



LOS ANGELES FEDERATION OF SCIENTISTS

P.O. Box 67941, Los Angeles, CA 90067 354-6893

(Formerly Los Angeles Chapter-Federation of American Scientists)

To the Atomic Safety and Licensing Board:

The Los Angeles Federation of Scientists, an organization of scientists and engineers from a wide range of disciplines in the Southern California area, at its June 25, 1981 meeting authorized the following statement:

Daniel Hirsch is a member in good standing of the Los Angeles Federation of Scientists and has valuably contributed his expertise to several technical projects of the group regarding nuclear matters. On several occasions he has made presentations to the group about various technical aspects of the UCLA nuclear reactor, about which L.A.F.S. has had a continuing interest. He has much knowledge of the fundamental principles involved as well as a good understanding of much of the detailed operation.

We have found his technical capability with regards certain specific apparatus, e.g. small nuclear research reactors, to be exceedingly creditable. His scientific knowledge has been apparently acquired primarily through experience rather than formal education. Such achievement is the result of much effort and day-to-day perseverance, a process of acquiring expertise quite familiar to most of our members.

Without prejudging the outcome of the UCLA reactor hearings, we feel that the quality of the evidentiary aspects of those proceedings will be greatly enhanced by his expert participation.

Robert W. Nelson, Ph.D.
Co-Chairperson
Los Angeles Federation of Scientists

DECLARATION OF MARK S. POLLOCK

I, MARK S. POLLOCK, declare:

1. I am an attorney licensed to practice law in the State of California and in the courts of the United States and am the attorney of record for the Committee to Bridge the Gap, Intervenor in the present action before the Atomic Safety and Licensing Board ("Board").


2. This hearing before the Board regards the application of the Regents of the University of California to the Nuclear Regulatory Commission for the renewal of the operating license of the research reactor sited on the campus of the University of California, Los Angeles.

3. I have no training or experience in technical aspects related to nuclear reactors and have relied extensively to date on the technical expertise of Daniel Hirsch for technical assistance in the preparation of contentions, interrogatories, and responses to interrogatories.

4. If I am not permitted to have Mr. Hirsch's expert assistance in examination and cross-examination of expert witnesses as to said technical matters, I will not be able alone to competently represent the interests of my client in the aforementioned proceeding and adequately address the public health and safety issues therein before the Board.

I attest that the foregoing is true and correct to the best of my knowledge and belief and under penalty of perjury do so declare.

Dated at Los Angeles, CA
June 30, 1981



Mark S. Pollock
Attorney for Intervenor
COMMITTEE TO BRIDGE THE GAP

UCLA

SCHEDULE OF CLASSES FALL QUARTER 1931
INCLUDING REGISTRATION INFORMATION



UNIVERSITY OF CALIFORNIA, LOS ANGELES

25¢

SPECIAL UNDERGRADUATE ENRICHMENT COURSES

For course ID numbers, see the appropriate departmental course listing in this Schedule.

COUNCIL ON EDUCATIONAL DEVELOPMENT (CED)

All CED courses carry 4 units of academic credit. For further information, contact the CED office, 3121 Murphy Hall, ext 55427.

CED 102 — Women's Movements: A Comparative Analysis — E. Saranarain, TuTh 11-12:15, GSM 1343 — The course will examine women's movements in several countries on a comparative basis. A number of the general theoretical works on social movements will be viewed. Their explanations of the women's movements will be evaluated cross-culturally. Movements in countries such as the United States, England, the Soviet Union, Egypt and Iran will receive special attention.

CED 118 — Energy Alternatives and Public Policy — D. Hirsch, Tu 7-10 pm, Dodd 121 — The course will examine public policy issues related to energy. We will discuss various criteria by which energy alternatives may be judged (such as risk/benefit analyses and environmental/economic trade-offs) and will take a look at one of the central energy policy debates — that between proponents of the so-called "hard" and "soft" energy paths.

CED 126 — Medicine, Law and Society — B. Towers, W. Winslade, J. Ross, TuTh 3-5, Bunche 3153 (sophomore standing or Honors College freshmen, limited to 30, consent of instructor) — The course will include a discussion of medical/legal issues, such as abortion, medical experimentation, voluntary sterilization, behavior modification, issues of death and dying, and the presentation of interdisciplinary panel discussions recorded live on videotape at the Medicine, Law and Society Forum, UCLA. Case studies will be examined in the light of readings from law, medicine and philosophy. Students will be encouraged to write a number of papers on these issues.

CED 131 — Ethics, Law and Social Science Research — T. Bixen, TuTh 4-7 pm, GSM 4357C (upper division standing, consent of instructor) — The seminar will focus on the legal and ethical issues in human experimentation, concentrating on social science research. Topics include the use of prisoners, children and the mentally disabled as research subjects, deception and risk of harm in psychological laboratory studies, hidden observation and privacy in field studies, ethnographic studies and interviewing, and social experimentation. Readings include research reports and ethical and legal analyses of such reports.

CED 170 — Origins of the World Food Crisis — S. Commins, TuTh 11-12:15, Dodd 121 — The course will provide an introduction to the roots of agriculture in the modern age, including an examination of early historical changes in agriculture, colonial era agriculture and the impact of "modernization." Special attention will be given to the political, economic and environmental factors that have shaped and now constrain the present world food system.

CED 189 — Literary Responses to the Holocaust — R. Kunzer, TuTh 11-12:30, Geology 4660 — The course will examine the history of the Holocaust; it will be studied as reflected in the literary imagination of novelists, poets and dramatists on the premise that while historical documents provide stark facts, works of fiction evoke those flashes of recognition and insight that bring the reader closer to an understanding of historical events.

DEPARTMENTAL COURSES/SEMINARS

All courses carry 4 units of academic credit unless otherwise noted. For further information, contact the appropriate department.

Architecture & Urban Planning 191 — Modern Architecture — Staff, to be arranged (consent of instructor) — see Diane Mills in Architecture 1317A)

Astronomy 3H — Introductory Astronomy and Astrophysics — Staff, TuTh 2-3:15, Geology 4660

Astronomy 10 — Practice in Observing — H. Ford, Tu 7-9:30 pm, Math Sciences 8118 (consent of instructor) — 2 units

Astronomy 10 — Practice in Observing — H. Ford, Th 7-9:30 pm, Math Sciences 8118 (consent of instructor) — 2 units

Earth & Space Sciences 120A — Rubey Colloquium: Major Advances in Earth Science — M.C. Kiverson, MWF 11, Young 227b (upper division standing)

Education M108 — Sociology of Education — J.C. Wrigley, MW 12-2, Haines 118 (junior standing)

Education 112 — Psychological Foundations of Education — Staff, see department listing for scheduling information (dept consent)

Education 125A — The Education of Exceptional Individuals — F. M. Hewett, TuTh 10-12, Kinsey 169 (dept consent)

Engineering 5 — Computer Literacy and Appreciation — T. Estrin, TuTh 9, Boelter 3400 (Engineering, Math & physical science majors are strongly discouraged from taking this course)

Engineering 11 — Patterns of Problem Solving — M.F. Rubinstein, see department listing for scheduling information

English 20 — Introduction to Creative Writing — Staff, TuTh 2-4, Bunche 3143 (consent of instructor)

English 136A — Practical Writing and Editing — M. Moore, Tu 2-5, GSM 4352B (limited to 25, consent of instructor)

English 136A — Practical Writing and Editing — R. Mitchell, Tu 2-5, GSM 4357B (limited to 25, consent of instructor)

History 99 — Introduction to Historical Practice — freshmen & sophomores only, limited to 15, enroll in department:

Sec 1 — R. Burr, Tu 2-5, GSM 3343C

Sec 2 — M. Ponnansky, W 2-5, Rolfe 3131

History 99H — Introduction to Historical Practice (Honors) — freshmen & sophomores only, limited to 15, enroll in department:

Sec 1 — E. Berenson, Tu 2-5, Rolfe 3131

History 101 — Introduction to Historical Practice — juniors & seniors only, limited to 15, enroll in department:

Sec 1 — E. Alpers, M 2-5, Rolfe 2106

Sec 2 — C.P. Clasen, Tu 2-5, GSM 4325B

Sec 3 — B. Krokac, M 2-5, Haines 127

Sec 5 — M.N. Wise, W 2-5, Haines 130

Sec 7 — L. Martinez, W 7-10 pm, Bunche 3117

Sec 9 — S. Novak, W 1-4, Haines 146

History 17A — Africa — E. Alpers, W 2-5, Rolfe 3123 (limited to 15, dept consent)

History 17B — China — D. Farquhar, W 2-5, Bunche 3161 (limited to 15, dept consent)

History 17C — Science and Technology — R. Frank, M 2-5, Bunche 3161 (limited to 15, dept consent)

History 17D — Medieval Biblical Exegesis — A. Funkenstein, Tu 4-7 pm, Bunche 3161 (limited to 15, dept consent)

History 17E — United States Political History — F. Gatell, M 2-5, GSM 4357B (limited to 15, dept consent)

History 17G — History of Crime and the Police — E. Monk-konen, W 2-5, GSM 4357B (limited to 15, dept consent)

History 17H — Modern China — P. Huang, M 2-5, Rolfe 3123 (limited to 15, dept consent)

History 17J — Ancient Rome — R. Mellor, Th 2-5, Bunche 3161 (limited to 15, dept consent)

History 17K — Modern Europe — E. Berenson, Th 2-5, Rolfe 2210 (limited to 15, dept consent)

History 17L — Higher Education and the Professions in the U.S., 20th Century — D. Levine, Tu 2-5, Haines 208 (limited to 15, dept consent)

Journalism 192 — The Media of Mass Communications — W. Wilcox, TuTh 8-9:30 am, Kinsey 141 (dept consent)

Latin American Studies 99 — Introduction to Latin American Problems — Staff, to be arranged

Library & Information Science 710 — Information Resources and Libraries — sophomore standing

Sec 1 — Staff, MW 9-11, Powell 330

Sec 2 — Staff, MW 11-1, Powell 330

Sec 3 — Staff, TuTh 9-11, Powell 330

Sec 4 — Staff, TuTh 1-3, Powell 330

Library & Information Science 111B — Ethnic Groups and Their Bibliographies: Afro-American History and Culture — J. Williams, TuTh 9-11, Powell 330

Microbiology 195 — Proseminar — R.J. Martinez, to be arranged (limited to 10-15, dept consent) — 2 units

Philosophy 9 — Principles of Critical Reasoning — Staff, MWF 9, Dodd 147

Political Science 4A — Current Problems in Political Science: Bureaucracy in Government — J.C. Res, MW 12-2, Geology 4660 — The course will examine the extent to which bureaucracy causes failures in government and public

policies. Bureaucracies will be studied not only as elaborate systems of people bound by rules and rules, but also as political actors of some consequence. Each student will undertake an independent investigation of how bureaucracy in government works and affects public policies, performance and people. This course is also part of the Freshman/Sophomore Professional School Seminar Program.

Psychology 95A — Lower Division Seminar — M. Holland, to be arranged (freshmen & sophomores only, limited to 15)

FRESHMAN/SOPHOMORE PROFESSIONAL SCHOOL SEMINARS

The seminars are available only to freshmen and sophomores. Students receive 4 units of academic credit unless otherwise noted. Enrollment is limited to 10-15 students. For further information, contact the Freshman/Sophomore Professional School Seminar Program office, 2859 Slichter Hall, ext 5248J.

Anatomy 96A — Disease in Society — E. Lomax, Y. O'Neill, MW 2-4, CHS 42-081E (Biomedical Library, Rare Book Room) — The course is designed to compare past experience with modern knowledge of certain common diseases and their treatment. Efforts will be made to demonstrate how the perception of illness is frequently a compromise between medical beliefs and social custom. The student will be required to read classic descriptions of diseases and to evaluate their effect upon the mores of the society that produced them.

Anatomy 96B — Mind, Brain and Culture — A. Scheibel, M 1-3, Math Sciences 5233 — 2 units — Presented will be an overview of the human brain; its development through time; man's struggle to understand his brain; the techniques he uses and some of the facts he has generated in this pursuit; its role as the central element in the development of human culture; and its probable continuing change as a result of that evolving culture.

Architecture & Urban Planning 96A — Planning and Design for Diverse Lifestyles — P. Kaminitzer, TuTh 2-5, Architecture 120NB (consent of instructor) — Featured will be a seminar/workshop to study our own immediate man-made environment; to understand and analyze the individual dwelling unit and multiple dwelling units; to develop programs and designs for an improved environment; to speculate on, plan and design for housing for alternative lifestyles, which would combine the established need for individual privacy with the renewed awareness of the advantages of communal arrangements.

Biomathematics 96 — A Genetic Approach to the Study of Human Disease — K. Kronquist, E. Spector, M.A. Spence, TuTh 1-2:30, Math Sciences 5137 — The course will not require any previous genetics courses. The goal of the course will be to illustrate how genetics helps us to understand the basic disease processes. It will include discussions of the biochemical, cellular and physiological aspects of the diseases, as well as social and ethical issues. Students will have the opportunity to participate in laboratory activities. Specific examples will include Down Syndrome, Huntington's Disease and phenylketonuria. There will be exams and a term paper.

Dentistry 96 — Dentistry and the Public's Health — G. Ting, TuTh 9:30-11, Math Sciences 5148 (P/NP only) — An in-depth look at the dental profession's role in American health care; the seminar will include social and scientific developments, disease and prevention concepts, interactions between society and the profession, and specific current issues and problems in health care. Theory and theory are contrasted with reality; various viewpoints are discussed. A midterm exam and a class project will be required.

Psychiatry 96A — Law, Literature and Politics — P. Von Blum, MW 2-4, Slichter 2854 (consent of instructor) — The seminar will employ literary works (especially drama, short stories and novels) to explore some broad relationships between law and politics. These works of literature deal with legal and political themes in a variety of cultural and historical settings. Students will be encouraged to examine literature as a source of material for social, legal and ethical analysis and to compare the insights and observations of literary artists with the actual operations of contemporary legal processes and institutions.

HONORS COLLEGIUM

The program is available only to freshmen and sophomores. Courses carry from 4 to 12 units of academic credit each and

Energy Alternatives and Public Policy

Course Description

The course will examine public policy issues related to energy. We will discuss various criteria by which energy alternatives may be judged, such as risk/benefit analyses and environmental/economic trade-offs, and take a look at one of the central energy policy debates, that between proponents of the so-called "hard" and "soft" energy paths.

Energy has become one of the central public policy issues of our time. Proponents of many competing "energy futures," while disagreeing on a great many issues, all seem to agree on one conclusion: that decisions made during the next few years about the direction our energy policy takes are going to have widespread and long-lasting impacts upon nearly every aspect of our society. And virtually all participants in the energy debate agree that the transition from our present energy sources to some future sources must be made quickly, because energy itself is required to make the transition. If we, as a society, wait too long, we may not have the energy, at least not in the forms needed, to make the transition to whatever new sources are chosen.

The public policy issues regarding energy are multitudinous and intricate. One of the most intriguing is how will the decisions themselves be made. The issues--essentially choices of competing technologies--are by definition significantly technical, comprehensible in any detail by rather small sectors of the population. And yet the consequences of those decisions are among the most far-reaching of any public policy issue facing our society. How these questions will be resolved--or more importantly, who will resolve them--raises important questions about the degree to which technology itself can variously erode democratic decision-making processes or enhance them.

As a nation struggles to come to terms with the new reality of oil shortages in the era of OPEC and finite resources, as the public tries to comprehend the true meaning of Three Mile Island and utility company warnings of electricity shortfalls if new reactors aren't licensed, we see an essentially new phenomenon for this country--essentially technical decisions becoming central issues of public debate. How that debate is resolved--not just what decisions are reached but what criteria are used to reach them and who is permitted to have a say in helping form those criteria and decisions--is a critical question worthy of serious examination. This course proposes to undertake such an examination.

The issues involved are complex and the public policy debate has to date suffered from a tendency on the part of many participants in it from all positions to oversimplify and make arguments unsupportable from the data. From elements of the nuclear industry one has heard claims of "too cheap to meter" ; "no one has ever died from nuclear power"; from some solar proponents one hears claims that power from the sun will be "cheap, safe, clean and renewable." But when they are questioned, say, about the people who died when the SL-1 reactor melted down, or about the finite character of the copper supply needed for the solar devices, it readily becomes apparent that the energy debate is rooted often more in assumptions than facts.

The issue is timely; it evokes considerable interest; and the attention given to the public policy questions related to energy alternatives has lacked precisely that form of scholarly rigor, the hearing of many sides of an issue and judgment made after a critical analysis of competing data, that the university can or should best provide.

Let me give a few examples of what I mean. A great deal of attention has been paid by the nuclear industry to analyzing potential single failure modes for nuclear power plants and attempting to build back-up systems to protect against such failures. For example, Emergency Core Cooling Systems (ECCS) have been developed to prevent what is viewed as the worst possible nuclear accident, the Loss Of Coolant Accident (LOCA) arising from a failure of the primary cooling system. A LOCA could result in a so-called Class IX accident, or complete core meltdown. While some critics such as MIT's Dr. Henry Kendall were critical of the quality of ECCS employed by reactor vendors, it is nonetheless clear that there was an attempt on the part of the industry to deal in some measure with the possibility of a single failure resulting in a loss of coolant.

But most students of the issue now agree that the accident at Three Mile Island demonstrated that not nearly enough attention had been given to multiple failure modes, i.e. when several unrelated things go wrong, compounding the consequences of each failure. At TMI, failure of feedwater pumps, a valve that failed, and other valves that were incorrectly left in the wrong position, as well as other failures, led to an accident far more serious than most people in the nuclear industry had thought was possible, in large part because of their focusing on accidents caused by a single failure mode.

Let me give an example from the "soft tech" side of the debate. Many proponents of solar energy are fond of thinking of solar hot water heaters as an example of a technology that is so simple it cannot conceivably have a deleterious health effect. The sun warms water, and you use that water as you would water from a gas- or electric-powered hot water heater. An elegantly simple system, as you can use natural convection to circulate the water and have no need for any energy besides that which normally falls on your roof anyway.

But, as is often the case, the simplicity and safety are somewhat deceptive. In most climates other than California and Florida, precautions must be taken to prevent the water in the solar collectors from freezing during the winter. One simple method is the adding of "anti-freeze"--ethylene glycol--to the water in the collectors. One obviously has to make that a closed loop, run it through a heat exchanger to heat the household water, or otherwise one would be drinking water laced with ethylene glycol. But here one runs into a problem familiar to

anyone who has studied nuclear power plants: you must make absolutely sure there is no leaking of your primary coolant into your secondary coolant. If such a leak occurred--and we all know how often car radiators develop leaks, at first undetectable--the ethylene glycol could get into the potable water system. The health effects on a nation relying on solar power for its hot water of even a small percentage of those hot water heaters developing small leaks, contaminating drinking and cooking water, is not known at present, or, to my knowledge, even studied to date.

The point is obvious. Even the simplest of the "safe, clean" sources of energy may not be as safe as thought. It may even have some of the same problems of the technologies it attempts to counter. And without the fancy gadgets a centralized power station can have to detect leaks, an ethylene glycol leak could go undetected for a long time.

Of course, the "maximum credible accident" for one energy source may be vastly greater than for another. And the likelihood of a minimal accident can be much smaller. It is how these complex factors are calculated and which risks are decided to be acceptable and which not that determines which energy paths we choose. And these choices can only benefit from a serious examination of the alternatives and their various implications.

Structure of the Course

The course will attempt to do two things: discuss various criteria by which energy alternatives may be judged, and apply these competing criteria to the principal alternatives presently being discussed.

We will do this by relying to a significant degree on material from the actors in the public policy debate themselves--government agency reports, legislative hearing records, industry and "public interest" group publications.

And for the technical aspects of these public policy choices we will rely upon guest speakers with expertise in the areas under review. And because there is considerable disagreement about these issues, guests from a wide spectrum of views will be utilized. This has always been the policy of this instructor. For his CED course on "The Citizen and Congress" he brought in Congressman George Brown, Jr. and Barry Goldwater, Jr. For his CED course on "Human Rights in International Perspective," a film critical of apartheid in South Africa was shown, followed by a semi-official spokesperson for the South African government presenting a defense of South Africa's human rights record. The students have always seemed particularly challenged when several differing positions are clearly presented, and that is the intention for this course on energy as well.

Course Requirements

A midterm worth 20% of the grade and a final examination and term paper each worth 40% of the grade will be required. The midterm will be a mid-course check to see that the central information of the course to date has been understood. The term paper will be a detailed examination of one of the energy issues studied; for example: Could the development of Ocean Thermal Energy Conversion (OTEC) create a kind of OTEC-OPEC whereby those nations with significant OTEC potential (nearby ocean areas with a significant temperature gradient between surface and bottom water) band together to push up the price of the OTEC energy they control?

Another sample topic could be: Does the reliance of all energy sources upon copper and aluminum, finite resources, to conduct the electricity generated mean that no matter how we resolve the energy shortage in the short run our present rate of energy usage in the long run is not sustainable because other resources will run out and at some point replacement resources will no longer be able to be found? Or: How should the cost of decommissioning a nuclear power plant at the end of its forty-odd-year lifetime be paid--by the customer who receives the power now or the public at the time the plant ceases to produce power, i.e. the time when the decommissioning must be done?

The final examination will be a chance for the student to summarize his or her conclusions about the issues raised in the class. As always, the conclusions the student comes to are his or her concern; evaluation will be on the degree to which the students can defend their conclusions with information and concepts from the course, the clarity of their argument, and the degree of evidence that the student has conscientiously considered the competing choices on that particular issue.

COURSE OUTLINE

WEE.

- 1 Introduction & Overview of Course.
- 2 The debate between proponents of "hard" and "soft" energy paths. Insertion of a middle position between the two: Harvard Business School Energy Futures study. The main criticisms of the three approaches.
- 3 Means for making energy choices: risk-benefit analyses, economic/environmental trade-offs, magnitude of "maximum credible accident" versus probability of accident occurring.

Computer modeling of risk/benefit estimates. Bias entering studies; case in point, computations of deaths from x megawatts of energy from coal versus x megawatts of energy from nuclear. Does study include the complete fuel cycle in each case; how does one estimate long-term deaths from, for example, radiation released from coal plant and from nuclear plant; how does one plug in estimates for normal operation as well as possible accident?

- 4 Present primary energy sources: oil, coal, wood, hydro. How to estimate resource reserves? The debate over the conclusions of the Club of Rome report on limits to growth--how many years of specific resources are "left?" Case study: petroleum and means of estimating total recoverable reserves.

The constraints on present energy sources: likelihood and severity of accidents (e.g. oil spills, refinery fires), resource limitations, environmental, public health, economic and political constraints.

- 5 Fission. Constraints: resource limitations (uranium as finite resource), likelihood and severity of accidents (controversies over WASH 740 and WASH 1400), environmental, public health, economic and political constraints, problem of nuclear weapons proliferation.

Description of complete fuel cycle. Advantages of not contributing to CO₂ buildup ("greenhouse effect"). Description of EBR-1, SL-1, Fermi, Chalk River, Windscale, SRE, Brown's Ferry, and TMI accidents. Discussion of conclusions of the various TMI commissions related to public policy on nuclear power.

- 6 Alternative models of nuclear reactors besides the FWR and EWR light water reactors. CANDU; breeders--liquid metal fast breeders as well as light water breeders. Advantages in extending available fissile Uranium supply. Problems of sodium explosions and fires, criticality potential, and plutonium proliferation for breeders. Fusion; benefits of reduced radiological danger, less scarce "fuel", reduced proliferation problem. Constraints of technological uncertainties (will it work?), size of investment necessary to find out, possible environmental and resource constraints.

Conservation as a "source" of energy. Increased efficiency in energy use--insulation, more efficient engines (e.g. heat pumps), cogeneration, burning of city garbage. Economic constraints (is it cost-effective to increase engine efficiency or go to cogeneration?), technological uncertainties (can we find a way of burning garbage without clogging up the apparatus?), environmental constraints (increased insulation traps pollutants, including

radioactive radon gas from normal building materials, inside the house; burning, garbage increases air pollution). Synthetic fuels; advantage of extending availability of fossil fuels, particularly of fuel liquids which are the most scarce and most useful (particularly for transportation) and reducing OPEC dependence. Resource constraints (limits to oil shale, tar sands, coal, and particularly water for processing); environmental constraints (synfuels reportedly particularly polluting; also contribute significantly to greenhouse effect; strip mining question).

- 7 Solar: wind, tidal, wave motion, hydroelectric (particularly low-head hydro), biomass, photovoltaic cells, solar power towers, active and passive systems for buildings, Israeli solar ponds, growing of fuel crops (e.g. for alcohol fuels), direct use of solar (crop drying, distillation).

Constraints on solar: technological uncertainties (can we get the solar systems to work?), economic uncertainties (can we get the price down far enough, for example, with photovoltaic cells?), resource limitations (copper, aluminum to conduct electricity or heat; other resources needed for certain photovoltaic materials, building of OTEC ocean platforms, power towers, etc.), environmental limitations (will OTEC change sea temperature or ocean habitats; will widespread use of solar collectors cover enough land mass to have some environmental effect?); efficiency limitations (can we get enough of this diffusely distributed energy to utilize it efficiently?); health effects (silicon dust from manufacture, anti-freeze leaks, greenhouse effect and air particulate pollution from burning biomass); reliability (solar not constant, problem of storage); problem of conversion to energy form needed (fuels for transportation, for example).

- 8 How government deals with these public policy issues. In particular, how do the various levels of government respond to these tough choices and the many interest groups whose vital interests are affected by any governmental action in this area?
- 9 How is the public informed and educated about these issues?
What is the role of the scientific and technical communities?
What is the role of the media?
- 10 Conclusion of class. Summarize questions raised. Discuss competing answers to those questions and the competing strategies for acting on those questions.

Reading List

- Mehring, Richard; Giant Oil Fields and World Oil Resources; a RAND report, prepared for the CIA, June 1978, R-2284-CIA
- Dreyfuss, D.J., et al; An Examination of Alternative Nuclear Breeding Methods, RAND Report R-2267, July 1978
- Perry, Robert, et al; Development and Commercialization of the Light Water Reactor, 1946-1976, RAND Report R-2180-NSF, June 1977
- Ellickson, Phyllis, et al, Balancing Energy and the Environment: The Federal Role and Local Interests, Rand Report R-2274-DOE, June 1978
- Candara, A., Electric Utility Decisionmaking and the Nuclear Option, Rand Report R-2148-NSF
- Cohen, Bernard L., "The Disposal of Radioactive Wastes from Fission Reactors", Scientific American, June 1977, Volume 236, Number 6
- Rose, David J. and Lester, Richard K., "Nuclear Power, Nuclear Weapons and International Stability", Scientific American, April 1978, Volume 238, No. 4
- Bethe, H. A., "The Necessity of Fission Power", Scientific American, January 1976, Volume 234, Number 1
- McIntyre, Hugh C., "Natural-Uranium Heavy-Water Reactors", Scientific American, October 1975, Volume 233, Number 4
- U.S. Government Accounting Office, "Areas Around Nuclear Facilities Should Be Better Prepared for Radiological Emergencies", March 30, 1979, EMD-78-110
- U.S. Government Accounting Office, "Radiation Control Programs Provide Limited Protection", December 4, 1979, HRD-80-25
- Environmental Control Technology Division, Department of Energy, "Report on Residual Radioactive Materials on Public or Acquired Lands of the United States", July 1, 1979, DOE/EV-0037
- California Assembly Permanent Subcommittee on Energy, "Oversight Hearings, Nuclear Power Safety: The Three Mile Island Nuclear Power Plant Accident and its Implications for California", April 12, 1979, testimony by Richard Hubbard and Harold Lewis
- Nero, Anthony V. Jr., A Guidebook to Nuclear Reactors, University of California Press, Berkeley 1979
- Ford, D.F., Hollocher, T.C., Kendall, H.W., et al, The Nuclear Fuel Cycle, Union of Concerned Scientists, Cambridge, Mass. October 1973
- U.S. Department of Housing and Urban Development, Regional Guidelines for Building Passive Energy Conserving Homes, November 1978, HUD-PDR-355

Office of Technology Assessment, Congress of the United States, Renewable Ocean Energy Sources, Part 1: Ocean Thermal Energy Conversion, May 1978, Washington, D.C.

Schurr, Sam H., et al, Energy in America's Future: The Choices Before Us, Resources for the Future, Washington, D.C. June 1979

U.S. Environmental Protection Agency, Office of Radiation Programs, Summary of Radioactivity Released in Effluents From Nuclear Power Plants From 1972 Thru 1975, June 1977, EPA-520/3-77-0066

Karas, Joseph S. M.D. and Stanbury, John B., M.D., "Fatal Radiation Syndrome From an Accidental Nuclear Excursion", The New England Journal of Medicine, April 15, 1965

Fan, John C.C., "Solar Cells: Plugging into the Sun", Technology Review, MIT, August/September 1978

DeGrasse, Robert Jr., et al, Creating Solar Jobs, a report of the Mid-Peninsula Conversion Project, 1978, Mountain View, California

Merrill, Richard and Gage, Thomas, editors, Energy Primer, Dell Publishing, 1978, NY

_____, Radioactive Materials in California, Report of the Secretary for Resources' State Task Force on Nuclear Energy and Radioactive Materials, April 1979, the California Resources Agency

Thompson, T.J. and Beckerley, J.C., editors, The Technology of Nuclear Reactor Safety, volume 1, pg. 508-708

McBridge, J.P., Moore, R.D., Witherspoon, J.P. and Blanco, R.E. "Radiological Impact of Airborne Effluents of Coal and Nuclear Plants", Science, December 8, 1978, Vol. 202, Number 4372

Johnson, Carl J. M.D., M.P.H., "Epidemiological Evaluation of Cancer Incidence Rates for the Period 1969-1971 in Areas of Census Tracts with Measured Concentrations of Plutonium Soil Contamination Downwind from the Rocky Flats Plant"

Meadows, Donella H. et al, The Limits to Growth, 1974, New American Library, NY

Ballif, J.L. Metallurgical Aspects of the SRE Fuel Element Damage Episode, AEC Research and Development Report, Atomics International, Canoga Park, CA., 1961

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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of)	
)	Docket No. 50-142
THE REGENTS OF THE UNIVERSITY)	
OF CALIFORNIA)	(Proposed Renewal of Facility
)	License)
(UCLA Research Reactor))	
)	

CERTIFICATE OF SERVICE

I hereby certify that copies of "RESPONSE TO BOARD ORDER OF JUNE 16, 1981, REQUESTING ADDITIONAL INFORMATION FROM DANIEL HIRSCH" in the above-captioned proceeding have been served on the following by deposit in the United States mail, first class, this 30th day of June, 1981:

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