DISCLAIMER

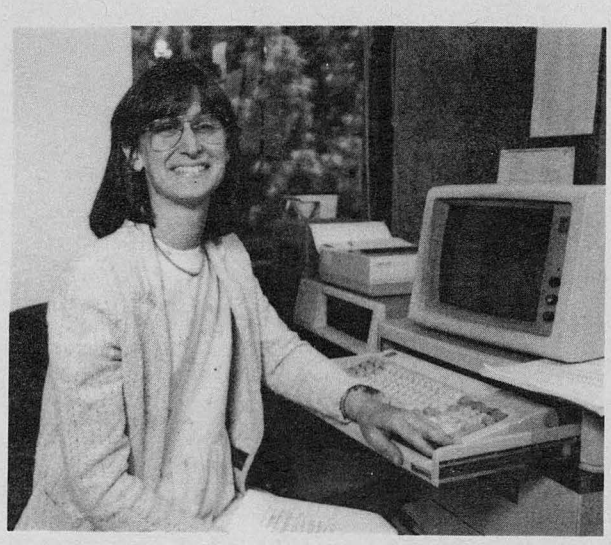
NEWSLETTER

Lawrence Berkeley Laboratory
Applied Science Division

APRIL/MAY 1987

EMPLOYEE PROFILE

We thought we would try something different and begin a series of short profiles about Division employees (suggestions for candidates/victims are welcome). The Division has employees scattered around the Hill and on Campus, and maybe this will help introduce you to each other.



NORI HUDSON began working at LBL in February 1986 as the Program Administrator for the Energy Efficient Buildings Program. With the Division reorganization in 1986, she handled the program administration for both the Indoor Environment and Windows & Lighting programs until a new administrator was recently hired for Windows & Lighting. She is currently the Program Administrator for the Indoor Environment Program.

Nori was born in Rhode Island, into a Navy family, and has subsequently lived all over the United States. She majored in music and English at the University of South Alabama in Mobile, where she also played the violin with the Mobile Symphony Orchestra. After graduation she moved to Chicago, where she spent several years working at the University of Chicago before deciding to go back to school for a Master's degree in Business. She received her degree from the Berlin campus of Boston University in 1982, and, like many others, moved to California. Before coming to LBL, Nori worked as a Contract Officer and Assistant Accounting Manager at Stanford University. Her move to LBL was prompted by a desire to live in the Berkeley area, and her personal interest in the kinds of research carried out by ASD.

Nori still likes to play chamber music, and currently plays the viola. Her "free time" is spent hiking, backpacking, cross-country skiing, and gardening in the yard of a 60-year old house she recently bought in Albany.

NUCLEAR WINTER THEORY

[*The following is a summary of an article from LLNL's Weekly Bulletin which shows the relationship of a specific ASD research project to a broader area of national concern.*]

Joyce Penner of Lawrence Livermore National Laboratory's (LLNL) Geophysical Sciences Division discussed the nuclear winter theory in a lecture sponsored by U.C. Davis' Department of Applied Science in February of this year. The message of her talk was that if a nuclear war is fought, after its immediate effects pass, the climatic effects of smoke could become a major threat to many areas of the world.

How much of a threat would smoke be? Penner said that public scientific debate on the extent and significance of smoke erupted after the December 1983 publication of two articles in *Science* magazine.

The authors of the first of those articles—who coined the term "nuclear winter"—predicted temperatures over major land areas dropping about 60° Fahrenheit and remaining below freezing for a month or more. (The article is known as the TTAPS report, after its authors: Richard Turco, Brian Toon, Tom Ackerman, James Pollack and Carl Sagan.)

The biologists and ecologists who wrote the second article predicted that extended subfreezing temperatures and low light levels, coupled with the direct effects and disruption of the war, could result in severe reduction or even extinction of human life due to crop failures, leading to mass starvation.

However, Penner cautioned that the one-dimensional computer model of the atmosphere used by the "nuclear winter" authors did not take into account many important variables. She said that many of that study's assumptions about the nature of a nuclear war and the resulting fires stand on shaky ground. Penner said that before she, her colleagues and other researchers around the world can reliably decide whether predictions of nuclear winter are fact or fiction, they need accurate answers to questions such as "How much smoke? What kind? How high will it go? How far will it spread?"

According to Penner, the quantity of smoke generated depends on factors such as: the quantity of fuel available, the type of fuel, how much of each fuel-type would burn, and the conditions under which the burning would take place. Penner disputed the TTAPS report's estimates of the total quantity of fuel that would be burned. For example, the TTAPS authors made their calculations using the assumption that continental-average forest surrounds all military targets, rather than choosing something closer to the reality that most such sites are surrounded by relatively fuel-barren fields or prairies.

The TTAPS authors also overestimated—by a factor of three—the amount of fuel that would burn in urban areas, according to studies by LLNL researchers and a UC Santa Barbara group funded by LLNL. The computer models for estimating the quantity of fuel burned are further complicated by the knowledge that fuels such as petroleum and plastics generate much more smoke than wood.

Penner cited an Applied Science Division study* by **Brady Williamson, Nancy Brown,** and **Tica Novakov** in which first a sample of wood was burned with as much oxygen available as the fire wanted, and then a matching sample was burned with less air available. The restricted fire emitted smoke at a rate six times greater than the unrestricted fire.

Penner discussed the drawbacks of relying on laboratory-scale tests for estimating emissions from huge fires. She noted that an instrumented controlled burn forest fire is needed to truly measure what happens. She also observed that there are many problems associated with computer models which oversimplify reality. The challenge of trying to predict what a cloud will look like and how it will change is enormous—even with the world's most powerful computers. It's the same kind of task a meteorolgist faces in predicting the weather, only worse.

Penner concluded her lecture with a look at the TTAPS predictions in light of newer data and more sophisticated analyses. She said, "Predictions of climate changes (around the world) still range from minimal to fairly drastic." According to her, further study is definitely in order, to understand where the deterrent effect of nuclear winters fits in with the deterrent effects of fire, blast, fallout, infrastructure breakdown and other severe consequences of a nuclear war.

DIVISION NEWS

— **Rudy Verderber** has been elected a Senior Member of the Institute of Electrical and Electronics Engineers, Inc.

— **Nancy Brown** has been elected Chair of the Western States Section of the Combustion Institute as of April 1987.

— In March 1987, **Alex Quintanilha** was appointed Chair of LBL's Toxic Substances Safety Subcommittee.

— **Ralph Greif** has been elected a Fellow of the American Society of Mechanical Engineers. Greif was honored for his "major contributions in heat transfer in studies in thermal radiation, natural convection, unsteady heat transfer and combustion, non-Newtonian flows and transport, rotating flows, and phase change."

— On March 19, **Don Grether** presented testimony on radon research before the Subcommittee on Natural Resources, Agricultural Research and Environment, House Science, Space, and Technology Committee.

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*Smoke Measurements as Related to the Nuclear Environment, funded by the Defense Nuclear Agency. Work on this project will continue through FY87.

REVISED ORGANIZATIONAL STRUCTURE FOR THE INDOOR ENVIRONMENT PROGRAM

When the Division was reorganized somewhat over a year ago the former Indoor Air Quality group was not as well suited to the new Program/Group structure as the other groups in the old EEB (Energy Efficient Buildings) Program. As an interim measure, the new Indoor Environment Program was initially set up with two Groups having *acting* Leaders, and with an authority structure that was incompletely reflected in the formal organization of the Program.

Over the past year the Program has experienced unfortunate reductions in funding and staff. On a positive note, Joan Daisey has joined the Program (see the January/February Newsletter) and the Program overall has new research opportunities, most immediately in the radon area. These changes, together with the interim nature of the original structure, provided the impetus for making revisions. The major features of the new structure are:

- Tony Nero is appointed Deputy Program Leader in recognition of his continuing leadership contributions.
- The activities of the two Groups with acting Leaders have been combined in a "box" entitled *Indoor Air Quality Studies* that lists both the more senior investigators and the research topics.
- The three Groups with regularly appointed Leaders remain intact: Indoor Radon (Rich Sextro), Indoor Organic Chemistry (Joan Daisey), and Energy Performance of Buildings (Max Sherman).

In a memo to the staff members in the Program, Elton Cairns and Dave Grimsrud stated that "we feel that the new structure is a good match to the research areas, staff, and future directions of the Program; and trust that it will help us work effectively together to meet the challenges and opportunities that lie ahead."

The revised organization chart for the Division is in the *History/Organization/Budget/Personnel/Program* handout discussed in a separate Newsletter article.

CONGRATULATIONS!

To Judi Dohn and Christian Gaaei Daughton on the birth of their son, Jaerrett Christian Gaaei (pronounced "guy") on April 3rd. This little "Gaaei" weighed in at 6 pounds 7 ounces, with brown hair and blue eyes (Gaaei is a Danish name, in case you were wondering).

HANDOUTS IN THE APPLIED SCIENCE RECEPTION AREA

This is a reminder that a bookcase in the reception area on the 3rd floor of 90 has a variety of handouts for your information, distribution to visitors, and the like. Standard fare includes:

- The Division's brochure (blue cover). Although somewhat dated, it still serves to give visitors a quick overview of the Division's research areas.
- A collection of vugraphs assembled under a cover sheet entitled: *History/Organization/Budget/Personnel/Program.* All of the information is updated once a year, usually just before the Annual Review. Some parts, such as the organization chart, may be updated more often.
- The *Committee List,* which lists the membership of all the Division's committees and those Laboratory committees that are of particular interest to ASD. The list is updated from time to time, particularly when new members are appointed to the Division's committees.
- A slim pamphlet that provides a brief description of LBL.

From time to time the bookcase will have handouts from special presentations, such as the annual Director's Budget Review (usually held in February) and the Annual Review of the Division (usually held in April). The bookcase currently has handouts from the latter:

- Update (of the Division) - Elton J. Cairns
- Perspective on the Reorganization - Elton J. Cairns
- The Impact of Past Accomplishments - Donald F. Grether
- A Perspective on a National Program of Research on Radon - Donald F. Grether

Let Angie Smothers, Susan Petersen, or Eric Essman know if we are out of something. Suggestions for additional or different handouts are always welcome.

REMINDER OF THE PROCEDURE FOR FOREIGN AND/OR DISTINGUISHED VISITORS

The Division has a rather steady flow of national and international visitors. We are obligated to notify the Director's Office in the case of:

- Foreign visitors
- High government officials
- Any elected government official
- High officials from other research institutions

The **purpose** of such notification is to help keep the Director's Office informed as to the ongoing activities of the Division. The **benefit** to ASD researchers is that the notice brings to the attention of the Director the national and international interest in our research. The **procedure** within the Division is to contact Susan Petersen and provide her with the specifics. Susan will then compose a memo from Elton to Dave Shirley.

Another reminder is that we need DOE permission for visitors from some countries, such as certain Eastern European ones. Again, contact Susan Petersen when you are anticipating such visitors.

RECENT REFEREED JOURNAL ARTICLES

M.H. Sherman and D.J. Wilson, "Relating Actual and Effective Ventilation in Determining Indoor Air Quality," *Building and Environment,* Vol. 21, pp. 129-228 (1986).

R.G. Sextro, "Understanding the Origin of Radon Indoors—Building a Predictive Capability," *Atmospheric Environment,* Vol. 21, pp. 431-438 (1987).

G.W. Traynor, "Field Monitoring Design Considerations for Assessing Indoor Exposures to Combustion Pollutants," *Atmospheric Environment,* Vol. 21, pp. 377-383 (1987).

J.R. Girman, A.T. Hodgson and M.L. Wind, "Considerations in Evaluating Emissions from Consumer Products," *Atmospheric Environment,* Vol. 21, pp. 315-320 (1987).

P.N. Ross, E.J. Cairns, K. Streibel, F. McLarnon, and P.C. Andricacos, "The Reaction Order for Oxygen Reduction in TFMSA on Pt," a short communication in *Electrochimica Acta,* Vol. 32, p. 355 (1987).

J.G. Reynolds, E.J. Gallegos, R.H. Fish and J.J. Komlenic, "Characterization of the Binding Sites of Vanadium Compounds in Heavy Crude Petroleum Extracts by Electron Paramagnetic Resonance Spectroscopy," *Journal of Energy & Fuels, 1,* pp. 36-44 (1987).

M.D. Tu and S.G. Chang, "Chemistry of a Flue Gas Combined NO_x and SO_2 Scrubber Employing Ferrous Cysteine Additives," *Environmental Progress,* Vol. 6, pp. 51-56 (1987).

S.G. Chang, "Technical Analyses of a Wet Process for Flue Gas Simultaneous Desulfurization and Denitrification," ACS Symposium Series No. 319, *Fossil Fuels Utilization: Environmental Concerns,* pp. 159-175 (1986).

D.T. Grimsrud, "Characterization of Sources and Emissions in Field Studies," *Atmospheric Environment,* Vol. 21, pp. 359-360 (1987).

R.G. Sextro, B.A. Moed, W.W. Nazaroff, K.L. Revzan and A.V. Nero, "Investigations of Soil as a Source of Indoor Radon," ACS Symposium Series 331, pp. 10-29 (1987).

W.W. Nazaroff, S.M. Doyle, A.V. Nero and R.G. Sextro, "Potable Water as a Source of Airborne ^{222}Rn in U.S. Dwellings: A Review and Assessment," *Health Physics,* Vol. 52, pp. 281-295 (1987).

R.J. Demyanovich and S. Lynn, "Vapor-Liquid Equilibria of Sulfur Dioxide in Polar Organic Solvents," *I&EC Research, 26,* pp. 548-555 (1987).

INVITED TALKS AND FOREIGN TRAVEL

March

- Art Rosenfeld, Ed Vine and Ron Ritschard attended the "Affordable Comfort Conference" sponsored by ACTION-Housing Inc. in Pittsburgh, Pennsylvania. Rosenfeld was the keynote speaker; his talk was titled "David and Goliath: How R&D has Saved 100 Power Plants and One Alaska." The title of Vine's talk was "Evaluation of Energy Conservation Programs: Identifying and Addressing the Issues." Ritschard participated as the leader of a workshop on "Overcoming Barriers to Energy Conservation in Public Housing."

- Tica Novakov and Henry Benner traveled to Vienna, Austria, for research discussions at the Technical University of Vienna. Novakov also participated in a planning meeting for the 3rd International Carbon Conference.

- Elton Cairns participated as a session vice-chairman for an electrochemical working group of a NATO Workshop at the Institute for Defense Analysis (IDA) in Alexandria, Virginia.

- Ron Ritschard was invited to present a seminar at Carnegie-Mellon University in Pittsburgh, Pennsylvania, on "Public Housing: Socio-economic and Technological Problems in Reducing Energy Usage."

- Max Sherman traveled to Wellington, New Zealand, for a meeting of the Air Infiltration Ventilation Center Steering Committee, including a workshop on a "Moisture Instrumentation Calculation Techniques Guide." He also traveled to Tokyo, Japan, for a study tour of air infiltration and ventilation.

- Art Rosenfeld was an invited seminar lecturer at Ball State University in Muncie, Indiana. His topic was "Energy Efficient Buildings."

April

- Mark Levine met with ASEAN (Association of South East Asian Nations) coordinators and research teams in Singapore; Bangkok, Thailand; Jakarta, Indonesia; Manila, the Philippines; and Kuala Lampur, Malaysia.

- Fred Winkelmann discussed collaboration on the Energy Kernel [simulation] System at the University of Paris-South in Orsay, France, and the University of Strathclyde in Glasgow, Scotland.

May

- Carl Lampert traveled to Japan for International Energy Agency meetings in Tokyo on R&D of materials for solar energy applications, and discussions of switching films technology at corporate laboratories in Yokohama, Yukosuka and Osaka.

- Jayant Sathaye traveled to Southeast Asia for a Workshop on Urban Energy Use in Beijing, China; and to gather data and information on energy use in Shanghai; Kuala Lampur, Malaysia; Bangkok, Thailand; Bombay and New Delhi, India; Manila, the Philippines; and Taipei, Taiwan.

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