

Lawrence Berkeley National Laboratory

LBL Publications

Title

LBL Newsletter

Permalink

<https://escholarship.org/uc/item/9379h5b9>

Author

Lawrence Berkeley National Laboratory

Publication Date

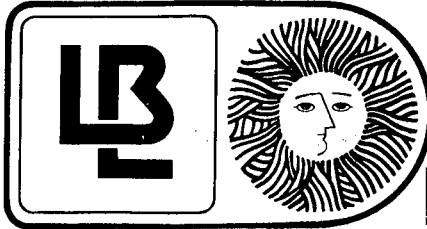
1979-04-01

Copyright Information

This work is made available under the terms of a Creative Commons Attribution License, available at <https://creativecommons.org/licenses/by/4.0/>

DISCLAIMER

This document was prepared as an account of work sponsored by the United States Government. While this document is believed to contain correct information, neither the United States Government nor any agency thereof, nor the Regents of the University of California, nor any of their employees, makes any warranty, express or implied, or assumes any legal responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by its trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof, or the Regents of the University of California. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof or the Regents of the University of California.



For Reference

Not to be taken from this room

NEWSLETTER
April 1979

Editor: Jeffrey Kessel
90-3026, ext. 5297

Lawrence Berkeley Laboratory Energy and Environment Division

RECEIVED
APR 25 1979

☆ DIVISION NEWS ☆ L.B.L. LIBRARY

- The Division's annual review was held on March 29-30, 1979. Twelve reviewers, chosen for their expertise in a variety of fields related to Energy & Environment Division research areas, heard presentations from the following projects: Energy Efficient Buildings, Atmospheric Aerosols, Pollutant Effects on Membranes, Aquatic Microcosms, Oil Shale Research, Trace Element Analysis, Optoacoustic Detection/Liquid Crystal Applications, and the Survey of Instrumentation for Environmental Monitoring. The review committee will be making its report in the near future to *Andy Sessler*.
- A reminder - Performance Evaluations, required for every employee, must be completed by supervisors and returned to the Division office by April 15.
- A new computer system, UNIX, is now available for word processing operations. The Division has several Gandalf terminals and a Diablo printer which has an output with quality suitable for printing. Anyone interested in UNIX training for their staff should contact *Dharmakaur* (ext. 6231) who will be coordinating training opportunities for UNIX processing.
- The DOE Spring Budget Submission has come and gone, and yes, the rumors you've heard are true; the worst has happened. The total budget submission of the Lab was so out of line with the Institutional Plan that it had to be cut back. The requests for 1980 had the Lab growing by 32% and the requests for FY-81 had it growing by 48%, an interesting problem when Headquarters has decreed a no-growth situation. (Less you think that E&E was particularly virtuous in this matter, our submission had a full 100% growth between FY-79 and FY-80.)

As soon as the Budget Office confirms it to her (well before you get this, we presume), *Barbara West* will inform each person who submitted a WPAS just what happened to it, and what can be done next.

- Institutional Plan : The FY78 Plan now exists (it covers FY78-84), and several copies are scattered around the Division if you're interested in seeing what one looks like. They are located with *Ted Edlin*, *Mike Wahlig*, *Jud King*, *Jade Carroll*, *Will Siri*, and *Sandy Mocco*. Work on the FY79 Plan (for FY79-85) is now underway.

John Deutsch, Director of the Office of Energy Research and LBL's "godfather," is scheduled to make his annual site visit on May 8. All the WPASs that didn't make it in the Spring submission, because they violated the FY78 Institutional Plan, have been worked into the E&E Division's submission to *Jack Hollander*

PUB 289

for Deutsch's visit as new work we'd like to pursue. Sometime, probably after Deutsch's visit, we will be asked for text to describe on-going and approved new work. All P.I.s are herewith promised the opportunity to write fulsome prose (probably in 25 words or less) on the research nearest to their hearts. Or paychecks.

- The following note, scrawled in a nervous hand, was recently received by *Barbara West, Dharmakaur Khalsa and Mary Worth* :

Once upon a time a junior faculty member, who was very inexperienced regarding bureaucratic matters at DOE, requested some money for research. This young man proceeded to apply for a grant on a WPAS (WE PATRONIZE ALL SUCKERS) form. Needless to say, it was the beginning of the beginning! and even now he is *still* (poor fellow) completing the original form plus more forms and more forms to the second forms, etc. Someday DOE may fund his work (after all he qualifies to be patronized) but he will have difficulty performing the research since he will first have to wade through the accumulated documentation to *remind* himself of what he unpretentiously had started out to do!

I *don't* envy your jobs,
I *hope* you are paid well,
and I'm glad as hell you're on *my* side.

★ APPOINTMENTS, AWARDS, GRANTS AND HONORS ★

- *Henry Ruderman* has been appointed to the recently-formed LBL Committee on Computer Policy.
- *Elton Cairns* is serving on the NAS Committee on Materials Research for Batteries, and is chairman of the Aqueous Electrolyte Batteries Panel of that committee.

★ TRIPS, CONFERENCES, AND PRESENTATIONS ★

- The following papers are being presented at the Joint Congress of the American Chemical Society/Chemical Society of Japan, in Honolulu, April 1-6, 1979:
Susan Lepman — Analysis of Geothermal Emissions.
Rollie Otto — Basic Energy Properties of Geothermal Fluids: A Comparative Analysis of Computational Methods
Sid Phillips — Treatment Methods for Geothermal Brines
Elton Cairns — Electrochemical Energy Conversion: Status & Future Needs
- *Phyllis Fox* attended an Oil Shale Management Team working session in Washington, D.C. on March 7-9. The purpose of the meeting was to continue the preparation of an Oil Shale Management Plan to secure additional funding for oil shale from OMB.
Seven oil researchers — Phyllis Fox, Don Girvin, Al Hodgson, Mathilde Kland, Lucy Pacas, Peter Persoff, and Peter Russell — attended the EPA Oil Shale

Sampling, Analysis and Quality Assurance Symposium in Denver, Colorado, on March 26-28. *Phyllis Fox* chaired the session on Quality Assurance and Pollution Control Technology Research and presented three papers: "Inter-comparison study of elemental abundances in raw and spent oil shales," "Retort water particulates," and "An interlaboratory intercomparison study of oil shale retort waters." While in Denver, *Phyllis* attended meetings of two national oil shale committees that she holds membership on: The NAS Oil Shale and Tar Sands Panel, and DOE's Paraho Oil Shale Data Evaluation Group. *Don Girvin* presented the paper, "Use of Zeeman atomic absorption spectroscopy for the measurement of mercury in oil shale gases," and *Peter Russell* presented the paper "Two species of caddisfly larvae as indicators of environmental stress from oil shale related effluents."

- *Mathilde Kland* attended the Environmental Law Forum at McGeorge School of Law in Sacramento on March 10, 1979. *Mathilde's* talk focused on chemical carcinogens in the environment and the procedural aspects of implementing the Toxic Substances Control Act (TSCA). She discussed the series of environmental episodes (thalidomide, pesticides, PCBs, PBBs, and Vinyl Chloride) which led to TSCA. In fact, it was disclosures of the harmful effects of vinyl chloride that broke a five-year bottleneck in Congress and led to the passage of PL 94-469 (TSCA). *Mathilde* went on to discuss a method of dealing with the approximately 100,000 commercial chemicals in our environment. She proposed using drug design 'in reverse' as a means of predicting dangerous effects by examining molecular structure and looking for similarities with known harmful compounds.
- *Jaime Kooser* will be attending the Association of American Geographers Convention and presenting a paper entitled, "The Decision-making Environment of California Electrical Utilities."
- *Gary Roseme* is attending the Conference on Indoor Climate, sponsored by the Swedish Association of Heating and Air-Conditioning Engineers, that is being held in Malmö, Sweden, April 3-6, 1979. Gary will present a paper entitled, "Indoor Air Quality in Energy-Efficient Buildings." This paper describes LBL research that is concerned with possible harmful effects from living in a dwelling that is much less leaky than present structures. Lowered ventilation rates could mean buildup of odors, and pollutants from gas cook stoves, tobacco smoking, and building materials. One possible solution, which Gary will discuss with experts in Sweden and Scotland, is the use in residences of forced (mechanical) ventilation with a heat exchanger to extract heat from the outgoing polluted warm air and deliver it to the fresh incoming cool air.
- *Craig Hollowell* is in Bilthoven, Holland, attending a meeting of the World Health Organization Working Group on Health Aspects Related to Indoor Air Quality. This meeting will discuss the state of the art and knowledge on indoor air quality, and will make recommendations for needed remedial action and control measures.
- *Lee Schipper* will be visiting European researchers concerned with energy use in buildings as a part of a DOE Energy Information Agency effort to assemble indices of residential energy use in certain European countries. Lee will also be visiting Kenya where he will gather data for an energy conservation project.

- Ron Kammerud will be attending meetings in Rome and Venice concerned with Passive Solar technology. A technical and management plan will be prepared for a project under joint U.S./Italian sponsorship. This project will probably involve the building of test structures in the U.S. and Italy with the intent of collecting data which will be useful for validating computer programs that attempt to model energy flows in passive solar structures (a passive solar structure is one in which solar energy is utilized without the assistance of pumps, fans, etc.). Other possible projects include large-scale applications, possibly in commercial buildings, of passive solar technology.

★ RECENT LBL REPORTS ★

DECEMBER 1978

- LBL-04432 Rev. A Manual for Cataloging and Indexing Documents for Database Acquisition (July 1978, 84 pgs), S. R. Schwartz, S. L. Phillips, and J. J. Perra.
- LBL-07860 Analysis of the California Solar Resource - Vol. 3: Appendices (November 1978, 162 pgs), P. Berdahl, D. Grether, M. Martin, and M. Wahlig.
- LBL-07866 Energy and Water Use in Irrigated Agriculture During Drought Conditions (June 1978, 69 pgs), R. L. Ritschard and K. Tsao.
- LBL-07867 Process Development Studies for the Production of β -Glucosidase from *Aspergillus Phoenicis* (September 1978, 106 pgs), M.S. Thesis for M. J. Howell, M. J. Howell and C. R. Wilke.
- LBL-08371 Circumsolar Radiation Data for Central Receiver Simulation (August 1978, 11 pgs), presented at the ERDA Solar Workshop on Methods for Optical Analysis of Central Receiver Systems. Houston, TX, August 10-11, 1978. A. Hunt, D. Grether, and M. Wahlig.
- LBL-08402 Interim Regional Report for National Coal Utilization Assessment, Impacts of Future Coal Use in California (July 1977, 188 pgs), R. Brandi, P. Chan, D. Ermak, M. Horovitz, J. Kooser, R. Nyholm, R. Ritschard, H. Ruderman, J. Sathaye, R. Sextro, and W. Siri.
- LBL-08434 Interim Validation Report: Major Fuel Burning Installation System (December 1978, 226 pgs), S. Alter, A. Baum, S. Hinds, A. Levinson, and R. Seeburger.
- LBL-08437 Interim Validation Report: Middle Distillate Price Monitoring System (December 1978, 293 pgs), D. G. Hopelain, D. Freedman, T. H. Rice, J. G. Veitsch, and A. Finlay.
- LBL-08438 The Dependence of Acoustically Non-Resonant Optoacoustic Signal on Pressure and Buffer Gases (September 1978, 16 pgs), submitted to Appl. Phys. Letters, D. R. Wake and N. M. Amer.

- LBL-08470 Impact of Reduced Infiltration and Ventilation on Indoor Air Quality in Residential Buildings (November 1978, 14 pgs), to be presented at the ASHRAE Symposium on Air Infiltration, Philadelphia, PA, January 1979. C. D. Hollowell, J. V. Berk, and G. W. Traynor.
- LBL-07877 Reliability Planning in Distributed Electric Energy Systems (October 1978, 56 pgs), E. Kahn.
- LBL-07879 Effect of Nitrogen Oxide Pretreatments on Enzymatic Hydrolysis of Cellulose (September 1978, 101 pgs), M.S. Thesis for R. K. Borrevik, R. K. Borrevik, C. R. Wilke, and D. L. Brink.
- LBL-07881 Determination of Trace Elements in Light Element Matrices by X-ray Fluorescence Spectrometry with Incoherent Scattered Radiation as an Internal Standard (December 1978, 34 pgs), submitted to Anal. Chem., R. D. Giaouque, R. B. Garrett, and L. Y. Goda.
- LBL-07887 Role of Carbon Soot in Sulfate Formation (September 1978, 7 pgs), to be presented at the Annual Meeting of the ACS/CJS Division of Environmental Chemistry Joint Chemical Congress, Honolulu, Hawaii, April 9, 1979, T. Novakov.
- LBL-07889 Studies of Desorption of Cellulase from Cellulose with Various Reagents (October 1978, 31 pgs), submitted to Biotechnol. Bioeng., M. Riaz and C. R. Wilke.
- LBL-07896 Energy Conservation: Policy Issues and End-Use Scenarios of Savings Potential - Part 2, Tradeoffs of Municipal Solid Waste Processing Alternatives (September 1978, 49 pgs), P. Benenson, R. Codina, B. Cornwall, D. Dornfeld, B. Greene, J. Elliott, W. Kempton, C. Langlois, H. Nelson, J. Nides, F. Rouse, C. Sullam, R. Barnes, and N. M. Bradburn.
- LBL-08298 Residential on-Site Solar Heating Systems: A Project Evaluation Using the Capital Asset Pricing Model (December 1978, 62 pgs), M.S. Thesis for S. R. Schultz.
- LBL-08315 Testing of Energy Conservation of Electronic Ballasts for Fluorescent Lighting, Review of Recent Results and Recommendations for Design Goals (October 1978, 23 pgs), presented at the IEEE-IAS 1978 Annual Meeting, Toronto, Canada, Oct. 3, 1978, R. R. Verderber, D. Cooper, and D. K. Ross.
- LBL-08316 Hospital Ventilation Standards and Energy Conservation: A Summary of the Literature with Conclusions and Recommendations, FY78 Final Report (September 1978, 308 pgs), R. L. DeRoos, R. S. Banks, D. Rainer, J. L. Anderson, and G. S. Michaelsen.

☆ NEW EMPLOYEES ☆

- Ake Blomsterberg joins the Building Envelopes and Ventilation research project where he will be working on experiments at the Walnut Creek research house concerned with relating air infiltration to local weather conditions, and with using a fan to pressurize an entire house in order to measure the resulting air leakage.

- *Richard Johnson*, an architect, joins the Windows & Lighting group to work with *Steve Selkowitz* on the research on energy efficient windows.
- *Ashu Mathur*, a Petroleum Engineer, has joined the Oil Shale Program from the GRID group. Ashu will be studying hydraulics and chemical transport in groundwater aquifers that surround abandoned in situ retorts.
- *Francis Rubinstein* will be working with *Sam Berman* on energy efficient lighting. This project, through research by LBL and sub-contractors, is attempting to develop and commercialize innovative energy efficient lighting systems.

☆ SEMINARS ☆

to be held at 4:00 pm in 90-3148

- April 24 -- John Cooper, PG&E:
The Utilities and Energy Conservation: Are
They Compatible?
- May 1 -- To be arranged
- May 8 -- To be arranged
- May 15 -- John Cooper, LLL:
The Aluminum-Air Battery for Electric Vehicles

AN INTERVIEW WITH TONY NERO

E&E: Tony, I was in the middle of reading your new book, *A Guidebook to Nuclear Reactors*, when Three Mile Island occurred. The diagrams were very helpful in getting a picture of what the different components of a nuclear plant look like. How did you come to write the book?

TN: My original research activities were in nuclear physics, but I had had a long-term interest in environmental matters. About five years ago I became involved in nuclear power partly as a natural way to combine my background and interests. I wrote the book to fill a need I saw for an overview of nuclear power accessible to the non-specialist as well as a need to survey the various reactor types being considered.

E&E: What happened at Three Mile Island?

TN: The analysis isn't complete, but it seems that a series of pump and valve failures, along with an erroneous water level indication -- perhaps combined with operator error, resulted in the unexpected problem of a hydrogen bubble.

E&E: Can't something like this happen frequently? I mean if there's millions of parts in a nuclear power plant, then it seems that two or three of them can simultaneously fail from time to time.

TN: Actually there are only a few hundred *critical* components in a nuclear plant. And the goal is to design the plants with enough redundancy to withstand such expected failures. As I understand it the same sort of pump failure took place at Three Mile Island about two months prior to this occurrence.

E&E: I heard the utility was in a hurry to get the Three Mile plant on line. In order to get a tax break it had to be operating by December 1978, and so there was a rush, and lots of overtime work. Do you think there's a contradiction between the economic motivation of a utility and the public safety?

TN: Public safety is not the primary premise of utility operation, although it is taken seriously. I think that one of the main lessons of this incident is that utilities will be less likely to underestimate the dangers and difficulties of operating a nuclear plant. But the problem is not simply private profit at the expense of public safety - in France and England, where the nuclear plants are run by the government, they still have strong incentives toward speed and profitable operation.

E&E: What are the lessons of Three Mile Island?

TN: First, I think there will be more careful operator training, with attention paid to how to react in unusual circumstances. Second, analyses of possible plant failures will be modified to include the occurrence of hydrogen bubbles. Third, there will probably be direct data links from all plants to the Nuclear Regulatory Commission - this way national expertise can be quickly brought to the aid of any malfunctioning plant. Fourth, there will be a much greater emphasis on emergency planning and public education. People want to know how nuclear plants operate and the possible consequences of living near one. There may be increased input by local inhabitants to nuclear plant siting decisions. Finally, I think the incident will result in better monitoring techniques at existing and future plants in order to better estimate the radiation exposure of the public in case of plant malfunction.

E&E: Can you tell me something about radiation standards?

TN: Well, the basic unit is the REM, which equals an amount of energy deposited in a certain mass of human tissue, weighted by the sensitivity of people to that particular type of radiation. The millirem (mrem) is equal to one one-thousandth of a rem. Background radiation from the natural environment exposes us to about 100 mrem/year. Medical and dental radiation adds about another 50 mrem/year to this. The atmosphere protects us from some of this radiation, that due to cosmic rays - if you live at high altitude, say, in Denver, your exposure will be higher than the average. In fact a long distance plane flight can add a few mrem to your exposure. Right now the International Standard for an individual's exposure is 500 mr/year.

Now here are some of the standards compared to exposures at Three Mile Island:

Natural + medical background	150 mrem/year
International standard maximum for an individual in the general public	500 mrem/year
International standard for maximum average exposure of a population	170 mrem/year
Design objective for radiation crossing the boundary of new nuclear power plants	5 mrem/year
Estimated extra dose at Three Mile Island for nearby community people	50-100 mrem

Standard for Atomic Workers 5000 mrem/year

Note that this standard for atomic workers is roughly equivalent to 100 rem in a person's lifetime. The 5000 mr/year limit was chosen to be well below (perhaps a factor of ten) the dosage where there would be noticeable effects. There are those who are presently trying to lower this standard for workers by a factor of 10.

Now it is assumed for assessment purposes that there is no threshold dose below which radiation will not cause harm. In other words, if 1000 people get a dose D, this is taken to have the same probability of causing, say, a cancer as when 10 people get a dose of 100D. Even though the dose D may be very small, if enough people receive such a dose then there could be a significant probability of harmful effects. For assessments performed along these lines, a typical dose-response used is that a population will have one extra cancer death if it receives 5,000 - 20,000 person-rem of radiation exposure. A person-rem is (number of people exposed) × (level of exposure in rem). For example, 1,000 people exposed to 1.5 rem is equal to 1,500 person-rem.

E&E: I heard John Gofman, a former associate director of Livermore Lab, state in a radio interview recently that 300 person-rem causes one extra cancer death.

TN: I think he uses the concept of 'doubling-dose' to arrive at that number, and there is no consensus over whether that procedure is justified. The whole field of radiation standards is very controversial. Right now some recent health studies of atomic workers in the Navy and at the Hanford atomic facility are being hotly debated. It's tricky to experimentally determine the effects of exposure to low levels of radiation for long periods of time.

Anyway, getting back to the figures, you see that normal day-to-day operation of a nuclear power plant should contribute a dose equal to a small fraction (5/150) of the background radiation. However, large accidents could cause exposures of thousands of rem, say, if the containment burst in the course of a meltdown.

E&E: Tony, how can we wrap this up? Do you think nuclear power has a future?

TN: Well ... I think that first the lessons from the Three Mile incident must be learned and incorporated into practice at all plants.

E&E: Did you see the film *The China Syndrome*?

TN: As a matter of fact, I saw it Saturday night. I liked it, but feel that some of the characters, particularly the utility executives, were more caricatures than people.

E&E: You know, I recently saw a documentary about the demonstrations against the Seabrook plant in New Hampshire, and after watching the then governor and the head of the local utility, I realized that compared to the *China Syndrome* film, Reality certainly outdid Art.

TN: That may be, but it is still true that most of the people in the nuclear power industry are sincere and well-meaning. Let's hope that out of this whole "incident" they will come to have a greater appreciation of the difficulties and dangers of nuclear power.