If their professional judgment is overruled under circumstances where the safety, health, property or welfare of the public are endangered, they shall notify their employer or client and such other authority as may be appropriate.
> >
> > b. Engineers shall approve only those engineering documents which are safe for public health, property and welfare in conformity with accepted standards."
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> "3. Engineers shall issue public statements only in an objective and truthful manner.

a. Engineers shall be objective and truthful in professional reports, statements or testimony. They shall include all relevant and pertinent information in such reports, statements or testimony."

Professional Obligations

"1. Engineers shall be guided in all their professional relations by the highest standards of integrity.

a. Engineers shall admit and accept their own errors when proven wrong and refrain from distorting or altering the facts in an attempt to justify their decisions.

b. Engineers shall advise their clients or employers when they believe a project will not be successful."

"3. Engineers shall avoid all conduct or practice which is likely to discredit the profession or deceive the public.

a. Engineers shall avoid the use of statements containing a material misrepresentation of fact or omitting a material fact necessary to keep statements from being misleading or intended or likely to create an unjustified expectation; statements containing prediction of future success;..."

ASCE (1993)
Fundamental Principles

"Engineers uphold and advance the integrity, honor and dignity of the engineering profession by:

1. using their knowledge and skill for the enhancement of human welfare;

2. being honest and impartial and serving with fidelity the public, their employers and clients;

3. striving to increase the competence and prestige of the engineering profession;"

Fundamental Canons

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

"c. Engineers whose professional judgment is overruled under circumstances where the safety, health and welfare of the public are endangered, shall inform their clients or employers of the possible consequences.

d. Engineers who have knowledge or reason to believe that another person or firm may be in violation of any of the provisions of Canon 1 shall present such information to the

proper authority in writing and shall cooperate with the proper authority in furnishing such further information or assistance as may be required."

"f. Engineers should be committed to improving the environment to enhance the quality of life."

"3. Engineers shall issue public statements only in an objective and truthful manner.

a. Engineers should endeavor to extend the public knowledge of engineering, and shall not participate in the dissemination of untrue, unfair or exaggerated statements regarding engineering.

b. Engineers shall be objective and truthful in professional reports, statements, or testimony. They shall include all relevant and pertinent information in such reports, statements, or testimony.

c. Engineers, when serving as expert witnesses, shall express an engineering opinion only when it is founded upon adequate knowledge of the facts, upon a background of technical competence, and upon honest conviction."

Summary and Recommendations

Until the motivation for compromise, adjustment, and disregard of ethics and integrity has been eliminated, or until there is sufficient disincentive for such practice, it will likely increase, and continue to be rationalized. At the core is clearly the avarice of companies and firms which metastasizes to employees and consultants. For some, this translates to fear of lost employment or to loss of clients or future business if the whole truth is not shaded or molded to fit the interests of the client or company. The fact is that consultants do lose business and clients, and opportunities for future work from both government agency and private clients when they do not bend to unjustified inclinations of the client - when they do not say "what the client wants to hear." Environmentalists and regulatory staff are often driven by zeal to promote a particular cause or position. While such energy is admirable, some positions are held and pursued irrespective of the technical information; face-savings and funding considerations play a role in the drive to "win" for the position rather than to accomplish appropriate protection of public health and environmental quality with the risk of appearance of "giving in" to others' interests.

Contributing to the incentive for selective disclosure is the litigious arena for addressing environmental quality issues. As noted above, the philosophy of the adversary system is inconsistent with that of the engineering and science communities' examination of all key aspects of an issue based on sound technical information and principles of engineering and science. In the adversary system, as well as in many aspects of the regulatory system, laypersons, or others without high degrees of expertise in the topic, are called upon to render judgments on the merits of technical arguments, findings, and principles. Those who question or who stand to be adversely affected by a particular project often do not have the financial and technical resources to hire competent technical advisors to examine the merits of the technical information and conclusions presented by project proponents. The unreliability and perception of unreliability of

technical information, and assurances of protection of public health and environmental quality provided by project advocates has contributed to the justification of the NIMBY attitude.

It is clear that the less-than-ethical practices of some in the broad environmental quality management area are harming the reputation of the professions, the confidence of the public in the professions and the regulatory agencies charged with protecting its interests, as well as the ability to ensure reliable protection of public health and environmental quality. However, the underlying conditions and realities causing these problems are not likely to be changed in the foreseeable future. One approach that may help neutralize the effects of biased practices of some professionals, both project advocates and opponents, may be to incorporate a requirement with project applications for funding independent, disinterested technical review that would be presented directly to the regulatory agency, decision-makers, and interested parties. Such an approach would provide some impetus for project consultants and advocates to be more forthcoming with reliable information, or to be faced with exposure in a peer-review public arena. It could also ease the NIMBY situation if individuals, communities, and interest groups had a mechanism for independent review and reporting of technical information.

It is recommended that a percentage of the cost of any proposed project with potentially significant public health or environmental quality implications, be made available for proper peer review of the project and required project documents such as Environmental Impact Statements and Environmental Impact Reports. While EIR's and EIS's should provide the vehicle for full technical disclosure, it has been the authors' experience that such documents rarely provide reliable in-depth review of complex technical issues, especially as they relate to the implications and management of chemical contaminants in the environment. Such reviews are typically superficial in these areas, and as noted above, are basically project-advocacy documents. It is recommended that every project applicant be required to conduct plausible worst-case scenario evaluations for projects involving chemical contaminants in the environment. Such evaluations must include consideration of:

- the nature, transport, fate, and effects of chemical contaminants under plausible worst-case conditions,
- the ability of the project's monitoring system to detect impending public health and environmental quality impairment under plausible worst-case conditions,
- the actions that would be taken in response to such detection,
- the magnitude of harm to public health and environmental quality that could result from inadequate response actions to plausible worst-case conditions,
- the magnitude and source of funding available for as long as the wastes/chemicals represent a threat, for corrective action required under plausible worst-case conditions, and
- the adequacy of the public health and environmental protection regulatory standards or other requirements applicable to the project, as well as potential future changes in those standards.

The plausible worst-case scenario evaluation would be among the materials provided for peer review of the project.

The adoption of this approach would provide the public, the regulatory community, as well as officers of the courts with a much better understanding of the potential consequences of undertaking a particular project or activity. It would also be a major step in reversing the tide of unethical practices that have become common in the environmental quality management field today.

References

ASCE (American Society of Civil Engineers), "Code of Ethics," ASCE Official Register, ASCE, New York (1993).

NSPE (National Society of Professional Engineers), "Code of Ethics for Engineers," November (1992).

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