Geological Society of America (GSA) Presidential Conference

(1997)

Report on

CONFERENCE ON"*ETHICS IN THE GEOSCIENCES*"

On July 16-21, 1997, a conference on "Ethics in the Geosciences" was held in Welches, Oregon. This event was a Geological Society of America (GSA) Presidential Conference and was co-sponsored by the American Association of Petroleum Geologists (AAPG), the AAPG Division of Professional Affairs, the American Institute of Professional Geologists (AIPG) and the AIPG Foundation, the GSA Foundation, and the U.S. Geological Survey (USGS). The National Science Foundation (NSF) awarded a matching grant.

In attendance were 69 geoscientists and nongeoscientists who convened to explore the complex issue of ethics and its relationship to the practice of geology. This diverse gathering of geologists represented the professional divisions of industry (mining, petroleum, consulting), academia (administration and teaching); non-profit institutions; and local, state and federal agencies. The nongeoscientists included philosophers, a federal judge, attorneys, an urban/regional planner, and institutional representatives [American Association for the Advancement of Science (AAAS) and the NSF]. As diverse as the professional representations was the geographic distribution: approximately one-third each from the West, middle America, and Atlantic states, plus 1 representative from Canada and 2 from Europe.

When formulating this conference, the conveners realized that they possibly might be in the minority in their concern for ethics in the geosciences. Yet, the nagging awareness remained -- that there was more to the issue of ethics than either they or their peers realized. Personal experience alone demonstrated that there are problems, but how large was the issue within the geoscience community (realizing that unethical behavior was not unique to this scientific community but an evolving societal issue)? Was the conference just speaking to the choir (those who thought the issue significant enough to attend)? And as the conference began, how would the age disparity (majority of participants over 45 years old) affect conference results? Would this be the old lecturing to the young? How do those concerned with the issue effectively address the geoscience community? What can or should geoscience professionals do as individuals or as a community?

To deal with any naiveté and to avoid recreating the wheel, nongeoscientists were recruited to guide and inform. (As one speaker defined his role, the philosopher serves as midwife, helping those assembled to deliver their thoughts). The conference became a forum for problem-specific, insightful, and often animated exchange of ideas. The meeting closed with a participant-directed platform for further action. The results, presented below, reflect the depth of understanding that evolved for those in attendance and their belief that, in addition to personal integrity, discussions of ethics among

geoscientists are critical for the successful practice of geology. As participant Clement Shearer (Carleton College) concisely expressed:

> *"A good foundation was laid down, and if the AGI, GSA, or another association builds upon it immediately, the foundation is there and I have faith that eventually geologists, being of good character in general, will come to recognize that developing professionals of good virtue cannot be left solely to good fortune but must be nurtured, and that such virtuous professionals are as important to the health of the discipline as are good teaching and research."*

The topics covered at the conference touched a broad range of perceived and experienced problems -- from ethical issues in research and teaching, in industry, and in state and federal agencies; to codes of ethics, enforcement, licensing, certification, and registration; to conflicting ethical systems and teaching/fostering ethical behavior. The material from these discussions is presented on the following pages and is organized as follows:

- *Ethics Defined:* What are ethics, and how do we judge ethical issues?
- *Ethical Issues in the Geosciences:* What are the ethical issues facing the geoscience community? What are the issues associated with licensing, registration, and/or certification in the geosciences?
- *Teaching Ethics:* How do you teach responsible science?
- *Codes of Ethics:* Are codes of ethics useful, necessary, effective?
- *Core Values for the Geoscience Profession:* What is fundamental to the geosciences? What are the particular ideals and goals of the profession?
- *Future Activities*: How do we communicate the results of this conference? What should be the products of this conference*?*

Ethics Defined

An issue arose early in discussions regarding the difference between the terms "ethics" and "morality" As explained by the non-geoscientists present, ethics is a system of belief that is articulated, codified, and philosophical in nature; morality is intuitive right and wrong, spiritual, and universal. Throughout the conference (and this report), these terms were used interchangeably.

The practice of ethics is the art of making good choices; the function of ethics is to avert falling into trouble (versus bailing out later). In the case of the geosciences, to reflect on ethics is to study what is acceptable and what is unacceptable professional behavior. In short, ethics defines what it means to be a professional.

For a person to be ethical, he/she finds fulfillment in truth and is the transcendental definition of an *authentic* person -- that is, one who is:

- attentive - observes and experiences;
- intelligent - takes information beyond experience and understands its significance;
- reasonable: judges and evaluates observations with logic;
- responsible: goes beyond personal gain and evaluates what is truly good (over what is surficially good); and

- surrendered to the demands of unrestricted love: whole-heartedly dedicated to the study.

Note, these are actions, not states of being. Therefore, to deal successfully with ethical issues, the geologist must have personal integrity and be "authentic" in professional life.

There are no special ethics for geologists -- only common morality. The problem is that common morality does not provide answers to all professional (and, for that matter, personal) problems. Ethical conflicts arise because we live in a world of duality. Society attempts to resolve debated issues through law (such as abortion) but the moral debate continues. Each professional must make a value decision on each conflict faced. According to Bernard Gert (Dartmouth College), moral problems arise if (1) what one is doing causes or significantly increases the probability of someone suffering harm. The examples that Dr. Gert cites are killing; causing physical or mental pain; causing injury or disability; causing loss of freedom, opportunities or resources; causing loss of pleasure or enjoyment; deceiving; breaking a promise; cheating or treating someone unfairly; breaking a law; or failing to perform one's duty. To do any of these acts without proper justification would be immoral. A litmus test for the moral acceptability of an act is if an impartial, rational person would be willing for everyone else to be allowed to do the same under similar circumstances.

Ethical Issues in the Geosciences

The correct practice of geology is impartiality regarding the data, application of the appropriate approach, and development of multiple-working hypotheses, all of which evolve from and are affected by moral judgment. In other words, understanding the earth is controlled by the way data are obtained and the form into which the data are cast, both of which rely on a geologist's integrity. As summarized by Victor Yannacone (Yannacone & Yannacone, P.C.), the practice of geology is to (1) contribute to, expand, and conserve the body of knowledge (to serve as stewards of that knowledge); (2) communicate with those who do not share the knowledge and who depend on the integrity of the stewards; and (3) meet the geologic needs of our civilization by locating the resources on which the society relies but also inform on the long-term impacts of providing these resources.

To examine the conditions under which a geologist's integrity is compromised, designated speakers explored issues in research and teaching; in industry; in state and federal agencies; and in licensing, registration and certification. These issues are described below.

Ethical Issues in Research and Teaching

Unethical practices in academia were presented as archetypes by Jerry Kaufman (University of Wisconsin-Madison). The archetypes and their practices are:

- the *Deceiver* who fabricates and/or falsifies data, plagiarizes, or selects data to support predetermined hypotheses.
- the *Power Abuser* who, as a teacher, unnecessarily ups the ante for student performance, is known for reprisals bordering on vindictiveness, and imposes sexual harassment.

- the *Obfuscater* who is deliberately unclear about assumptions underlying hypotheses or about methods used to gather and analyze the data.
- the *Misrepresenter* who takes credit for research done by others, uses others' research work without giving credit, or shows credentials not earned.
- the *Hider* who does not divulge conflicts of interest.
- the *Repackager* who -- to inflate research credentials and list of publications -- alters articles in ways that basically replicate a previously published article.
- the *Hoarder* who does not share data and research findings prior to publication.

Bob Hatcher of the University of Tennessee and Oak Ridge National Laboratory identified issues that are not commonly covered by codes of ethics. These issues include:

- *Consulting by university faculty* which involves issues of turf-guarding, competition with the private sector, data manipulation, teachers' benefits from student research and mentoring, outside contracts, and income.
- *Ethics in management*, which are affected by such issues as competing with parallel groups, leadership (by example), communication of information of value to subordinates, rewards, funds utilization, stated (and unstated) goals and expectations of employee, empowerment, mentoring, and advertising for available positions.
- *Teaching*, which involves the awarding of grades, the role of GTAs, approach to absolutely forbidden acts as defined in the faculty manual, the teaching and content of graduate versus undergraduate classes, admission of underqualified students to the university, faculty behavior in the classroom, preparation and grading of exams.
- *Scientific Research*, which includes competing for funds, mentoring, interacting with colleagues, submittal of manuscripts to more than one journal, timely dissemination of results, data manipulation and massaging, reviewing research proposals of others, and turf guarding,

Tom Holzer (USGS) questioned another ethical dilemma in research: is there truth in science? Interpretation is subject to ethical choices, and research tends toward the consensus of opinion, possibly squashing minority views. Holzer cited T.C. Chamberlain's urging of researchers to focus on facts, to interpret those facts using multiple-working hypotheses, and to leave options open. Issues arise with pressures from media representatives who demand information from researchers for "the bottom line", a story punch line, or an answer to a problem. For the public, *theory* means "unbridled speculation." Therefore, the nonscientist must be continually reminded that absolute truth in science -- the total and final answer -- is not the scientific process.

Reasons for why unethical actions in research and teaching go unchecked were presented: (1) university administrators, faculty, teachers and students elect to be blind to wrong-doing (a "don't look, don't find" approach) and/or are naive about such matters ("not possible in this department"); (2) peer review is motivated by self-interest and self-protection; (3) the illusion of academia predominates (i.e., colleges/universities are centers of truth and honor, and unethical practices are not part of the image); and (4) there is a lack of institutional support (i.e., anti-whistleblower atmosphere).

Ethical Issues in Industry

The practice of geology in industry still involves the scientific approach, but the more direct demands of business and profit result in some unethical practices. Dave Stephenson (South Pass Resources, Inc.) cited observed unethical behavior in consulting including falsification of credentials on resumes, misrepresentation in proposals (such as using a firm or individual to be awarded the work and then failing to use those services), and in expert testimony/advocacy, by misrepresenting or withholding scientific information. Unemployment and competition for fewer environmental projects has only fostered the cases of unethical practices, especially consulting outside one's expertise.

Pete Rose (Telegraph Exploration, Inc.), examined the role of the geologist as employee and independent consultant in the oil and gas exploration industry. "Professionalism is an attitude -- the personal endorsement of consistently high standards of knowledge, work performance, and conduct. Professionalism requires capability beyond mere competence, and it requires a willingness to be accountable." Rose also emphasized that the decline in mentoring of young professionals has contributed to a decline of ethical behavior in industry. He urged all professionals to establish mentoring through which future professionalism (the heart of ethics) can be instilled.

Diana Dale (Worklife Institute) presented a spectrum of ethical issues that she categorized as:

Employee to Company Issues:

llegal or improper interview practices.
- new employee data-grabbing (obtaining information on previous employer).
- field kickbacks.
- falsification of employment history.
- unregistered geologists signing off on documents.
- taking credit for others work.

Company to Company Issues:
- resume loading for proposals.
- theft of prospect/concept from presentations.
- confidential data access during company merger.

Company Overseas:
- bribery (termed "facilitation").
- kickback demands.
- nepotism.
- competition with other nations' companies.
- dealing with cultures, tribes and territories.

Ethical Issues in State and Federal Agencies

This group of discussion leaders (Diane Nielson, Utah Department of Environmental Quality; Richard Grauch and Tom Holzer, USGS; and Don Hull, Oregon State Geologist) had a unique approach to presentation of ethical issues in agencies. Rather than summarizing their points of view, they grouped participants by professional

affiliation: government, academic, industry, and nongeoscientists (philosophers, legal professionals, institute professionals, consultants). These four groups were asked to address the same questions:

1. With respect to geoscience, what are your **expectations** of local/state/federal government?
2. To whom are geoscience governmental agency employees **accountable**?
3. What are the **ethical issues** associated with these expectations?

A consensus of the results of these group discussions on the ethical issues perceived for geoscience positions in government are summarized below.

Perceptions expressed by representatives of:	Question 3: Ethical Issues Associated with Expectations of Government Agencies
INDUSTRY	• Competition of government agencies with private industry. • Conflict between researchers and elected officials dictating results. • Unqualified decision makers. • Regulatory agencies conducting predetermined "research". • * Failure to release compiled data. • Continuance of non-productive projects. • * Favoritism in contracting. • Selective enforcement of regulations. • * Lack of accountability of individuals. • Lack of responsible management of both personnel and money. • * Junk science. • Imposed gag rules. • Policy makers not providing required resources • * Failure to check credentials.
ACADEMIA	• * Hoarding and procrastination. • * Hiring practices. • * Contracting practices.
GOVERNMENT	• Compromising public health, safety and welfare. • * Withholding geoscience information. • Fairness and equity in serving customers. • * Bad science. • Willful manipulation of data to achieve policy goals. • Biased research priorities. • Lack of full disclosure. • Minority opinions not communicated. • Failure of stewardship of public funds and resources. • Consulting by government employees within their jurisdiction. • Post-government geologic job seeking with regulated industries. • * Conflicts of interest
	Question 3 Restated by Group: Ethical Issues that (Government) Geoscientists Face
NONGEOSCIENTISTS	• * Timely release of information and decision-making.* Manner i • Determining when is data-gathering sufficient to make a decision or recommendation. • * Conflicts of interest • * Who bears the burden. • Obligation not to create a panic.
BREAK-OUT	• Use of government and academic facilities for consulting that competes with

Note: Themes in common are identified by an asterisk (*).

Ethical Issues Associated with Licensing, Certification, and Registration

Licensing, certification, and registration are the direct approach for endorsing and monitoring professional ethical behavior. Licensing and registration are conducted through a state or government; certification is through professional societies. More specifically, licensing is the right to practice bestowed by an authority, certification is right-to-title, and registration is placement on a list showing license or certification. In Oklahoma and Colorado, "definition" is to legally practice as a geologist.

Licensing and Registration Issues (Government control):

In California, noted violations of registration include:

1. Conviction of a crime associated with the qualifications, functions, and/or duties of a geologist.
2. Commission of deceit, misrepresentation, violation of contract, fraud, negligence, incompetence, or unethical conduct (*beginning in January 1998*) in the practice of geology.
3. Fraud or deceit in obtaining registration.
4. Aiding or abetting any person in violation of registration law.
5. Violation of any provision of the licensing law.

Ethical problems, irresponsibility or deceit brought to the attention of the California Board of Registration are commonly associated with Class I RCRA Hazardous Waste Sites reports in which:

- basic scientific principles are ignored.
- critical factors are not investigated.
- data are not analyzed.
- data collection is obviously incomplete or inappropriate.
- assertions are unsupported.
- presentation of data is misleading.
- conclusions or recommendations are missing.

Seena Hoose of the California Board of Registration summarized several enforcement options: citation (up to $2500 fine), disconnection of business telephone service, license reproved (privately or publicly), license suspended (up to 1 year), and license revoked.

Discussions focused on other professional licensing organizations that require continuing education in ethics for license renewal (i.e., the licensee must take a course in ethics); on the pros and cons of state versus national registration; how licensing/registration is cast as a barrier to entry into the profession; the irony that a driver's license has reciprocity throughout the United States (and internationally) and professional licensing does not; and should licensing exams include questions on ethics.

Certification Issues (Professional Society Control):

Example issues found during certification reviews included applicant semantic deceit and misrepresentation of qualifications and sponsor misrepresentations. Sponsor misrepresentations included (1) cross-sponsoring between applicant and sponsor; (2) questions regarding the true qualifications of the sponsor; and (3) the sponsor was the immediate supervisor of the applicant (and seeking certification for company marketing purposes. Dave Abbott, Chair of the Ethics Committee of AIPG, led discussion on what are appropriate actions by professional societies regarding violations of precepts? Denouncement? Peer Counseling at onset of errant ways? Releasing a public relations editorial to communicate that errant action does not represent the geologic community?

Teaching Ethics

> *"Of course I worry about the few professionals who violate the obvious standards of conduct, but [I] think the biggest payback would be from assisting those who are of virtuous soul to avoid temptation and to recognize it when it first appears, that 'the best way to get out of trouble is to stay out of trouble.' Education is the logical component. Recognizing the autonomy of individual campuses and academic departments, what can we do to promulgate the inclusion of professional ethics in the undergraduate and graduate school education?"*
>
> (Clement Shearer, Carleton College))

Ethics have not commonly been taught at any level of education. Moreover, geology departments have been reticent in providing non-scientific instruction to its students. As a result, recognition of the need is behind that of disciplines (such as law, medicine, engineering, urban planning, business) which, for some time, have included formal courses on professional ethics. Several participants speculated as to why professors shy away from teaching ethics:

- they feel uncomfortable with the subject matter;
- they doubt the need for such material (ethics was not part of his/her education , so why is it necessary now); and
- they believe that when an ethical issue arises, there is one right solution and it will be obvious.

For earth science educators, the common belief has been that students would learn by example from mentors and peers -- an *implicit* educational approach. One of the strongest messages to evolve from this conference was the need for *explicit* geoscience education in professional ethics because:

1. It is critical to communicate expectations of standards and values for scientific inquiry.
2. Ethical values can be taught and comprehended through <u>study</u> and reflection. Moral compasses must be tuned throughout adulthood -- to learn how to make and act upon moral judgments.

3. The learning environment must be supportive of the practice of ethics. Not to discuss the issues at educational institutions is not to stress the importance of ethics in professional life.

For an effective ethics education program, (1) the subject must be interactive; (2) all geoscience faculty must be involved; (3) relevant topics must be identified by the geology department; and (4) the educational program starts early and continues throughout academic life (i.e., reinforcement of the message through mentors, in other classes, and special-topic seminars). The goals of the study of ethics as it relates to the practice of geology are to:

- stimulate the moral imagination (thinking you are right but not knowing why);
- recognize issues, thereby avoiding surprises (good intentions and upbringing are not enough);
- emphasize key ethical concepts and principles;
- discuss ambiguity and disagreement (thereby dispersing attitudes of "all is gray" and "everyone's opinion is equal"; and
- arouse a sense of responsibility (to do good is more than the absence of evil).

In addition to these goals for studying ethics in general, Stephanie Bird [Massachusetts Institute of Technology (MIT)] identified the goals for teaching responsible conduct for research:

1. to increase awareness and knowledge of professional standards by identifying and clarifying acceptable research practices, examining the assumptions that underlie different practices, and assessing immediate and long-term implications of different practices.
2. to increase awareness of the ethical dimensions of the science.
3. to provide pre-thinking experience in making and defending decisions about ethical issues.
4. to teach how to gather resources for making decisions.

Education on ethical issues takes the abstract notion to the real and the student to becoming the practitioner. Students must be made aware that their activities affect their profession -- that they have the personal responsibility to control and monitor their decisions in order to be fully effective scientists.

Methods of Teaching

The issue of how to teach ethics was addressed. Should there be a separate ethics course? Not necessarily. Should ethics be taught by a geologist? Absolutely. Team teaching is always an option, possibly with a member of the Philosophy Department. However, the geology instructor does not have to be ingrained in philosophical ethical issues: a thoughtful, investigative approach would suffice. Geology professors know the particularities of ethical situations and what may confront the student or professional, and those ethical issues can be integrated into the total fabric of the course. Moreover, if ethical material cannot be discussed openly by scientific

professionals, it gives the student the erroneous impression that the subject is beyond the average person's insight and ability to comprehend.

Examples of how ethics can be integrated into technical courses were provided by Jerry Kaufman (Department of Urban and Regional Planning, University of Wisconsin) and John Williams (Department of Geology, San Jose State University). Kaufman's approach is to integrate a full semester ethics course as part of the Planning program. "To teach ethics takes time, thinking, planning and more time. I try to stimulate my students' moral imaginations." Kaufman explained that because ethics underlie the practice of science, students need to be introduced to and to think about issues that will confront them (to be fore-warned is to be fore-armed). He introduces the core values of the profession as expressed in the professional code of ethics in order for students to be aware of the existence of codes and of the profession's aspirations. In addition, throughout the semester, he highlights ethical issues associated with subject course material (the modular approach).

John Williams uses the modular approach for which components of ethics are introduced throughout a scientific course. The modular approach is a solution where university or department requirements would not allow a full-term course focusing only on ethics. William's philosophy is if he sets aside that much time from scientific course material to discuss ethics, he is attaching significance to the subject. "A student may never do a triaxial test, but he will encounter these problems." Williams method is to devote 5 to 10 minutes several times a week to examine a case study related to that day's class material. In addition, a full day's class is devoted to presentation and discussion of specific issues including plagiarism and misrepresentation of data.

Stephanie Bird (MIT) described how ethical issues in scientific research at MIT are addressed through an all-university, cross-discipline, small-group workshops that meet for 2 to 3 hours once or twice a semester. Organizers of these workshops work with the various departments with the goal of training students to *think* ethically. Other approaches that were suggested include: (1) working with the Philosophy Department for team-teaching or for integrating material on ethics either for specialized geology seminars/workshops or for course material, and (2) having students develop a professional code of ethics -- whatever means to provide a mechanism for discussion of ethical issues.

Codes of Ethics

The Purpose of Codes of Ethics

Codes of ethics are the means by which professional disciplines are able to express their shared beliefs and values and to define their goals. An ethics code specifies the way a society wants its members to act. The function of codes is to:

- serve as a consensus of a community's opinions (that is, an expression of the highest common denominator of values for the profession);
- serve as an enabling document that provides direction and allows informed choices, thereby leading members to less of a moral dilemma and facilitating habit to do the right thing;

- reflect ethics of action and of character;
- reaffirm the professionalism of the group by allowing for professional socialization that gives a grounding and identification;
- provide a public image of discipline and accountability, serving as a basis for defining expectations, and gaining public trust and support;
- serve as an educational tool to deter unethical behavior and uphold group integrity;
- provide support against unreasonable demands on professionals of that society;
- serve as a source of public policy; and
- provide a supportive climate for whistleblowers.

Types of Codes

The type of code selected by a society or group is a reflection of the extent of their consensus, their awareness of the options and functions of a code, and the resources of that group. The types are:

spirational -- states ideals and highest level of achievement of the profession.

- *Educational* -- contains principles and explicit guidelines.
- *Regulatory* -- provides rules that guide conduct and includes provisions for monitoring and sanctions.

Content of Codes of Ethics

Codes often cover issues associated with authorship/publication practices; data management; mentoring, responsibility to expose misconduct; conflicts of interest, sexual harassment, discrimination and harassment, responsibilities to society; peer review; use of human subjects; and humane treatment of animals. Codes declare professional responsibilities to the world environment, society, employers, profession, family and self -- all of which can be in conflict. Enforcement procedures are often defined in a separate document from the code. Societies whose codes are tied with licensing carry particular enforcement clout.

In general, as presented by Bernard Gert (Dartmouth College), codes should be an educational document designed to help socialize new geologists and to make clear those already in the field what is expected of them. Secondly, a code should not only be compatible with common morality but should emphasize those problems specific to geology. Of particular note, codes should make clear that there can be legitimate disagreements and should provide some procedure for settling disputes.

Concerns Regarding Codes

The European Federation of Geologists has been developing a one-page "Code of Conduct" over the past 5 years. Problems associated with development of this code which is intended to serve a broad geographic and culturally diverse membership:

- because legal systems differ, disciplinary problems must come through local membership;
- language translation cannot be exact and the nuances cannot be conveyed;
- Hong Kong members (formerly part of the Federation) are in limbo.

For societies that do not yet have a code of ethics -- and for those societies that wish to reevaluate their codes -- the following should be considered (Mark Frankel of AAAS):

1. Is it necessary or important to have a code?
2. What kind of code would fit the need?
3. What is the process to be used to develop the code?
4. What should the code contain?
5. How shall the code be implemented?
6. Will there be an enforcement mechanism? What procedures will be followed?

Enforcement is not necessary for a code to be functional. However, for effective enforcement of codes of ethics, both the membership of a professional society and the governing council of a society must recognize the hard realities:

> Individual Members must be willing to (1) recognize ethical violations by colleagues; (2) report these violations in writing; (3) face adverse consequences such as cross-examination, being viewed as a whistle-blower or "not part of the team", possible loss of job, and possible lawsuit.
>
> Professional Societies must demonstrate the willingness to accept the risk of being sued; devote resources to the investigation of the infraction; and publish annual, generic summaries of complaints received and actions taken.

Discussions of these enforcement realities emphasized that people are reluctant to turn in colleagues if expulsion is the only option. Rehabilitation and letters of reprimand are initial options to correct a course of inappropriate behavior. Some argued that the role of professional societies should not be that of police to its membership. A code of ethics would best serve only as a mentoring document, but if enforcement actions are taken, publicity is crucial. Allowing resignation and keeping it quiet will have negative consequences: let members know of sanctions taken, how it was decided and the reasoning, and the enforcement decision. In addition, other affected agencies and societies should be notified.

Finally, because codes are political documents, they can be divisive within an organization and costly to the society's image and internal relationships. Communication of ethical issues to the membership, and followup on violations, are the means for making a code meaningful to the organization membership that it purports to serve. Use of case studies is both educational and validates the code (or reflects the shortcomings in the code).

Comparison of Professional Codes

Bill Knight of AIPG contacted 31 professional societies for samples of their codes. Many did not have a code of ethics, and some had codes that were one to two

paragraphs in length. Of the 31 societies contacted, 13 societies responded and submitted their codes, and the ideals and ethical obligations in common to these codes are summarized below:

1. Maintenance and promotion of professional standards (ethics as a way of life).
2. Promotion and protection of public health, safety and welfare through compliance with the laws; accurate, truthful and candid communications; impartial public affairs; and promotion of geology.
3. Faithful and compatible service to employers and clients.
4. Respect for the rights and interests of other professionals.
5. Responsiveness to society and the profession (which includes improvement of knowledge/skills and reporting of violations).

Additional obligations cited in State Geologists code of ethics included prohibitions against discrimination, use of seal by others felony convictions, moral turpitude and mental incompetence, and others.

These comparisons and the range of values expressed in the various codes of ethics served as a basis for discussion and for defining the overall core values for the geosciences (presented in the following section).

Core Values for the Geoscience Community

"The particular ideals or goals of a profession should be specified. These are clearly distinguished from the requirements and duties of a profession"
(Bernard Gert, Dartmouth College)

"We must understand the core values of the geosciences profession. Core values anchor and trigger the character and conduct of members. Without core values, the public will not give authority or respect to the profession.
(Mark Frankel, AAAS)

After five days of discussing the nuances of ethics and its role in the geosciences, the participants questioned what would be the most worthwhile product of the conference -- one that would be of use to the professional geologic societies, to educators, administrators -- to the diverse community of geoscience professionals. What would be an appropriate launching pad for further efforts in the promotion of discussions on ethics in the geosciences. The unanimous decision was identification of core values and virtues for the profession -- to specify those particular ideals or goals of importance to geoscientists.

Because this gathering was a broad representation of geoscientists, with input from the disciplines of law, philosophy and education, the setting and circumstances were ideal. Once again, the 60-plus participants divided into professional groups (academic, industry, government, non-geologist) and addressed the following two questions:

1. **Core Values**: What are the *goals of the profession*? Why does society confer the status of professional on you? What can the public expect of your performance? What does the profession aspire to be?
2. **Virtues***:* *What are the* ideals , the character traits that the effective geologist (the "authentic" geoscientist) should have?

The consensus of answers from all four groups:

Core Values for the Geosciences

For the professional geoscience subject areas, the specified goals are:

Science: To study and understand the Earth, planets, and their processes, and to communicate that knowledge to the public.

Hazards: To identify and communicate knowledge about earthquakes, volcanoes, floods, and other geologic hazards.

Resources: To discover, develop, and produce energy, mineral, and water resources needed for society in an environmentally and economically responsible manner.

Environment: To apply geoscientific knowledge to environmental, engineering and land-use planning issues.

Education: To provide geoscience education to the public, new geoscientists, and the profession.

Identified Virtues for the Geosciences

The geoscientist accepts uncertainty and integrates information with a unique perspective about time, space, and scale. The professional geoscientist is:

Honest
Objective
Open-minded
Observant
Trustworthy
Competent
Curious
Dedicated
Cooperative
Collegial
Creative
Clear
Prudent
Persevering
Enthusiastic
Courageous

Future groups can refine what conduct is expected of professional geoscientists. The geoscience community (via the various geological societies) is urged to use Core Values as a basis for developing more involved, detailed codes. Other professional communities have found it beneficial to identify core values in order to (1) establish expectations of colleagues for professional behavior, and (2) to establish relationships between members and society. At a minimum, the geosciences as a whole should have a code of professional responsibility -- an affirmation to protect the public wellbeing through the science.

Future Activities

This conference was just the starting point, and this report could serve as a preamble to future geoscience ethics activities. Conference participants will be participating in the following activities:

- Individual participants will be writing on a variety of subjects/issues arising from this conference. These writings include articles that will be published in *Geotimes*, *GSA Today*, and in individual society newsletters plus a summary report to the National Science Foundation. In addition, AAPG (via Pete Rose) has compiled case studies on ethical issues in the geosciences (available through AAPG).
- Short-term actions by individual participants include:
    - development of materials for inclusion with geology course material.
    - establishment of a website for posting of case histories and commentaries.
    - societal newsletters running regular discussions on ethics.
    - presentations on ethical issues at societal annual and sectional meetings.
    - brown-bag (lunch) seminars at places of employment.
    - inclusion of topics on ethical situations in technical writing courses.
    - reviewing this conference's findings at faculty meetings to plan year.
    - presentations to local geological societies and organizational meetings (such as the Association of American State Geologists).
    - letters to USGS leadership to urge continued formal discussions and inclusion of the subject of ethics in the USGS *Employee Conduct Handbook.*
    - presentation of conference material at the September 1997 meeting of Sigma Gamma Epsilon (geology honorary society).

Conclusions

Although ethical dilemmas exist throughout the geoscience profession, there is a degree of naiveté and reticence within the geosciences community to probe these issues. This conference of diverse geoscientists became a forum for problem-specific, insightful, and often animated exchange of ideas. The results reflect the participants' newly-found or reinforced beliefs that there is more to our profession than scientific knowledge and skills. The onus is on the individual geoscientist to (1) recognize that ethics is part of a geoscientist's professional responsibility, and (2) become proactive in ethics through discussions, study, teaching, and mentoring. Individual integrity is not enough: to be truly ethical, one must have personal integrity as well as an on-going awareness and insight into the ethical problems existing throughout the geoscience profession. In other words, geoscientists must become alert to, and active in, the subject of ethics in order for the practice of geology to be truly ethical.

Pride in being a geoscientist generates the moral courage to foster, uphold, and protect the credibility and reputation of the profession. As Victor Yannacone (Yannacone & Yannacone, P.C.) emphasized, "In choosing to become geologists, you have assumed a burden -- one that at the time you may not have fully realized but now must shoulder: that is, the intellectual stewardship of the planet Earth as a dynamic system. No one else is serving or can serve this function." The duty of the geologist is to

- The subject matter of geology: the thorough and appropriate investigation of that body of knowledge from observation and study over time.
- One's self: what motivates professionals is pride and self-respect, that individual sense of honor which is the cornerstone of ethical behavior.
- The profession: that community of professionals which is a force -- the shared commitment of honorable geoscientists who are focused on the subject matter and the effective practice of geology Pride in being a geoscientist generates the moral courage to foster, uphold, and protect the credibility and reputation of the profession. Ethical violations must be denounced immediately by the geoscience community so that the public does not lose confidence in geoscientists.

Because of time demands, tedium, overwhelming self and outside expectations, the day-to-day job activities present situations where acting without full reflection on the ramifications is unavoidable. Well-intentioned actions often create problems. Most professionals and students alike believe that they are ethical and that they act ethically in professional and private life, but sincerity is not enough. To be truly faithful to professional ethical behavior is to see reality beyond merely one's own personal perception. The answer is in reading, studying and discussing ethical issues -- to become alert. This conference introduced that reality.

Prepared by **Heidi Horten**, Conference Writer, South Pass Resources, Inc., Scottsdale, AZ

Principal Convener: **Dave Stephenson**, South Pass Resources, Inc., Scottsdale, AZ
Co-Conveners:

Richard Grauch, USGS - Denver, CO
Tom Holzer, USGS - Menlo Park, CA
Jonathan Price, University of Nevada - Reno, NV
Pete Rose, Telegraph Exploration, Inc., Austin, TX

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Participants

David Abbott
Ernest Angino
Victor Baker
James Bela
Joseph Berg
Stephanie Bird
George Bole
Marvin Carlson
Robert Casavant
Robert Corbett
Vince Cronin
Diana Dale
James F. Davis
John Dragonetti
David Dunn
Robert Fakundiny
D. Christopher Findlay
Richard Fox
Mark Frankel
Robert Frodeman
Lee Gerhard
Bernard Gert
M. Charles Gilbert
Donald Haney
Robert Hatcher
Seena Hoose
David Howell
Lynn Hughes
Don Hull
Jerry Kaufman
William Knight
Frank Kresse
Ernest Lehmann

Robert Lindblom
Leon Long
John Maccini
Heather Macdonald
Charles Mankin
Thomas Melrose
Marcus Milling
Eldridge Moores

James Neal
Dianne Nielson
Keith O'Brien
Paul R. Pinet
Michael Pritchard
Manuel Regueiro
John Rold
James Sansom
Craig Schiffries
Robert Sellars
Clement Shearer
Arnold Silverman
James Skehan
James Slosson
Robert Spoelhof
John Stafford
Stephen Stow
Robert Tepel
Daniel Titerle
John W. Williams
Victor Yannacone

Copies of Conference Presentations
[available from Dave Stephenson]

Dale, Diana (Worklife Institute): *Presentation Outline, "Ethical Issues in Industry"*

Frankel, Mark S. (American Association for the Advancement of Science): *A Code of Ethics for the Geosciences.*

Gert, Bernard (Dartmouth College): *Procedure for Considering Moral Problems* and *A Code of Ethics for Geologists.*

Hatcher, Robert D. (University of Tennessee, Knoxville): *Overheads regarding Ethics in Faculty Consulting, in Management, in Scientific Research, and in College University Teaching Setting.*

Hughes, Lynn N. (Judge, US District Court, Houston): *Paradigms, Paradoxes, and Potential.*

Kaufman, Jerome (University of Wisconsin, Madison): *Summary Sheet - "Ethical Transgressions in the Research Area."*

Pritchard, Michael S. (Western Michigan University): *Ethics in the Geosciences - Preliminary Reflections.*

Rose, Pete (Telegraph Exploration, Inc.): *Presentation Outline: "Ethics in Oil and Gas Exploration".*

Skehan, James W. (Weston Observatory, Boston College): *Spiritual Foundations for Ethical Behavior in the Geosciences.*

Williams, John (University of San Jose, California): *Sample Case Studies: "Motorcycle Size and Rates of Soil Erosion -- Right of Review, Comment and Censorship", and Geology 140 Ethics Course Material.*

Yannacone, Victor J., Jr. (Yannacone and Yannacone, P.C.): *Discussion Materials [a series of reports and presentations on environmental law, education, and communication].*

SUGGESTED READINGS
SUBMITTED BY
DISCUSSION LEADERS AND PARTICIPANTS

American Association for the Advancement of Science — *Institutional Responses to Cases of Fraud and Misconduct in Science*. A Media Roundtable at the National Press Club, Washington, D.C., June 22, 1989.

American Association for the Advancement of Science — *Integrity in Scientific Research* -- 5 Video Vignettes and a Discussion and Resource Guide, May 1996.

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