

PROSPECTUS OF HUMAN BIOLOGY 41, "PUBLIC DECISIONMAKING REGARDING THE
HUMAN ENVIRONMENT"

Purposes of HB 41:

- to introduce and sensitize the class to the overall complexion of American public decisionmaking about the "environment";
- to demonstrate how scientific and technical factors are accommodated in policymaking, and how technically-trained people contribute to the policy process;
- to illustrate several systematic approaches to social policy analysis;
- to develop habits of constructive criticism;
- to begin to build policymaking skills;
- to communicate the importance and excitement of thinking about and working on public issues;
- and to indicate directions for further study and involvement (projects, courses of study, careers).

Emphases:

- (principal focus of the course will be U.S., but international considerations will be woven throughout);
- policy is inextricably tied to politics, both in day-to-day operation and in conceptual content;
- policy analysis, criticism, and prescription can never be bias-free; the problem is to make explicit and balance the bias.

Format:

MWF 11:00-12:00 lecture/discussion sections, supplemented by required one-hour section meetings led by teaching assistants. The course will involve extensive exercise with current environmental-policy issues. There will be a written final examination and a take-home written midterm. Requisite: the Human Biology Core or equivalent.

Required texts:

Erik P. Eckholm, The Picture of Health: Environmental Sources of Disease (W.W. Norton for Worldwatch Institute, New York, 1977).

Paul R. Portney, editor, Current Issues in U.S. Environmental Policy (Johns Hopkins University Press, for Resources for the Future, Baltimore, 1978).

Walter A. Rosenbaum, The Politics of Environmental Concern, second edition (Praeger/HRW, New York, 1977).

Recommended background text:

Paul R. Ehrlich, Anne H. Ehrlich, and John P. Holdren, Ecoscience: Population, Resources, Environment (W. H. Freeman, San Francisco, 1977).

Grading:

Section participation and papers	25%
Take-home midterm examination	20
Group project	30
In-class final examination	<u>25</u>
	100%

Lecture hall:

Meyer Library Forum Room (northeast corner of ground floor).

Reserve reading:

Meyer Library will hold several reserve copies of the required texts and other readings.

Staff:

Instructors: William W. Lowrance
Kathleen F. Durham

Administrative assistant: Susan Meikle

Teaching assistants: John Jacus
Dawn Neisser
Patricia Ward
Tom Wellnitz

OUTLINE OF HUMAN BIOLOGY 41, "PUBLIC DECISIONMAKING REGARDING THE
HUMAN ENVIRONMENT"

- I. Environmental issues can be viewed as problems of applied ecology and of political economy.
 - A. Ways of defining and viewing the "environment":
 - *ent+viros, ecos+logos, ecos+nomos*
 - environmental components and cycles
 - problems of interdependence and integration of systems, both "natural" and manmade
 - B. This course will embrace an extremely broad view of environmental problems
 - C. Definitions and examples of "policy"
 - D. Transformation of the landscape is a characteristic of the human species:
 - fire and desertification (Pleistocene)
 - agriculture and deforestation (Mediterranean, Northern Europe)
 - irrigation, diversion of rivers (Asia)
 - plowing of temperate grasslands (19th c. North America)
 - E. Factors precipitating the "environmental crisis" over recent decades:
 - human population explosion
 - problems inherent in growth-oriented economics
 - inadequacies of free-market mechanisms
 - Western cultures' attitudes toward Nature
 - F. Industrialization and urbanization bring special problems:
 - enormity of technological scale
 - time as a factor
 - nonrenewable resource depletion
 - exhaustion of the "commons"
 - G. Reasons for developing environmental policies and plans:
 - protect human health
 - manage physical resources
 - facilitate cultural "progress"
 - protect the commons
 - preserve special species and ecosystems

II. Three prototypical cases

- A. Illustration of sociotechnical dynamics: the history of DDT from its discovery (1939) to the present.
- B. Illustration of social-change-driven issue: the Redwood Park controversy.
- C. Illustration of widening circles of effect for a high-technology-driven issue: nuclear power.

III. History and overview of the environmental arena and policy

- A. History of U.S. attitudes toward the environment:
 - attitudes about "wilderness"
 - the "growth" and "progress" ethics; "growth" and "progress" versus a "damped" or steady-state economy
 - attitudes about work and the work environment
 - sociopolitical influence of environmental disasters
 - evolution of institutions for environmental protection and management
 - what should be the role of government? What is "market failure"? What are the alternatives to governmental intervention?
- B. Actors, institutions, and procedures in the current environmental arena:
 - industry
 - labor
 - special-interest groups
 - the Congress
 - the Executive departments (regulatory agencies, promotional agencies, CEQ, etc.)
 - federal/state/local interactions
 - the courts (and legal instruments, such as NEPA)
- C. Current international environmental issues and institutions:
 - 1. Issues:
 - population growth
 - trans-boundary pollution
 - constraints on economic growth
 - "commons" problems (upper atmospheric pollution, management of the oceans, etc.)
 - radiation and radioactive waste disposal
 - food and agriculture (pesticides, fertilizers)
 - growth of nation-states

2. Institutions:

-- United Nations Environment Program, World Health Organization, etc.

-- regional efforts (Club du Sahel anti-desertification campaign, Rhine cleanup, Mediterranean pollution battle)

3. Instruments (treaties, courts, monitoring programs, taxes)

4. Special features of international problems as compared to domestic

IV. Analysis as the basis for decisions

A. Aims of analysis:

1. describe essence of problem ("facts", uncertainty)
2. describe context of decision (economic, political, ethical)
3. clarify social objectives of issue
4. construct models
5. lay out options
6. assess consequences

B. Problems of correlation, cause, and effect

C. Decisional attributes:

- risk
- efficacy
- cost
- benefit
- distribution of costs, risks, etc.
- equity of distribution of costs, risks, etc.
- pragmatic feasibility

D. Introduction to empirical and quasi-empirical methods:

- "modelbuilding"
- biostatistics and epidemiology
- prospective and retrospective appraisal of health effects of chemicals, radiation, infernal devices, etc.
- special aspects of risk analysis
- special aspects of efficacy analysis
- "risk--benefit analysis"
- "cost--benefit analysis"
- "decision analysis" and decision trees

E. Analysis and criticism employing the political and social sciences (ex: tropical deforestation)

F. Economic-impact analysis (investment, inflation, employment)

G. The need to distinguish matters of empirical fact from matters of normative value

H. Limitations of formal analysis

- problems with definition, assumptions, boundaries
- tendency to slight intangibles
- apples and oranges
- comparison of alternatives difficult
- may forget goals

V. The gathering and management of information for decisionmaking

- A. Models of democratic (and small-r republican) decisionmaking
- B. Roles of "experts" (and the "When-is-a-fact-a-fact?" problem)
- C. "Public participation" and "public opinion" (referenda, polls, lobbying)
- D. The environmental database problem (monitoring, surveillance, global information networks)

VI. Available modes of environmental control

- A. Free market, perhaps modified by governmental incentives
- B. Economic internalization instruments (such as effluent taxes)
- C. Industry self-regulation (both as individual firms and as industry organizations)
- D. Government regulation (states, EPA, OSHA, CPSC, FDA, DoT, CEQ)
- E. Courts (National Environmental Protection Act; environmental impact assessments)
- F. Multilateral and international agreements (ex: Ocean Dumping Treaty; Law of the Sea)
- G. (comparison of the experiences of the U.S.S.R., Japan, and the U.S.)

VII. Goals, values, priorities, and responsibilities

- societal goals and goalsetting
- embedded values
- priorities
- special responsibilities of technically-trained people

4 April 1979

PROSPECTUS OF HUMAN BIOLOGY 144, "DECISIONS ABOUT RISKS TO HUMANS"

Purposes of HB 144:

- to develop broad perspective on risktaking and risk assessment;
- to demonstrate how the biological and physical sciences dovetail with law, economics, and other disciplines as society copes with risks;
- to build analytical skills;
- to review some current collective approaches to the assessment and management of risks;
- and to demonstrate the ways in which societal goals and values are accommodated in decisionmaking.

Format: MW 2:15-4:05 lecture/discussion sessions. Beginning the first week of class, each student will conduct an in-depth study of a particular hazard of current concern (such as the use of the herbicide 2,4,5-T in California forests, or earthquake contingency plans) or of a hazard-management issue (such as the inadequacies of the Delaney amendment to the Food and Drug Act).

Required texts:

William W. Lowrance, Of Acceptable Risk: Science and the Determination of Safety (William Kaufmann, Inc., Los Altos, CA, 1976).

Ian Burton, Robert W. Kates, and Gilbert F. White, The Environment as Hazard (Oxford University Press, NY, 1978).

Classroom: 541 Durand Laboratory Building (behind Memorial Church-- enter via Panama St.)

Reserve reading:

Meyer Library will hold reserve copies of the required texts and other readings.

Staff:

Instructor: William W. Lowrance (telephone: 497-3693)

Teaching Assistant: Kathryn (Kitty) Kelly

Grading:

midterm exam	20%
class participation and assignments	30
research paper	50
	<u>100%</u>

OUTLINE OF HUMAN BIOLOGY 144, "DECISIONS ABOUT RISKS TO HUMANS"

*"We are in for a sequentiality
of improbable possibles...."
(- Finnegan's Wake)*

I. Introduction: Risks, and risktaking, in perspective

A. Lowrance's working assumptions and points of departure:

1. Nothing can be completely free of risk; therefore nothing can be considered to be absolutely safe;
2. Technology, although by no means an unmixed blessing, has in many ways enriched the human condition and will long remain an important aspect of human civilization;
3. Many of our problems are technological in origin and will necessarily be technological, as well as political, in their solution;
4. Technological development has indeed brought undesirable effects, but many of these must be viewed as the expense of decreasing our vulnerability to the hazards of nature; and
5. In order to make our world safer, we can start changing only from where things are today.

B. Types of hazard and their complexion:

- "natural" diseases and disasters (ex: floods, hurricanes, typhoons, tsunamis, earthquakes; solar-radiation-induced skin cancer; aflatoxin and other naturally-occurring food poisons; infectious diseases)
- acute physical accidents (ex: household, occupational, recreational, consumer-goods, and transportation accidents)
- chronic environmental and occupational hazards (ex: poisoning, disease, psychological stress, mutagenesis, teratogenesis)
- social-systemic hazards (ex: armed conflict; terrorism, theft, and sabotage risks of nuclear power)
- failure of engineered structures and systems (ex: dam failure, nuclear reactor accidents, broaching of biological containment; failure of aircraft guidance systems; fire hazards of large buildings; oil-tanker spills).

C. Characterization of hazards:

- acute versus chronic
- "natural" versus manmade, "natural" aggravated by manmade, and manmade aggravated by "natural" (ex. of the latter: earthquake potentiation of hazard associated with the built environment)
- reversible versus irreversible
- moderately-frequent moderate hazard versus very rare hazard having extraordinary consequences

D. Historical change in risk exposure, in attitudes about risks, and in approaches to coping with risks:

- the hazards have changed
- personal and societal attitudes have changed (American workers' traditionally fatalistic acceptance of occupational hazards is diminishing, for instance, and cross-cultural comparisons are illuminating)
- collective action is more frequently undertaken now
- what is special about many present-day hazards is the immensity of their social and physical scale, and the irreversibility of their effects (ex: disposal of radioactive waste; recombinant-DNA research; depletion of the upper-atmospheric ozone)
- we are now quite capable of outsmarting ourselves (ex: given that the lag period for onset of human cancer after exposure to a carcinogen may be ten to twenty years, how can we adequately appraise the hazards of pesticides that are modified chemically every few years?)

E. There are two components of risk decisions: empirical and quasi-empirical assessment of the likelihood, magnitude, and distribution of the hazards; and normative appraisal of those empirical findings

F. Five stages of decision in dealing with risk issues:

1. identifying the issue (things become public issues because they are new hazards, because values are changing, or because society wishes to explore coping in a new way)
2. assessing the risk (may involve testing, analysis of models, predicting consequences)
3. appraising the social importance of the risks (may involve polling, conducting market surveys or political referenda, court determination, etc.)
4. deciding how to "cope" (may choose to reduce risk, avoid risk, absorb risk)
5. coping (may involve market or governmental action, international effort, further research, etc.)

G. Special international and "global commons" issues:

- universal problems (ex: dealing with toxic chemicals)
- international "commons" problems (ex: global build-up of atmospheric carbon dioxide, destruction of upper-atmospheric ozone by halocarbons, nitrous gases from decay of nitrogenous fertilizers; oil spills; release of krypton-85 from nuclear waste)

H. Personal versus collective action:

- because of informal preference, or misunderstanding, or ignorance, personal decisions may not be risk-minimizing;
- what should be the role of governments?
- a variety of collective actions is possible (ex: industry self-regulation, consumer boycotts, labor union action on occupational hazards, government regulation, insurance schemes, etc.)
- (brief overview of the work of the FDA, EPA, CPSC, OSHA)

II. Empirical assessment of hazards (measuring and estimating risk)

A. Sources of evidence:

- traditional or folk knowledge (ex: lead poisoning, poisonous plants)
- common-sense assessment (ex: analogy of artificial food additives to natural food components)
- analogy to well-known cases (ex: new noise hazards can be compared to long-studied ones)
- experiments on human subjects (ex: testing of pharmaceuticals; consumer-product trials)
- review of inadvertent and occupational exposure (ex: follow-up of Hiroshima victims to learn about radiation effects; predicting non-occupational hazard of asbestos by reviewing workplace data)
- epidemiological surveys (ex: correlation of smoking with cancer)
- experimentation on non-human organisms
- tests of product performance (ex: fatigue-testing of tires, playroom testing of toys)

B. Sizing up hazards:

- defining conditions of exposure (ex: detecting minute traces of toxic chemicals; predicting floods and other natural threats)
- identifying adverse effects (ex: need to consider subtle effects, such as mutagenicity, teratogenicity, behavioral stress; may need to predict broad social effects)
- relating exposure with effect
- developing the overall risk profile (ex: in the assessment of energy sources, it is important to consider the net energy cycle, not just part of it; both chronic and acute risks should be brought in; distributional effects need to be considered)

C. Problems of inference:

- relating effect with cause
- extrapolating from animals to humans
- sorting out synergistic and antagonistic effects

D. Special problems of chronic, low-level agents:

- possible latent period for onset of effect
- possible need to use very large doses in some animal tests, and very large numbers of animals for significance, and several animal species
- possible great ignorance (ex: research with recombinant DNA)

E. Special problems of natural disasters:

- sporadic, episodic occurrence (ex: earthquakes)
- sudden onset (ex: influenza epidemics, Legionnaire's Disease, typhoons)

F. Special problems of large engineered structures and systems:

- may depend on elaborate analytic modelling, vulnerable to cumulative uncertainties and to joint occurrence of failures (ex: nuclear reactors)
- may not be able to subject a real structure to a full actual test (ex: nobody has ever pushed a major dam to failure)
- human failure is often the Achilles heel ("You can make it foolproof but not damn-fool-proof." Ex: the nearly catastrophic fire at the Brown's Ferry Nuclear Station was ignited by a workman's candle; graduate-student cavaliness or carelessness is often considered to be the weak part in recombinant-DNA containment protocols)

G. Social mechanisms for gathering the "facts" and bounding the uncertainties:

- "fact" is an orthodoxy that seems to work for the moment and have predictive power
- approaches include advisory committees, taskforces, public hearings, and scientific tribunals

III. Decisional factors

A. Factors of empirical analysis:

- risk
- efficacy
- cost
- distribution of risks, benefits, and costs

B. Factors of normative value judgment:

- (safety)
- benefit
- equity of distribution of risks, benefits, and costs

C. Factors of technical, social, and political feasibility

D. Policy guides:

- "reasonableness", usually a phantom guideline (ex: its legislation directs the Consumer Product Safety Commission to protect consumers from "unreasonable risk of injury"; the Toxic Substances Control Act directs the Environmental Protection Agency to protect the public from "unreasonable harm")
- custom of usage (ex: the list of chemicals "Generally Recognized As Safe", GRAS, exempts such substances as table salt from special scrutiny by the Food and Drug Administration)
- prevailing professional practice (ex: medical malpractice suits often depend on this notion)
- degree of necessity (ex: often invoked in decisions about toys, cosmetics, and food colorings)
- the Delaney principle (this Food and Drug Act amendment requires that "no (food) additive shall be deemed to be safe if it is found... after tests which are appropriate for the evaluation of the safety of food additives to induce cancer in man or animal.")
- threshold effect (ex: hearing impairment from noise)

E. Considerations in judgment:

- voluntariness of exposure
- immediacy of effect
- availability of alternatives
- degree of certainty

- essentiality of exposure
- occupational/non-occupational
- "dreadness"
- likelihood of misuse
- reversibility of harm

F. Constructing hierarchies of hazard (ex: CPSC's "Product Hazard Index")

IV. Decision-analytic frameworks: overall approaches to appraising risks

- A. "Utility theory" (decision trees and their construction and pruning; illustrative examples might include decisions about seeding hurricanes (Ron Howard's research) and decisions about surgical operations such as hysterectomy (John Bunker's research))
- B. "Expected utility" and "subjective probability"
- C. Other approaches to evaluating the price of human life:
 - willingness-to-pay (ex: consumer market behavior)
 - implicit valuation (ex: insurance commitments)
- D. Formal "risk-benefit analysis"
- E. The problems of intangibles and amenities
- F. Intercomparing risks (ex: comparing contraceptive pills to intrauterine contraceptive devices; full-cycle net assessment of energy sources)

V. Perceptions of, and attitudes about, risks

A. General psychology of risktaking:

- "subjective" and "objective" estimates of risk often disagree (ex: research by Amos Tversky and Paul Slovic)
- surprises and disasters are usually accorded special concern
- attitudes are revealed by common expressions
 - "It won't happen to me..."
 - "Why don't they make these glass doors so I won't walk into them?"
 - "My Daddy was a miner, and his Daddy was a miner, and I guess I'm bound to be a miner, too."

B. Social expressions and manifestations of attitudes:

- consumer behavior (purchasing, boycotting, suing for damages)
- polling, referenda, hearings (ex: California's "Proposition 15" regarding nuclear power, 1976; referenda on fluoridation of municipal water supplies)
- risk-averse actions
- recovery actions after harm is incurred

VI. Coping with risks

A. Strategies of risk acceptance

(ex: fatalism about natural events; current campaign urging that nuclear power risks be compared with the risks of other electricity sources)

B. Strategies of risk reduction

(ex: pre-marketing screening of pharmaceuticals, pesticides, and some other chemicals; flood-management schemes)

C. Strategies of risk buffering and sharing

(ex: insurance programs; disaster relief; indemnification for risk-reductive actions by firms)

D. Strategies for reducing uncertainty

(ex: global environmental monitoring systems)

E. Instruments of social control (a wrap-up discussion):

-- market mechanisms, industry self-regulation, modified market mechanisms

-- government regulation (ex: FDA, CPSC, OSHA, EPA, FAA)

-- court action (ex: the recent Supreme Court decision forbidding the FDA to ban Laetrile; product liability suits; negligence and professional malpractice suits)

F. Thinking about the future:

-- the economic discounting controversy

-- responsibilities toward future generations (ex: genetic hazards; disposal of radioactive waste)

VII. Dynamics of controversies and decisions

- A. Complexion of the risk arena
- B. Policymaking is politics!
- C. Special role of the communications media
- D. Technically-trained people as handicappers, guardians, assessors, and advocates
- E. Issues of special responsibility for technical people (ex: issues of professional ethics; whistleblowing; advising and consulting; client relations).

- Anderson, James E.; Public Policy-Making, 2nd ed. (1979)
- Ashby, Eric; Reconciling Man with the Environment (1978).
- Brown, Harrison; The Human Future Revisited (1978).
- Clawson, Marion; Forests: For Whom and For What? (1975).
- Daly, Herman E.; Steady-State Economics (1977).
- Eckholm, Eric; The Picture of Health (1977).
- Edwards, George C., & Sharkansky, Ira; The Policy Predicament (1978).
- Ehrlich, Paul R.; Ecoscience: Population, Resources, Environment (1977).
- Goodman, Robert; After the Planners (1971).
- Jones, Charles O.; An Introduction to the Study of Public Policy (1970).
- Keeney, Spurgeon, ed.; Nuclear Power Issues and Choices (1977).
- Leopold, Aldo; A Sand County Almanac (1966).
- Lovins, Amory; Soft Energy Paths: Toward a Durable Peace (1977).
- Lowrance, William W.; Of Acceptable Risk: Science and the Determination of Safety (1976).
- Meier, Kenneth J.; Politics and the Bureaucracy: Policymaking in the Fourth Branch of Government (1979).
- Nash, Roderick; The American Environment: Readings in the History of Conservation (1976).
- Nash, Roderick; Wilderness and the American Mind.
- Portney, Paul R., ed.; U.S. Environmental Policy (1978).
- Rosenbaum, Walter; The Politics of Environmental Concern (1977).
- Stokey, Edith, & Zeckhauser, Richard; A Primer for Policy Analysis (1978).
- Worster, Donald; Nature's Economy (1977).

MEYER RESERVE READING LIST -- DECISIONS ABOUT RISKS TO HUMANS

Lowrance, William W., Of Acceptable Risk: Science and the Determination of Safety. (Required reading)

Burton, Ian, Robert W. Kates and Gilbert F. White, The Environment as Hazard. (Required reading)

Environment, Vol. 20:

- No. 7: Hazard Management: "Our Hazardous Environment" (manmade vs. natural hazards), and
"Handling Hazards" (theory of hazard management)
- No. 8: "Environmental Causes of Cancer" (causes, sources, obstacles to assessment), and
"Pitfalls of Hazard Management" (study of the CPSC)
- No. 9: "Mercury: Measuring and Managing the Risk"

Singer, Max, "How to Reduce Risks Rationally", Public Interest 51: 93:112 (The importance of evaluating the costs as well as the benefits when reducing hazards.)

"Disasters as a Necessary Part of Benefit/Cost Analyses," Science 197: 1160-1162, 9/16/77. (Argues that benefit/cost analyses for water projects have generally not included the expected costs (residual risks) of low probability disasters such as dam failures and landslides. Without appropriate estimates, benefit/cost analyses will be biased and projects that are not economically justifiable may result.)

Lawless, Edward W., Technology and Social Shock. (Case histories, include oral contraceptives safety hearings, DES ban, food additives, oil leaks, pollution, nuclear issues, many more. See also Chapter V and appendices.)

Stokey, Edith, and Richard Zeckhauser, A Primer for Policy Analysis (Very good introductory text to policy analysis, including cost/benefit analysis chapter assigned in class. Emphasis on "how decisionmaker should structure his thinking about a policy choice and analytical models that will aid understanding...")

Tversky, Amos, and Daniel Kahneman, "Judgement Under Uncertainty: Heuristics and Bias," Science 185: 1124-1131 (1974). (Article describes three heuristics used in making judgements under uncertainty, and the biases to which these heuristics lead.)

"How Safe is Safe Enough? A Psychometric Study..." (Psychometric procedures used to elicit quantitative judgements of perceived risk, acceptable risk and perceived benefit for various activities and technologies.)

HB 144 Reserve List (cont.)

- Council for Science and Society, The Acceptability of Risks: The Logic and Social Dynamics of Fair Decisions... (similar to Bill's book in subject matter, from a British perspective)
- Rowe, William D., An Anatomy of Risk (setting acceptable levels of risk for technological systems and programs -- risk valuation, risk assessment, methodological approaches, problems involved, etc.)
- Office of Technology Assessment, Assessing the Efficacy and Safety of Medical Technology, Sept. 1978. (Mammography case study from this book. Concepts of safety and efficacy, history and case studies in efficacy and safety assessment, current federal agency assessment activities, implications, policy alternatives, much more.)
- Clark, Elizabeth, Risk-Benefit Analysis and Public Policy: A Bibliography, (Bibliography on a wide variety of subjects, including risk-cost-benefit analysis, economics, value of a life, technology assessment, decision analysis, utility theory, perception of risks, legal issues, standard setting, natural hazards, nuclear power, energy sources, LNG, radiation risks, public health, water resources, air pollution, food and drugs, consumer products, noise, fire, occupational safety, transportation, policy...)
- Baumol, William, Economics, Environmental Policy and the Quality of Life, (perspectives on environmental problems, critical policy issues for the quality of life, design of environmental policy)
- Bunker, John P., Costs, Risks and Benefits of Surgery, (evaluation of surgical innovation, as well as the assessment of the costs, risks and benefits associated with both new and established procedures)
- World Health Organization, Health Hazards of the Human Environment (Air, water, food, soil and land, insects and rodents, home, work, climate, transportation, mental health, ionizing and non-ionizing radiation, selected environmental pollutants, noise as sources of health hazards; surveillance and monitoring; epidemiology; intervention; etc.)
- UC Berkeley School of Law, Ecology Law Quarterly, "Hazardous Substances in the Environment: Law and Policy" (Toxic chemicals, safety standards for food additives, color additives and animal drugs, OSHA, TSCA, international regulation, ritalin, vinyl chloride)
- Kates, Robert W., Risk Assessment of Environmental Hazard, (Co-author of The Environment as Hazard. Coping with environmental hazards, risk assessment methods, organized modes of assessment, trends and attitudes in assessing environmental threat.)
- Zeckhauser, Richard, "Procedures for Valuing Lives" in Public Policy 23:4, Fall 1975. (Argues that procedures for valuing lives must take into account matters of process, anxiety, income distribution, and possibilities for comparison.)
- Rhoads, Steven, "How Much Should We Spend to Save a Life?" in Public Interest 51:74-92, Spring 1978. (Review of various literature on this topic.)

HB 144 Reserve Reading List (cont.)

Starr, Chauncey, et al, "Philosophical Basis for Risk Analysis" in Annual Review of Energy 1:629-662 (1976). (Evaluations of risk and benefit and descriptions of general philosophical features common to most risk-benefit decisions. Also uncertainty principle, risk assessment, voluntary vs. involuntary exposure.)

Owen, Henry, and Charles L. Schultze, editors, "Safety Regulation", Chapter 11 in Setting National Priorities: The Next Ten Years, 1976. (Positive and negative aspects of the current system for safety regulation with particular emphasis on CPSC and OSHA.)

Food Safety Council, Proposed System for Food Safety Assessment, (Report of the Scientific Committee of the Food Safety Council, a group formed by industry with representation from government, science, industry, academia and the general public. Sept. 1978)

HUMAN BIOLOGY 41

Required section exercises:

Herbicide 2,4,5-T: Critique of the study leading to the EPA cancellation
Regulation of air pollution

Roadless Area Review and Evaluation (RARE II): competing interests in
Trinity County (Calif.) wilderness management

Amoco Cadiz oil spill: international regulatory and economic implications

Group project topics:

Santa Barbara Oil Spill in Retrospect: an historical and developmental study
of the preparedness for oil spill prevention in Santa Barbara

Evaluation of Current Proposals to Relocate Remaining Population of California
Condors (endangered species)

Should Exploratory Oil Drilling Be Allowed Off the Coast of San Mateo County?

What are the Major Barriers to Implementing/Enacting a Returnable Bottle Bill
in California?

Analysis of the Potential for Recycling Milk Cartons

Conflicting Interests re. Resource Management in the Lake Tahoe Basin

Assessment of Paper Use in Stanford University Academic Departments;
Recommendations as to how to reduce paper consumption

Assessment of Alternatives for the Future of the Palo Alto Yacht Club, as
an example of the problems confronting the S.F. baylands in general

HB 144 RESEARCH PAPER TITLES/TOPICS

OSHA's Standard for Benzene

Assessment of the Biohazards Surrounding Nuclear Testing

Risks of the Pill

The Risks, Costs, and Benefits Associated with Taking the Pill under Strained Circumstances

Are Solar Homes Really the Answer?

A Decision Analytic Approach for the Diagnosis and Treatment of Pulmonary Embolism

Should Earthquake Predictions, if Credible, be Issued as Public Warnings? (Socio-economic impact)

Evaluating a Proposal for Nuclear Waste Disposal or Comparing Costs/Benefits Two Systems of Waste Disposal

Food Additives: Physical, Emotional and Social Effects, Alternatives and Tradeoffs

Effects of Oil Spills on the Marine Environment and the Subsequent Impact on Man

2,4,5-T: Problems, Cost/Benefit Analysis, Risk Assessment, Alternatives, --Should it be banned?

Necessary Food Additives

Treadmill Testing as a Screening Technique for Latent Coronary Artery Disease

DES-- Risks as a Morning-After Pill

Traditional vs. Alternative Methods of Childbirth

A Study of Post-Coital Birth Control Methods Examining Vacuum Aspiration, Menstrual Extraction, Chemical Morning-After Treatment (MAT) Excluding DES

Post-Transfusion Hepatitis

Sleeping Pills-- For a Good Night's Rest?

With the given data about the carcinogenicity of saccharin, what types of regulatory decisions: 1) can be made; 2) are affected by outside factors; and 3) should be made?

What Net Effect Can We Predict for Anthropogenic Warming or Cooling of the Atmosphere Over the Next 50 Years, via CO₂ and Dust; What are the Risks Associated with such an Effect and their Policy Implications?

Media Coverage of Risks to Humans

Is the Concept of an Addictive Drug as a Human Health Hazard one that can be Effectively Utilized as a Criterion for Assessing the Safety of Pharmaceutical Products?

Beyond Effectiveness: Health Risks Associated with One IUD: the Lippes Loop

Employment Rights/Women/Pregnancy/Toxic or Potentially Teratogenic Chemicals in the Workplace

Herbicide 2,4,5-T in the Pacific Northwest: Problems Associated with Herbicide Use and the EPA Suspension

Risks of Mass Immunization Programs

The Courts, Regulatory Agencies and Adversary Hearings in the Assessment of Risk

Occupational Dermatoses: What are the Legal Implications?

Microwave Regulation in the U.S.

Nuclear Liability: Let's Point Some Fingers

(developing a model for)The assessment of bottle- vs. breast-feeding

Evaluation of Predictive Value of (Medical Research) Testing for
Carcinogenicity of Low-level Radiation (for some specific risk)