PPPL
PRINCETON PLASMA PHYSICS LABORATORY
HOTLINE

Volume 11, No. 1 October 18, 1989

Diversification Efforts Gain Momentum

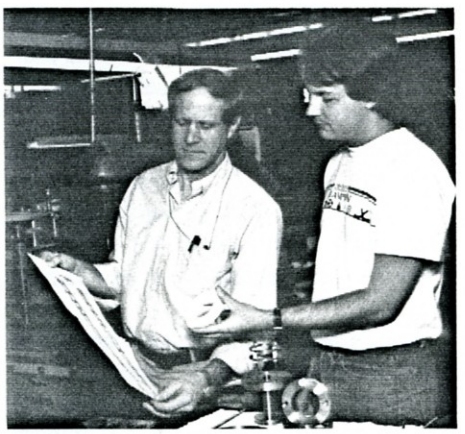
Two small, but significant, steps help PPPL strengthen its developing diversification program.

by Phyllis Rieger

A $30,000 research grant and a $20,000 purchase order are two small, but significant, steps PPPL has achieved, strengthening the linkage between the Lab and government agencies and industry in developing PPPL's diversification program.

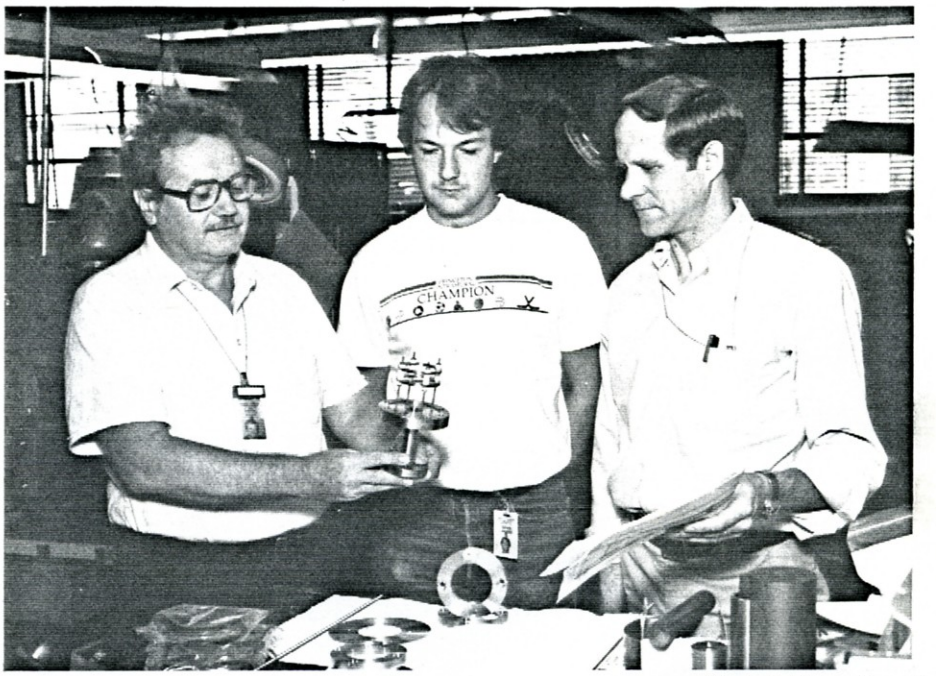
To broaden its program and funding base, the Lab has launched a number of proposed project initiatives. Essentially, this means the Lab is linking the interests and capabilities of the research and engineering staffs with the research and engineering programs of government agencies and industry.

According to Richard Rossi, who's coordinating the diversification efforts, PPPL received a $30,000 grant from the National Institute of Standards and Technology, a branch of the U.S. Department of Commerce, and a $20,000 purchase order from the Physics Department of Princeton University for engineering services. The Physics Department project is expected to lead to an order for fabrication of a vacuum vessel with a total funding of as much as $200,000.



(Photo by Dietmar Krause)

Physicist Fred Dylla (left) with Princeton University graduate student David Moore looks over some of the materials to be used in devising an electron diffusion pressure gauge for vacuum calibration.



(Photo by Dietmar Krause)

PPPL machinist Nick Dereka (left) consults with Princeton University graduate student David Moore (center) and physicist Fred Dylla about machining an electron diffusion pressure gauge.

Developing a Gauge

The $30,000 grant is to continue experimental work developing an electron diffusion pressure gauge for vacuum calibration.

According to physicist Fred Dylla, who's leading the research, with Princeton University graduate student David Moore, "There's no universal standard to use for high vacuum measurements so it's difficult to obtain calibrated vacuum measurements. Using a pure electron plasma, we're working on developing a new type of pressure gauge. This project has the possibility for developing a high vacuum pressure standard."

The research so intrigued David that it's now his thesis project. "Originally, it was only my theory project which we do in our second year, but the work was so fascinating I wanted to continue," he said.

Fred explained that he and David were studying a plasma configuration by Professor John Malmberg from the University of California at San Diego, and they noted information from his studies that proved useful to them.

According to Fred, recently the Project obtained a loan of $10,000 worth of aluminum vacuum hardware, specially treated

Continued on Page 2

for ultrahigh vacuum studies, from the SMC Corporation in California. This will aid them in their research.

Vacuum Design & Budget

The $20,000 purchase order is for the conceptual design and budget estimate of the fabrication of a vacuum vessel for a new scientific project to be sited at the Argonne National Laboratory in Illinois.

The order comes to PPPL's Mechanical Engineering Division via Dr. Frank Calaprice, Professor, in Princeton University's Physics Department. He and his colleague, Dr. Aksel Hallin, represent Princeton as one of five institutions collaborating on the proposed Atlas Positron Experiment, known as "APEX."

This large acceptance spectrometer would be used to study positrons and electrons produced in heavy ion collisions. Other participating institutions include: Florida State University, Michigan State University, Yale University and Argonne.

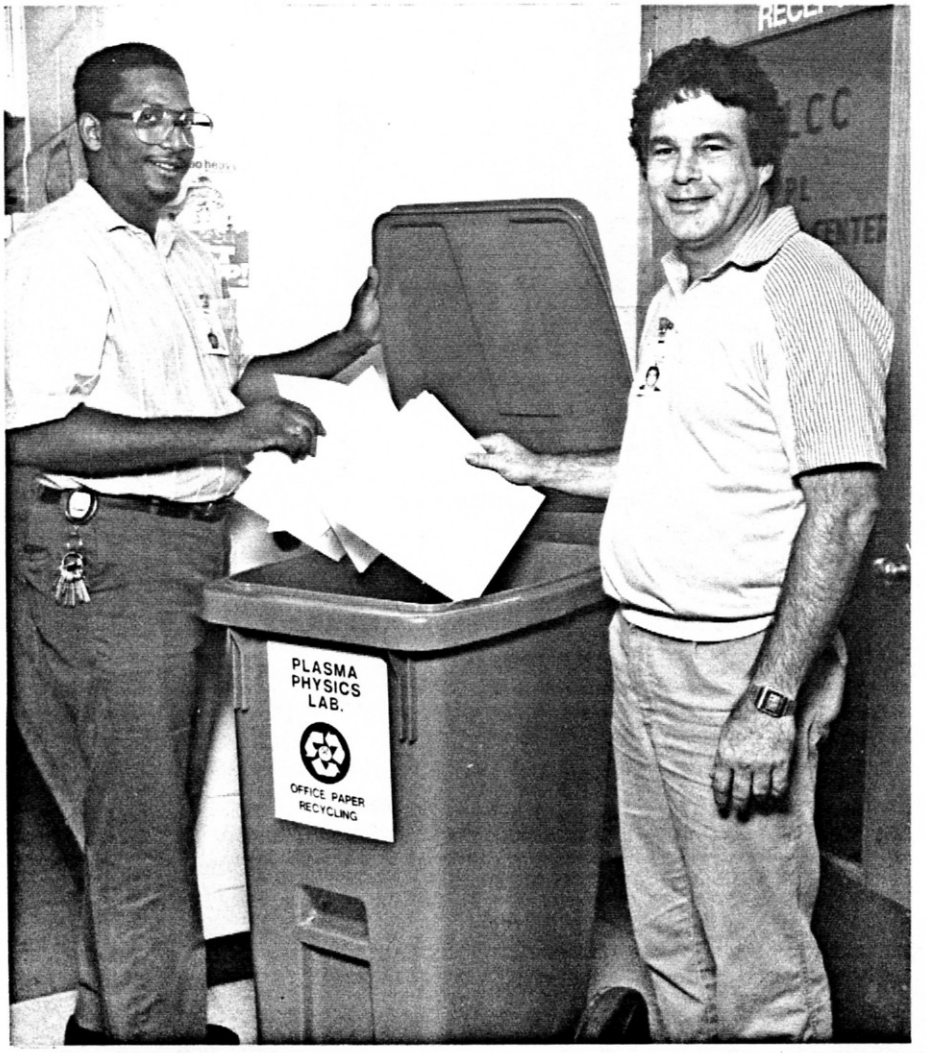
PPPL's Bob Walls is the engineer in charge of conducting the conceptual design and budget. According to Jack Joyce, Head of PPPL's Engineering Department, "This means PPPL will be in a strong position to get the vacuum vessel fabrication job. It's also a rejuvenation of efforts by the Engineering Department in the Lab's diversification endeavors."

PPPL's Technology Transfer Officer Joe File pointed out that the Lab has recently published a 19-page booklet which outlines PPPL's engineering capabilities. Joe undertook a detailed analysis of the Engineering Department outlining its specific areas of expertise for the various engineering divisions including electrical, mechanical, engineering analysis, engineering computing and drafting.

"The booklet is disseminated to representatives from other laboratories and government agencies who are interested in PPPL's capabilities," Joe explained. "So far, I've handed out over 100."

Dick Rossi said, "Diversification efforts are picking up steam. We'll continue to print news of contracts, grants, etc. in HOTLINE on a periodic basis so that the staff is aware of new programs and activities." ✿

Recycling—PPPLers Make It Work



(Photo by John Peoples)

Recycling Right—Jerry Williams (left) and Wayne Robinson (right) recycle their office paper in one of PPPL's special containers.

by Phyllis Rieger

So far, so good. That's the feeling of Jerry Williams who's supervising PPPL's recycling program.

"Recycling's been in effect since July 17th," said Jerry. "We're pleased most staff do recycle. I've had a lot of calls about what should be and shouldn't be recycled, and the kinds of containers needed. That shows me people are interested. It is the law, but we try to make it easy for employees to comply."

According to Jerry, many questions concern the recycling containers which, due to manufacturer delays, have been inadequate in some areas of the Lab. As soon as the new containers become available, they'll be used. You can also use your own receptacles and these can be ordered from Philadelphia Stationers.

"It's important to label all containers," Jerry emphasized. "If you need labels, please contact me at extension 3595 or pager #059." The labels list which recyclables can be deposited into a container.

Jerry's been asked about foam plates and cups (they go into "garbage only" containers), plastic (we don't recycle this now but may in the future), and aluminum foil (goes into "garbage only"). Office paper recyclables shouldn't be crumpled and staples should be removed.

"Overall, recycling is working well at PPPL," said Jerry. "Most people make the effort and my staff and I appreciate it." ✿

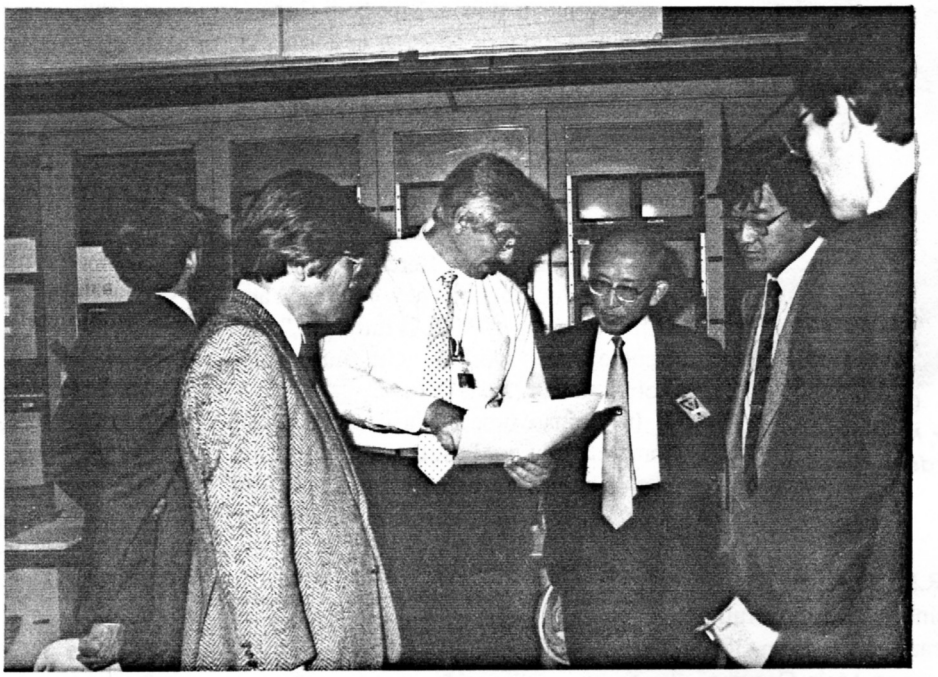
JAERI Delegation Visits PPPL

(Photo by John Peoples)

PPPL Director Harold Furth wlecomes Yoshinori Ihara, President of the Japanese Atomic Energy Research Institute (JAERI), to the Laboratory on September 29.

(Photo by John Peoples)

JAERI President Ihara finds the Daruma in the lobby, a gift of the JT-60 (Japanese tokamak) group to TFTR, very interesting. With the Japanese delegation are PPPL's Assistant Director Rush Holt and TFTR Head Dale Meade.



(Photo by John Peoples)

TFTR Head Dale Meade introduces JAERI President Ihara and delegation to the TFTR Control Room.

Bleach Named Division Head

by Phyllis Rieger

Tony Bleach is the new Head of the Accounting and Financial Controls Division, replacing Wanda Mizutowicz who left to work for the Supercollider Project in Texas.

"In this position I'll be overseeing three sections: Accounts Payable, Payroll, and General Accounting with a total of 19 employees," explained Tony. "My Division has the responsibility for collecting all pertinent backup, the recording, processing and reporting of all Laboratory financial transactions in a timely manner and in accordance with Generally Accepted Accounting Principles and other applicable regulations.

"We also have the responsibility for coordinating audits and reconciling PPPL accounts with University records. Additionally, petty cash and travel arrangements come under our purview. My administrative staff also finds itself highly involved in special projects for the Controller's Office," Tony pointed out.

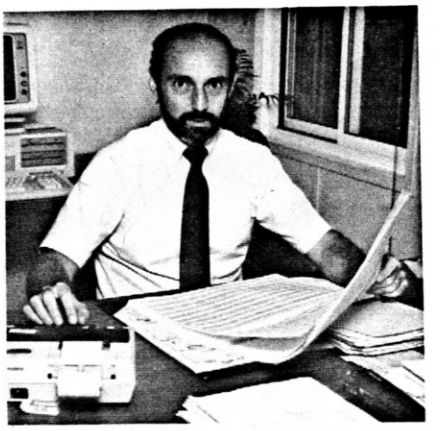
He began his career at PPPL in 1981 as a cost control analyst and had worked his way up to Manager of General Accounting before assuming his current position. Previously, he had worked in the accounting departments of Associated Lead Company in Philadelphia and Great Adventure.

He holds a B.S. Degree in Accounting from Suffolk University in Boston and an M.B.A. Degree from Monmouth College, N.J.

"I just passed the Certified Public Accountant exam and am applying for my New Jersey license," Tony said.

Originally from Lakewood, N.J., he now lives in East Windsor with his wife, Neile, who currently works in our Credit Union, and his son, Kristopher. "In my leisure time I enjoy running and spending time with my family," said Tony.

Other PPPL and/or University activities in which Tony is active include the Social Committee which is responsible for recommending to Council activities funded by the Morale Fund, the Supervisory Committee for the Credit Union, the PPPL Softball team, and the University Basketball League.



(Photo by John Peoples)

Tony Bleach, new Accounting and Financial Controls Division Head, oversees accounts payable, payroll, and general accounting.

Tony said, "I"m enjoying the challenge of my new job and I feel fortunate to have such an experienced and supportive staff."

Nurse Joins Medical Staff

(Photo by John Peoples)

Using her computer, Nurse Connie Riviera keeps her records updated.

by Phyllis Rieger

Connie Riviera, R.N., joins the PPPL Occupational Medicine Office as a full-time nurse. She transferred from the McCosh Health Center on Main Campus "where I worked as the night duty nurse at the infirmary since 1985, and handled a number of responsibilities," she explained.

She graduated from Elizabeth General Hospital School of Nursing in Elizabeth, N.J. "I've been a nurse for 22 years," said Connie who's experienced at all kinds of nursing, including private duty and geriatrics. Her duties at PPPL include: physical assessment, surveillance, examinations, and emergency assistance.

"PPPL presents a different side of nursing. I was looking for a new challenge and I think working at PPPL is fulfilling," said Connie who's working with nurse Faith Robak and Dr. John Caruso.

In her spare time, she's working toward completion of her B.S. Degree in Nursing from Thomas Edison State College. She lives in Neshanic Station, N.J., with her teenage sons, Jeffrey and Eric.

Staff Day is October 21

TRANSITIONS

The HOTLINE offers congratulations to the following employees:

Births

Eric Frederickson, TFTR Program Physics, and his wife, Laura, whose daughter, Rachel, was born August 22.

Anne Rosenwasser, TFTR Tokamak Operations, and her husband, Robert, whose daughter, Elizabeth Anne, was born September 29.

Retirements

John R. Clarke who retired October 1 after 14 years of service. John was a Section Head in the Electrical Engineering Division, Radio-Frequency Branch.

D. Eugene Colborn who retired October 1 after 12 years of service. Eugene was a Technical Assistant in the Engineering Department.

Thomas A. Goedert who retired October 1 after 10 years of service. Thomas was Supervisor, Process Spares in the Materiel Control Division.

Herbert F. Ogawa who retired October 1 after 13 years of service. Herbert was a Technical Assistant in Tokamak Operations.

S. Douglas Steacy who retired October 1 after 12 years of service. Douglas was a Computer Analyst in the Controller's Office. ✿

Friends and co-workers of Bob Smart gathered together recently to say goodby and to wish him well in his new position as Director of Grounds and Buildings at Princeton University, main campus. Bob, who was PPPL Associate Head, Administration Department, and General Manager of Facilities for 11 years, expects to visit the Laboratory often in his new position, so be sure to say hello when you see him. Pictured with Bob is his wife, Betty. (Photo courtesy of Edna Kalmus, Plant Maintenance.)

Thank You

I wish to thank my friends and coworkers here at PPPL for the many kind thoughts and expressions of sympathy on the death of my mother and during my recent illness.

Carolyn Springer

News from TIAA-CREF

Teachers Insurance and Annuity Association-College Retirement Equities Fund (TIAA-CREF) announced today it will offer educational institutions and policyholders new investment funds and other options within the first quarter of 1990.

The announcement followed issuance of an order by the Securities and Exchange Commission approving an agreement reached last December between CREF and the major intervenors in CREF's request for certain relief under the Investment Company Act of 1940.

The agreement defined conditions under which CREF would offer policyholders opportunities to transfer pension accumulations to alternative funds or to receive cash on termination of employment, if approved by their employing institutions.

At the same time, CREF provides these flexibilities, it plans to introduce two new investment funds of its own to complement its current Stock and Money Market Funds. Introduction of all the new options remains subject to appropriate state regulatory approvals.

Dr. Clifton R. Wharton, Jr., TIAA-CREF chairman and chief executive officer, said the SEC action signaled major advances in the company's 71-year history.

We now have the opportunity to offer institutions and policyholders new choices to consider for their retirement plans," Dr. Wharton said. "These choices will round out TIAA-CREF's full-service capabilities."

He said exact descriptions of the new CREF funds would be announced at a later date, but that both would give policyholders broader options to diversify their pension savings during the accumulation stage. Availability of the new CREF funds will be subject to employer approval.

Materials notifying employers of the details and the steps they must take to elect the options are being prepared and will be distributed at least 90 days prior to implementation. Employers will have the following elections to consider:

- Permit eligible employees to transfer current and future CREF accumulations to alternative investment vehicles approved by the employer.
- Permit eligible employees to receive up to 100% of their CREF accumulations in cash at termination of employment, if permitted by the employer.
- Permit former employees to transfer or cash out CREF funds accumulated while employed at the institution.
- Adopt either or both of the two new CREF investment options for employees.

While employers will be asked to make their elections on forms that will be supplied, John McCormack, TIAA-CREF executive vice president for pension and annuity services, emphasized they will not be foreclosed from changing their options at any time in the future.

Individual employees will be provided with a rider to their CREF certificates authorizing them to use the options elected by their employers. Full details describing the options will be provided at the same time.

McCormack also noted that the new options apply to CREF policyholders only. Additional flexibilities for TIAA policyholders are planned for introduction within two years. However, many individuals in TIAA also now participate in CREF. They also are eligible to direct future premiums to CREF accounts. ✿

Choosing the Right Fire Extinguisher

Several types of small fires can be contained and extinguished if the right fire extinguisher is used. Learn the four types of fires so that you'll know which extinguisher to use if you find yourself in a fire emergency.

Types of Fires

Type A: Wood, paper, cloth, rubbish
Type B: Flammable gas/liquids
Type C: Electrical fires
Type D: Combustible metals

Fire Extinguisher Codes

Fire extinguishers are coded by letter and label color to reflect the type of fire they can put out: Type A, green label; Type B, red label; Type C, blue label; and Type D, yellow label. Some multipurpose extinguishers can be used on more than one type of fire. ✿

Safety Sponsors Contest

Winning Slogans Posted at Entrance

"We're trying to get everyone involved in thinking about safety both at work and at home and to have a little fun too," said Head of Safety Training and Publications, Mary Ann McBride, as she described the Safety Slogan Contest being sponsored by the PPPL Safety Office. "Attending safety meetings and classes are already important parts of our Laboratory safety program, so we wanted to do something different, something that would be fun, wouldn't take up too much time, and that would tap into the creativeness here at PPPL," she continued.

The contest, which was first announced in the August **PPPL Safety Bulletin**, is open to all employees. Two slogans are chosen each month to be displayed on the safety sign at the entrance to the Laboratory — one for on-the-job safety and one for off-the job safety. Winners receive five, one-dollar coupons redeemable at the C-Site cafeteria. Slogans must be sent to Mary Ann McBride, Safety Office Trailer D41-15, D-Site by the end of each month. Non-winning entries are carried forward to the next month's contest.

Mitch Dorum, Marshall Lewis, and Robert Vant were the winners for September and October. Mitch, who won both in September and October, likes to write slogans and firmly believes safety should be everyone's concern. He said, "Safety slogans are a definite help in our safety program, but they're not the bottom-line answer, individuals are."

Next time you enter or leave the Laboratory take a look at the winning slogans. Then, put on your thinking cap and create your own slogan. Most importantly, remember to make safety a part of your life — because you're worth it.

Safety Training

The Safety Office has scheduled the following safety training courses for November:

Course	Date/Time/Location
Confined-Space Entry	9 November, 10:00-11:30 a.m. Safety Conference Room Safety Trailer D41-16
Basic Electrical Safety	14 November, 8:30-10:30 a.m. Safety Training Trailer D41-5
ASC Training	15 November, 9:00-10:00 a.m. Theory Conference Room or 29 November, 3:00-4:00 p.m. Theory Conference Room
*Basic Safety (Special Sessions)	13 November 7:00 a.m. 1:30 p.m. 4:00 p.m. Safety Conference Room Safety Trailer D41-16

Employees must obtain permission from their immediate supervisor to attend these classes. Supervisors should call Mary Ann McBride at ext. 3468 to enroll their employees.

*Basic Safety is also offered every Monday at 1:30 p.m. Call Mary Ann McBride at ext. 3468 for location.

Staff Day 89 Set for October 21

Princeton University Staff Day is Saturday, October 21. Refreshments and luncheon will be served at Jadwin Gym beginning at 10:45 a.m. The football game starts at 1:00 p.m. in Palmer Stadium. Free parking is available to all cars with University stickers in all lots except 4, 15, and 21.

Admission is by ticket only. PPPL bi-weekly employees at C-Site can pick up their tickets at the Reception Desk in the LOB Lobby. Staff at 305 and 307 College Road can pick up their tickets at the Reception Desk in 307.

PPPL
PRINCETON PLASMA PHYSICS LABORATORY
HOTLINE

Volume 11, No. 2 | United Way Special Edition | November 6, 1989

United Way Hits Mark when Helping Others

At the United Way Campaign kickoff meeting on October 24, Deputy Director for Administrative Operations, Jim Clark, standing in for Laboratory Director Harold Furth, told United Way Volunteers there are two basic reasons why the Laboratory, from top management down, contributes to the United Way. First, and most important, the United Way is the best vehicle for channeling contributions to the real needs of the community. Second, contributions to the United Way underscore and support PPPL's membership in the local community.

"The United Way is like no other in hitting the mark, in getting to the roots of human needs, in making a difference in the community. While Dr. Furth is away at the CIT Policy Review Board meeting in Texas — the first meeting of a body which will help to unite the fusion community behind the CIT at Princeton — we here at PPPL will be reaching out to another community, the local community, by showing our support for the United Way," he said.

"PPPL does not exist in a vacuum," Clark continued. "In fact, the Laboratory needs community support as much as the community needs us. The Laboratory's solid record of rising participation in United Way campaigns over the past few years, from 11% to 67%, helps to establish our credentials as a good neighbor, and this participation does not go unnoticed." Clark urged everyone to work a little harder this year to increase participation. "Everyone give a little or whatever you can," he said.

Getting the Campaign off to a fast start, Clark presented PPPL United Way Chairman Jack Joyce with pledge cards from the Director, the PPPL Council, and PPPL General Council. Handing the cards to Joyce he said, "Senior management of the Laboratory supports the Campaign 100%. Dr. Furth believes very strongly in the United Way and made his pledge before leaving for Texas. I hope that the participation percentage represented by these pledges will hold throughout the fund drive, as we as a Laboratory show our support for the United Way."

Joyce States Goals

Announcing the twin goals of a 75% participation rate and a $28,000 contribution, Jack Joyce, PPPL Campaign Chairman and a Board of Trustees member for the United Way, told the volunteers, "We have once again set ambitious goals for ourselves, but I know we can reach them. I was deeply moved by what was accomplished last year. With the advance pledges from senior management to get us off to a

Continued on Page 2

(Photo by John Peoples and Dietmar Krause)

Volunteers play a major role in PPPL's United Way Fund Drive. This year over 50 volunteers will be seeking their fellow employees' support for the United Way. Show you care, say "yes" when you're asked to give.

really good start and with the same kind of support that you gave last year we will meet our goals."

This year PPPL United Way dollars are worth 10% more. As University employees, funds we contribute will be considered part of the total University's employee contribution to the United Way, and as such will be included when calculating the University's Institutional Gift. This year the University's Institutional Gift is 10 cents for every employee dollar contributed, with a guarantee that it will never be lower than that of the previous year.

Your pledge is valuable in other ways too. It makes you eligible to win one of several gift certificates contributed by community restaurants in support of our campaign, and it supports your department in its quest to be a recipient of a "Challenge" victory party. For details see "Area Restaurants Add Spice to Fund Drive" and "Challenge Teams Square Off" in this issue of HOTLINE.

The PPPL United Way Committee is composed of representatives from five major areas within the Laboratory. They are: Jack Joyce (Chairman), Engineering; Halsey Allen, TFTR; Angelo Candelori, Administrative Operations and the Director's Office; Harry Howard, DDTO Technical Support, CIT, QA/QC, and Safety Office; and Don Monticello, Theory, Applied Physics and Experimental Projects. Mary Ann Brown, United Way Coordinator, will provide administrative support for the campaign.

Volunteers have already started to distribute pledge cards. Fill yours out now. If you have any questions or need additional pledge cards, contact Mary Ann at extension 3045.

Challenge Teams Square Off

United Way Real Winner

Last year to add incentive to reach the very aggressive participation levels and dollar goals set for the United Way Fund Drive, Jack Joyce and the Engineering Department issued a challenge to four other Lab groups to beat them in percentage participation, promising a party hosted by Engineering to any group that did. Only one group met the challenge, the Administrative Operations/Director's Office team. True to his word, Jack and his group hosted a party for the winners.

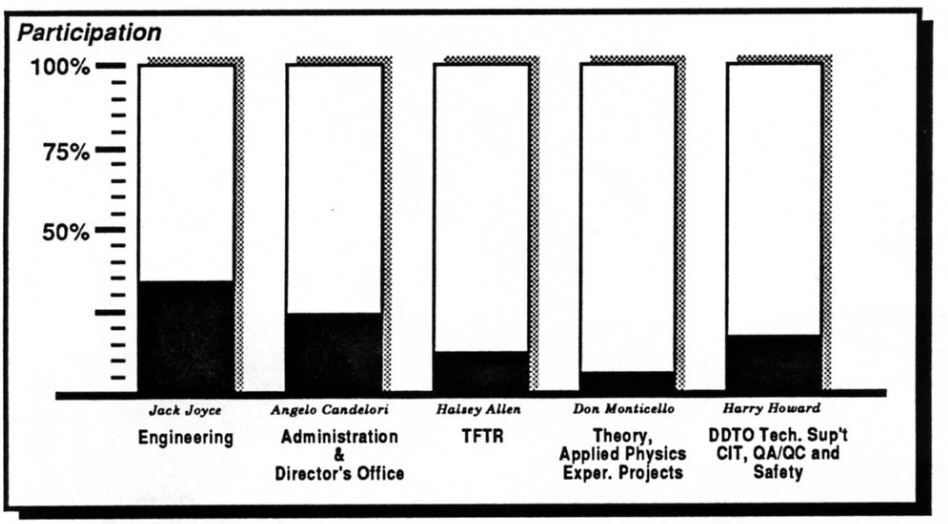
Adm Ops Challenges Engineering

Standing to survey the audience, Angelo Candelori, new leader of the victorious Administrative Operations/Director's Office team, said, "I wish to thank Jack Joyce and the Engineering Department for the terrific party they hosted for us last year. It was a real pleasure to be met personally by Jack in his tuxedo and to be attended to by members of the Engineering Department. In fact, we all enjoyed it so much we want Engineering to throw us another party this year. Therefore, Jack, I'm challenging Engineering to a rematch. The stakes are the same: If you lose, you throw us a party. If we lose, we'll throw you one. But, let me say, I have every confidence we are going to win again, and I look forward to another outstanding show of good sportsmanship from you and your crew."

"Engineering didn't expect the challenge last year to be an easy one, but we certainly didn't expect to lose. We welcome this opportunity for a rematch," said Jack Joyce, Engineering team leader. He added, "Do I detect a little overconfidence on the part of Adm Ops?"

UNITED WAY

MEET THE CHALLENGE !



(Art Work by Greg Czechowicz)

Challenge graphs will be posted in the LOB Lobby, the 307 reception area, and many bulletin boards throughout the Laboratory. Check your team's progress towards being the winner of a PPPL party.

TFTR Takes On Rest of Lab

"Someone has to finish last, but it's not going to be TFTR," declared Dale Meade, TFTR Project Head. Admitting to a "not very good showing last year" he challenged the Theory, Applied Physics, Experimental Projects and DDTO Technical Support, CIT, QA/QC, Safety Office teams to a competition of their own. "The stakes will be the same: losers host a party for the winner," he said.

Don Monticello, leader of the Theory, Applied Physics, Experimental Projects team, responded, "Last year at this time we were posturing, but this year we're going to come screaming out of the blocks. We're going to leave Dale and the TFTR crew so far behind, they'll be gasping for air when its all over." Harry Howard speaking for DDTO Technical Support,

Continued on Page 3

CIT, QA/QC, and Safety Office added, "We are amazed at the extraordinary display of brashness. We will of course be number 1!"

TFTR team leader Halsey Allen concluded, "We look forward to the response to the TFTR challenge. TFTR may be the long shot in this year's competition, but I think Monticello's and Howard's teams had better watch out. They have their work cut out for them if they expect to collect any victory spoils."

Mary Ann Brown, United Way Coordinator, will be tracking the teams' weekly progress. To see how your team is doing, check the Challenge Boards located in the LOB Lobby and near the 307 College Road reception desk or with your team leader.

The teams have squared off, the competition has begun: Administrative Operations and the Director's Office against Engineering. TFTR against the Theory, Applied Physics, Experimental Projects and DDTO Technical Support, CIT, QA/QC, Safety Office teams. Who will win? No contest. United Way.

United Way Agencies

American Red Cross-Princeton Area Chapter
Association for Advancement of Mental Health
Better Beginnings Child Development Center
Big Brothers/Big Sisters Association of Mercer County
Boy Scouts of America—George Washington Council
Camp Fire Girls and Boys Self-Reliance Programs
Catholic Charities: Family Growth Program (Child Abuse/Family Violence Program)
Child Care Connection, Inc.
Children's Home Society of New Jersey
Community Guidance Center of Mercer County
Crawford House
Deaf Contact
Delaware-Raritan Girl Scout Council
Family Counseling Service of Somerset County
Family Service Princeton Area
Florence Crittenton Home
Jewish Community Centers of the Delaware Valley
Jewish Family Service of the Delaware Valley
Mercer Unit—NJ Association for Retarded Citizens
Princeton Area Council of Community Services
Princeton Community Homemaker: Home Health Aide Service
Princeton Nursery School
Princeton Family YMCA
Princeton Senior Resource Center: Homefriends Program
Rape Crisis Program of the Trenton YWCA
Rock Brook School: Outreach Program
Rolling Hills Girl Scout Council
University-Now Day Nursery
Womanspace
YMCA of Hightstown/East Windsor
YWCA of Princeton

Area Restaurants Add Spice to Fund Drive

Good Time Charley's, the Tap Room at the Nassau Inn, the Sandalwood at the Ramada Hotel, and the Village Green Sea Grill at the Princeton Marriott have generously donated gift certificates to PPPL in support of our United Way Fund Drive this year. Any employee who pledges $25.00 or more is eligible to win one of the certificates, which will be given throughout the campaign.

Get Your Pledge In Early

Every Monday for five weeks, beginning October 30, two names will be drawn from a basket containing all the names of those who have donated $25.00 or more. How many chances you have to win depends on how quickly you return your pledge card. Once your name is in the basket, it remains there until the contest is over. Odds for winning decrease as more names are added, so it's to your advantage to make your pledge early. Winners will be notified by telephone and their names will be posted in the LOB Lobby and at 307 College Road near the "Challenge" scoreboards.

Three Times a Winner

Elmer Fredd and Charlene Onofri both won gift certificates last year. Elmer used his certificate to take two of the Electronic and Electrical Engineering Division secretaries to lunch, and Charlene and a friend enjoyed a quiet dinner together.

"I would have given to the United Way anyway," Elmer said, "but when I won the certificate I thought I would like to use it to say a special 'thank you' to the section secretaries for all their support and hard work." Charlene said, "We really enjoyed ourselves and the food was very good."

You're a winner three times over when you give to the United Way. Your donation of $25.00 or more helps the United Way help those in need, it makes you eligible to win one of the gift certificates from our community restaurants, and it helps your team in the Challenge Competitions.

—John Dong and Judy Giarrusso Win October 30 Drawing!—

PPPL United Way Volunteers—They Make it Work!

Area	Volunteer	Extension
Accounting and Financial Control Division	Tony Bleach	3621
	Flo Short	3503
Administration Department Office	Gloria Pollitt	2653
Applied Physics Division Office	Betty Carey	2646
Compact Ignition Tokamak	Bob Simmons	2766
Controller's Office	Ed Winkler	2218
Deputy Director for Technical Operations' Office	John Wheeler	2082
Director's Office	Letty Wohar	3048
Emergency Services Office	Skip Clayton	3166
Engineering Analysis Division	Judy Giarrusso	2168
Engineering Computer Division	Sally Connell	2689
	Steve Davis	3170
	Gary Oliaro	3125
Engineering Department Office	Mary Ann Brown	3045
Engineering Drafting Division	Pat Melsky	2196
Electronic and Electrical Engineering Division	Mel Gensamer	3042
Experimental Projects	Virginia Baunach	3161
Graduate Affairs Office	Barbara Sarfaty	2489
Information Resource Management Office	John Harralson	3532
Information and Administrative Services Office	Pat Stephens-Buggs	2750
QA/QC Operations	Dianne Intoccia	2201
Materiel Control	Chris Gillars	2853
Mechanical Engineering Division	Frank Anderson	3070
	Joe Hengeli	3031
	Steve Kemp	3069
	Jack Mount	3144
	Vincent Smith	3029
Medical Office	Faith Robak	2369
PBX-M	Phil Heitzenroeder	3043
	Ned Sauthoff	3207
Personnel Division	Ceil O'Brien	2036
Plant Maintenance and Engineering	Dominic Bisanzio	3559
	Ed Gilsenan	2887
	George Kalescky	2949
	Edna Kalmus	3384
	Mark Kijek	3417
Procurement	Eugenia Spears	2428
Project Engineering Office	Louise Schaufler	3006
Project Planning and Safety	Elaine Kozinsky	2600
TFTR Diagnostics	Janet Hergenhan	2675
	Ann McKee	2539
	Hal Nastelin	2818
	Nadirah Shakir	2897
	Verna Weyman	2051
TFTR D-T Systems	Dolores Bergmann	2200
TFTR Heating System	Pat Shangle	3748
	Gail Stevens	2044
TFTR Physics Program	Chris Ritter	3347
TFTR Project Office	Dolores Bergmann	2200
TFTR Tokamak Operations	Rosemary Fuchs	3334
	Barbara Nini	3300
Theory Division	Terry Greenberg	2629
	Phyllis Schwarz	3192
X-Ray Laser Studies	Sheryl Wasylenko	3277

PPPL
PRINCETON PLASMA PHYSICS LABORATORY
HOTLINE

Volume 11, No. 3 November 10, 1989

Transport Studies Underway on TFTR

by A.R. DeMeo

The current TFTR experimental run, which began on July 31, is going "exceptionally well" according to Project Head Dale Meade. "When we started in late July, we set a goal of 3,000 shots by the end of December, which would correspond to a typical year. I am extremely pleased that the TFTR has already achieved over 3,000 shots as of October 26. This is a tribute to the excellent work of the TFTR operations staff." TFTR's prolific performance has been a good test of the repairs completed this summer on two toroidal field coils in which small water leaks were discovered last January.

Since the beginning of August, TFTR has been maintaining an ambitious schedule, running 5 weeks instead of the usual 3 between scheduled maintenance weeks. According to Meade, "The TFTR program has been extended to study transport (the loss of particles and energy from the plasma) in order to better understand energy confinement in tokamaks. There is now a 50-50 balance between pushing towards scientific breakeven and plasma understanding. An improved comprehension of transport should lead to improved performance and hence breakeven."

Scientific breakeven will occur when the energy multiplication factor Q equals 1. Q is the ratio of fusion power output to total plasma heating power supplied by ohmic, neutral-beam injection or radio-frequency heating. To date, TFTR has produced world record values of the Lawson factor (1.4×10^{14} sec cm^{-3}) and the temperature (340 million °C) required for breakeven. If tritium were added to TFTR, the Q value for the TFTR's high temperature experiments is projected to be about one-half. This represents a 200-fold improvement over the PLT (Princeton Large Torus) generation of tokamaks and is only a factor of two away from breakeven.

To aid in transport studies, TFTR staff are improving existing diagnostics and developing a number of new measurement techniques. For example, fluctuations in plasma temperature and density will be studied to understand how they affect transport. A beam emission spectroscopy diagnostic is being developed for TFTR in collaboration with the University of Wisconsin. In addition, different techniques will be employed to agitate (perturb) the plasma and study its response.

"With the planned extension of TFTR's capabilities, we are confident that TFTR will continue to make major contributions to the physics data base...."

Pellet injection is being used on TFTR, both as a means of perturbing the plasma and fueling it. For the past few years, a Deuterium Pellet Injector (DPI), developed by the Oak Ridge National Laboratory (ORNL), has been used on TFTR producing peaked central plasma densities (1.4×10^{14} cm^{-3}) at a plasma temperature of approximately 10 million °C. Over the past year, PPPL collaborated with MIT (Massachusetts Institute of Technology) to

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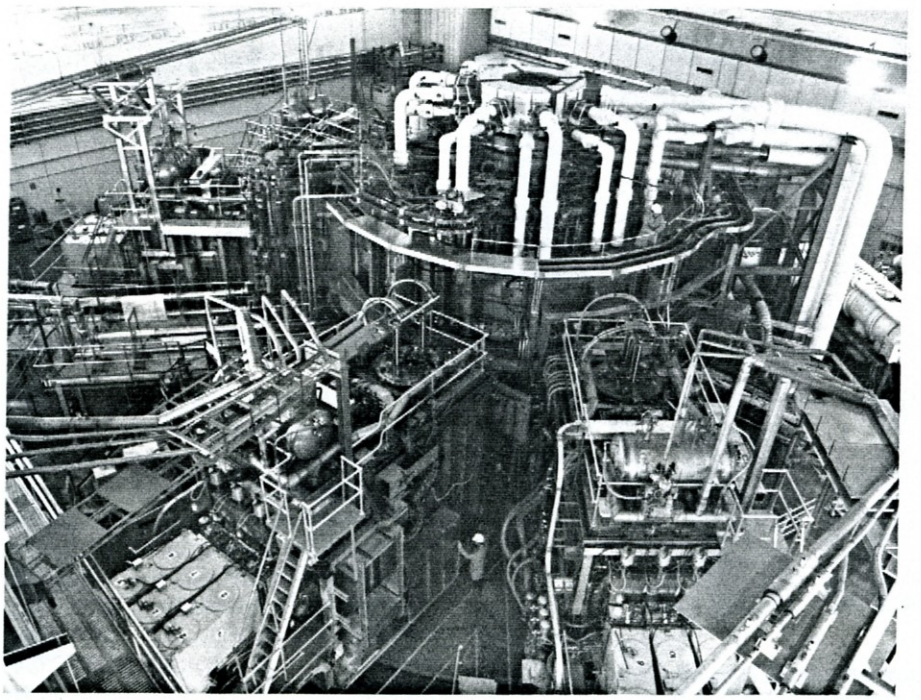


(Photo by John Peoples and Dietmar Krause)

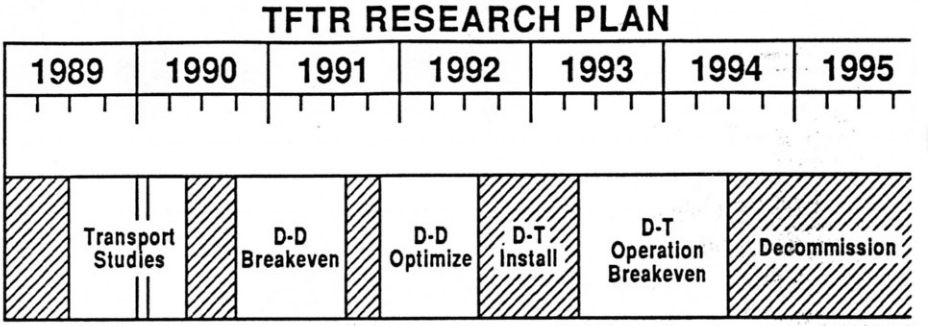
The TFTR is surrounded by a maze of pipes and cables that make up the auxilary heating and cooling systems and the sophisticated diagnostics that are used to measure plasma parameters.

design and construct a Lithium Pellet Injector (LPI), which has been installed on TFTR for use during the current run. For the same pellet size and speed, the lithium will penetrate the plasma more deeply than deuterium. Lithium ions eventually leave the center of the plasma and are replaced by deuterium ions, resulting in higher central deuterium densities.

Radio-frequency heating will become a major part of the TFTR program this year. Experiments have been conducted with 4.5 MW of ion cyclotron radio-frequency (ICRF) heating, delivered to the tokamak by the highest power density antenna in the world. The ICRF heating system was developed in collaboration with ORNL and will be used in conjunction with TFTR's DPI and LPI to fuel and heat high-density plasmas with peaked density profiles. The use of ICRF is expected to result in greater penetration of heating power into the higher-density central region of the plasma, compared to neutral-beam injection. TFTR's longer term plan (early 1992) is to increase the ICRH powers to the neighborhood of 14 MW.

Another important goal for TFTR during the coming year is the reduction of oxygen and carbon impurities in the plasma. These elements enter the plasma when it interacts with internal vacuum vessel components. Impurities soak up energy, radiate it away, rapidly cooling the plasma. During early December, TFTR's internal components will be coated with a thin layer of boron. Based on experience on the TEXTOR and ASDEX tokamaks in Europe, a coating of a relatively light weight element such as boron is expected to reduce substantially the influx of carbon and oxygen resulting in improved energy confinement and therefore higher Q values.

The availability of 25-30 MW of neutral-beam injection and 5-7 MW of ICRF heating, coupled with sophisticated pellet injection and enhanced impurity control, is setting the stage for the most interesting and exciting work yet conducted on TFTR. As Meade noted, "The extension of the TFTR project to 1994 and the emphasis on transport studies are giving us an opportunity to perform experiments aimed at enhancing tokamak performance. With the planned extension of TFTR's capabilities, we are confident that TFTR will continue to make major contributions to the physics data base necessary for the successful operation of the Compact Ignition Tokamak, the International Thermonuclear Experimental Reactor, and eventually a prototype fusion power reactor." The recent changes in leadership in Washington are not expected to change the present TFTR plan significantly.



(Art Work by Greg Czechowicz — 89A0079)

The TFTR Project has been extended to mid-1994.

Republican Staff Director Visits PPPL

(Photo by John Peoples)

David Clement (Left), Republican Staff Director of the U.S. House of Representatives Space, Science and Technology Committee, recently visited PPPL to learn firsthand about magnetic fusion energy. With Mr. Clement in the control room of TFTR are Rich Hawryluk (center), Head of TFTR's Tokamak Operations, and Tip Brolin (right), Deputy Director for Technical Operations.

Princeton Plasma Physics Laboratory

PPPL

Our best story ideas for HOTLINE come from you. So if you have an idea for an article, call Carol Phillips at ext. 2754.

The PPPL HOTLINE is issued by the Princeton University Plasma Physics Laboratory, a research facility supported by the United States Department of Energy. It is primarily an internal publication. Correspondence and requests to reprint material should be directed to Carol Phillips, Editor, PPPL HOTLINE, P.O. Box 451, Princeton, NJ 08543 or telephone 609-243-2754; Interoffice correspondence should be addressed to Room B366, James Forrestal Campus, C-Site.

PPPL
PRINCETON PLASMA PHYSICS LABORATORY
HOTLINE

Volume 11, No. 4 December 12, 1989

Update

Energy Conservation at PPPL

(Photo by John Peoples)

PPPL's Energy Management Team is comprised of (left to right) Bob Gulay, Dick Rossi, Rich Pfeifer, and Jim Clark. The success of our In-House Energy Management Program "is due to the cooperation and hard work of the entire Laboratory staff and to the commitment and support of all levels of Laboratory management," said Rossi.

According to the PPPL Energy Management Team and U.S. Department of Energy (DOE) Quarterly Energy Conservation Performance Report, the Laboratory continues to be a winner in its battle to conserve energy and reduce energy-related costs. Comparing FY89 energy usage costs with FY85 (the base year against which energy savings are measured), $503,800 was saved in electrical and $41,700 in fuel oil costs (Table I). Coupled with the $847,200 savings from the PSE&G Interruptible Service contract, $1,392,700 was saved in FY89.

Dick Rossi, Associate Director and Head of the Administrative Department, said, "It's very gratifying to achieve these savings for the Laboratory. They show that our In-House Energy Management Program is working. This success is due to the cooperation and hard work of the entire Laboratory staff and to the commitment and support of all levels of Laboratory management."

In fiscal year 1985, DOE initiated and PPPL began a new 10-year energy conservation program. Under this program, an energy reduction of 10% in Buildings, Experimental Operations, and Vehicle/Transportation must be achieved. According to Rich Pfeifer, Head of Plant Maintenance and Engineering, "We are faced with a major challenge. Even though we have 10 years to meet the mandated reductions, our success will require ingenuity, hard work, and the continued support of everyone. However, I believe PPPL will continue to meet DOE's energy reduction requirements, just as we have in the past."

"We're off to a good start," confirmed Bob Gulay who is in charge of energy management conservation for the Laboratory. He said, "Several major accomplishments were realized in FY89. When converted to British thermal units per square foot — a unit of heat energy — and averaged FY85 base year to FY89, PPPL achieved reductions of 10.7% in Buildings, 11.1% in Experimental Operations, and 43.4% in Vehicle/Transportation. These reductions mean that the Laboratory is well on its way towards meeting the across-the-board energy reduction goal of 10% by 1995. However," cautioned Gulay, "any statistically bad year could disrupt this Laboratory's successful energy conservation position."

Table II shows the Laboratory's reduction in energy and heating for buildings for the FY85-89 period. According to Pfeifer, "These reductions are mainly attributed to smart energy management, innovative energy conservation engineering tech-

Continued on Page 2

Table I. Energy Cost Savings in FY89.

Electric (FY89 vs FY85)	$503,800
Heating Fuel (FY89 vs FY85)	$ 41,700
PSE&G Interruptible Service Contract (FY89)	$847,200

(Note: These figures do not reflect a yearly savings of approximately $1,200,000 due to energy conservation projects already in place prior to FY89.)

Continued from Page 1

niques, the Laboratory employee energy awareness program, sophisticated computer-controlled energy management systems, and in-place operating energy retrofit projects."

Gulay said, "Experimental Operations has always been one of the most difficult areas in which to effect energy conservation. Comparing FY89 to the FY85 base year, TFTR, PBX-M, the Current Drive Experiment (CDX), and other PPPL experimental devices where able to maintain, in concert, successful research programs while holding their energy consumption down — only a two tenths of one percent energy increase was recorded. Most remarkably, in FY89, TFTR increased its total plasma shot attempts by a whopping 18.4% compared to FY85! Yes, Experimental Operations made a significant contribution to the Laboratory's conservation program. This is a good example of preserving Laboratory funds while maintaining the Laboratory's mission."

Continuing, Gulay pointed out, "The TFTR energy savings were achieved through the strong management efforts of Rich Hawryluk (Head of TFTR Tokamak Operations), Dave O'Neill, TFTR's Chief Operating Engineers, Tom Browning, and the TFTR Physics Management and support team. The savings were realized primarily because electrical demand was optimized by careful pre-planning of operations; because monthly electrical demand goals were set and met; because of stringent device time management; and because the maximum number of shots per hour of machine operation were obtained. Similar conservation efforts were practiced on the other experimental devices."

Summing up, Jim Clark, Deputy Director of Administrative Operations, said, "Employee support for our energy conservation projects has had significant impact on our ability to reach our energy conservation goals and maintain our Laboratory's mission. As our conservation program succeeds, our research and experimental programs reap the benefits. A hearty 'well done' to everyone, and keep up the good work!"

PPPL has been doing a good job conserving energy, but in today's environment of reduced budgets, it is important to complete the outstanding energy projects as soon as possible, in order to save even more energy and dollars, to provide more operating funds for salaries and experimental work.

Bob Rodgers
In-House Energy Manager
Program Coordinator
Princeton Area Office

Table II. Energy Reduction Goals and Results for Buildings (FY85-FY89).

Energy Usage	Buildings FY85	Buildings FY89	Energy Goal	Year-to-Date Change Average
Energy Consumption (10^3)(Btu/ft^2)	620	517	-10.0%	-10.7%
Heating (10^3)(Btu/ft^2/HDD)	20.8	19.3	-10.0%	-8.3%

(Note: Btu/ft^2 = British thermal unit per square foot.
HDD = heating degree days.
Fuel oil used FY85-87.
Natural gas and fuel oil used FY88-89. All energy converted to Btu for comparison.

Energy Awarness Observed in December

"Energy Builds a Better America," is the theme of this year's DOE energy awareness poster, which is on display around the Laboratory. The poster was especially designed to remind everyone of the importance of energy and the need to continue to use our energy resources wisely and efficiently. It emphasizes the essential relationship between energy and a better life for all of us.

On the poster, the flag — symbol of our Nation — flies above a stylized landscape with composite city skyline, recognizable monuments, and natural features representing various regions of the country. The theme, in bold type at the top of the poster, makes the simple but compelling statement that America's abundance, now and in the future, rests upon a foundation of secure and abundant energy.

"PPPL has been very successful in its conservation efforts," said Dick Rossi, Associate Director and Head of the Administrative Department. He explained, "We have had a highly successful energy conservation program for many years. We are presently about halfway through a ten-year plan that calls for a 10% reduction in three areas: buildings, experimental operations, and vehicle/transportation. So far, when averaged against the FY85 base year, we have realized reductions of 10.7% in buildings, 11.1% in experimental operations, and 43.4% in vehicle/transportation. These statistics translate into a 'good

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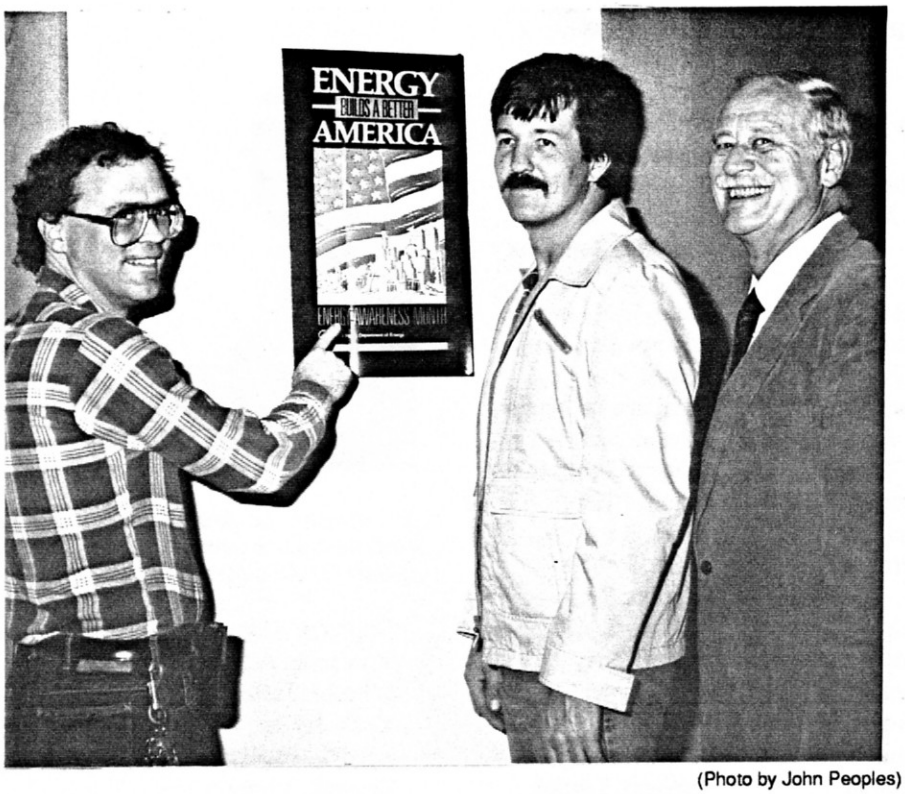

(Photo by John Peoples)

Rich McDonough (left), Mark Kijek (center), and Bob Rodgers are part of a team who help make energy conservation work at PPPL. Mark is supervisor of the Heating, Ventilating, and Air Conditioning section (HVAC) in Plant Maintenance and Engineering, and Rich is a HVAC technician. Bob is the In-House Energy Manager Program Coordinator for DOE's Princeton Area Office.

Continued from Page 2

start,' however, we're only about halfway to the finish line, and a bad year could change the Laboratory's clearly excellent energy conservation report card." Rossi added, "PPPL has an important role in the nation's long-term efforts to provide energy without creating environmental problems. In the near-term, as a major energy consumer, it is important that PPPL continue practicing good energy conservation."

The Laboratory will be observing December as Energy Awareness Month.

Red Cross Honors PPPL

Dr. John Caruso, PPPL's Medical Director, recently received a plaque from the American Red Cross recognizing PPPL's outstandingly successful blood drive this fall and a personal thank-you note from James Moffat, American Red Cross Recruitment Representative. "Many thanks for your leadership in an outstanding blood drive in September. Please extend this thank you to everyone at PPPL who made this life-saving event possible," Moffat said in his note.

"The response by the Laboratory personnel to this blood drive was an extremely warm and pleasant surprise. Blood donating truly is giving of one's self for benefit of others. A real personal satisfaction. Well done PPPL!," said Dr. Caruso.

PPPLers who donated blood are:

Allen, Halsey
Anderson, John
Anderson, Michael
Baker, Eugene
Bartsche, Lisa
Bartzak, Joseph
Bateman, Glenn
Bayes, Trevor
Bebb, Russ
Bergmann, Dolores
Bernett, Olga
Bernhardt, Valentine
Bodinizzo, Richard

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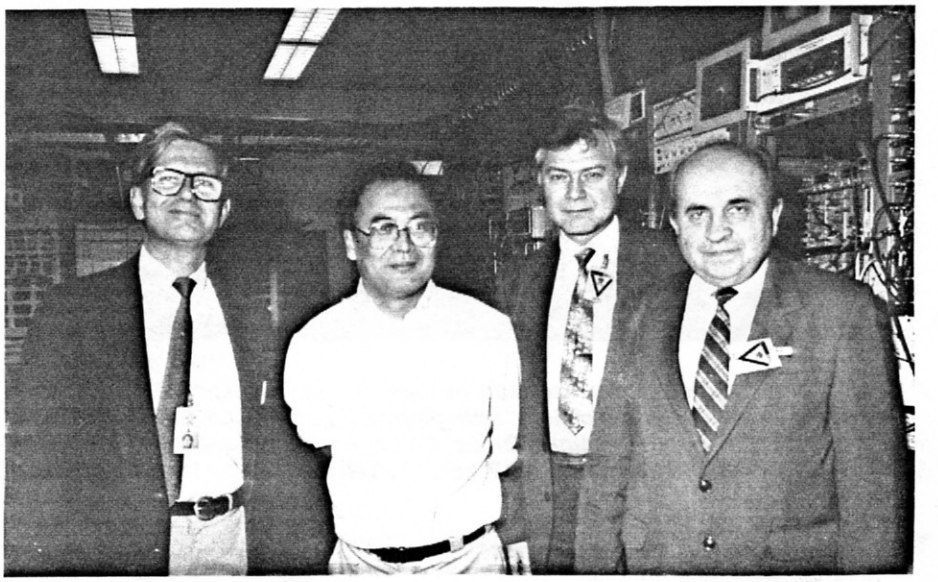


(Photo by John Peoples)

Academician B.B. Kadomtsev (right), Director of the Plasma Physics Department, I.V. Kurchatov Institute of Atomic Energy, Moscow, USSR, and Dr. V.A. Chuyanov (second from right), Head of the Technology Division of the Plasma Physics Department, visited PPPL in November. Drs. Kadomtsev and Chuyanov were returning from a meeting of the ITER (International Thermonuclear Experimental Reactor) International Scientific and Technical Advisory Committee (ISTAC), held at the University of California at Los Angeles. Dr. Kadomtsev is Chairman of the ISTAC, and Dr. Chuyanov directs the work on ITER in the USSR. At PPPL, Dr. Kadomtsev presented a colloquium titled "Phenomenology of Ball Lightning and Self-Organization in Tokamaks." With Drs. Kadomtsev and Chuyanov are Paul Rutherford (far left) and Michio Okabayashi.

Continued from Page 3

Bunting, Carl
Candelori, Michael
Cargill, Richard
Chu, James
Cole, John
Colestock, Partick
Connell, Sally
Czeizinger, Thomas
Daugert, Richard
Davenport, Joseph
Delgavio, Sherry
Denne, Boel
Devine, Thomas
Drozd, Gary
Dudek, Lawrence
Fleming, Robert
Frankenfield, Richard
Fuchs, Rosemarie
Gettelfinger, Geoffrey
Gillars, Chris
Gould, Roger
Graber, Dennis
Guyet, Allan
Henkel, James
Holcombe, Spencer
Holt, Rush
Hurst, Paul
Ilcisin, Kevin
Juhasz, Alex
Kilpatrick, Stephen
Krushelnick, Karl
Lanzi, James
Larson, Scott
Lawson, Matt
LeBlanc, Benoit
Mastrocola, Vince
McBride, Mary Ann
McCormack, Brian
McGeachen, Thomas
Mitman, Eugene
Mole, Michaela
Morales, Hector
Mount, John
Oldaker, Mark
Olivieri, Daniel
O'Malley, Richard
O'Neill, David
Palladino, Anne
Palladino, Richard
Pecht, Frank
Peoples, John
Perry, Erik
Phillips, Carol
Potensky, Carl
Quadland, Kenneth
Ramsey, Alan
Reardon, Beth Ann
Reynolds, William
Ritter, Christine
Roberts, Donald
Rosser, Roy
Schechtman, Nathan
Schoen, Stanford
Schoeneck, Joseph
Schultze-Berge, Sibylle
Silber, Kenneth
Smart, Robert
Stratton, Brent
Strykowsky, Ronald
Sutton, Larry
Synakowski, Edmund
Tompkins, Gregg
Towner, Harry
Troyano, Stanley

(Photo by John Peoples)

Dr. Caruso is proud of the special American Red Cross plaque PPPL received for its successful blood drive.

Upperco, Alan
VonHalle, Alfred
Whitley, Justine
Yeck, James
Zeedyk, Patricia
Zelenak, Virginia

(Photo by Dietmar Krause)

We did it! Working as a team, the staff of the Plant Maintenance & Engineering (PM&E) Division earned an "excellent" rating from a Department of Energy appraisal team from the Chicago Operations Office. Celebrating the good news are PM&E Supervisors: (l to r) Dick Terhune, Pich Pfeifer, Carl Potensky, and Wayne Robinson.

TRANSITIONS

The HOTLINE offers congratulations to the following employees:

Promotion and Reassignment

John DeLooper has been promoted to Head, Quality Assurance and Reliability, reporting directly to Deputy Director for Technical Operations, Tip Brolin. He replaces **Harry Howard** who is on special assignment to both Brolin and Richard Rossi, Associate Director and Head of the Administrative Department.

Births

Doug LeBon, TFTR Neutral Beams, and his wife, Carla, whose daughter, Hannah Rebecca, was born October 23.

Elaine Lu, Engineering Analysis Division, and her husband, Jason, whose son, Alfred, was born October 19.

Andrew McInerney, Computer Division, and his wife, Theresa, whose son, Robert, was born November 20.

Paul Snook, CIT, and his wife, Laura, whose son, Connor, was born November 22.

The Inimitable Don Grove

by Phyllis Rieger

When does six months on a special assignment turn into a 36-year career? When you're Donald J. Grove.

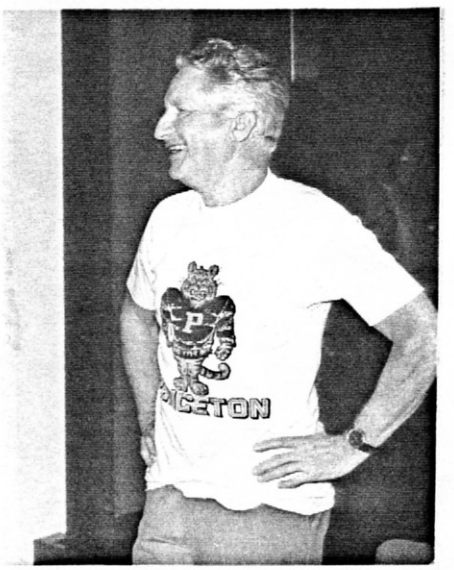
Don retired from his position as Head of Research and Development for CIT in November. But those who know him suspect that he will never really retire. Don noted, "I hope to continue an association with the Lab."

He explained how he first came to PPPL. "It all started in 1954 when I came on loan to PPPL from the Westinghouse Electric Corporation. My family and I were living in Pittsburgh; in fact, my wife, Dane, and I had just bought a new house.

"I was asked to come here by Dr. Lyman Spitzer, PPPL's first director, who was eager to bring industrial scientists into the fusion field. At one point I was convinced I wasn't the right person for the job because I felt a person with extensive engineering skills would be better suited to the project. I never dreamed Princeton would become home."

Physics—Early Interest

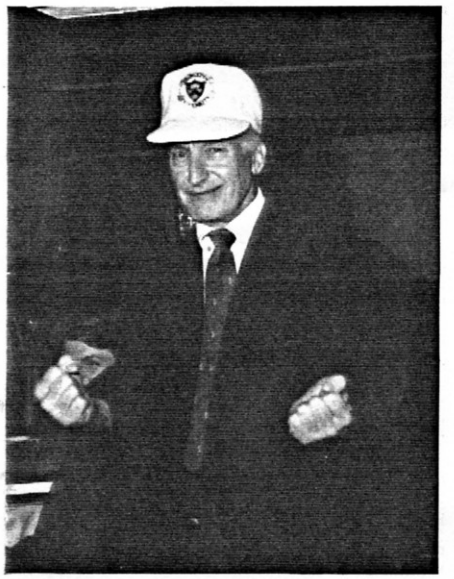
Don explained his interest in physics and engineering started when he was a high school sophomore. "I always liked to take things apart and see how they worked, like clocks and locks," said Don. He studied mathematics and physics at the College of Wooster in Ohio, then went to the Massachusetts Institute of Technology (MIT).



In 1982, after nearly thirty years at PPPL, Don became an "offical" Princeton University employee when he joined the Lab as a Principal Research Physicist.

"MIT had a special program directed toward students from small colleges interested in physics. I was one of four small college representatives from all of the United States chosen to participate, but World War II was on and it was difficult to continue," he pointed out.

In the summer of 1942 he worked on classified projects at Westinghouse, eventually going to school half-time and working full-time. While working on his Ph.D. thesis full-time, he worked at Westinghouse half-time. "My wife mowed the grass, shoveled the snow, etc.," said Don. "Without her, I couldn't have done it." He obtained his Ph.D. degree in Physics from Carnegie Mellon University in 1953. His thesis focused on the synchrocyclotron, a particle accelerator that involved many interesting aspects of vacuum, electricity and magnetism.



Don has always had the "can do" spirit.

He picked Westinghouse as an employer because a friend of his father mentioned to Westinghouse personnel that Don had an interest and background in some work the company was doing. He work for the Plasma Physics Laboratory as a Westinghouse contract employee until 1982 when he officially became a University employee.

The banner says it all — Good Luck Don!

Held Several Positions

Throughout his career at PPPL Don has held a number of positions. From 1960 to 1970, he was the physicist-in-charge of C-Stellarator operations. He managed the entire facility and generated more than 50 papers on plasma physics and controlled thermonuclear research. From 1970-1972, he managed a crash conversion of the C-Stellarator to the Symmetric Tokamak and oversaw operations for the project.

Next he became Project Manager for the Princeton Large Torus, responsible for its design, fabrication, installation, and physics operations. He joined the TFTR project in May, 1976, as Deputy Project Manager and became Manager in November, 1982 after retiring from Westinghouse and joining PPPL as a Principal Research Physicist.

"Each device was a super event of the time but I had the most fun converting the C-Stellarator to a tokamak."

In October, 1986, he became Deputy Director for Technical Operations, and, anticipating retirement, stepped down in January, 1988, to work on special assignments involving the University, the U.S. Department of Energy, and community officials.

Continued on Page 6

Don Grove , representing PPPL, "accepts" the Tokamak Fusion Test Reactor from Jim French, representing Ebasco Services Inc.

According to Don, "Each device was a super event of the time but I had the most fun converting the C-Stellarator to a tokamak. It was an exciting time for the fusion community. We were getting the first real support for tokamak physics in this country."

He continued, "In those days, you could do things more quickly. Four of us—John Boychuk, Jack Joyce, Wolfgang Stodiek, and I—flew it by ear for the stellarator conversion. We'd make little sketches and often solved very difficult problems with on-the-spot ingenuity."

In 1958 the United States, the Soviet Union, and Great Britain all declassified their fusion research programs, in time for the Second Atoms for Peace Conference, held in Geneva. Don feels this was the start of a new beginning for fusion researchers. "Essentially,we discovered that all countries, including the Soviet Union, were working along the same lines," said Don.

"I always liked to take things apart and see how they worked, like clocks and locks."

Another event that will always be a part of PPPL's and Don Grove's history is the look of undisguised joy on his face as TFTR achieved first plasma. "That was quite an unforgettable time," he said.

He has a number of "souvenirs" to remind him of his illustrious career. One of them is a part of the vacuum vessel for the B-3 Stellarator which is only 2" in diameter, quite a contrast to today's machines.

Active Person

What will he do with his spare time now? "Well, I'll continue with some of my 'outside' activities," explained Don, who plays bridge, bowls on the University Bowling League, and plays in the Golf

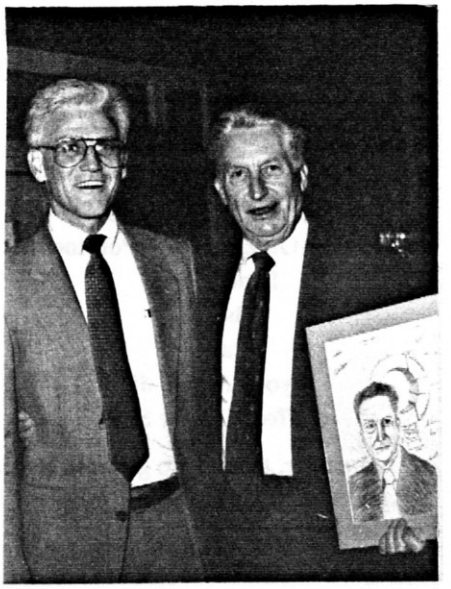
Continued on Page 7

Time stood still waiting for TFTR to achieve first plasma. The clock was stopped at 1:54 a.m. on December 24, 1982, and it wasn't until 3:05 a.m. that the historic event took place. Undisguised joy registered on Don's face when first plasma was achieved.

League. He said, "My mechanical skills will be put to good use keeping my 1967 Ferrari in tip-top running condition."

He'll also have more time for his three children and seven grandchildren. His youngest son, Bob, followed in his dad's footsteps, getting his Ph.D. degree in Physics. His oldest son, Jim, is a chemical engineer. He often sees his daughter, Ellen, who lives in Princeton as Don does.

"PPPL though is an important part of my life," said Don. We know that and we know that Don Grove plays a major role in the history of PPPL and fusion. His contributions will not be forgotten.



At the retirement dinner, Milt Johnson (left), Manager of the USDOE Princeton Area Office, give Don a pencil sketch he made of Don in front of a TFTR toroidal-field coil.

Dale Meade (right) presents Don with the TFTR "Flashing Hat Award." According to Dale, "only the most outstanding contributors to TFTR are given this award." Interestingly, the hat was first given to Don by his daughter, Ellen, and Don gave it to TFTR. When given the hat, Don asked, "Can I keep it." Dale replied, "only if you really retire, otherwise you have to give it back."

Tips for a Safe Holiday

Even though you are in a rush shopping, **stay alert** to your surroundings and the people around you.

Shop with a friend whenever possible.

Avoid carrying large amounts of cash.

Pay for purchases with a check or credit card.

Be extra careful with purses and wallets. Carry your purse tightly under your arm and don't leave it unattended, even for a minute.

Don't display gifts where they may be seen through a window or doorway.

Be extra cautious about locking doors and windows when you go out, even for a few minutes.

If you go away, **have a neighbor watch your home** and pick up newspapers and mail. Get an automatic timer for your lights.

PPPL Holiday Schedule

The Laboratory Council has approved a Laboratory closing during the December holiday season. The dates of the closing are Monday, December 25, 1989 through Monday, January 1, 1990:

Monday	December 25	University Holiday
Tuesday	December 26	University Holiday
Wednesday	December 27	Laboratory Closing
Thursday	December 28	Laboratory Closing
Friday	December 29	Laboratory Closing
Monday	January 1	University Holiday

All staff members have the option to charge three days, December 27, 28, 29, as vacation or to use their Optional Holidays. Because New Year's Day falls on Monday in 1990, one of the usual designated holidays around New Year's has been changed to an optional holiday; therefore, there are three optional holidays instead of two for 1988-1989.

Exempt staff members will receive their December paycheck on Wednesday, December 20th; bi-weekly paychecks will be distributed on Friday, December 22nd; Hourly staff can pick up paychecks in the Payroll Office, Mod II, Friday, December 29th between 9:00 a.m. and 1:00 p.m.

If you have any questions, please contact Steve Iverson on ext. 2007.

Cafeteria Menu Week of December 11

Item	Monday	Tuesday	Wednesday	Thursday	Friday
Soup #1 ($.80)	Chicken Noodle Low sodium	Cream of Mushroom	Beef Barley	French Onion	New England Clam Chowder
Soup #2 ($.80)	New England Clam Chowder	Chicken Noodle Low sodium	Cream of Mushroom	CHRISTMAS SPECIAL:	Lentil Tomato
Entree #1	Rare Roast Beef w/Vegetable $2.95	Spanish Meatloaf w/Vegetable $2.70	Linguini w/Clam Sauce & Garlic Bread $2.70	Boneless Breast of Capon w/Apple Stuffing, Green Beans Almondine,	Catch of the Day w/Vegetable $2.85
Entree #2	Knockwurst w/Hot German Potato Salad $2.65	Chicken Supreme w/Vegetable $2.75	Breaded Pork Chop w/Vegetable $2.75	Honey-Glazed Sweet Potatoes, Dinner Roll, Sherbet,	Beef Stroganoff w/Noodles $2.85
Dieter's Special	Broiled Flounder w/Veg. & Roll 273 Cal. $2.95	Oven Roasted Chicken w/Veg. & Roll 287 Cal. $2.75	Cold Seafood Salad Platter 295 Cal. $2.25	Coffee, Tea, or Soda (12 oz.) $3.99	Broiled Fish w/Veg. & Roll 273 Cal. $2.85
Hot Sandwich	Bacon-Swiss Burger w/French Fries $2.45	Grilled Cheese w/Tomato $1.45	Grilled Pork Roll w/Cheese $1.39	NO GRILL	The Hoboken $2.25
Cold Sandwich	Ham, Salami, Swiss on Rye $1.90	Bacon, Lettuce & Tomato $1.95	Pita Stuffed w/Tuna $1.98	COLD SANDWICHES WILL BE AVAILABLE	Ham & Swiss Sub $1.98
Salad by the Ounce (18¢ per ounce)	Potato Salad	Zucchini w/Tomatoes	Pasta Salad	Antipasto Salad	Fresh Garden Salad
Breakfast Specials	2 Eggs, 2 Bacon, Toast, Small Coffee $1.90	3 Pancakes, 2 Bacon, Small Coffee $1.93	Cheese Omelet, Toast, Small Coffee $1.80	2 Eggs, Sausage, Cheese on Kaiser, Small Coffee $1.93	2 French Toast, 2 Sausage, Small Coffee $1.80

NOTE: Effective Jan. 2, Hot Oatmeal will be served daily at breakfast.

Holiday Feast Highlights Cafeteria Menu

On Thursday, December 14, the Cafeteria will be featuring it's special holiday menu. For only $3.99 you feast on:

Boneless Breast of Capon
Apple Stuffing
Green Beans Almondine
Honey-Glazed Sweet Potatoes
Dinner Roll
Sherbet
and
(your choice of)
Coffee, Tea, or Soda

Remember, there is no grill service on special menu days. Cold sandwiches will be available.

Emergency Closing Information

On those occasions when the Laboratory will be closed for the day or the normal starting time will be delayed (late opening), special announcements will be made over the following radio stations:

Princeton	WHWH	1350 kHz
Trenton	WTTM	920 kHz
Trenton	WPST (fm)	97.5 MHz
Levittown	WBCB	1490 kHz
New Brunswick	WCTC	1450 kHz

PLEASE REMEMBER: When Princeton University is mentioned, the announcement also includes the Plasma Physics Laboratory.

The University begins monitoring weather conditions as early as 4:00 a.m. and arrives at the decision to open, close, or have a delayed opening as early as practical. PPPL does not independently arrive at its own decision to open or close.

The Laboratory has installed two answering machines to provide an emergency telephone number to call to determine whether the Laboratory will have a delayed opening or other actions as may be required. Please call this emergency number only if you are unable to receive radio broadcast announcements. The answering machines' telephone numbers are 609-234-2034 and 609-243-2035.

In the event that PPPL remains open, employees who find it impossible to report to work because of hazardous conditions should notify their supervisors as soon as possible that they are unable to report to work.

PPPL

Princeton Plasma Physics Laboratory

Our best story ideas for HOTLINE come from you. So if you have an idea for an article, call Carol Phillips at ext. 2754.

The PPPL HOTLINE is issued by the Princeton University Plasma Physics Laboratory, a research facility supported by the United States Department of Energy. It is primarily an internal publication. Correspondence and requests to reprint material should be directed to Carol Phillips, Editor, PPPL HOTLINE, P.O. Box 451, Princeton, NJ 08543 or telephone 609-243-2754; Interoffice correspondence should be addressed to Room B366, James Forrestal Campus, C-Site.

Produced by Carol Phillips.

Happy Holidays!

PPPL
PRINCETON PLASMA PHYSICS LABORATORY
HOTLINE

Volume 11, No. 5 December 21, 1989

Events of a Decade Recorded

HOTLINE Celebrates Tenth Anniversary

1979
First issue of *PPL Hotline*
ACT-1 (Advanced Concepts Torus-1) produces first plasma

1980
PLT achieves 82,000,000 °C — beats 1978 world record
T.H. Stix receives James Clerk Maxwell Prize in Plasma Physics
President Jimmy Carter signs the Magnetic Fusion Energy Engineering Act
H.P. Furth named to succeed M.B. Gottlieb as PPPL Director
Melvin B. Gottlieb retires as PPPL Director

1981
Former President Jimmy Carter visits PPPL
First TFTR Motor Generator tests successful

1982
New Jersey Governor Thomas Kean visits PPPL
TFTR first plasma

1983
TFTR Dedication
S-1 Spheromak produces first plasma
P.H. Rutherford receives E.O. Lawrence Memorial Award

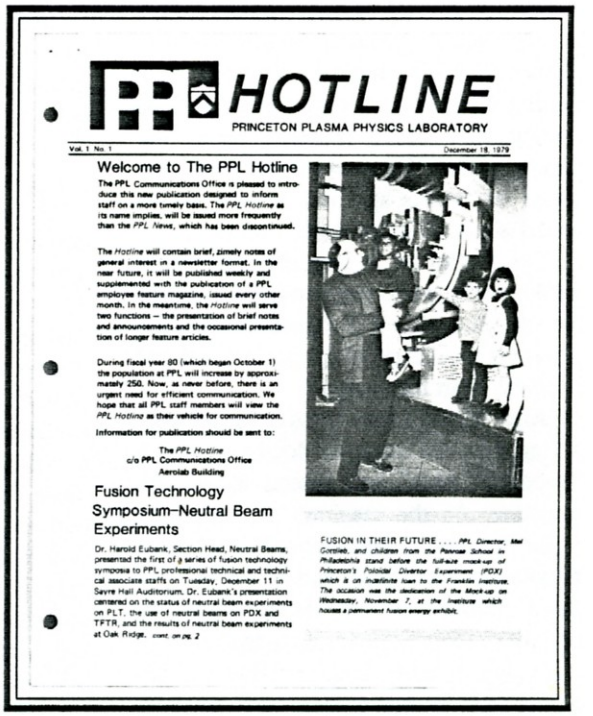
1984
PBX produces first plasma
PLT sets radio-frequency heating record
PPPL achieves 1,000,000 manhours without a lost time accident

1985
PPPL suffers first reduction-in-force
PPPL receives National Safety Council's Safety Award of Merit

1986
Opinion Research Corporation conducts PPPL Employee Attitude Survey
TFTR produces record plasma temperatures of 200,000,000 °C
Laboratory consolidation efforts begin
PLT shuts down

1987
Laboratory consolidation efforts completed
Picosecond Laser System produces "first plasma"
S-1 Spheromak shuts down

1988
PPPL achieves 1,000,000 manhours without a lost time accident


HOTLINE
PRINCETON PLASMA PHYSICS LABORATORY
Vol. 1 No. 1 December 18, 1979
Welcome to The PPL Hotline
The PPL Communications Office is pleased to introduce this new publication designed to inform staff on a more timely basis. The *PPL Hotline* as its name implies, will be issued more frequently than the *PPL News*, which has been discontinued.
The *Hotline* will contain brief, timely notes of general interest in a newsletter format. In the near future, it will be published weekly and supplemented with the publication of a PPL employee feature magazine, issued every other month. In the meantime, the *Hotline* will serve two functions -- the presentation of brief notes and announcements and the occasional presentation of longer feature articles.
During fiscal year 80 (which began October 1) the population at PPL will increase by approximately 250. Now, as never before, there is an urgent need for efficient communication. We hope that all PPL staff members will view the *PPL Hotline* as their vehicle for communication.
Information for publication should be sent to:
The *PPL Hotline*
c/o PPL Communications Office
Aerolab Building
Fusion Technology Symposium–Neutral Beam Experiments
Dr. Harold Eubank, Section Head, Neutral Beams, presented the first of a series of fusion technology symposia to PPL professional technical and technical associate staffs on Tuesday, December 11 in Sayre Hall Auditorium. Dr. Eubank's presentation centered on the status of neutral beam experiments on PLT, the use of neutral beams on PDX and TFTR, and the results of neutral beam experiments at Oak Ridge. cont. on pg. 2
FUSION IN THEIR FUTURE . . . . PPL Director, Mel Gottlieb, and children from the Penrose School in Philadelphia stand before the full-size mock-up of Princeton's Poloidal Divertor Experiment (PDX) which is on indefinite loan to the Franklin Institute. The occasion was the declaration of the Mock-up on Wednesday, November 7, at the Institute which houses a permanent fusion energy exhibit.

"Welcome to the PPL Hotline. The PPL Communications Office is please to introduce this new publication designed to inform staff on a more timely basis." Thus, on December 18, 1979, the PPL Hotline was introduced to the employees of PPPL.

Have a Safe Holiday Season

Countertop Device Measures Cholesterol

The PPPL Medical Office has recently acquired a new tool for use in PPPL's developing Wellness/Fitness Program. Called a Reflotron, the breadbox-sized countertop device measures blood cholesterol level from a few drops of blood. "It's a very useful screening device, said Dr. Caruso, PPPL's Medical Director. "Now getting a cholesterol count is as easy as having your blood pressure taken and almost as fast. We received our Reflotron about six weeks ago and already we've tested about 60 individuals," he said.

The Reflotron is accurate (to within ±5%), very easy to use, provides immediate results, and is less expensive than the previous procedure of drawing blood and sending it out for analysis.

After taking a few drops of blood from a fingertip, the nurse or doctor smears a "chemical stick" and inserts it into the machine. As the machine measures the color changes, it continuously blinks red numbers on its digital counter. After about three minutes, the process is completed, and the cholesterol level is recorded. "If an individual receives a high reading, we will advise him or her to see their personal physician for further tests, evaluation, and possible treatment," Caruso said.

"We do not take the place of the employee's private physician," he stressed. "We're here to help people evaluate their personal health risk factors, such as cholesterol level, blood pressure level, and weight control. By using various simple screening devices we can let a person know if they have any high risk factors and, if necessary, encourage them to follow up with their own doctor," he said.

If you would like to have your cholesterol level check, call the dispensary at extension 3200 for an appointment. While you're there, why not have your blood pressure checked too?

Bill Zimmer: Machinist, Mummer, Military Man

by Phyllis Rieger

If you ask Bill Zimmer what he does in his spare time, be prepared for a lengthy list. The robust machinist is a teacher, national guardsman, fireman, soccer coach, Shriner, and mummer. He's also the father of six, four boys and two girls, who range in age from 22 years to 19 months. "But two are in the Navy now. One stationed at Groton and the other in South Carolina," said Bill proudly.

For 18 years, Bill has played an active role at the New Jersey Military Academy where currently he is an NCO (non commissioned officer) in charge of the Basic NCO course and the Instructor Trainers' course. In his teaching, he focuses on leadership, weaponry, communications and combat techniques. In those 18 years he has seen changes and he likes what he sees.

He said, "Camaraderie is coming back. People care about the people they work with. They try to get them trained and educated. A lot of guys that we trained in the Basic NCO course have gone back to their units to help others."

(Photo by John Peoples)

Machinist Bill Zimmer is a volunteer coach, fireman, mummer, etc. in his spare time.

When he's not training or drilling, Bill coaches recreational league soccer for five and six-year-olds or he may be fighting fires in his community of Bricktown. He's been a volunteer fireman for 18 years and is a former president of the fire company.

Besides these activities, Bill "struts his stuff" as captain and leader of the 48-member Shriner Crescent Temple String Band. The Shriners are a part of the Mason's, a national fraternal organization known for its civic mindedness and fun-loving qualities. For those not from Philadelphia, a mummer might be described as a special merrymaker, dressed in an elaborate costume of satin, bedecked with sequins and feathers, who dances and prances around doing what's called the "Mummer's Strut."

"Each outfit costs about $2,000," explained Bill who said he's only been a mummer since 1985 although his grandfather was a founder and captain of the Garden State String Band. "One of the reasons the costumes are expensive is that the ostrich feathers have to be imported from Australia and there aren't all that many ostriches around anymore. Also the feathers are gray and have to be bleached, and then dyed to match an outfit, or rebleached to crystal white. Each feather costs about $8."

He pointed out his backpiece may weigh as much as 50 pounds and he built a special harness to help him carry it. "Since I don't play a musical instrument, I get to strut around as captain," said Bill who travels frequently with the band. "Last year we went to Los Angeles and the people there hadn't seen anything like the Mummers. We all had fun just

Continued on Page 3

Bill Zimmer "struts his stuff" as captain and leader of the Shriner Crescent Temple String Band.

watching the people mesmerized by our performance." The band also competes in contests around the country.

At other times, the band travels to nursing homes and veterans centers, and Bill said, "I see a lot of PPPL retirees at different parades, usually the ones at Hamilton Square and Burlington." He also sees many of his coworkers at events. "Some people here know I'm a mummer because I sometimes dress up in my costume after work if I'm on my way to a performance."

The money from the band's performances goes to Shriner hospitals which specialize in treating handicapped children. "We especially try to help people who can't afford the treatment our hospitals have to offer," said Bill who explained it was someone once again mistaking him for his identical twin brother that got him involved in the Shriners.

"My twin works at IBM on College Road," said Bill and someone at the barber shop thought I was him and started telling me about joining the Shriners."

Whether it's his involvement in the Shriners or the fire company or the National Guard, Bill Zimmer shows that a lifelong commitment to volunteering can be personally satisfying and fun.

Safety Training

The Safety Office has scheduled the following safety training courses for January 1990:

Course	Date/Time/Location
Confined-Space Entry	11, 18, and 25 Jan Time and Place to be Announced Call Sue Hill, ext. 2526
Radiation Safety	22-24 Jan, 8:30 a.m.-12:00 noon Theory Conference Room
Basic Safety	15 Jan, 9:00-10:00 a.m. Safety Office Conference Room D-Site
CPR Training	Date to be Announced Call Sue Hill, ext. 2526

Employees must obtain permission from their immediate supervisor to attend these classes. Supervisors should call Sue Hill at extension 2526 to enroll their employees.

Cafeteria Menu Week of January 2, 1990

Item	Monday	Tuesday	Wednesday	Thursday	Friday
Soup #1 ($.80)	HAVE	Cream of Tomato	Garden Vegetable Low sodium	Italian Lentil	Manhattan Clam Chowder
Soup #2 ($.80)	A	French Onion	Cream of Tomato	Garden Vegetable Low sodium	Italian Lentil
Entree #1	SAFE AND	Oven Roasted Chicken w/Veg. $2.75	Swedish Meatballs w/Noodles $2.70	Tortellini Alfredo w/Garlic Bread $2.70	Catch of the Day $2.85
Entree #2	FUN-FILLED NEW YEAR!!	Beef Enchilada $2.75	Western Omelet w/French Fries $2.40	Veal Parmegiana w/Spaghetti $2.75	Chicken Tetrazzini $2.70
Dieter's Special		1/2 Roast Chicken w/Veg., Roll 247 cal. $2.75	Chicken Salad Platter w/Fresh Vegetables 304 cal. $2.09	Tuna Crowned Tomato 335 cal. $2.05	Broiled Fish w/Veg., Roll 273 cal. $2.85
Hot Sandwich		Bacon-Cheese Dog $1.45	Tuna Melt $1.95	Garden Burger $1.60	Cheese Steak $1.89
Cold Sandwich		Ham and Swiss w/Let., Tom. on Croissant $2.05	Roast Beef Club $2.40	Genoa Salami and Provolone $1.85	Hot Buffalo Wings w/Celery $2.25
Salad by the Ounce (18¢ per ounce)		Carrot and Raisin	Marinated Vegetable	Homemade Pasta	Coleslaw w/Caraway
Breakfast Specials		3 Pancakes 1 Sausage Small Coffee $1.93	2 Eggs, Ham and Cheese on Kaiser Roll, Small Coffee $1.93	2 Eggs, Hash-browns, Toast Small Coffee $1.93	2 French Toast 2 Pork Roll Small Coffee $1.90

Merry Christmas and Happy Hanukkah

Enjoy Partying

(Without Gaining Weight)

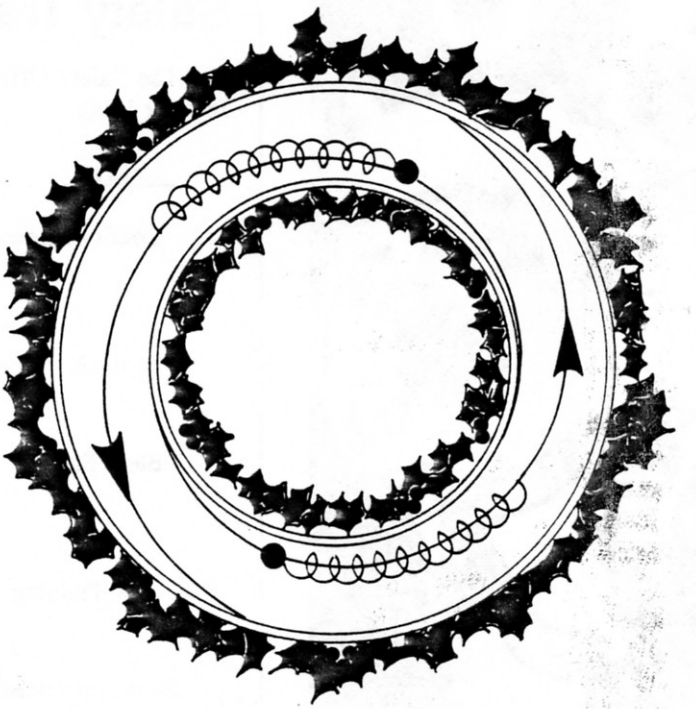
There's more to the holiday season than chestnut stuffing, marzipan cookies, roast goose, little chocolate bells wrapped in foil, and candy canes.

'Tis the season to be jolly, but not necessarily to stuff your face. In other words, it IS possible to have a fun and memorable holiday season without gaining 15 pounds by the time New Year's Day rolls around.

While few people would suggest the month of December as the ideal time to begin a diet, there's no need to sabotage a diet in progress or to be forced to go on one next month simply because of damage done now. All it takes is a commitment to good nutrition and a few suggestions:

- **Increase your exercise.** If you burn up more calories, you can sneak that extra helping of gravy onto your plate. Promise yourself that for the month of December you will skip the elevator and hike up the steps; park in the last row of the parking lot and walk briskly to your office. Even little adjustments help.
- **Focus on other aspects of the holiday besides food.** Promise yourself, for example, a new outfit to wear to the company Christmas party; but also promise yourself you'll be good at the party!
- **Eat before you go.** Have dinner before the party so you won't be tempted by high-calorie treats.
- **Hang out by the raw vegetable platter.** Instead of planting yourself in front of a buffet table or next to a platter of pizza appetizers, stand near the vegetable tray and snack to your heart's content on raw veggies. A word of caution, however; go easy on that tasty dip. It's probably laden with calories.
- **Stick to wine spritzers, diet soda, or mineral water.** This not only makes sense, calorie wise, but also makes for safe advice if you have to drive home.
- **Reduce portion sizes.** If you can't say no to that mince meat pie or fruit cake, then the next best thing is to eat just a sliver. But, dieter: Know thyself! Some people can't eat just a little piece, and if you're one of those, then it's better not to take even a taste!

But, perhaps, the best advice of all is to focus on the spirit of the holiday season—not the food that goes with it.



Season's Greetings

Have a good holiday.
Best wishes for 1990!

PPPL
PRINCETON PLASMA PHYSICS LABORATORY

HOTLINE

Volume 11, No. 6 January 25, 1990

New Assignments for Kungl and Heitzenroeder

Dan Kungl has been named Head of the PBX-M Engineering Branch. He replaces Phil Heitzenroeder who has joined the Compact Ignition Tokamak Project to participate in the design of the CIT magnet systems. The new assignments were effective January 22.

TFTR Vacuum Vessel Entry

All personnel who require entry into the TFTR Vacuum Vessel must complete the following training:

a. Radiation Safety (two-year recertification).
b. Confined-Space Entry (two-year recertification).
c. Test Cell Work Practices.
d. Vacuum Vessel Work Practices (NEW COURSE).

"Vacuum Vessel Work Practices" includes the following topics:

a. Special hazards to personnel and equipment.
b. Protective clothing.
c. Cleanliness requirements.
d. Door guard duties and responsibilities.
e. Various administrative concerns.
f. Emergency procedures.

"Vacuum Vessel Work Practices" will be offered in the MGB Auditorium at the following times in January and February:

Tuesday, January 30 from 9:00 to 11:00 a.m.
Friday, February 5 from 9:00 to 11:00 a.m.

Participants should be on time, as the course begins promptly and runs the entire two hours.

"Confined-Space Entry" will be offered in the Safety Trailer Conference Room on:

Friday, January 26 from 10:00 to 11:00 a.m.

For more information, contact Mike Leonard at ext. 3115.

February is American Heart Month and Black History Month. There will be a total eclipse of the moon on February 9 and February 14 is St. Valentine's Day.

Fusion Videos in February

The videos "PPPL: An Overview," and "Fire from the Sun: The Search for Fusion Energy," will be shown in the MBG Auditorium on Friday, February 2, and Monday, February 5, beginning at 12:00 noon. "PPPL: An Overview" runs for approximately 8 minutes, and "Fire from the Sun: The Search for Fusion Energy," is about 1 hour long.

"Fire from the Sun: The Search for Fusion Energy," was produced by Michael Pack of Manifold Productions, Inc., Hollywood, California 90028.

"PPPL: An Overview," was produced by PPPL Information Services and can be borrowed by calling Photo Lab, extension 2090.

Procedures Alert!

A new series of procedures and revisions to existing procedures has been issued to all controlled copy holders of the PPPL Procedures Manual. A brief summary of the changes are presented below. Please remember to sign the receipt and return it to Dianne Intoccia, Trailer C56-3, C-Site, when you have updated your copy of the manual.

New procedure 20.017, "Guidelines for the Conduct of Operations," provides general policies and guidelines for operating research devices within Technical Operations. The procedure is limited to the TFTR, PBX-M, and CIT projects.

Revised procedure 23.022, "Emergency Deenergization/Deactivation of C-Site 350kW Standby Diesel Generator," describes the latest information for emergency deactivation of the diesel, including methods for the remote disabling of the generator.

Revised procedure 23.023, "Emergency Deenergization/Deactivation of D-Site/TFTR 2600kW Standby Diesel Generator," describes the latest information for emergency deactivation of the diesel, including methods for the remote disabling of the generator.

Continued

Revised procedure 23.024, "Emergency Deenergization of PSE&G Power to C- and D-Site," provides the latest information for deactivating the power from Public Service.

New procedure 23.025, "Control of Work In Technical Operations Shops," describes the methods employed to request work from a shop. A new form entitled a "Work Request" is now part of the method utilized for assigning work to one of the shops. The procedure also provides information as to the level of documentation required with the Work Request based on the criticality of an item.

New procedure 23.026, "Hydrostatic and Pneumatic Testing," describes the approved method for conducting these tests and documenting the test results.

Revised procedure 30.002, "Administrative Operations Policies and Procedures," describes how Administrative policies and procedures are initiated, reviewed, and approved.

Revised procedure 31.002, "Information Services Policy and Procedures," has been revised to change the title of the procedure.

Revised procedure 36.003, "Subcontract Proposal Evaluation Board (SPEB) Policy," has been revised to change the dollar amounts listed for subcontracts in paragraph 1.

New procedure 37.003, "Emergency Preparedness Plan Internal Appraisal," establishes a requirement for a yearly audit of the plan to assure compliance with the DOE requirements.

New procedure 40.001, "Accounting and Financial Control Organization," describes the organization, responsibility, and reporting relationships of the PPPL Accounting and Financial Control Division.

New procedure 40.002, "Policies and Procedures Manual," describes the chapters in the PPPL Accounting and Financial Control Policies and Procedures Manual.

New procedure 41.001, "Budget Office Organization," describes the organization, responsibilities, and procedures of the PPPL Budget Office.

New procedure 41.002, "Budget Office Policies and Procedures Manual," describes the chapters in the Budget Office Policies and Procedures Manual.

New procedure 42.001, "Information Resource Management Organization," describes the organization, responsibility, and reporting relationships of the PPPL Information Resource Management activity.

New procedure 42.002, "Information Resources Management (IRM) Operations Manual," describes the chapters in the IRM Operations Manual.

You should read each of the procedures that are applicable to your activities, so as to understand all of the responsibilities and actions required. Each procedure is relatively short, typically 2 pages.

Cafeteria Menu for Week Beginning January 29, 1990

Chinese New Year

Item	Monday	Tuesday	Wednesday	Thursday	Friday
Soup #1 ($.80)	Chicken with Rice	Cream of Broccoli	Egg Drop	Navy Bean	Manhattan Clam Chowder
Soup #2 ($.80)	New England Clam Chowder	Chicken with Rice	Cream of Broccoli	Egg Drop	Navy Bean
Entree #1	Beef a la Hunter w/Vegetable $2.85	Salisbury Steak w/Vegetable $2.75	Beef with Broccoli Stir-Fry Over Rice $2.80	Rigatoni a la Romana w/Garlic Bread $2.60	Catch of the Day w/Vegetable $2.85
Entree #2	Rosemary Chicken w/Vegetable $2.75	Feta, Spinach & Bacon Omelet w/French Fries $2.45	Chicken Chow Mein $2.75	Baked Manicotti $2.60	Fettucini Prima Vera $2.70
Dieter's Special	Baked Chicken w/Vegetable, Roll 287 cal. $2.65	Cottage Cheese w/Fruit & Jello 342 cal. $2.65	Combo: Egg Drop Soup, Choice of: Chicken Chow Mein or Beef w/Broccoli Egg Roll, 12 oz. Bev., Fortune Cookie $3.99	6 Oz. Broiled Chopped Steak w/Vegetable, Roll 348 cal. $2.65	Broiled Fish w/Vegetable, Roll 273 cal. $2.85
Hot Sandwich	Blue Max Burger $1.95	Grilled Pastrami Reuben w/Kraut $2.25		Italian Hot Dog $1.85	Pork Roll w/Cheese $1.40
Cold Sandwich	Tuna on a Croissant, Lettuce & Tomato $2.15	Turkey, Bacon, & Tomato on Pumpernickle $2.35	Chicken Salad Club $2.25	Bacon, Lettuce & Tomato $1.95	PPPL Sub $.35/inch
Salad by the Ounce (18¢ per ounce)	Marinated Vegetables	Danish Cucumber	Egg Rolls $.99 ea.	Pasta Salad	Carrot 'n Raisin
Breakfast Specials	2 eggs, 2 Bacon, Toast, Small Coffee $1.98	3 Pancakes, 2 Bacon, Small Coffee $1.98	2 Eggs, Sausage, Cheese on Kaiser, Small Coffee $1.93	Cheese Omelet, Toast, Small Coffee $1.80	3 French Toast, 2 Sausage, Small Coffee $1.93

Note: Bold print signifies Special-of-the-Day.

PPPL
PRINCETON PLASMA PHYSICS LABORATORY
HOTLINE

Volume 11, No. 7 February 5, 1990

From the DDTO

A recent survey by the Engineering Department shows that thirty engineers at PPPL have Professional Engineering (PE) Licenses! Congratulations!

Other members of the Engineering and Scientific Staff are encouraged to obtain a PE license. It is good for professional development and good for the Laboratory to have more professionally licensed engineers. The Laboratory will help by conveniently scheduling review courses at the Laboratory's expense. Please sign up!

Members of the PPPL staff who currently have a Professional Engineering License are:

C.R. Ancher	C. Bushnell	J. Faunce	A.V. Ilic	R.H. Lechner	R.A. Rossi
N. Bowen	J. Citrolo	J. File	J.B. Joyce	R. Parsells	R. Simmons
E.C. Brolin	J. DeLooper	R.B. Fleming	C. Kircher	L.D. Meixler	R.L. Strykowsky
G. Bronner	L. Dudek	G. Gettelfinger	R.W. Kress	R. Mika	M. Viola
A. Brooks	H.M. Fan	H.P. Howard	G. Labik	C.V. Ptak	G.R. Walton

TFTR Appointments

I am pleased to announce the following TFTR appointments, which are effective immediately.

Rich Hawryluk is appointed Deputy Project Head of TFTR, in addition to his existing appointment as Head of the Tokamak Operations Division.

Erik Perry is appointed Head of the Tokamak Engineering Branch in the Tokamak Operations Division in addition to his present appointment as Head of TFTR Shutdown Management.

Tom Browning is appointed acting Head of TFTR Financial Management.

Kevin McGuire is appointed Head of the Physics Program Division.

Mike Zarnstorff is appointed Deputy Head of the Physics Program Division.

The TFTR Operations Center is transferred from the Tokamak Operations Division to TFTR Project Engineering, headed by Myron Norris. **Louise Schaufler** is appointed Head of the TFTR Operations Center.

Videos in February

The videos "PPPL: An Overview," and "Fire from the Sun: The Search for Fusion Energy," will be shown in the MBG Auditorium on Monday, February 5, beginning at 12:00 noon. "PPPL: An Overview" runs for approximately 8 minutes, and "Fire from the Sun: The Search for Fusion Energy," is about 1 hour long.

"Fire from the Sun: The Search for Fusion Energy," was produced by Michael Pack of Manifold Productions, Inc., Hollywood, California 90028.

"PPPL: An Overview," was produced by Information Services and can be borrowed by calling Photo Lab, extension 2090.

VV Course Cancelled

The Vacuum Vessel Work Practices course scheduled for Monday, February 5, has been cancelled. Call Mike Leonard, ext. 3115, if you still need to attend this course.

Reminder

Recommended and **supported** Word Processing Packages for IBM and Macintosh users.

Macintosh	MS Word 4.0
IBM	Wordperfect 5.0

If you have any questions call Microcomputer User Support at extension 2275.

Retirement Dinner for Miller

Henry Miller is retiring and his friends in the Materiel Control Division have planned a retirement dinner for him at Cedar Gardens on Thursday, February 22, at 6:00 p.m., dinner at 7:00. Cost is $26.00. If you would like to attend, please call Joyce Bitzer, ext. 2714, to make reservations.

Blairstown Weekend Set for 16-18 Feb

The Princeton University Education Center at Blairstown, N.J. is once again offering its "Winter Weekend" to University faculty, staff, students, and their families. Scheduled for 16-18 February, the cost is $75 for adults, $53 for students, and $40 for children 12 and under. All meals and accommodations are included. Advance registration and a nonrefundable deposit of $35 per person or $60 per family is required.

The weekend begins Friday night at 6:00 p.m. with check-in, a candlelight supper at 7:00 p.m, and an evening of fireside activities. Outdoor activities begin after breakfast on Saturday and continue to mid-afternoon Sunday. Meals are served family style with hot beverages and snacks available at all times. Sleeping arrangements are in wood-heated, bulk-room-style log cabins.

Activities are varied. Relax, go for a walk through the woods. Enjoy dam rappeling, the adventure course, or hike the Appalachian trail. Bring your ice skates, go ice fishing, or try cross country skiing. Just set around the fireplace and read a book.

Call the Princeton Education Center at Blairstown at 201-362-6765 to make reservations. The deadline is February 7. The weekend is limited to 60. Saturday arrival will be accepted if space is available. Cost is $65 for adults, $45 for students, and $30 for children 12 and under.

The Princeton Education Center at Blairstown (PECB) is affiliated with, but not funded by, Princeton University. The PECB is an organization committed to empowering urban youth. The Center provides adventure-based experiential education programs for youth and adult groups aimed at strengthening self-confidence, group cooperation, environmental appreciation, and outdoor fun. The Center conducts its programs with youth agencies, secondary schools, University departments and organizations, churches, and business groups.

Stockroom News

New Items

The following is a list of some of the items recently added to the C-Site Stockroom inventory:

- Tefzel Wire — gauges 16, 18, 20, 22, 24 are available in various colors (101507 thru 101542)
- PhoneMate Cassette Tapes — 30 and 60 minutes (180881 and 180882)
- RF Line Filters (123689)
- RFI Line Filters (123883)
- RFI Line Filter Cords (123884)
- 63-37 Solder (152061)
- Check Valves (210165 and 210166)
- MAC Modem Cable (123885)

Closed Items

No further orders will be made for PVC hook-up wire. It has been replaced with "Tefzel" wire.

Potential Phase-Out Items

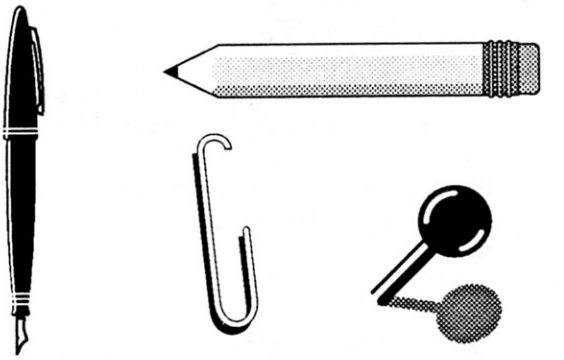
Items in the stockroom for which no requests have been made in the past year will be phased out.

Request for New Items

Request forms for new items to be included in the Stores inventory are available in the stockroom. Please see Stores personnel for further information.

Other

Information on recent adds, phase-outs, and closed items are available in the stockroom for your review.



Cafeteria Menu for Week Beginning February 5, 1990

(Effective February 5, there will be a 10% increase on selected items.)

Item	Monday	Tuesday	Wednesday	Thursday	Friday
Soup #1 ($.80)	Cream of Mushroom	Chicken Noodle	Split Pea w/Ham	Minestrone	New England Clam Chowder
Soup #2 ($.80)	Manhattan Clam Chowder	Cream of Mushroom	Chicken Noodle	Split Pea w/Ham	Minestrone
Entree #1	Beef Burgundy over Noodles $2.75	Baked Lasagne $2.85	Meat Loaf a la Clarence w/Veg. $2.70	Chicken Cacciatore w/Spaghetti $2.65	Catch of the Day w/Vegetable $2.85
Entree #2	Hawaiian Ham w/Vegetable $2.70	Stuffed Cabbage w/Vegetable $2.60	Sweet & Sour Pork w/Herb Rice $2.75	Ravioli w/Garlic Bread $2.55	Maccaroni and Cheese $2.70
Dieter's Special	Broiled Fish w/Vegetable, Roll 342 cal. $2.19	Broiled Chopped Steak w/Veg. 315 cal. $2.60	Tuna Platter w/Fresh Vegetable 295 cal. $2.05	Baked Chicken w/Vegetable, Roll 287 cal. $2.65	Broiled Fish w/Vegetable, Roll 273 cal. $2.85
Hot Sandwich	Italian Hot Dog $1.85	Grilled Cheese w/Tomato $1.50	Pork Roll w/Cheese $1.60	French Bread Pizza $1.25	Bacon Cheese Burger $1.95
Cold Sandwich	Great Dane $2.39	Bacon, Lettuce, and Tomato $1.95	Pita Fonda $1.98	Turkey Club $2.60	Ham & Swiss Sub $1.95
Salad by the Ounce (18¢ per ounce)	Potato Salad	Carrot 'n Raisin	Pasta Salad	Antipasto Salad	Fresh Garden Salad
Breakfast Specials	2 Eggs, 2 Bacon, Toast, Small Coffee $1.98	3 Pancakes, 2 Bacon, Small Coffee $1.93	Cheese Omelet, Toast, Small Coffee $1.80	2 Eggs, Sausage, Cheese on Kaiser Roll, Small Coffee $1.93	3 French Toast, 2 Sausage, Small Coffee $1.93

PPPL
PRINCETON
PLASMA PHYSICS
LABORATORY

HOTLINE

Volume 11, No. 8 February 8, 1990

A Time for Remembering

Commemoration Service Scheduled for February 11

Princeton University will hold its annual "Commemoration: A University Service of Music, Remembrance, and Thanksgiving" on Sunday, February 11 at 2:00 p.m. in the University Chapel. This service remembers and gives thanks for the lives of faculty, staff members, and students who have died during 1989. The Commemoration will be presented by members of the Glee Club, Chapel Choir, and Gospel Ensemble. Following the services there will be a reception in Murray-Dodge Hall. All are invited.

PPPL Laboratory employees who will be remember this year are: Robert Ellis, Jr., Victor Gambio, Michael Ignas, George Ioannidis, George Lennox, Irene Long, Helene Maginnis, John Nicol, Barton Reavis, and Thomas Scully.

"We hope that the Sunday afternoon time will be an occasion when many from the University as well as family members of the deceased can participate," said Dr. Shapiro, Princeton University President, in a letter announcing the service. Continuing he said, "There are perhaps too few opportunities at Princeton when we can come together as a community, so we do hope that all our departments will be well represented at this service."

Cafeteria Menu for Week of February 12

Item	Monday	Tuesday	Wednesday	Thursday	Friday
Soup #1 ($.80)	Cream of Tomato	Hearty Beef Barley	Navy Bean	Minestrone	Fisherman's Chowder
Soup #2 ($.80)	New England Clam Chowder	Cream of Tomato	Hearty Beef Barley	Navy Bean	Minestrone
Entree #1	Southern Fried Chicken w/Veg. $2.65	Chopped Tenderloin w/Sauteed Onions $2.70	Vegetable Quiche w/French Fries $2.45	Veal Parmegiana w/Spaghetti $2.85	Catch of the Day $2.85
Entree #2	Hungarian Beef Goulash over Noodles $2.85	Stuffed Shells w/Garlic Bread $2.75	Herb Marinated Chicken w/Rice $2.75	Mussels Marinara w/Garlic Bread $2.75	Chicken Tettrazzini $2.75
Dieter's Special	Broiled Chicken w/Veg. & Roll 287 cal. $2.65	Broiled Chopped Tenderloin w/Veg. & Roll 328 cal. $2.70	Baked Fish w/Veg. & Roll 342 cal. $2.75	Tomato Surprise 335 cal. $2.10	Broiled Fish w/Veg. & Roll 273 cal. $2.85
Hot Sandwich	Grilled Swiss w/Tomato $1.50	Cheeseburger w/French Fries $1.93	Cheese Steak w/French Fries $2.45	The Hoboken $2.25	Grilled Ham & Cheese $1.75
Cold Sandwich	Egg Salad w/Bacon, Lettuce, & Tomato $1.95	Tuna, American Cheese, Bacon on Whole Wheat $2.39	Ham, Turkey, Swiss on Kaiser Roll $2.45	Marcello Pastrami $2.39	Tuna Club w/Chips $2.60
Salad by the Ounce (18¢ per ounce)	Beet w/Onion	Pasta Salad	Danish Cucumber	Spinach Salad	Garden Salad
Breakfast Specials	2 Eggs, 2 Bacon, Toast, Small Coffee $1.90	3 Pancakes, 2 Bacon, Small Coffee $1.93	Cheese Omelet, Toast, Small Coffee $1.95	2 Eggs, Sausage, Cheese on Kaiser Roll, Small Coffee $1.93	3 French Toast, Sausage, Small Coffee $1.93

PPPL HOTLINE
PRINCETON PLASMA PHYSICS LABORATORY

Volume 11, No. 9 February 15, 1990

Furth Recovering from Surgery

To Return Home Soon

We are happy to report that Director Harold Furth's operation on Tuesday, February 13, was successful. He was in recovery in the intensive care unit (ICU) in the early afternoon. He continues to improve. He will be moved to his room from the ICU early Thursday morning where he will remain for about a week, returning home about February 22. Dr. Furth will recuperate at home for about a month before returning to the Lab.

We hope you will all sign a Laboratory Get Well card that has been placed at the C-Site Reception Desk. The card will be taken to him at home when he returns to Princeton. Individual good wishes may be sent to Dr. Furth at his home address — 36 Lake Lane, Princeton, New Jersey 08540.

Look for further updates of Dr. Furth's condition in future issues of the **HOTLINE**.

Science on Saturday Begins Sixth Year

Science on Saturday, PPPL's popular student lecture series, will begin its sixth year on Saturday, February 24, and continue for six weeks concluding on March 31. The 1990 program is organized by Fred Dylla and Dennis Manos, both veteran lecturers from previous Science on Saturday programs. "This year," Dylla notes, "we went beyond the Princeton area to invite several lecturers from two well-known industrial laboratories in New Jersey, Exxon Research and Engineering Company and AT&T Bell Laboratories. One of the purposes of the program is to present a wide variety of scientific vocations to high school students, who typically have little concept of what a scientist does for a living."

Science on Saturday seminars are open to high school students, teachers, and parents free of charge. The lectures are informal and several include scientific demonstrations. A tour of PPPL is included as part of the program. Students who complete the series receive a certificate. Topics for this year's lectures are:

February 24
"Confusion over Fusion: Hot and Cold"
Fred Dylla and Dennis Manos
Princeton Plasma Physics Laboratory

March 3
"The Universe as Seen from Mauna Kea"
Jill Knapp
Astrophysical Department, Princeton University

March 10
"Our Amazing Solar System: The Voyager Expedition"
Lou Lanzerotti
AT&T Bell Laboratories

March 17
"Deep Sea Hydrothermal Vents and the Valdez Oil Spill: Learning from Nature"
Ed Stiefel
Exxon Research and Engineering Company

March 24
"New Superconductivity at 'High' Temperatures"
Gordon Thomas
AT&T Bell Laboratories

March 31
"The Greenhouse Effect and Climate Changes"
V. Ramaswamy
Geophysical Fluid Dynamics Laboratory

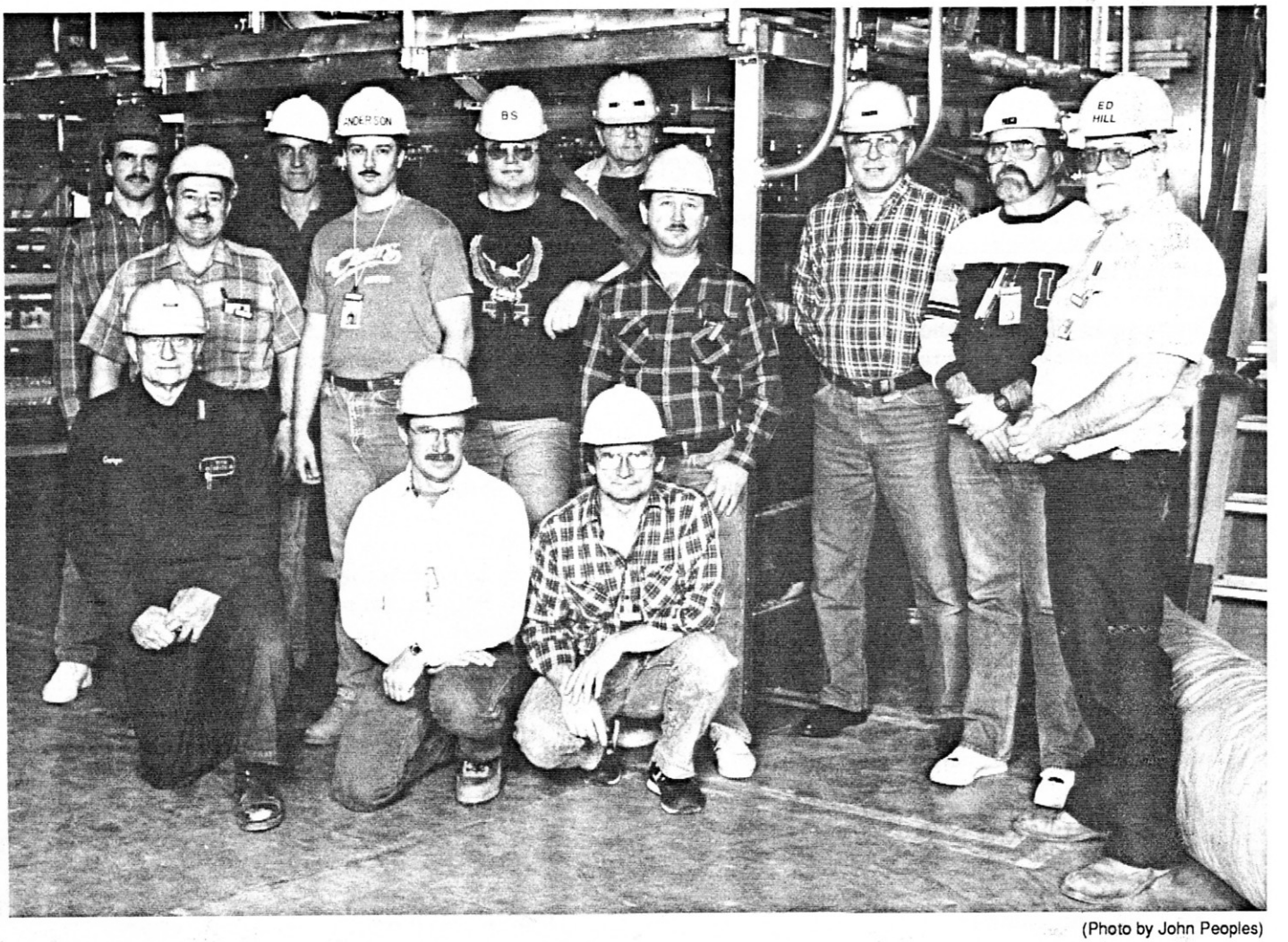
Lectures will be held in the MBG Auditorium beginning at 9:30 a.m. and lasting for approximately two hours. Employees interested in participating can call extension 2556 to register or for more information.

Shutdown Operations Ahead of Schedule

TFTR Technicians Maintain Two-Shift Operation as Work Proceeds

Since February 5th, two crews of technicians under the direction of George Barnes and Doug Loesser, with Russ Wester and Carl Bunting as crew leaders, have been preparing the TFTR vacuum vessel for in-vessel work and carrying out the initial phases of this work. Working first and second shifts, they have set up an entryway into the vacuum vessel at bay K, established a radiation work area on the East side of the Test Cell, installed lights and a floor in the vacuum vessel, measured the position of the bumper limiter, and removed the bumper limiter midplane graphite tiles that are being replaced with carbon-carbon tiles during this shutdown. "The exceptional productivity of this crew of in-vessel technicians has resulted in our now being four days ahead of schedule," said Erik Perry, who is in charge of shutdown operations.

A second group of in-vessel technicians, Crew #2, with crew leaders Joe Winston and Danny Crook, began work on February 13th and will continue until February 28th. Their primary goals are to install most of the new carbon-carbon bumper limiter tiles and to carry out an alignment of these tiles to assure a smooth surface. They will also assist with numerous in-vessel tasks planned by the TFTR Diagnostics Division.



(Photo by John Peoples)

Picture above are the technicians responsible for initial TFTR shutdown activities. They are, from left to right, back row: Doug Loesser, George Barnes, Dave Richardson, Russ Wester, Jim Benchoff, and Ed Hill; center row, Charles Pollack, Mike Anderson, Bob Sorenson, Bob Mucha; kneeling, George DePagnier, Dave Miller, and Bob Biache. Technicians not shown are: Val Bernhardt, Carl Bunting, Tom Czeizinger, Ray Gernhardt, Bob Herskowitz, and Bob Tucker.

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HOTLINE

Volume 11, No. 10 February 23, 1990

Pryometer: Saving Energy In a Colorful Way

by Phyllis Rieger

When does the color red signify cold and the color blue mean hot? When you're using a boiler imaging pyrometer system for fossil fuel power plants.

It's a mouthful to say, but this system, recently developed by PPPL engineers, will measure temperatures of flames in coal-burning power plants. This is accomplished using a telescope-periscope containing a remotely controlled iris to monitor the flames and map their heat intensity. A television picture, a false color display color-coded to show the temperature gradients in the flame, would be viewed by a boiler plant operator. Using a computer and special software developed by PPPL, the operator would then adjust the the fuel and oxygen, making sure that one flame isn't burning too hot and another too cold. There's an eight-color spectrum ranging from red which signifies cold, to blue which is the hottest. All this fine-tuning means energy saved.

According to PPPL engineer George Renda, "We began devising this system after several meetings between PPPL and staff researchers at Public Service Gas and Electric (PSE&G) Corporation held to identify areas where technology developed for fusion research might be useful to improve the performance of existing coal-fired power plants."

Over the past 30 years PPPL has developed diverse and unique engineering capabilities to meet the scientific and technical challenges of fusion energy research. The Laboratory is diversifying its program by developing projects in both the public and private sectors in which the Laboratory's technological resources and, in particular, the outstanding skills of the PPPL engineering professional staff can be applied. This promotes the transfer of technology and expertise developed under the fusion research program.

George Renda explained, "PPPL uses image sensor television cameras to monitor the plasma position in tokamak vacuum vessels, so we based our pyrometer on a similar premise. We began exploring the possibility of using a similar television camera with digital image processing to measure temperature gradients in the multiburner flames of a power plant boiler."

A feasibility study, conducted at PSE&G's Mercer Power Plant on Duck Island in Trenton, showed that the engineers were on the right track. George along with technical associate Greg LeMunyan began designing the pyrometer and its imaging system. Greg handled the electrical and software design while George served as program manager and systems engineer, with Bob Hoch responsible for mechanical detail engineering. PPPL engineers Steve Hayes and Don Long were brought in to consult on various areas of the system.

"We had to keep in mind that the pyrometer would be measuring flames between 2000-4000° F which meant we also had to design protection for the optics, so they wouldn't be damaged," said George. The entire pyrometer system sits on a tabletop and is about 12" wide, and 40" long, weighing about 60 lbs. It's not very impressive to someone unfamiliar

(Continued on Page 2)

Meeting to discuss the pyrometer's performance were: (l to r) PPPL's Greg LeMunyan, PSE&G's Dr. Melvin Zwillenberg, PPPL's George Renda and Bob Hoch.

with imaging systems, but PSE&G's Melvin Zwillenberg, principal staff engineer-research, who attended an unveiling of the pyrometer system on October 25 was very pleased with its performance, according to George. "We installed the system at the Duck Island facility for testing and a company, in addition to PSE&G, is interested in licensing the pyrometer," said George who's been working with Dr. Zwillenberg. Con Edison, the New York utility, also is interested in the system.

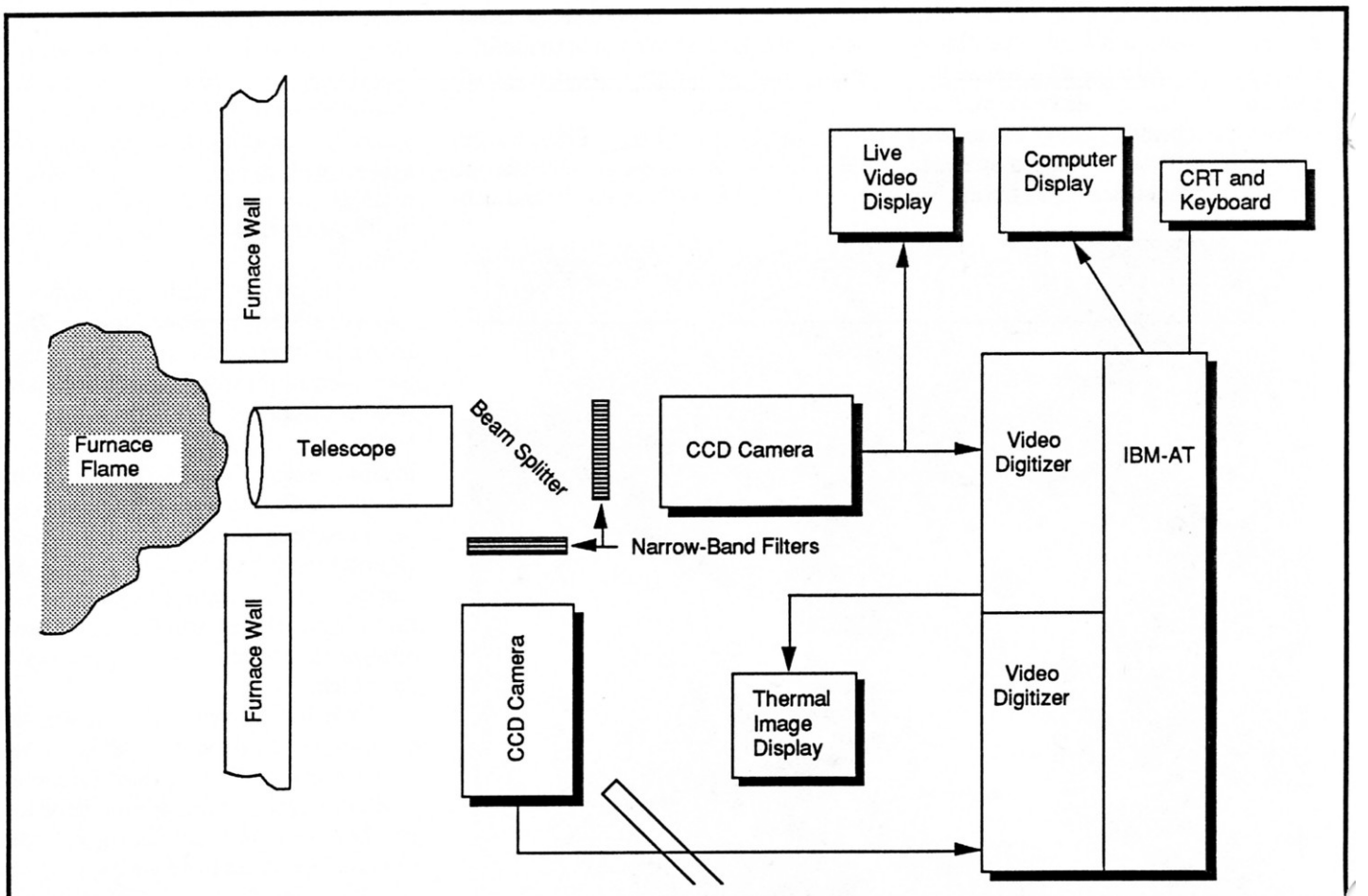
At the demonstration, George and his coworkers explained how the system works. George said, "Basically, all bodies (including the human body) emit light which varies in wavelength and intensity. Both wavelength and intensity are temperature dependent. Using the radiation laws, you can determine the temperature of a body by measuring the amount of light emitted in two close wavelengths. A two-color system helps reduce some errors which are normally encountered in a one-color system.

"In the PSE&G system we developed, the periscope views the furnace flames through a 90° field of view. The light is separated by the beam splitter and passes through two spectral filters. The light is then converted to an electrical signal by two CCD cameras. This means each camera contains the same spatial image but their intensity varies because each image is from two different wavelengths."

George explained, "The computer receives the resulting signals and processes the raw data to obtain the ratio of the intensity of any point in the optical image at the two selected optical wavelengths. Each image is composed of approximately 250,000 picture elements. The ratio is then compared to the ratio of the intensity of blackbodies at the same wavelengths to determine the temperature of the burner flame. The processed image is then converted to eight bands of colors and displayed on a color monitor as a thermal image where each color represents approximately a 200° F change."

He continued, "A new thermal image is then processed and displayed every ten seconds. The images can be recorded on a videotape and selectively recorded on the computer's hard disk. More quantitative results can be obtained by freezing an image of interest and temperature, then plotting the rows and columns of interest."

George and Greg are obviously happy with their new creation. "We spent many months devising the pyrometer," said George. "We're pleased with our accomplishment and look forward to PSE&G's test results so we can refine the system. It signals another step toward energy saving for the future."



Boiler Imaging Pyrometer

JT-60 Progress

The world's largest tokamak, the JT-60 in Japan, has successfully completed its first phase of operations and was recently shut down for extensive upgrading. Values of the plasma density-confinement time-temperature product ($n\tau T$) of 1.3×10^{14} cm^{-3} sec keV were obtained using pellet injection — about double the value obtained in gas-fueled discharges. Experiments on lower hybrid current drive were also carried out using a newly-developed multi-junction type launcher. A current drive efficiency of 3×10^{19} m^{-2} A/W was attained, an efficiency which approaches that required for ITER-class machines.

The upgraded machine, called JT-60U, is expected to begin operations about a year from now. It will be capable of 6 MA of plasma current in noncircular divertor deuterium plasmas and will be equipped with 40 MW of neutral beams, 8 MW of ICRF and 15 MW of lower hybrid power.

We congratulate our Japanese colleagues on their many successes in fusion. For further information contact Dr. Akira Oikawa, Japan Atomic Energy Research Institute, Tokai, Naka Ibaraki 319-11, Japan.

This article reproduced from Fusion Power Associates' Newsletter for January 1990.

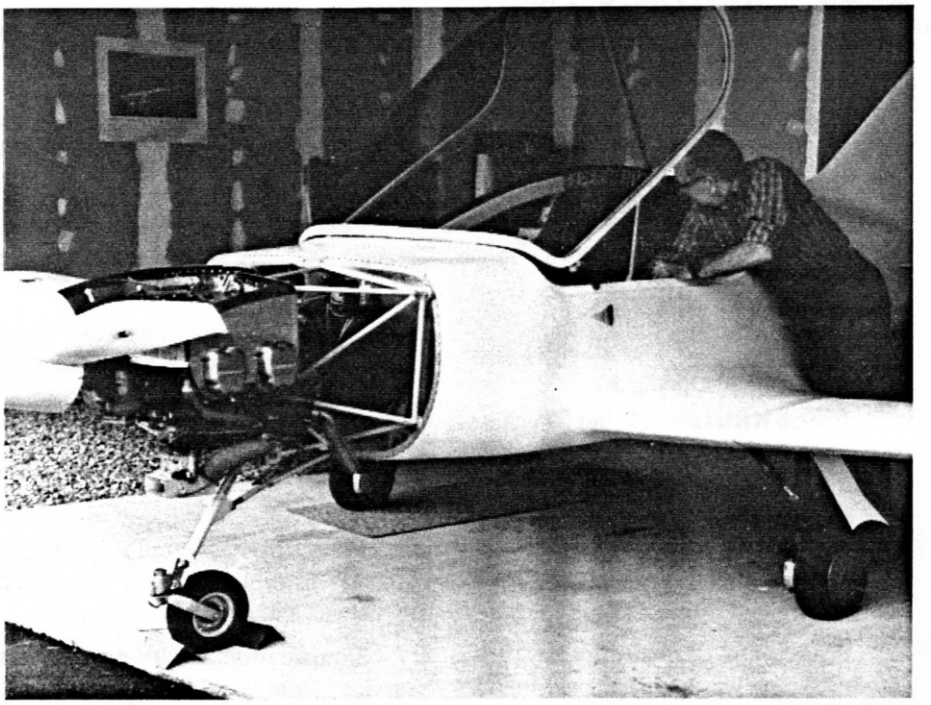
For Don Harnsberger, It's Up, Up & Away!

by Phyllis Rieger

As PPPL mechanical engineer Don Harnsberger tells the tale, "It all started at Oshkosh '85, . . ."

That's when he flew to Oshkosh, Wisconsin, for the annual exhibition of the Experimental Aircraft Association, a nationwide organization of 120,000 people interested in aviation. "Since I learned to fly in 1944, I've always loved flying," said Don who explained his father was an enthusiastic flier.

"For the exhibition about 15,000 aircraft fly in and it's airplane heaven," he said. The heavenly design he liked was the Aero Mirage TC-2, a futuristic looking plane with a very slim profile and light weight (750 lbs empty, 1200 lbs gross), based on the use of Kevlar and fiberglass "skins" bonded with vinylester resins. It has an advertised performance of 200 mph with a 100 horsepower Continental power plant.



The Aero Mirage TC-2, built by Don Harnsberger.

Don thought about it for two months and decided, why not? Yes, he'd build his own plane. He traveled at year's end to Gainesville, Florida, to pick up the "kit," which only included the fuselage shell and main spar installation. "Very little else was available," explained Don. "Mirage management assured us the other skins and hardware kits would be following soon."

Don continued, "We brought the fuselage and a few miscellaneous parts to Princeton in a U-Haul trailer, built a heated enclosure in half of the garage, and started to work." The "we" includes Don's son, Bob, now 17, who started helping his dad when he was 14.

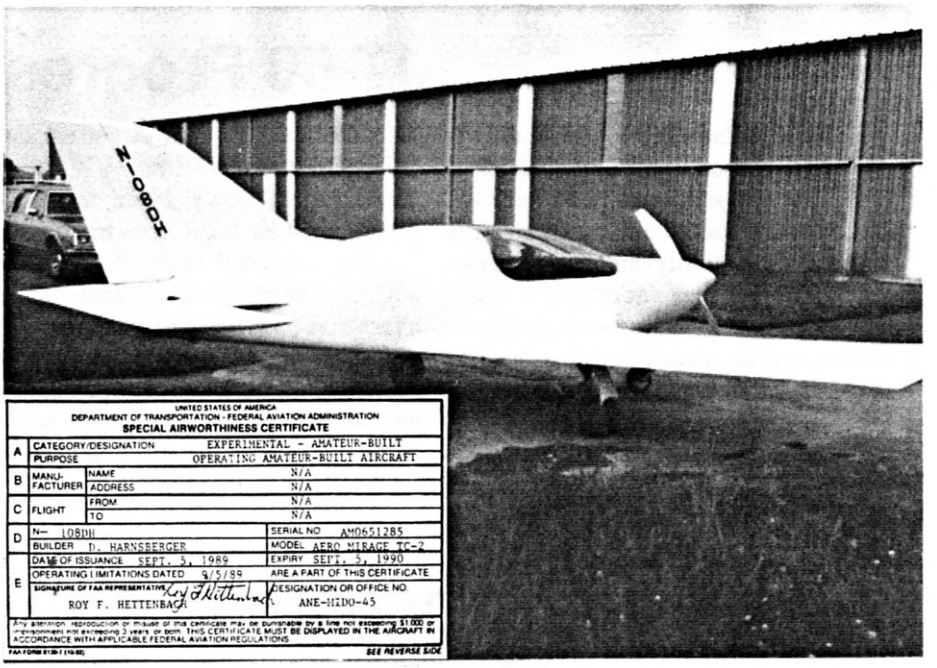
Ingenuity+

Don labored throughout 1986, completing the main fuselage assembly and the landing gears. By mid-1987 though, it dawned on him that the "kit supply train" had stopped running. He was now on his own. Creativity and ingenuity mixed with hard work helped him to devise the other parts he needed. Following occasional consultation with PPPL tech shop personnel who also lent him moral support, he completed fuel tank and control bracket fabrication, hydraulic system components, engine mounting adapters, exhaust pipes, etc.

He persevered and finally by August, 1989, had the plane completed. Lee Benson's (a former PPPL employee) race car trailer provided the means of transport

(Continued on Page 4)

to Princeton Airport where the wings were reinstalled and the control and final wiring connections made in preparation for "taxi-testing." During the taxi tests the speed was gradually built up to 70 mph to "feel out" the plane's stability and lift-off capabilities, leading up to the issuing on September 5th of the "Special Airworthiness Certificate," a piece of paper as valuable as gold for someone like Don. "It means the Federal Aviation Administration (FAA) inspector has ascertained my plane is ok to fly for 40 hours until the next and final inspection," said Don. "I can't have a passenger until that final step," he explained. "And a flight is restricted to a 25-mile radius from 'home port.' " He also has a special construction log book, required by the FAA, which documents all the work he did.



UNITED STATES OF AMERICA
DEPARTMENT OF TRANSPORTATION - FEDERAL AVIATION ADMINISTRATION
SPECIAL AIRWORTHINESS CERTIFICATE

A	CATEGORY/DESIGNATION	EXPERIMENTAL - AMATEUR-BUILT	
	PURPOSE	OPERATING AMATEUR-BUILT AIRCRAFT	
B	MANUFACTURER NAME	N/A	
	ADDRESS	N/A	
C	FLIGHT FROM	N/A	
	TO	N/A	
D	N- 108DH	SERIAL NO. AM0651285	
	BUILDER D. HARNSBERGER	MODEL AERO MIRAGE TC-2	
E	DATE OF ISSUANCE SEPT. 5, 1989	EXPIRY SEPT. 5, 1990	
	OPERATING LIMITATIONS DATED 9/5/89	ARE A PART OF THIS CERTIFICATE	
	SIGNATURE OF FAA REPRESENTATIVE Roy F. Hettenbach	DESIGNATION OR OFFICE NO. ANE-HIDO-45	

Any alteration, reproduction or misuse of this certificate may be punishable by a fine not exceeding $1,000 or imprisonment not exceeding 3 years or both. THIS CERTIFICATE MUST BE DISPLAYED IN THE AIRCRAFT IN ACCORDANCE WITH APPLICABLE FEDERAL AVIATION REGULATIONS

FAA FORM 8130-7 (10-82) SEE REVERSE SIDE

For Don Harnsberger, building his own plane meant one of his dreams became a reality. The "Special Airworthiness Certificate" (inset) is as valuable as gold.

". . . Like a Dream"

He made his first flight on September 7th and some ten hours of flight time had been logged through mid-October. Don reports, "It handles like a dream with good stability and quick maneuvering capabilities."

Once he has his final certificate, he already has three special trips planned. The first to the Experimental Aircraft Association meeting in Florida, scheduled for spring, 1990; the second to visit friends in Houston, and the third to the Association's Annual Exhibition in Oshkosh in August.

"I have to get the plane's performance all mapped out," said Don. "It holds 25 gallons of fuel, about four hours of flying time at 175 mph. That's good gas mileage."

According to Don, "More people are building planes than you think. It's not that unusual." That's news to those of us not airplane aficionados. For Don, building his own plane has meant he's one of the lucky ones who's seen one of his dreams become a reality.

TRANSITIONS

TRANSITIONS

The HOTLINE offers congratulations to the following employees:

Births

Karen Tuttle-Frank, Computer Division, and her husband, Alan, whose daughter, Emily Katherine, was born January 25.

Retirements

Harry Anderson retired after 17 years of service. Harry was a Radio-Frequency Technician in Technical Operations.

Henry Bornkamp retired after 12 years of service. Henry was Manager of Subcontracts in the Procurement Division.

Uffe Christensen retired after 33 years of service. Uffe was a Principle Engineer in the Engineering Analysis Division.

James Clark retired after 7 years of service. Jim was Deputy Director for Administration Operations.

Hsi Feng retired after 13 years of service. Hsi was an Engineer in Technical Operations.

Samuel Goldfarb retired after 14 years of service. Sam was a Senior Engineer in Technical Operations.

Joseph Kittel retired after 29 years of service. Joseph was a Technical Associate in the TFTR Neutral Beams Branch.

Gioetta Kuo-Petravic retired after 13 years of service. Gioetta was a Project Engineer in the TFTR Diagnostics Application Section.

Francis Lawn retired after 10 years of service. Frank was an Electrical Engineer in Technical Operations.

John Lowrance retired after 23 years of service. John was an Engineer in Technical Operations.

Paul McCann retired after 30 years of service. Paul was a Technical Associate in Technical Operations.

Arthur Miller retired after 22 years of service. Arthur was a Technical Associate in the Theoretical Division.

Melvin Shampanier retired after 11 years of service. Melvin was a Buyer in the Procurement Division.

Muriel Strohl retired after 20 years of service. Muriel was an Administrative Assistant in Technical Operations.

Conrad Stout retired after 15 years of service. Connie was Head of the Plant Maintenance and Engineering Division.

Safety Training

The Safety Office has scheduled the following safety training course for February:

Course	Date/Time/Location
CPR TRAINING	*28 Feb, 12:30 - 4:30 p.m.* *LOB Commons*

The Center for Emergency Medical Training will conduct this class in the life saving technique of Cardiopulminary Resuscitation. Recertification is required every year.

Employees must obtain permission from their immediate supervisor to attend these classes. Supervisors should call Sue Hill at ext. 2528 to enroll their employees.

DOE Sponsors 'Earth Day' Poster Contest

The U.S. Department of Energy (DOE) is sponsoring a poster contest for elementary-school-aged children as part of the twentieth anniversary celebration of Earth Day. Earth Day recognizes the "necessity for conservation of natural resources of the world." Many millions of Americans take part in celebrations and peaceful demonstrations on this day.

○

The theme of the posters is "How I would use science to improve the quality of life." Winning entries will be displayed in the Department's Earth Day Exhibit at DOE Headquarters in Washington, D.C.

○

All young children of PPPL employees are encouraged to participate. Entries should be sent to Information Services, Room B378, by Thursday, March 15. The name, age, and grade of the artist, as well as the name of the parent and his/her Laboratory telephone extension should be printed clearly on the back of the poster. Posters will be forwarded to the DOE for judging. Participants will be informed if their posters are selected for display.

Editor: Carol Phillips
Photography: John Peoples, Dietmar Krause
Layout: Terry Birch
Reproduction: Teri Daynorowicz

Our best story ideas for HOTLINE come from you. So if you have an idea for an article, call Carol Phillips at ext. 2754.

The PPPL HOTLINE is issued by the Princeton University Plasma Physics Laboratory, a research facility supported by the United States Department of Energy. It is primarily an internal publication. Correspondence and requests to reprint material should be directed to Carol Phillips, Editor, PPPL HOTLINE, P.O. Box 451, Princeton, NJ 08543 or telephone 609-243-2754; Interoffice correspondence should be addressed to Room B366, James Forrestal Campus, C-Site.

PPPL
PRINCETON PLASMA PHYSICS LABORATORY
HOTLINE

Volume 11, No. 8 11 March 12, 1990

Lemonick Joins PPPL

by Carol A. Phillips

Aaron Lemonick began a two-year term as PPPL Deputy Director for Administrative Operations in January. He will oversee the Controller's Office, which is responsible for all financial operations of the Lab, and the Administrative Department, which is responsible for general administrative affairs, and be a member of the Director's Council. He replaces Jim Clark who recently retired.

Dean Aaron Lemonick joined PPPL as Deputy Director for Administrative Operations in January.

An energetic bear of a man with a booming voice and a decidedly outreaching personality, Dean Lemonick has been a member of the University community for most of the last 40 years. He tried "retiring" last summer when he stepped down after having been Dean for 20 years to return to the professorate. However, after the fall semester as a visiting professor in the Physics Department at Harvard, he returned to Princeton at the request of Princeton's President Shapiro to take up his position at the Laboratory.

"I appear to be addicted to decanal-like work, more work than you can possibly do, an absolutely full-time, all-consuming job. When I went to Harvard, it was like going cold turkey on an addiction, and now I'm back and it feels familiar," said Lemonick, describing his first months at the Laboratory.

Tapped Early as a Leader

Dean Lemonick's association with Princeton began in 1950 when he came to the University as a graduate student in physics after receiving his B.A. from the University of Pennsylvania. At Princeton, he received his M.A. in 1952 and his Ph.D in 1954. Lemonick spent the next seven years, until 1961, at Haverford College in Pennsylvania, the last four as Associate Professor and Chairman of the College's physics department, before returning to Princeton for good as Associate Professor of physics. In 1964, he was promoted to Professor.

In the sixties, Lemonick's administrative activities were expanded. He was named Associate Director of the Princeton-Penn Accelerator, then Associate Chair of the Physics Department, and then Dean of the Graduate School. In 1973, he became Dean of the Faculty. He served in this position until he stepped down last June.

Learning about the Lab

In December, Lemonick spent a few weeks familiarizing himself with PPPL and, in particular, with Administrative Operations and its staff. "The Laboratory is a complex organization with a complicated organization chart. I met with every office and division head in Dick Rossi's and Ed Winkler's departments. I tried to understand what they did, how they fit in the Laboratory structure and mission, and, above all, their problems," Lemonick said.

Lemonick is asking administrators to tell him what needs to be done that isn't getting done, and conversely, whether there are things of lower priority to the Laboratory that we can do without. "One of my very important jobs is to assist people to figure out how we can live most effectively within our means. And through it all I want them to know that I am on their side and that they have my support," he said.

When asked how he sees the process of sorting out, of organizing and coping with the tasks before him, he expressed his belief that for administrative tasks, not unlike any other task in the Laboratory, one should bring to them experience, intelligence, grace, love and caring — to the smallest detail as to the largest. When asked if he had any first impressions, he, with a touch of humor, alluded to the sea of acronyms in which the Laboratory floats, acronyms which are to the newcomer, an undecipherable jargon. He admits that his letters may be longer than most because of his intention to avoid acronyms, at least until he succumbs to the practice of using them.

Teaching Still on Agenda

Teaching has always been very important to Lemonick, and he has continued to teach throughout his long administrative career. He has taught courses ranging from elementary physics to quantum mechanics, electricity and magnetism, and thermodynamics. Continuing this tradition, Dr. Lemonick plans to co-teach an undergraduate course on cosmology, for juniors and seniors in the humanities and social sciences with Jerry Ostricker, Chairman of the Astrophysics Department, and Richard Gott, Professor of Astrophysics, in the fall when he is more settled into his position as Deputy Director.

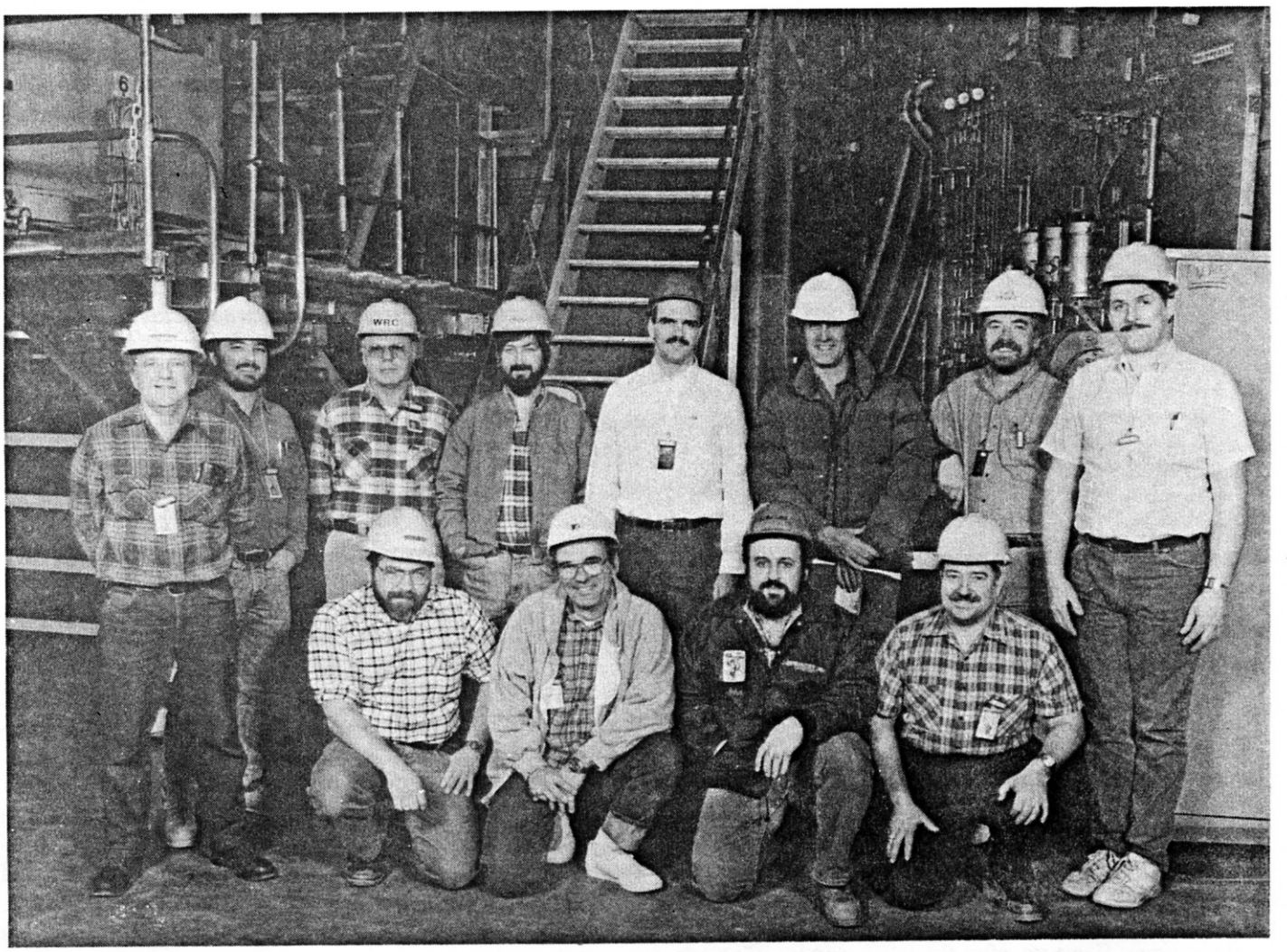
Dean Lemonick lives in Princeton with his wife Eleanor. Their son, Michael, is Associate Science Editor for **Time** magazine and their son, David, is a thoracic surgeon. In his spare time, Lemonick enjoys sailing and woodworking.

TFTR Shutdown Activities Ahead by Nine Days

Since February 13th two crews under the direction of George Barnes and Doug Loesser, with Joe Winston and Danny Crook as crew leaders, have been carrying out the first phase of the in-vessel repairs and upgrades for TFTR. They have installed the new carbon-carbon bumper limiter tiles, carried out the initial alignment of the bumper limiter, measured for the bumper limiter locking shims, and carried out a trial of these locking shims. In addition, they have removed the RF limiter tiles, which will get stronger mounts (some were damaged in the last weeks of the run period), and have assisted with several tasks for the TFTR Diagnostic Division, including the initial phases of the Reflectometer and Beam Emission Spectroscopy diagnostic installation. Because of the hard work of this crew of in-vessel technicians, shutdown activities on TFTR are now nine days ahead of schedule!

The in-vessel Crew #3, with crew leaders Paul Kivler and Steve Jurczynski, began work on March 1st and will continue until March 18th. Their primary goals are to repair the RF limiter mounts, replace the surface pumping system panels with shields, install the bumper limiter locking shims, and perform a final alignment of the bumper limiter. They will also assist with numerous in-vessel tasks planned by the TFTR Diagnostics Division.

Construction and alignment work inside the TFTR vacuum vessel will end on March 16th and pump down of the vacuum vessel and the neutral beams will occur on March 26th and 27th. Bakeout of the vacuum vessel will begin on April 2nd and machine operation will resume on April 9th.



Crew #2 in-vessel technicians are, back row, left to right: Ken Lincoln, Ed Bush, Warren Class, Buddy Kearns, Doug Loesser, George Barnes, Danny Crook, and Gary Damico. Kneeling, left to right, are: Allen Patterson, John Dolobacs, John Mazzella, and Charlie Pollack. Technicians not shown are: Joe Winston, Ed Rogers, Bruce Berlinger, George DePagnier, Dave Brelsford, Jim Benchoff, and Roger Coston.

Safety Training

The Safety Office has scheduled the following safety training courses for March:

Course	Date/Time/Location
Basic Safety	13 March, 1:00-2:00 p.m., Safety Office Conference Room, D-Site

This one-hour class is required every two years. It includes information on radiation and the New Jersey Right-to-Know Law.

CPR Training — 20 March, 12:30 p.m.-4:30 p.m., LOB Commons

The Center for Emergency Medical Training will conduct this class in the life saving technique of Cardiopulminary Resuscitation. Recertification is required every year.

Employees must obtain permission from their immediate supervisors to attend these classes. Supervisors should call Sue Hill at ext. 2526 to enroll their employees.

Bloodmobile to Visit Lab March 22

Giving blood is easy, takes very little time, and is 100% safe. Join your fellow employees and donate a pint when the American Red Cross Penn-Jersey Blood Services' bloodmobile team comes to PPPL on Thursday, March 22. The blood donating facility will be located in the Emergency Services Unit Firehouse, and will be open from 9:00 a.m. to 2:00 p.m. The Laboratory's goal for this visit is to donate 75 pints.

Last September's blood drive was the "best ever." Employees exceeded the goal by 15 pints. Let's do it again! Call the Medical Office, ext. 2272, to schedule an appointment.

Retirement Luncheon for Hengeli

***Joe Hengeli** is retiring and his friends in the Mechanical Engineering Division have planned a retirement luncheon for him at Good Time Charley's on Tuesday, April 10 at 12:00 noon. If you would like to attend, call Jeanne Salerno, ext. 3003, for more information regarding the menu and to sign up.*

Editor: Carol Phillips
Layout: Terry Birch
Photography: John Peoples
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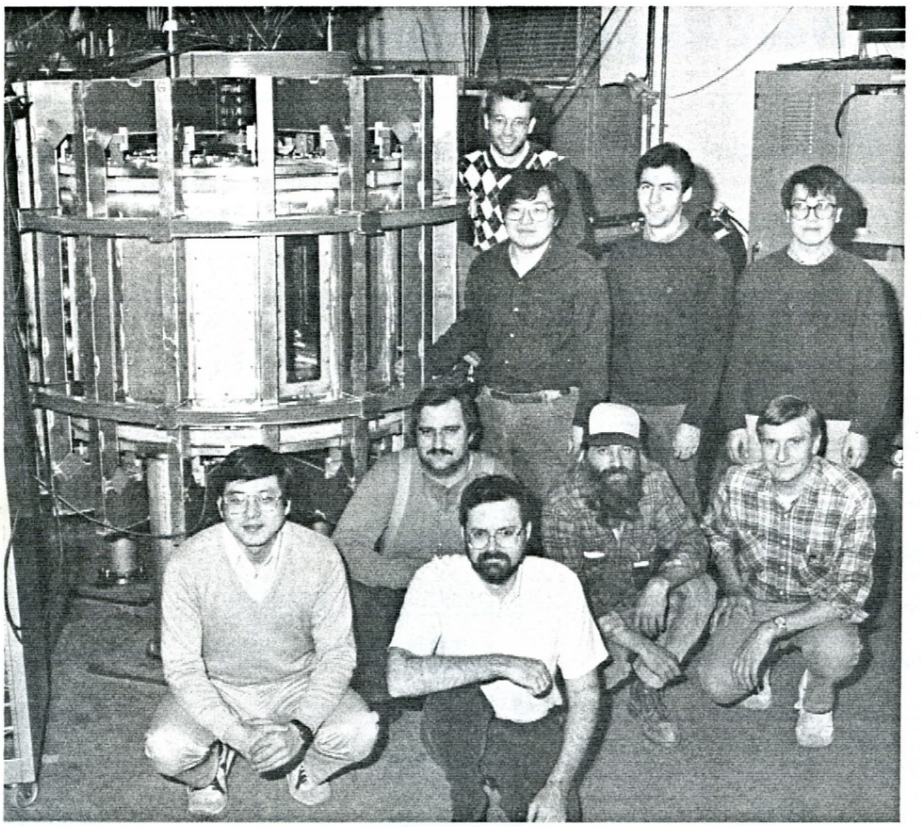
Cafeteria Menu for Week of March 12, 1990

Item	Monday	Tuesday	Wednesday	Thursday	Friday
Soup #1 ($.90)	Garden Vegetable	Cream of Tomato	Beef & Barley Vegetable	Split Pea w/Ham	New England Clam Chowder
Soup #2 ($.90)	Manhattan Clam Chowder	Garden Vegetable	Cream of Tomato	Beef & Barley Vegetable	Split Pea w/Ham
Entree #1	English Beef Stew over Noodles $2.85	Chicken coq au vin over Noodles $2.70	Flounder Florentine w/Vegetable $2.95	**Special I** Hot Corned Beef w/Cabbage, Parslied Potatoes,	Catch of the Day w/Vegetable $2.85
Entree #2	Spinich Quiche w/French Fries $2.40	Baked Ziti w/Meat Sauce $2.65	Hawaiian Ham Steak w/Vegetable $2.75	Roll & Butter, 12 oz. Fountain Beverage,	Chicken Tettrazzini $2.70
Dieter's Special	Tuna-Stuffed Tomato 295 cal. $2.25	Broiled Chicken w/Vegetable & Roll 287 cal. $2.70	Broiled Fish w/Vegetable & Roll 273 cal. $2.85	Lime Sherbet **$3.95**	Broiled Fish w/Vegetable & Roll 273 cal. $2.85
Hot Sandwich	Chicken Parmigiana on a Kaiser $2.45	Bacon, Cheese-burger w/French Fries $2.45	Grilled Pork Roll & Cheese $1.45	**Special II** Irish Lamb Stew w/Roll **$2.95**	Grilled Ham & Cheese $1.80
Cold Sandwich	Ham, Turkey & Swiss on Kaiser $2.45	Tuna Club w/Chips $2.50	PPPL Sub $.35/inch	**No Grill**	Salami & American Cheese on Whole Wheat w/Lettuce & Tomato $2.40
Salad by the Ounce (18¢ per ounce)	Garden Salad	Macaroni Salad	Beet w/Onions	Spinach Salad	Marinated Vegetables
Breakfast Specials	2 Eggs, 2 Bacon, Toast, Small Coffee $1.90	Ham Omelet, Toast, Small Coffee $1.95	3 Pancakes, 2 Bacon, Small Coffee $1.93	2 Eggs, Cheese, Sausage on Kaiser $1.93	3 French Toast, 2 Bacon, Small Coffee $1.93

PPPL
PRINCETON PLASMA PHYSICS LABORATORY
HOTLINE

Volume 11, No. 8 12 March 16,1990

CDX-U Produces First Plasma: Meets DOE's Milestone for Start Up



The CDX-U device, shown in the upper left-hand corner of the photo, replaces the CDX device, which ended experimental operation on January 2 of this year. In little more than six weeks, the CDX was dismantled and in its place the CDX-U assembled. PPPL staff responsible for the project are, in the back row, left to right, graduate students Cary Forest, Yong-Seok Hwang, Ted Jones, and Won Ho Choe; in the middle row, left to right, Tech Shop technician Tom Signs and CDX-U technicians Jim Taylor and Bill Kineyko; in the foreground, left to right, CDX-U Project Head Masa Ono and physicist Glenn Greene. Others who have contributed to the project include engineer Phil Heitzenroeder, who consulted on the machine design and fabrication techniques, and physicists Doug Darrow and Tom Stix.

by Carol A. Phillips

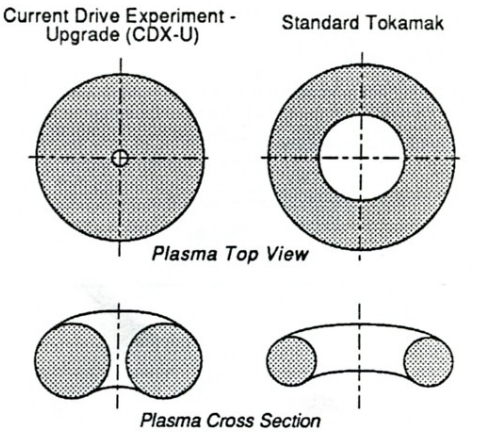
The Current-Drive Experiment-Upgrade (CDX-U) achieved first plasma on February 15, successfully meeting its U.S. Department of Energy milestone for start up.

The CDX-U is the latest in a series of small tokamak devices, including ACT (Advanced Torus Concepts), ACT-1, and CDX (Current Drive Experiment), that have operated since the summer of 1979.

The main physics goals for CDX-U are to investigate the physics of steady-state current drive in plasmas and to develop a method to produce steady-state currents in future tokamak fusion reactors. Steady-state currents, that is, continuous currents, could be used to maintain plasmas for longer times. The device will also be used to study plasma transport properties — what causes plasma particles and heat to escape — and how plasma transport is affected by plasma fluctuations, radial electric fields, and plasma aspect ratio (how skinny or fat the plasma is).

Two types of plasma current drive will be studied in CDX-U: direct current (dc) helicity injection current drive and transport driven current drive. In dc-helicity injection, a high-current, low-energy electron beam is injected along the magnetic field at the edge of the plasma and the current is carried into the plasma center. Transport current drive is a natural current in the plasma. It is driven by the plasma flowing outward from the plasma interior.

The CDX-U device is unique among existing tokamaks in that the "doughnut hole" or center core formed by the inner toroidal field (TF) coils is very small, about 6 inches as compared to 40 inches for standard-sized tokamaks. The closeness of the coils causes the toroidal fields near the plasma's inner edge to be much higher than those on its outer edge. In CDX-U plasmas, the ratio of the high field region to the low field region can vary by up to a factor of 6 (sometimes called the mirror ratio); in a



The CDX-U device differs from other present-day tokamaks in that the size of its "doughnut hole" is very small: 6 inches as compared to 40 inches for standard-sized tokamaks. Nevertheless, 160-turn water-cooled toroidal-field coils surround the vacuum vessel.

(continued)

typical tokamak, such as PLT and TFTR, the difference is only about 2. Therefore, the CDX-U can be used to investigate tokamak plasma properties in a wide range of mirror ratios.

Another unique feature of the CDX-U is its physical flexibility. The device can literally be taken apart and put back together in about three weeks, allowing physicists to change the machine configuration to meet the physics needs of the magnetic fusion program. Additionally, it has a large number of diagnostic ports for measuring plasma properties and, because of its relatively small size and the nature of its research objectives, it is also well-suited for graduate student training and thesis experiments: PPPL graduate students actively participated in its design and construction, and also in the planning of its physics programs.

Volunteer work you can do laying down. Give blood on March 22, 9:00 a.m. to 2:00 p.m., at the Emergency Services Unit Firehouse. Call extension 2272 to schedule an appointment.

Cafeteria Menu for Week Beginning March 19, 1990

Item	Monday	Tuesday	Wednesday	Thursday	Friday
Soup #1 ($.90)	Chicken Noodle	Navy Bean	French Onion	Lentil	Fisherman's Chowder
Soup #2 ($.90)	New England Clam Chowder	Chicken Noodle	Navy Bean	French Onion	Lentil
Entree #1	Southern Fried Chicken w/Veg. $2.65	Chopped Tenderloin w/Sauteed Onions & Whipped Potatoes $2.70	Vegetable Quiche w/French Fries $2.45	Spaghetti w/Meatballs & Garlic Bread $2.65	Catch of the Day w/Veg. $2.85
Entree #2	Beef Burgundy over Noodles $2.85	Baked Manicotti w/Garlic Bread $2.65	Herb Marinated Chicken w/Rice $2.75	Baked Lasagna w/Garlic Bread $2.85	Stuffed Cabbage w/Veg. $2.60
Dieter's Special	Broiled Chicken w/Veg. & Roll 287 cal. $2.65	Broiled, Chopped Tenderloin w/Veg. & Roll 328 cal. $2.70	Baked Fish w/Veg. & Roll 342 cal. $2.85	Tomato Surprise 335 cal. $2.10	Broiled Fish w/Veg. & Roll 342 cal. $2.85
Hot Sandwich	Cheeseburger w/French Fries $1.95	Grilled Swiss w/Tomato $1.50	Hot Dog w/Kraut $1.45	**Grilled Turkey Reuben*** **$2.35**	Cheese Steak w/Grench Fries $2.45
Cold Sandwich	Great Dane $2.39	Egg Salad w/Lettuce & Tomato $1.75	Tuna, American Cheese, Bacon on Whole Wheat $2.39	Genoa Salami & Provolone Hoagie $1.95	Bacon, Lettuce, & Tomato $1.95
Salad by the Ounce (18¢ per ounce)	Spinach Salad	Danish Cucumber	Pasta Salad	Claremont Salad	Garden Salad
Breakfast Specials	2 Eggs, Cheese, Sausage on Kaiser Roll, Small Coffee $1.93	2 Eggs, 2 Bacon, Toast, Small Coffee $1.90	3 French Toast, 2 Bacon, Small Coffee $1.93	Ham & Cheese Omelet, Toast, Small Coffee $1.95	3 Pancakes, 2 Bacon, Small Coffee $1.93

*Note: **New items are noted in bold print.**

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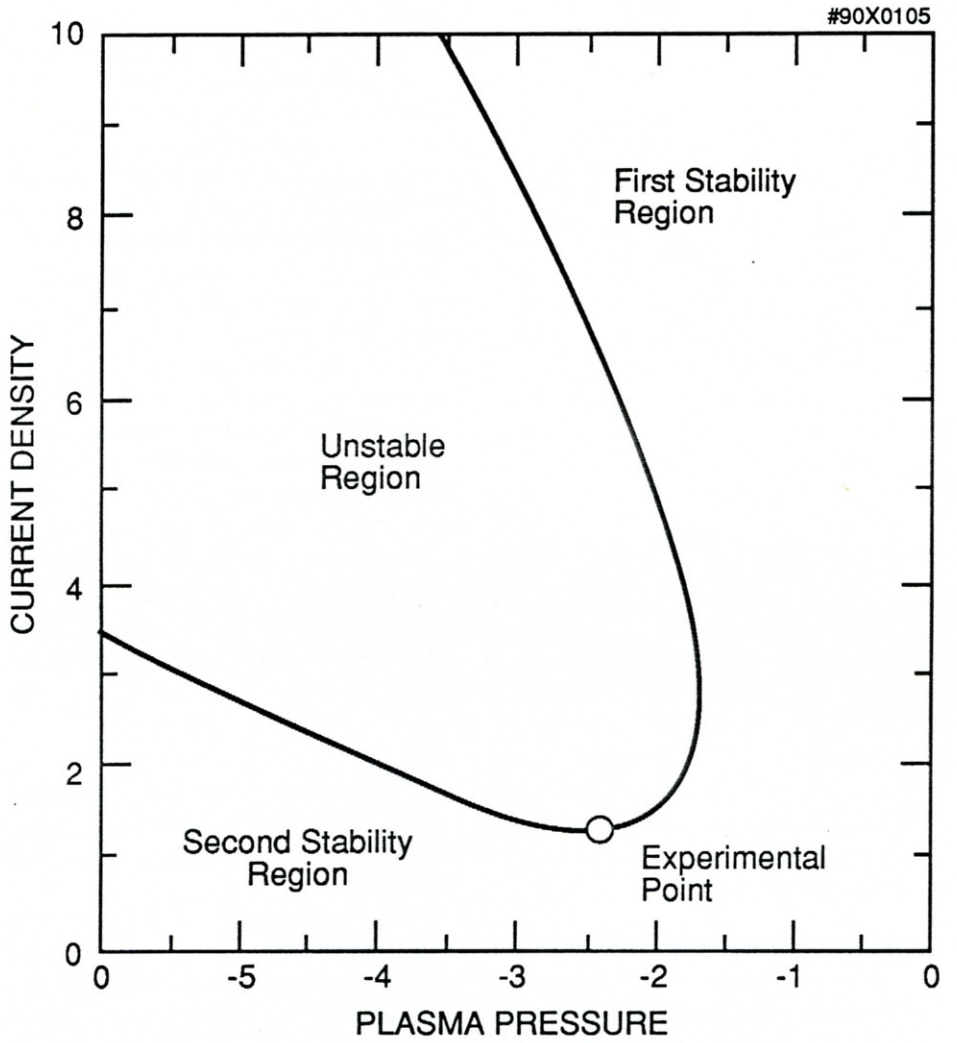
HOTLINE

Volume 11, No.13 | Special Edition | April 6, 1990

PBX-M Fiscal Year Roundup



By controlling the plasma current and pressure profiles, physicists will try to steer around the instabilities on their way to the second stability region. Enhanced-confinement, high-beta plasmas are predicted for the second stability regime.

by Carol Phillips

The PBX-M (Princeton Beta Experiment-Modification) physics and engineering teams recently completed a very busy and productive year in which they diagnosed and fixed problems that were hampering reliable machine operation, reached record high PBX-M betas of 6.8%, demonstrated the effectiveness of the passive stabilizer plates in suppressing plasma instabilities, and successfully tested and operated diagnostics that measure the current density profile.

PBX-M Project Head Ned Sauthoff said, "The measured high beta of 6.8% had an exciting feature. The plasma had very high ion temperature — for instance, ion temperatures at the center near 5 keV (58 million °C), and confinement times about 50% longer than predicted. This says that we had enhanced-confinement high-beta discharges, which is a big accomplishment." Producing enhanced-confinement, high-beta plasmas is one of the major goals of the PBX-M program.

High Beta, Second Stability Regime, and Plasma Instabilities

For several years, theorists have been predicting the existence of an unexplored region of plasma stability, called the second stability regime. In this regime, it is believed that plasmas will be more stable and that enhanced-confinement and high-beta (typically, greater than 10%) will result. The challenge is to reach this second stability regime while avoiding the instabilities that limit beta in the first stability regime.

Physicists have identified several major types of plasma instabilities — external kinks, internal kinks, and ballooning modes — that must be controlled or bypassed if high beta and the second stability regime are to be reached. Four major techniques have been developed for PBX-M to control and manipulate these instabilities. They are:

- Placing passive stabilizer plates (also called close-fitting conducting walls) close to the plasma to stabilize external kinks.
- Indenting or "shaping" the plasma using a pusher coil to help stabilize the plasma against ballooning modes.
- Using lower-hybrid current drive, neutral beams, and current ramping to manipulate the plasma current density profile.
- Using Ion-Bernstein-Wave (IBW) heating to control the plasma pressure profile.

Progress in the first two areas was achieved during the past year, and an antenna for the Ion-Bernstein-Wave heating system was successfully tested. A 1-MW lower-hybrid current-drive heating system, which will allow control of the current

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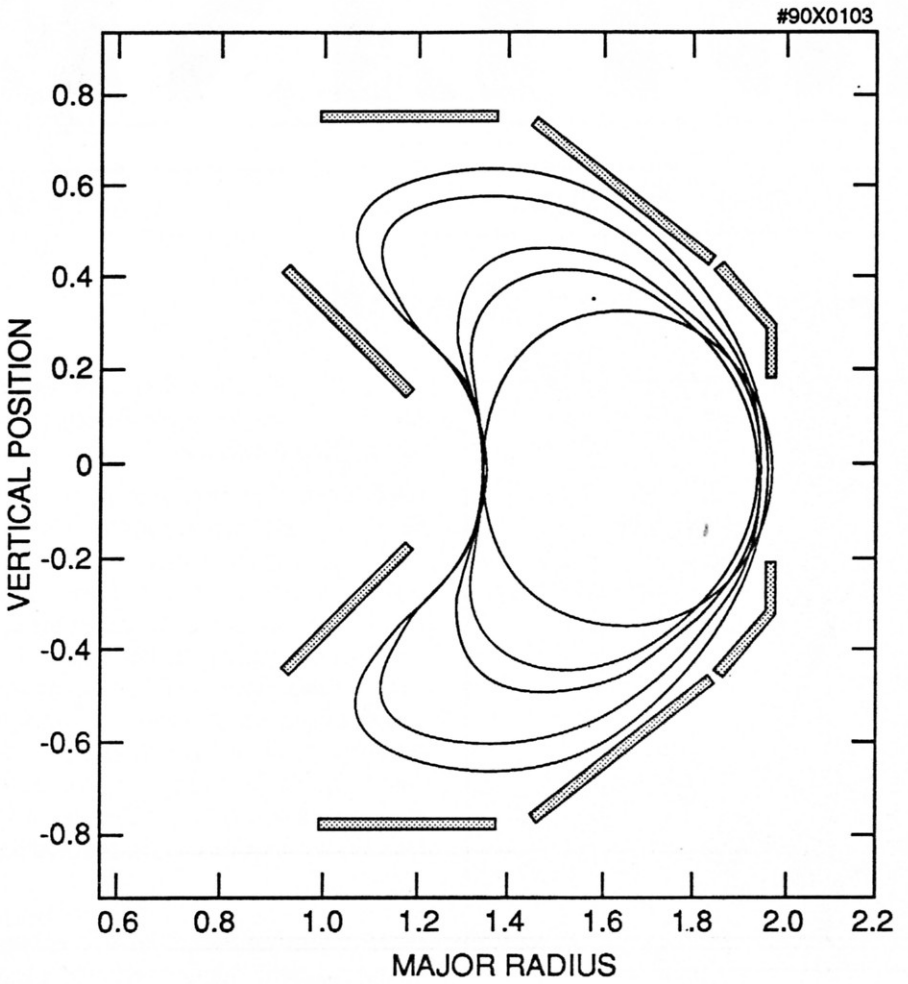


Installation of the passive stabilizer plates (gray bars) was the major improvement between PBX and PBX-M. Their effectiveness in controlling external kinks was demonstrated during the experimental run periods.

density distribution using radio-frequency power, is being installed on PBX-M during FY90 and will be augmented by a second megawatt in FY91.

October through December 1988

During the first few months of FY89, PBX-M experienced problems with electrical arcing and failures of the insulation inside the vacuum vessel. This caused damage to machine components and unreliable machine operation.

"We didn't completely understand the problem, although we were pretty sure voltages from plasma disruptions were responsible, so we decided to improve the insulators which support the passive stabilizer plates and instrument these plates to measure the voltages and currents. We could then gather data for design criteria to fix the machine," Sauthoff said.

The PBX-M engineering team was responsible for modifying the machine so that physicists could identify and study plasma disruption effects and for designing modifications to correct the problems. These activities were critical if PBX-M was to operate reliably.

January through June 1989

Measuring voltages caused by plasma disruptions was the main engineering physics goal during the January through March experimental run period. Henry Kugel and Michio Okabayashi lead the experimental physicists in measuring the voltages and currents, and theoretical predictions and assessments were made by Steve Jardin and Charles Kessel. "We determined that the voltages were moderate, about 1,000 volts, and this allowed us to do rather simple fixes," said Sauthoff. Chuckling, he added, "there were some wide differences between the measured voltages and the predicted ones, and Steve is still scratching his head over this. Understanding the difference is important for projecting requirements for future machines like the Compact Ignition Tokamak and the International Thermonuclear Experimental Reactor."

The effectiveness of the passive stabilizer plates, the major improvement between PBX (Princeton Beta Experiment) and PBX-M, in controlling external kink instabilities was also investigated during this run, and the current was raised to explore high-β_T.

A high-beta plasma was achieved operating at modest toroidal fields, $B_T \sim 1$ T (= 10 kG), and high neutral-beam power, 5 MW. The maximum beta was 6.8%, tying the record set a few weeks earlier by DIII-D (at General Atomics in San Diego). "The good confinement and high temperatures in these plasmas were especially interesting and demonstrated enhanced performance," Sauthoff said.

From April through June, PBX-M was shutdown so that engineers and technicians could upgrade the insulation in the vacuum vessel and thus increase the reliability of the machine. In addition, one of six possible antennas for the ion-Bernstein-wave-heating system was installed, and a one-channel prototype for a new plasma fluctuation profile diagnostic, the Beam Emission Spectrometer (BES), was tested successfully.

July through October 1989

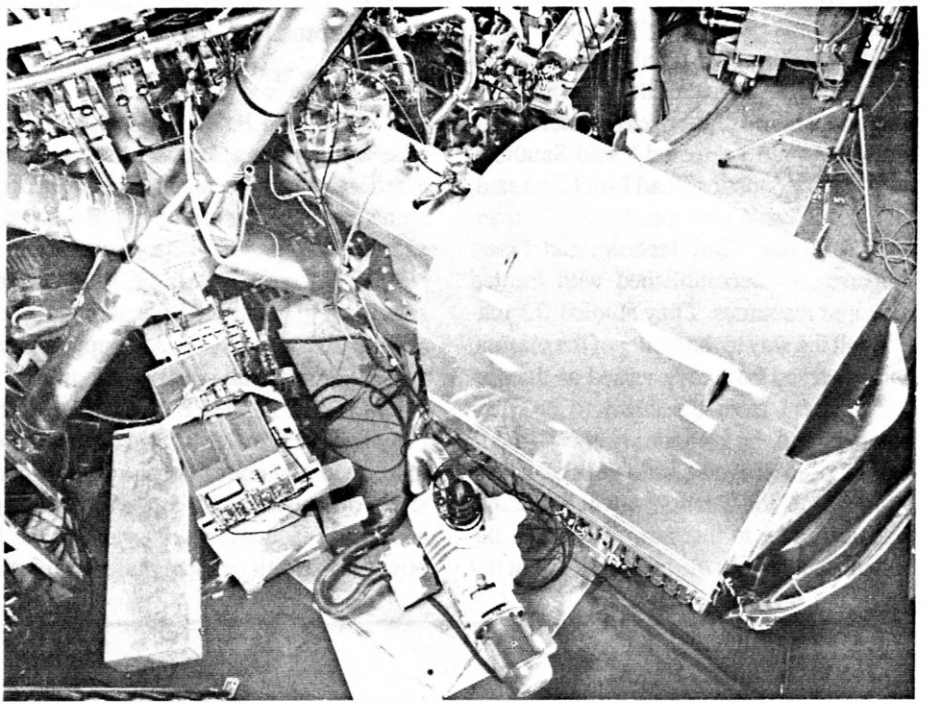
This run period was focused on control of the plasma current distribution using rapid change of the plasma current, neutral beams, and pellet injection.

Theorists have determined that at a particular plasma current and magnetic field, the beta that a plasma of a given size can achieve is limited by the onset of instabilities. This is called the "Troyon Limit," and it defines the boundary of the first stability regime. However, PBX-M physicists obtained betas which were four times this limit, and detailed analyses of these plasmas showed that they were at the threshold of the second stability regime. "The results confirmed that PBX-M is on the right track. When all the planned tools [passive stabilizer plates, pusher coils and divertor, ion-Bernstein-wave heating, and lower-hybrid current drive] are available in FY91/92, even higher performance should be achievable," Sauthoff said.

(continued)

Also during this period, diagnostic measurements of the plasma current density were made to study plasma stability. (Diagnostics are instruments used by physicists to measure how well the plasma is performing and to assess how well their methods towards controlling the plasma are working.) Being able to accurately measure and control the plasma current density profile is very important to achieving the goals of PBX-M. Accordingly, three diagnostics employing different techniques were developed to measure the current density and to provide valuable cross checks between measurements. All were successfully employed during the summer run.

The Motional Stark Effect (MSE) polarimeter was developed by Fred Levinton of the Jaycor Corporation of San Diego, California; it measures the plasma magnetic field direction. The X-Ray Pinhole Camera diagnostic, developed by Ray Fonck and graduate student Ed Powell, measures the plasma magnetic surface contours. The Fast Ion Detector Experiment (FIDE) diagnostic, developed by Bob Kaita and graduate student Don Roberts, measures the fast ion orbit shifts. Both the FIDE and MSE diagnostics use an 80-keV neutral probe beam, which was developed jointly by PPPL and the Culham Laboratory in England.



Top view of the 80-keV neutral probe beam on PBX-M.

Plasma fluctuations are important plasma characteristics which need to be measured to understand the plasma performance. They are "waves" in the plasma which are driven by the instabilities and may drive transport (the motion of energy or particles within the plasma); the measurements of fluctuations tell the physicists how well the instabilities are being suppressed or how virulent they are.

During the summer run, an upgraded, four-channel Beam Emissions Spectro-

(continued)

Personnel from many areas of the Laboratory were involved in operations on the PBX-M. Standing (l to r): Bob Diernbach, Fred Levinton, Dick Yager, Tong-Wen Jaeng, Masa Ono, Madge Mitas, Ned Sauthoff, Walt Maciolek, Don Roberts, Yunuen Qin, Frank Polom, Sr., Ed Powel, Janet Felt, Stefano Bernabei, Ron Hatcher, Gary Drozd, Les Gereg, Pete DePeter, Munier Awad, Bill Persely, Jim Dickinson, Eric Thorsland, Stan Schweitzer, Harry Krotz, Fred Wasylenko, Joe Carson, Tom Kozub, Henry Kugel, and Michio Okabayashi. Kneeling (l to r): Dick Shoe, Ray Pressburger, Phil Heitzenroeder, Dan Kungl, Dan Bollenbacher, Nobu Asakura, Herb Fishman, Rich Palladino, Bob Raimond, Rich Frankenfeld, and Bill Davis. Staff also involved with PBX-M, but not available at the time of the photo are: Virginia Baunach, Ron Bell, Morrell Chance, Gordon Chiu, T.-K. Chu, Mary Corneliussen, Nick Dereka, Jim Faunce, Jerry Gething, Gary Gibilisco, Tom Gibney, Glenn Greene, Steve Jardin, Charles Kessel, Alex MacAulay, Janard Manickam, Bob Mika, Dave Moser, Steve Paul, Sherry Preische, Ken Quadland, Mike Reusch, Phyllis Roney, Bob Santoro, John Semler, Tom Sereni, Steve Sesnic, Hiro Takahashi, Keith Voss, and George Vetoulis.

scopy (BES) system to measure the fluctuations was installed. "We had put a window in during the April/June shutdown and were able to install the system in the wee hours of the night so experimental operations weren't affected," said Sauthoff. PBX-M Diagnostics Head Bob Kaita said, "It's remarkable how much the BES team — Ray Fonck, Kurt Jaehnig, and Pierre Duperrex — accomplished with limited time and resources. They studied fluctuations all the way to the center of the plasma, and observed how they varied as the discharge went from the standard confinement regime, or L-mode, to the H-mode regime of improved confinement."

A single ion-Bernstein-wave antenna was used, late in this run, to validate the antenna and assess the effects of about 0.7 MW of 41 MHz waves; Masa Ono and Glenn Greene lead this effort.

The Future

The PBX-M FY89 program consisted of several successful phases that produced a reliable machine and included experiments exploring current profile control and access to the high-beta second stability regime. Early in FY90, the PBX-M was shutdown to install additional diagnostics and heating systems and to upgrade in-vessel hardware and instrumentation.

During FY90, the PBX-M teams will be busy installing lower-hybrid current drive to allow direct control of the current density profile using radio-frequency heating, additional ion-Bernstein-wave heating power to permit greater plasma pressure profile control, and the capability for applying voltages to the passive stabilizer plates to study the effect of edge electric fields.

"The PBX-M will become operational again at the beginning of FY91 when funding arrives," Sauthoff said. "We will then begin studying the effects of plasma cross-section shaping and active current density and plasma pressure profile control on stability and confinement. The PBX-M team looks forward to applying its flexible control and unique diagnostic tools to studying their influences on plasma fluctuations and confinement, leading to the development of a more advanced toroidal configuration which will improve the attractiveness of the tokamaks as a fusion reactor," he said.

Editor:	Carol Phillips
Layout:	Terry Birch
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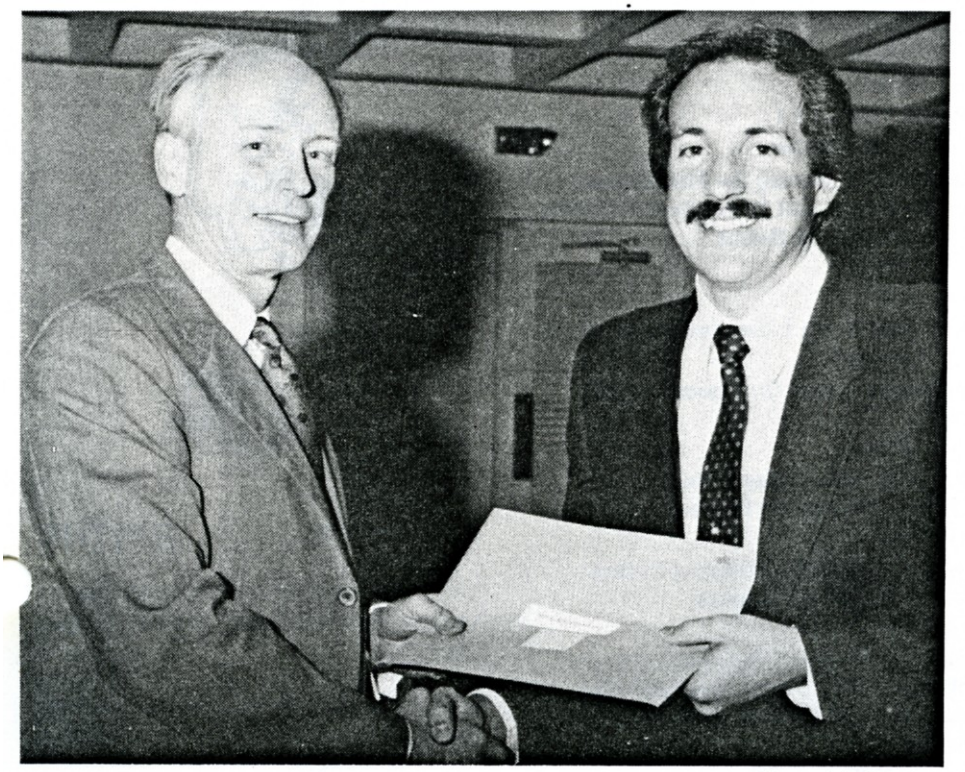
PPPL
PRINCETON PLASMA PHYSICS LABORATORY

HOTLINE

Volume 11, No. 14 May 29, 1990

Inventors Honored



(Photo: John Peoples)

Tip Brolin, Acting Director of PPPL, presents Mike Vocaturo with a patent award.

by Carol Phillips

Thirty-nine PPPL inventors were honored at the ninth annual PPPL Patent Awareness Program recognition dinner on April 30 at Prospect House. The Committee on Inventions hosted the dinner for the inventors and their guests as part of the PPPL Patent Awareness Program which was established in 1981 to foster the disclosure of inventions, to recognize creative inventors, and to raise the patent-mindedness of Laboratory staff. Twenty-one invention disclosures were made, two patent applications were filed, and one statutory invention registration was issued in fiscal year 1989.

The Committee on Inventions, chaired by John Johnson and consisting of members Peter Bonanos, Richard Rossi, Charles Staloff, Schweickhard von Goeler, and Marilyn Hondorp, and Joseph File, Head of the Office of Technology Transfer serving *ex officio*, makes cash awards to inventors for their novel ideas — $100 per inventor listed on an invention disclosure (with a maximum of $300 per disclosure shared among inventors if there are four or more). Additional monies — $200 per inventor — are awarded when the Department of Energy files a patent application on the invention. In fiscal year 1989, PPPL inventors were awarded over $4000. Over $60,000 has been awarded since the program began.

At the ceremony, Chairperson John Johnson spoke of the desirability of filing invention disclosures and acknowledged the continuing strong support the Committee and inventors received from Laboratory management, Princeton University, and the Department of Energy. He pointed out that "good ideas can come back to help us in our old age," as with the invention "Toroidal Reactor," by John Dawson, Harold Furth, and Fred Tenney which

Continued on Page 2

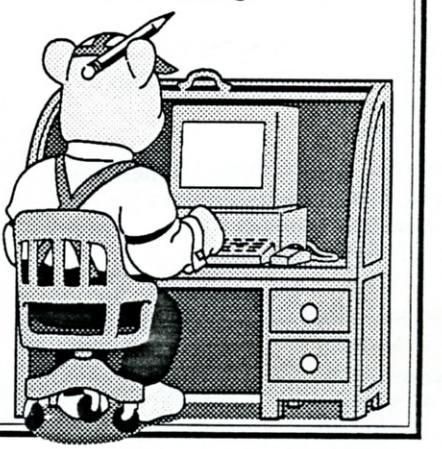
HOTLINE is Back!

Thanks to your interest, *HOTLINE* is returning! But we need your help. Do you know of a good story idea? How about classified ads — for sale, rent or to give away — we've saved a place for your notice. We're anxious to fill this newsletter with information about employees, activities and upcoming events.

Ellen Webster is our new writer, and you may see her around asking questions and taking pictures. Smile!

Give Carol Phillips a call at ext. 2754 with suggestions.

. . . We're waiting!



Continued from Page 1

received Statutory Invention Registration status in fiscal year 1989. "Its basic idea is why the TFTR works," he said.

Department of Energy Area Office Head, Milt Johnson expressed gratification to the inventors for their dedication in continuing to make time to "take part in the creative process" in the face of budget cuts and increased workloads. He said, "It reflects your desire for continual improvement and for doing things better."

Tip Brolin, Acting Director and Deputy Director for Technical Operations commented on the opportunities that exist for PPPL inventors to receive cash payments and shares in royalties from licensing an invention to commercial interests. He then presented Certificates of Recognition to the following.

Statutory Invention Registration in Fiscal Year 1989

Toroidal Reactor
J. Dawson
H. Furth
F. Tenney

Patents Applied for in Fiscal Year 1989

Hydrogen Isotope Separation Utilizing Bulk Getters
R. Knize
J. Cecchi

Method of Sustaining a Radial Electric Field and Poloidal Plasma Rotation Over Most of the Cross Section of a Tokamak
M. Ono
D. Darrow

Inventions Disclosed in Fiscal Year 1989

Four-channel ZnS Scintillator Detector for Escaping Charged Fusion Products
S. Zweben

Method of Measuring the DC Electric Field and Other Tokamak Parameters
N. Fisch
A. Kritz

Long Wavelength Phase Conjugation Using Weakly Ionized Plasma as Nonlinear Medium
J. Federici
E. Valeo

Composite Rail Gap Laser
L. Meixler

Hydrostat 10
H. Swiderski
D. West
J. Swatkoski

An Optically Pumped CH_3OH Laser with a Stark-Tuning Capability and with a Fluid-Cooled Cavity
D. Mansfield
M. Vocaturo
L. Guttadora

Method of Constructing Very Large, Multidimensional Arrays of Sensing Devices
A. Janos
R. LaBaw
F. Wood

SPARK Version 1.1
D. Weissenburger

Method of Measuring the Momentum, Energy, Power, and Power Density Profile of Intense Particle Beams
G. Gammel
H. Kugel

ECH Drive X-ray Lithography Source
P. Colestock

Apprentice System for Plasma Physics Theory
H. Mynick

Ultra-Fast Probe Measurements in High-Temperature Plasmas
A. Janos

Amplitude and Phase Control System for High Power RF Sources
G. Cutsogeorge

Proposal to Measure Poloidal Field of a Tokamak via Energetic Neutral Helium Atoms Injected by a Neutral Beam Injector
F.C. Jobes

A D-He^3 Fusion Reactor Based on Dipole Magnetic Field
A. Hasegawa
L. Chen

Evaporatively Cooled Pumped Limiter
P. LaMarche

Improved ECR Microwave Plasma Source
J. Stevens
J. Cecchi
P. Colestock

Laser and Electron Beam Produced White Carbon
J. Timberlake

Combined Soft X-ray Holographic and Reflection Imaging Microscope for Lithographic Inspection
S. Suckewer
C. Skinner
R. Rosser

High Density Control Multiplexer/ Demultiplexer
G. Greene

Carrier for Bridgeport Milling Machine
E. DuBois

The HOTLINE offers congratulations to the following employees:

BIRTHS

A son, Charles Louis, was born to **Charles Neumeyer** (of CIT) and his wife Leslie on March 20.

A son, Nicholas John, was born to **Joe Greco** (of the Safety Department) and his wife Jean on March 21.

A son, Philip Thomas, was born to **Karen Heinemann Kerek** (of the Maintenance Department) and her husband Philip on April 5.

A son, Shawn, was born to **Ed Simmons** (of the RF Section) and his wife Lisa on April 12.

A son, Sean Martin, was born to **Steve Cowley** (of the Theory Division) and his wife Margaret on April 21.

A son, Benjamin Henry, was born to **Cynthia Kieras Phillips** (of TFTR Physics) and her husband Michael on May 3.

A daughter, Courtney, was born to **Bob Kaita** (of PBX) and his wife Chiu-Tze on May 5.

A son, Benjamin Aaron, was born to **Nat Fisch** (of the Theory Division) and his wife Tobe on May 18.

MARRIAGES

Kelliann Glasson (of the Budget Department) and Jeffrey Potts were married on May 5.

RETIREMENTS

Jack A. Bartow retired April 1 after 30 years of service. He was a Project Engineer in the Technical Operations Department.

Richard A. Carlese retired on May 1 after 21 years of service. He was a Technical Associate in the Administrative Operations Department.

Elsie G. Ferreras retired April 1 after 18 1/2 years of service. She was a Word Processor in the Technical Operations Department.

Helen J. Glover retired April 1 after 12-1/2 years of service. She was a Staff Assistant in the Administration Department.

Kristofer P. Mann retired on April 1 after 32 years of service. He was a Technical Associate in the Technical Operations Department.

Henry Mikulewicz retired April 1 after 21 years of service. He was Technical Associate in the Technical Operations Department.

Henry Miller retired on March 2 after 31 years of service. He was the Manager of Transportation Services in the Administration Department.

Chester V. Ptak retired on April 1 after 10 years of service. He was a Cryogenic Engineer in the Technical Operations Department.

Joseph Solivoda retired on May 1 after 26 years of service. He was a Senior Vacuum Technician in the Technical Operations Department.

Leo Ulatowski retired on May 1 after 10 years of service. He was a Technical Associate in the Technical Operations Department.

(Photo: John Peoples)

Rod Templon and Skip Schoen with recent CPCM achievment award.

The Pride of Procurement

by Ellen Webster

Why would two busy men from the Procurement Department willingly study six to eight hours on their own time and then take a three-hour essay exam if they weren't required to do so?

According to Rod Templon, Manager of Subcontracts, and Skip Schoen, now working in the TFTR Planning & Control Office, the incentive to successfully complete the Certified Professional Contracts Manager (CPCM) exam and become certified in their field had to do with both personal and professional motivation.

Templon said that this award indicates that they have achieved a certain level of technical proficiency. It also provides them with a status among their peers because the certification is not easily attained. Additionally it is a positive sign to the Department of Energy that their job knowledge goes far beyond the norm.

Roger Gould, Head of Procurement applauded their accomplishments and said, "Rod and Skip should be congratulated for their independent efforts to make significant contributions to the Procurement Division."

Templon said that continuing to take courses and stay on top of what is happening within one's field is a good way to "develop portable skills — ones that belong to the individual and can't be taken away."

The CPCM exam is administered by the National Contract Management Association which has a national membership of 25,000; only about 4,000 of whom are certified. In addition to the written exam, certification requires that a candidate hold a bachelor's degree, complete eight courses in procurement or in procurement-related areas and have a minimum of two years of contracting experience.

Templon explained contract management as "the process of soliciting, placing, and administering contracts for goods and services." At PPPL this translates to everything from cafeteria management contracts and radio-frequency switch gears to computer maintenance service — even supplying the tiles which line the interior of the TFTR.

In addition to Templon and Schoen, Larry Sutter is also CPCM certified, and has been since 1977.

Fusion for My Generation

by Carol Phillips

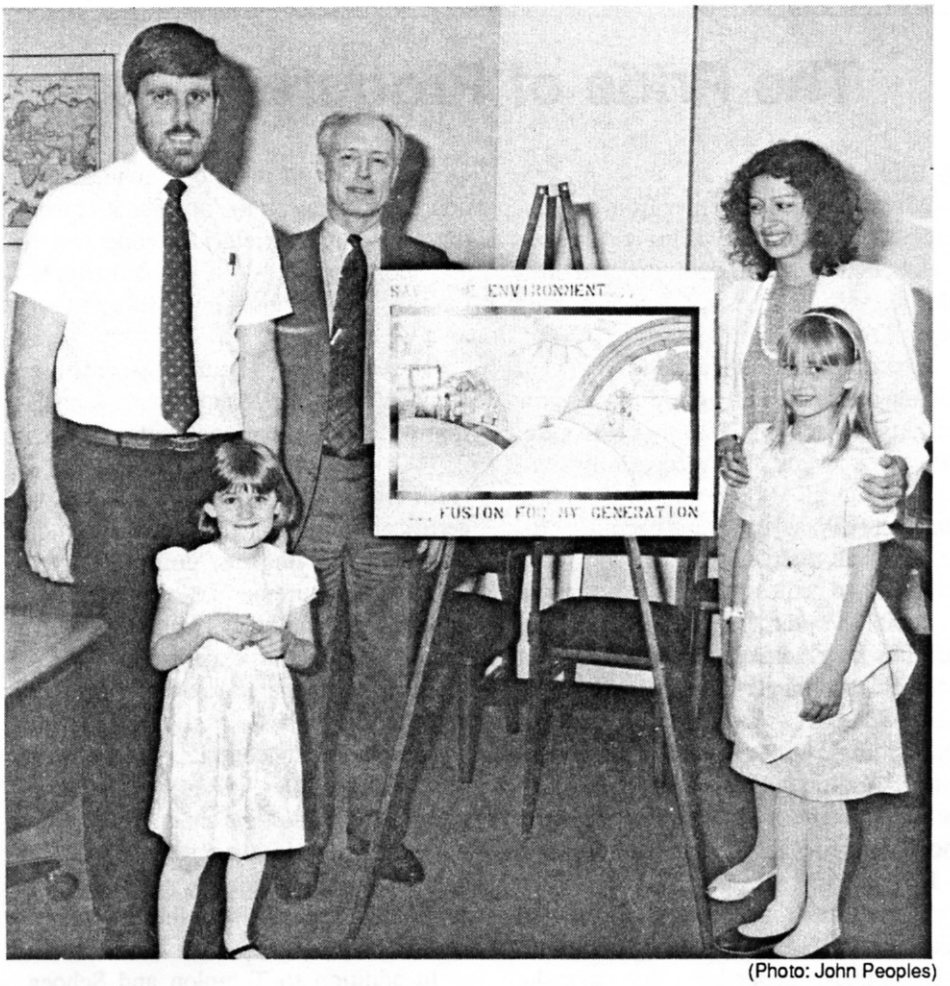
Christine Williams, eight-year-old daughter of TFTR Heating Systems Division Head Mike Williams, was recently named a first-prize winner in the U.S. Department of Energy's Earth Day Poster Contest. Her poster, depicting fusion energy as a clean energy source for "my generation," was part of DOE's Earth Day exhibit at the Mall in Washington, D.C. She received a $100 savings bond, a *Webster's New World Atlas*, a Certificate of Merit, and a personal letter of accommodation from Secretary of Energy James D. Watkins.

Tip Brolin, PPPL's Acting Director, presented Christine her awards at a ceremony at the Laboratory. He told her, "We are very proud of you and how you presented a future we are all working for."

Christine spent a lot of time "talking with Daddy about fusion" before she decided on a theme for the poster. "I knew I wanted to use the Simpson cartoon characters because lots of people like them," she said. It took Christine about two weeks to complete the project. "Drawing the Simpsons was the hardest part," she added.

Christine is a third grader at University Heights Elementary school in Hamilton Square where she participates in the gifted and talented program. Besides drawing awarding winning posters (she was a PPPL Safety Poster Contest winner last year), Christine is involved in gymnastics, dance class, ice skating, and Brownies. She would like to be a teacher.

You can see Christine's winning poster in the LOB Lobby.



(Photo: John Peoples)

Christine Williams' poster about fusion won first prize in DOE's Earth Day Poster Contest. Tip Brolin, Acting Director of PPPL (third from left), presented Christine (front, right) with her awards. Her mother, Sue, sister, Michelle, and father, Mike, joined in the special ceremony.

What's Doing at PPPL?

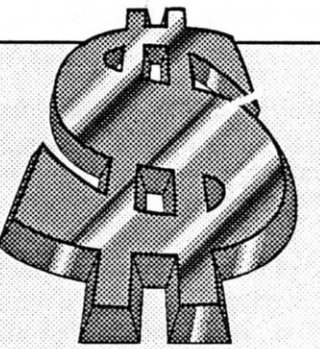
Travelling Display to Visit Princeton

The USDOE Travelling Display of R&D Magazine's Award-Winning Technologies will be exhibited in the PPPL lobby from May 29th to June 15.

A highlight among this year's winners is PPPL's Composite Optical X-Ray Laser Microscope (COXRALM) which will be featured in the display.

Each year 100 prestigious awards are presented by *R&D* magazine to recognize technological accomplishments of laboratories around the country.

PPPL was also a winner in 1987 for the development of an X-Rray laser which operates at a wavelength of 18.2 nanometers in the soft X-Ray regions of the electromagnetic spectrum. The COXRALM is an application of the original invention and combines an inverted phase-contrast optical microscope with a soft X-Ray laser microscope. Both achievements are the result of several years of research by the PPPL X-Rray Laser Group under the direction of Professor Szymon Suckewer.



For Sale

General Electric **VHS Video Camcorder**, Model 1CVM6060E. Includes: Camcorder, 2-hour battery, charging unit, cables, and carrying case. Excellent condition. $550. Call Tony, ext. 2755.

Metal Desk with return—$50; **Ski Boots**, women's size 7 1/2—$75; **Mag Wheels** (2) '84 Daytona—$150. Call Marilyn, ext. 2656.

A Glimpse of the Future: PPPL SEER Awards

by Ellen Webster

Last year the emphasis of the project was geothermal energy. This year thermonuclear laser fission was explored. Next year fusion will be examined, and finally, using the data collected over the three-year period, a comparison of these energy sources will be conducted.

Does this sound like a major undertaking of the DOE? A wide-sweeping project of a major university? Perhaps postdoctoral research of an ambitious scholar?

It is none of these, but rather the result of curiosity and initiative on the part of Daniel Weitz, a sixth grader from Morristown, who is one of this year's PPPL winners in the Student Exposition of Energy Resources (SEER) education project.

Another winner, fourteen-year-old Rebecca McCarthy, conducted an energy survey as part of her project on nuclear engines. She questioned approximately 75 classmates and teachers in order to determine their level of comfort with fusion and fission. When asked which type of power they had more overall confidence in, 80% of those surveyed said fusion.

SEER, now in its eleventh year, is sponsored by the National Energy Foundation's New Jersey Chapter. This annual contest challenges the imagination and creativity of youths from across the state who compete for cash prizes from SEER and recognition from individual organization and companies such as PPPL.

"Kids come up with ideas that adults just don't think of."

John Bradish

On Friday, May 18, these students and their guests visited the Laboratory. David Ciotti conducted a tour and Mary Ann Brown, coordinator of the PPPL awards, hosted a luncheon in their honor. Jack Joyce welcomed the students and thanked them for their interest in science. He applauded them for "acquainting themselves with the information" that was necessary to design their individual projects.

(Photo: John Peoples)

Mary Ann Brown, Patrick McGeachen, Daniel Weitz, Tom Garatina, Andrew Weekley, Becky McCarthy, Josh Wade, Charles Anchor and John Bradish.

John Bradish, formerly of PPPL and now with Princeton University, was a judge at this year's competition and has had a long association with the program. He said that because of raw imagination and ingenuity "kids come up with ideas that adults just don't think of." This is evident, he said, by the range and complexity of their projects as well as their approach to problem-solving.

This year's student PPPL SEER winners and their projects are: Andrew Weekley and Jeff Snyder, eighth graders from Franklin — Nuclear Waste Storage; Daniel Weitz, a sixth grader from Morristown — Thermonuclear Laser Fission; Joshua P. Wade, an eighth grader from Freehold — Chain Reaction Nuclear Fission; Patrick McGeachen, son of Tom McGeachen from the Administration Department — Fusion; Tom Garatina a fourth grader from Port Murray — How to Make Electricity with Piezoelectric Plastic; Rebecca McCarthy and Brie Kolan, eighth graders from Franklin — Nuclear Engines; Robert McLaughlin, a high school student from Forked River — Fiber Optics Video Communications; Robert Egenolf, an eighth grader from Freehold — Cold Fusion; Lisa Cruz a sixth grader from Manaloapan — Atoms and Their Isotopes; and Christopher DiPierro, an eighth grader from Freehold — More Efficient Electricity.

This year's judging panel consisted of: John Bradish; Mary Ann Brown, Engineering Department Secretary; Martin Brown, retired from Bell Laboratories; Charles Anchor, an Electrical Engineer at PPPL; and Dr. Joseph File, Head of the PPPL Technology Transfer Office.

HOTLINE

Editor:	Carol Phillips
Writer & Layout:	Ellen Webster
Photography:	John Peoples
Reproduction:	Teri Daynorowicz
	Dan Klinger

Our best ideas for HOTLINE come from you. If you have a story idea, call Carol Phillips at ext. 2754.

Come One! Come All!

On June 2, from noon to 4:00 p.m., the PPPL grounds will be transformed into a festival for families for this year's employee picnic.

Are you partial to the Mid-way? If so, you can look forward to the Clown Toss, Ball Bingo and earn prizes for your skills.

Prefer a little gamble? Stroll over to the Casino Royale and try your hand at Blackjack, Roulette and the Big Six Wheel. At the end of the day redeem your winning chips for raffle tickets and take home the grand prize!

Maybe brute strength is more your fancy. You'll have a chance to test your brawn at the Speed Pitch and Bell Ringer.

The day will be professionally organized and catered by American Family Day, a company who's sole business is to conduct picnics.

All Laboratory employees, their spouse or guest, and dependent children under 21 are invited. Tickets can still be purchased from: Mary Ann Brown, LOB, Room B354, C-Site, ext. 3045; Rich Cargill, Materiel Control Module, C-Site, ext. 3573; Sue Murphy, CICADA, C-Site, ext. 3264; Jeanne Salerno, 307 College Road, Room 121A, ext. 3003; and Jim Taylor, L-Wing, Room L212, C-Site, ext. 2565. Ticket prices are adults—$5 and children ages 4-12—$2. If you have more questions, contact Bobbie Forcier at ext. 2101 or Steve Iverson at ext. 2007.

Good Work, Bob Verney . . .

RECEIVED FEB 2 8 1990

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PLAINSBORO, NEW JERSEY 08536-0278

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ATTACHMENT D.M. 90-08

CLIFFORD L. MAURER
CHIEF OF POLICE

February 22, 1990

Mr. Alan Guyet
Director of Public Safety
Princeton University, Forrestal Campus
Princeton, New Jersey 08540

Dear Mr. Guyett

On Tuesday, February 13, 1990 at 1853 hours, there was a serious motor vehicle accident on Mapleton Road, Plainsboro Township, in which an automobile struck a utility pole. The resulting power failure caused an alarm to be sent to your office from the water monitoring station near the accident scene. Officer Bob Verney, from your security staff, responded to the scene to check on the cause of the alarm.

Upon his arrival, he discovered the accident scene, where a Plainsboro Officer was already present, and attending to an injured person. Officer Verney immediately offered his assistance and assumed a position for traffic control, as requested, until additional Plainsboro Officers arrived. Sgt. Furda of this Department, has advised me that Officer Verney was very professional in his demeanor, and he provided invaluable assistance to the officers at the scene of this accident.

I would like to take this opportunity to thank Officer Verney for providing his professional assistance. His conduct was a very positive reflection of your department. He is continuing a tradition that we have come to expect from your department, but we do not take for granted. Thanks to your department and Officer Verney.

Sincerely,

Captain Timothy L. Matheny

TLM:acc

An Accredited Law Enforcement Agency

Congratulations to Bob Verney for taking the initiative to offer his help and expertise in a recent auto accident. Bob is an Emergency Services Officer with the Emergency Preparedness Division and Public Safety.

Have a bright idea?
Send it to HOTLINE!
Interoffice correspondence:
Room B366
James Forrestal Campus, C-Site
or call Carol at ext. 2754

PPPL
PRINCETON PLASMA PHYSICS LABORATORY
HOTLINE

Volume 11, No. 15 June 13, 1990

The Joy of Discovery:

Sagdeev Encourages Balancing Traditional and Modern Science

by Ellen Webster

Roald Sagdeev says that interaction between science and government can cause conflict, but there seems to be little or no antagonism when the combination is science and friendship.

Invited to be the first speaker in the Robert A. Ellis Jr. Memorial Lecture on Science and Society, Sagdeev, of the Institute of Space Science in Moscow and the University of Maryland, and long-time friend of Bob Ellis, spoke to a standing-room-only audience on Wednesday, May 30 in the MBG auditorium.

Sagdeev and Bob Ellis first met in 1958 at the Atoms for Peace Conference in Geneva. From that time until Dr. Ellis' death in December of 1989, the two remained friends.

Their families knew one another as well. Bob Ellis, III, a Mechanical Engineer in the Engineering Analysis Division, said that both families had children of roughly the same age and met in 1969 when the two scientists were working together at the Institute of Nuclear Physics in Novosibirsk in the Soviet Union.

In his lecture, "Is the Golden Age of Science Over?," Sagdeev proudly traced to Peter-the-Great the support his government has given science. He said, however, that that dependency — primarily visible in the influence governments in both the Soviet Union and and the United States have over budgets and management — concerns him. "The very notion that physicists are trying to impress the government with the scale of their machines is playing a very negative role in modern science," he said.

Photo: John Peoples

The Ellis family with R. Sagdeev: Robert Ellis, III, Dr. Roald Sagdeev, Mrs. Victoria Ellis, Julia Ellis and Walter Ellis.

And continuing in this bigger-isn't-better theme he said, "We are losing our traditional values approach to scientific activity with over-sophistication . . . with super-machines on which we are more and more dependent." He emphasized the need to strike a balance between superscience and more basic, traditional science.

Sagdeev also cautioned those present to be aware of the gap that is widening between researchers and eager young scientists coming through university systems. He encouraged the audience to recognize their own ability to help reduce the distance that exists between these two groups. He further appealed to them to help instill in young people the idea that "science is beautiful . . . to be believed and accepted."

Sagdeev told a story about one Soviet scientist, a brilliant man with a bewildering idiosyncrasy: He insisted on conducting his own research, even though the procedures could easily have have been delegated to assistants. When asked about this, the scientist responded, "If I would ask someone else [to do the work], they would steal the joy of discovery which I would like to keep for myself." That answer, according to Sagdeev, was a lucid observation about the essence of science.

And those present at the lecture seemed to agree. It might also have been the backbone for a friendship that was formed some 30 years ago between two international scientists, Roald Sagdeev and Robert Ellis. ▲

INSIDE!
Employee Picnic Photos!

The Do-It-Yourself Employee Picnic:

Team Spirit Saved the Day

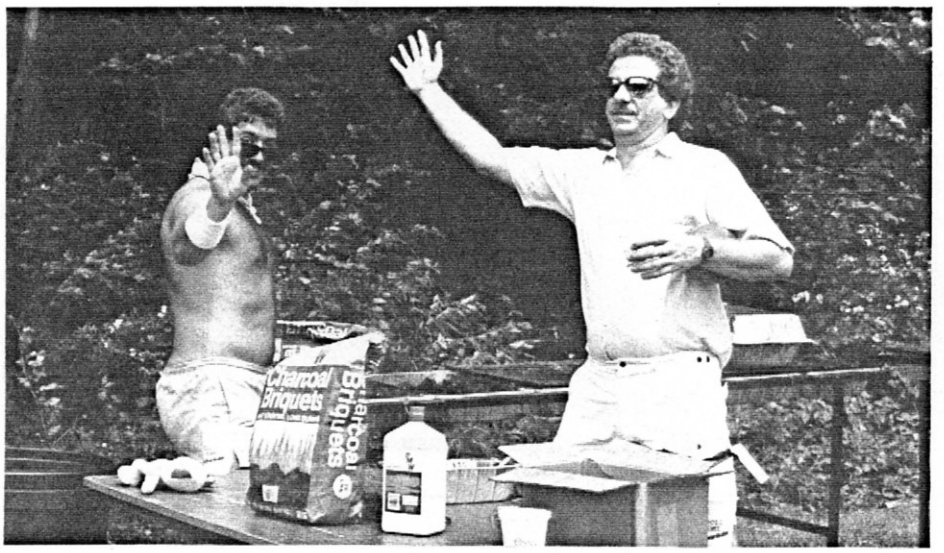
by Carol Phillips

It could have been a disaster. It could have been a gripe session. But, in fact, it was a successful picnic where everyone — employees, their families and guests, and children — pitched in and turned a potentially bad situation into a good time for all.

What greeted picnic goers as they arrived was far from what was anticipated. Very little was ready. No carnival-like midway with games for kids and adults, no Moonwalk, no sno cone, cotton candy, or soda booths. Only disarray — scattered piles of unopened bags, stacks of boxes, and unassembled game equipment. A disaster in the making.

First you have to set it up . . . Employees pitch in to get the party rolling.

Jerry Hart and Ed Gilsenan, who had arrived at 7:00 a.m. to supervise setup activities had found, much to their surprise, that they were the setup team and their only help was Ed's children. Sue Murphy and her team of teenagers arrived next. They quickly started organizing the game equipment and prizes. Initial setup of the games were in progress as the first picnic goers began to arrive.



Ed Weisenberger and Jim Hirsch — taking a break from grilling?

Rick Cargill, a member of the PPPL Social Committee, explained to everyone that local teenagers who were scheduled to help set up and serve had not shown up. If there was to be a picnic, PPPLers would have to do it themselves — nothing new. He explained that volunteers were needed to set up games and run them. Cooks and servers were needed too. At first, the number of volunteers was small, but it grew steadily. I heard, "I'll get my family settled and then I'll be by to help. I'll relieve you in a while, as soon as I get something to eat."

Gradually, the games appeared, and as the volunteers got into the swing of being carnival barkers you heard shouts of "... and we have another winner here." Soon the cotton candy, sno cone, and soda booths were operational. Adults were the first volunteers, but later teenagers and other children were helping too. Helpers at Ball Bingo — nine-year old Scott and seven-year old Becca Holcombe — were so conscientious their parents had to remind them to eat, and I had to keep urging them to try the games themselves.

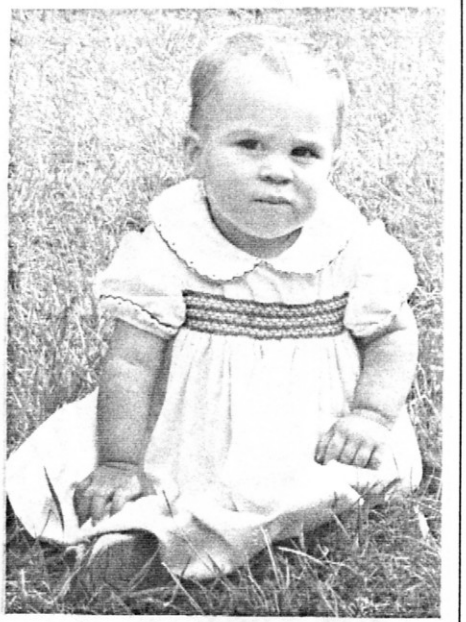
PPPLers from all staffs and departments did the cooking — George and Dori Barnes, Paul Funk, Greg Tompkins, Sally Connell, Scott Larson, Tip Brolin, Paul LaMarche, Mike Williams, to name a few — and others serving — Charlene Onofri, Mel Gensamer, JoAnne and Mike Bianco, JoAnn and Peter Pallandino. Steve Iverson assumed the role of "go for," making sure there was always plenty of food available

story continued on page 7
photos — see following pages

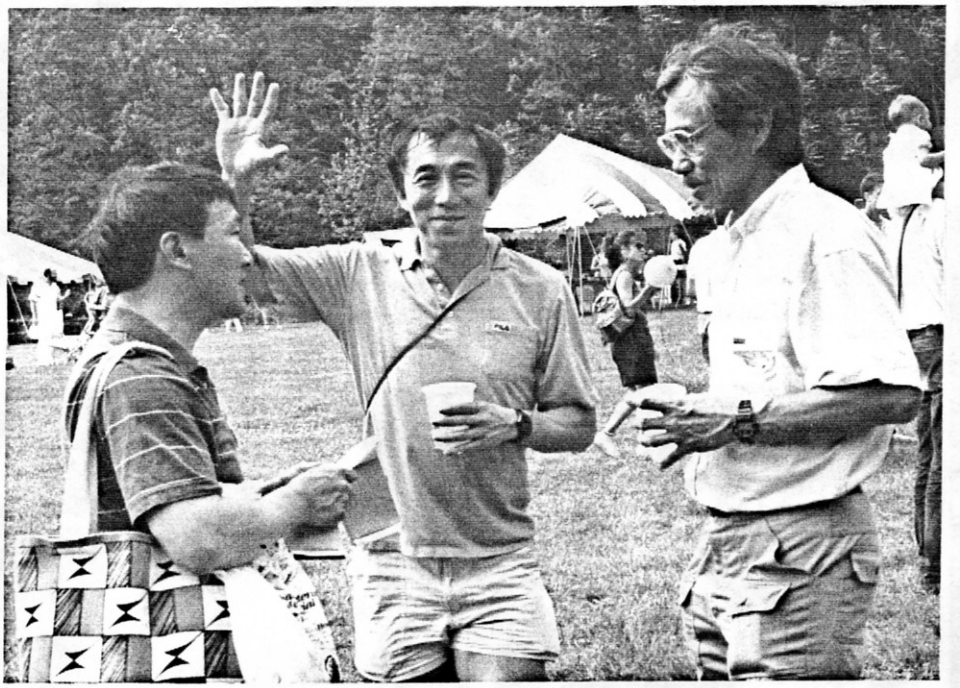
Moose came along with Molly and Greg Tompkins.

PPPL Employee Picnic Scrapbook

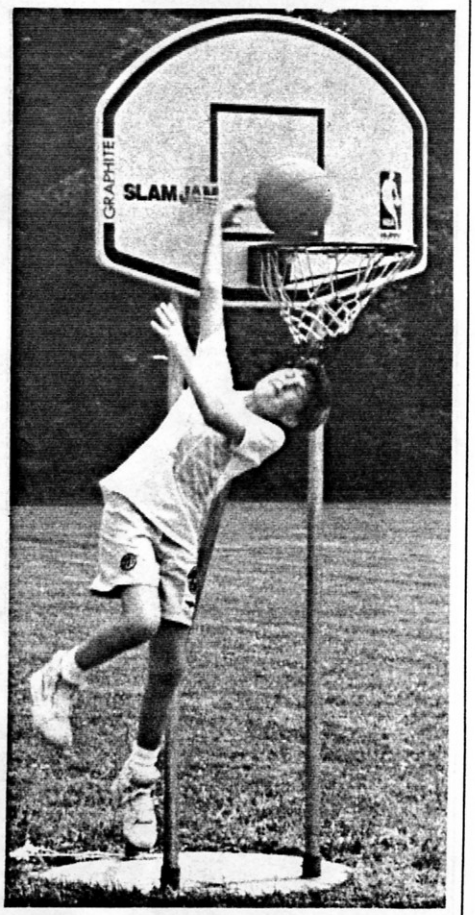
Heidi Fuchs, nine-year-old daughter of Rosemarie Fuchs, helps with face painting.



A party for all ages.



Hulbert Hsuan, Willie Lee, and Morrell Chance.

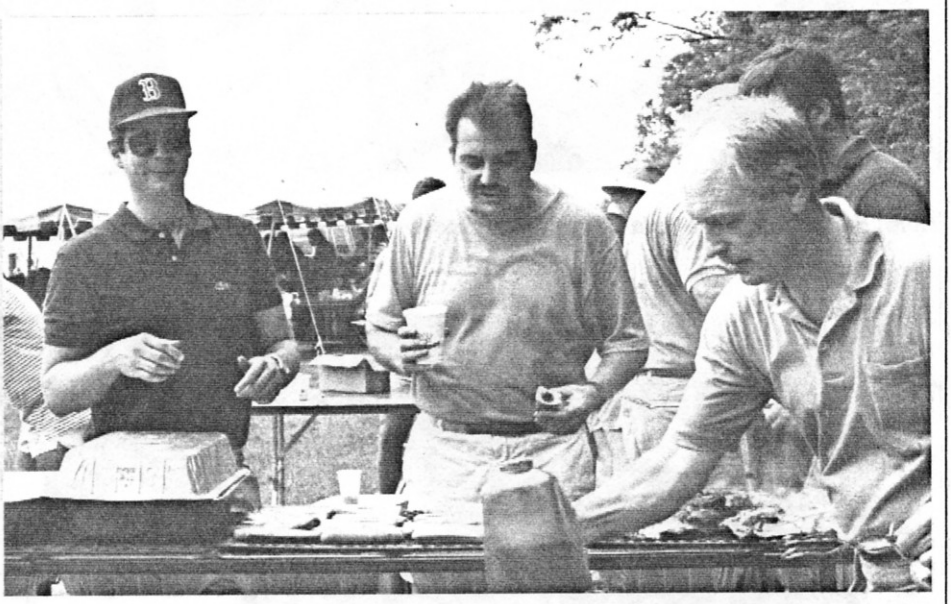


Slam dunk!

PPPL Employee Picnic Scrapbook

Some familiar faces — Jose Aquino, Jerry (Rock) Boyd, and Jo Lumberger.

Cotton candy & painted faces.

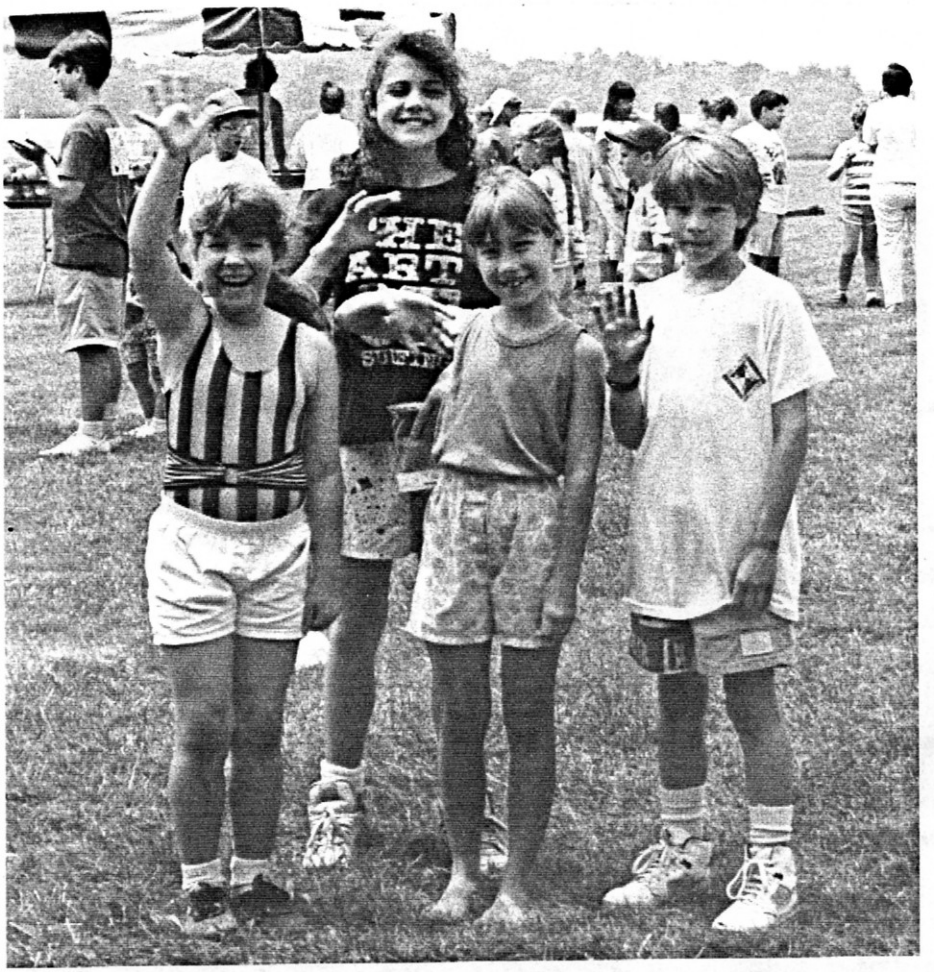


Paul LaMarche, Paul Funk, and PPPL Acting Director, Tip Brolin.

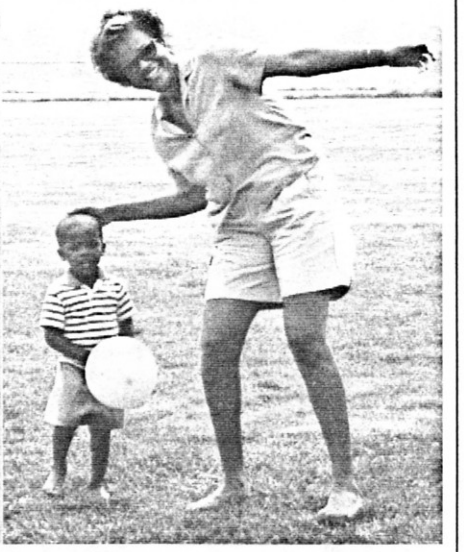
Plenty of space to run . . .

Lynn Shapiro, recent bride of Dick Yager, managing the children's games.

PPPL Employee Picnic Scrapbook



Smiles!



Janet Roberts and her son Michael.

Workers of all ages helped out.

Norton Bretz & Dori Barnes

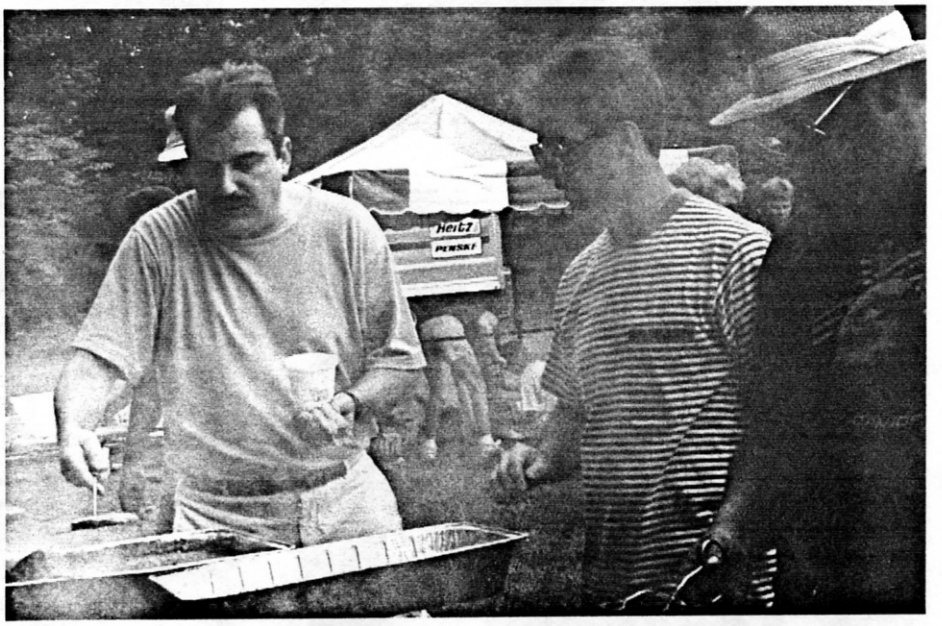
Volunteering at the cotton candy machine.

PPPL Employee Picnic Scrapbook

Sue Williams, wife of Mike Williams, designing original faces.

Prizes!

And bigger prizes!



Talents were revealed. One-handed burger flips by Paul Funk, Pete Palladino and Jim Totaro.

continued from page 2

for cooking. Shoichi and Ellie Yoshikawa worked the soda booth for a while, Jerry Hart manned the Coors wagon, and Gary Kater and daughter Stephanie made delicious sno cones.

Sue Williams and Rosemarie Fuchs' nine-year old daughter, Heidi, used their artistic talents to paint faces. Balloons, unicorns, flamingos, flowers, butterflies, and Batman were among their specialties.

When it came time to clean up, people didn't slink away leaving it for others. They "policed" their areas, making sure things were in order before they left. "Everyone pitched in and helped. It was really wonderful. The teamwork, the spirit of cooperation, I've never seen anything like it," said Iverson.

Giggles and shouts of laughter from the Moonwalk, adults smiling and talking, kids turning cartwheels and chasing and racing. Of course there was dismay at the turn of events, but the recurring theme heard was that the picnic was reminiscent of long ago, when PPPLers hosted and worked their picnics.

PPPL's 1990 picnic was not exactly as planned or anticipated, but it was a good day nevertheless — PPPLers again working together to make it happen. ▲

A Special Thanks

Thank-you to all the behind-the-scene picnic workers. To: Ginny Zelenak, for designing this year's tickets; Teri Daynorowicz and Dan Klinger for printing tickets; Mary-Ann Brown, Rick Cargill, Sue Murphy, Jeanne Salerno and Jim Taylor for their expert salesmanship; Jack Thompson for obtaining the beer permit in record time; and Arlene White for handling all purchasing details.

— Bobbie Forcier
Personnel

HOTLINE

Editor:	Carol Phillips
Writer & Layout:	Ellen Webster
Photography:	John Peoples
Reproduction:	Teri Daynorowicz
	Dan Klinger

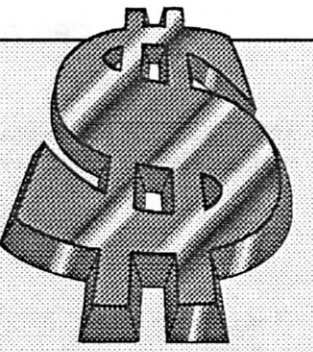
Our best ideas for HOTLINE come from you. If you have a story idea, call Carol Phillips at ext. 2754.

Correction

In the last issue of HOTLINE, Larry Sutton's name was mistakingly spelled Sutter.

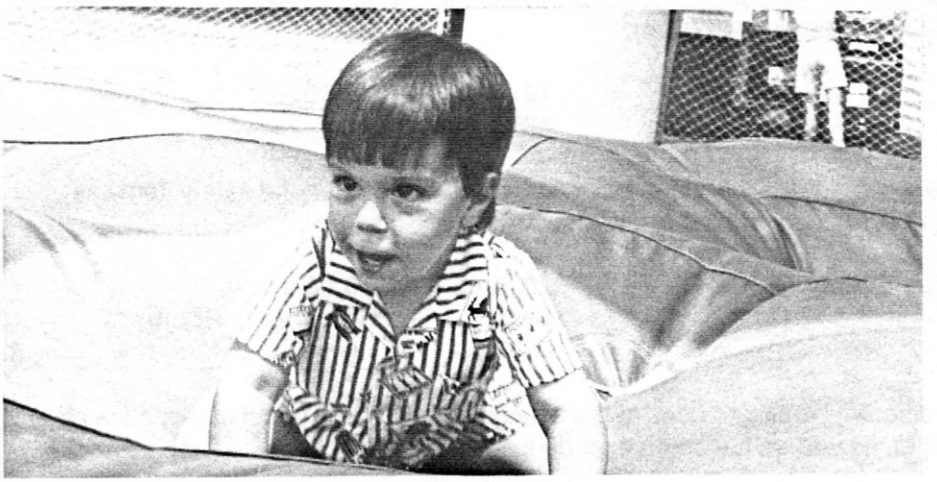
Picnic Photos

Picnic photos were taken by Carol Phillips and Teri Daynorowicz.



For Sale

AIR CONDITIONER — Sleeve-type. 8,000 btu. Nearly new. Fits Fedders, Sears, and Whirlpool sleeves. Price is negotiable. Call Don Greene, ext. 3717.



Andrew Lawson, son of Dolores and Matt Lawson — just bouncing along.

The soda booth was competently manned by Dr. and Mrs. Yoshikawa.

Up higher dad, I can't see a thing!

Safety Courses

The Safety Office has scheduled the following safety training courses for June

Course	Date/Time/Location
Basic Electrical Safety	**14 June, 9:00 a.m. MBG Auditorium**

This course reviews the effects of electricity on the human body, energy sources, conversion and modification equipment, energy storage devices, energy uses, conductors, protective procedures, wiring methods, devices and tools, and emergency procedures. It is required for all employees working in the electrical field.

CPR Training	**13 June, 8:30 a.m.-12:30 p.m. LOB Commons**

The Center for Emergency Medical Training will conduct this class in the life-saving technique of Cardiopulmonary Resuscitation. Recertification is required every year.

Basic Safety	**19 June, 9:00-10:00 a.m. MBG Auditorium**

This one-hour class is required every two years. This class includes information on general safety items as well as environmental and radiation information and the New Jersey Right-to-Know Law.

Proper Use of Fire Extinguishers	**20 June, 9:00-10:00 a.m. Safety Office Conference Room D-Site**

Personnel will be instructed in the different types and uses of fire extinguishers and will receive guidance as to when to fight a fire and when not to, as well as hands-on experience in the use of extinguishers.

Employees must obtain permission from their immediate supervisor to attend these classes. Supervisors should call Sue Hill at ext. 2526 to enroll their employees.

The Safety Office has two new safety-related audiovisual aids available for check out.

"Safe Handling and Storage of Compressed Gases" — VHS format
"Safe Handling of Liquified Nitrogen and Argon" — slide/cassette format

Call Sue Hill, ext. 2526, for more information or to check out materials.

PPPL
PRINCETON PLASMA PHYSICS LABORATORY
HOTLINE
Volume 11, No. 16 June 28, 1990

Telling Employees What They Do Right

Employee Recognition Awards Symbolize Administrative Operations' Appreciation

by Olga Bernett and Aaron Lemonick

On June 5, twenty-six employees in the Administrative Operations department were recognized for their contributions to the Laboratory as part of a program designed to acknowledge the accomplishments of both individuals and teams of workers.

Nominated employees came from three staffs within Administrative Operations; Lab & Shop, Office & Support, and Exempt Staff Individuals, plus teams of workers. Nominees were judged by panels of peers (see accompanying article).

This year's nominees and winners were, from the Lab and Shop staff:

Robert Brown, Emergency Services Unit (ESU), for developing and managing an improved work schedule in a place where work schedules are complicated.

Teri Daynorowicz, Information Services Duplication, under whose supervision the Duplication Center received the only "Superior" rating in DOE's appraisals.

Ronnie Koon, Plant Maintenance & Operations (PM&O). When severe cuts threatened PM&O's ability to function properly, Ronnie assumed the role of lead technician and led the group to confound the predictions of doom, and as a result, the completion rate and spirit actually rose!

Gene Pinelli, Materiel Control, for 31 years of dedicated service marked by the respect and confidence not only of his supervisors but of his peers as well.

Bill Snyder, Plant Maintenance & Operations, who in addition to completing his regular duties as carpenter and general trades planner, took on pipe planning. He acquired the knowledge and the expertise and did the job in an exemplary fashion.

The winner was **Gene Pinelli**.

Nominees from the Office and Support Staff were:

Dawn Horner, General Accounting Branch of Accounting and Financial Control, who, with only only a three-day transition period, took on the travel office function in addition to her regular duties of processing vendors under subcontract.

Frances Jenner, Property Administration in Materiel Control, for her profess-

continued on page 2

Back row, left to right: Aaron Lemonick, Bill Snyder, Antonio Morgado, Ronnie Koon, Ralph Dean, Jerome West, Richard Alexander, Frances Jenner, Teri Daynorowicz, Olga Bernett. Front row, left to right: Connie Cummings, Gail Jimson, Tina Whitley, Dawn Horner, Bobbie Forcier. Photo: JOHN PEOPLES

Fusion Funding Passed by Full House

On Tuesday, June 19, the House of Representatives approved an appropriations bill which includes a total of $325 million for magnetic fusion energy nationally for fiscal year 1991. This level of funding was requested by President Bush in his budget message presented to Congress in January.

The Senate must now act to prepare its appropriations bill followed by action of a Senate-House conference committee should the Senate and House appropriations bills differ. The resulting compromise bill would then require the President's signature to become law.

Because of the overall fiscal problems faced by the federal government, FY 91 funding for fusion is still uncertain, but the the results so far are encouraging. ▲

Inside

ional, hard-working and courteous approach to the day-to-day responsibilities of capital equipment records, of which there are thousands of equipment transactions which must be dealt with each year.

The winner was **Dawn Horner**.

Teams nominated were:

Vern Clift, Ralph Dean, Robert Deys, Nero Fortune, Steve Green, Yvonne Harris, Antonio Morgado, Calvin Perry, Matthew Powell, Charles Sims, and **Jerome West,** Plant Maintenance & Operations, Janitorial Staff, who have responded in an outstanding manner to the challenge of keeping this place clean and presentable, and who have taken on the extra tasks surrounding the great clean-up.

Richard Alexander, Connie Cummings, and **Gail Jimson,** Accounts Payable Branch, for magnificent performance in the tedious and exacting task of year-end closing, which was done with reduced personnel resources.

Diane Schloder and **Jim MacTaggart,** Information Resource Management (IRM) Programming, for successfully installing a new automated accounts system during the past fiscal year and completing it on time in spite of obstacles.

Team winners were **Diane Schloder** and **Jim MacTaggart.**

Exempt Staff Individuals nominated were:

Bobbie Forcier, Personnel, who in addition to her regular duties in personnel benefits administration and her work with foreign nationals, helped develop the voluntary separation program where she provided materials, assistance, and counseling.

Ed Gilsenan, Plant Maintenance and Operations, who in his 18 years at the Laboratory, continues to deal with as many as 10 to 15 crisis calls in a day and is on-call 24 hours a day.

Diane Schloder, IRM Programming, for going beyond reasonable expectations to develop a sophisticated financial information system for the Laboratory, and during a three-year period juggled the DOE's and the Laboratory's accounting systems on a tight schedule and on time.

Tina Whitley, Payroll Branch, for working closely with programmers and management as she developed an improved computerized data system which provides more flexibility and accuracy, greater control, is cost effective and even causes less eye strain.

The winner was **Diane Schloder.**

First-time nominees and Peer Panelists were given Mark Cross pens; those who have been recognized or who have served for a second time received matching pencils. Winners are presented with Ovatron clocks.

Now in its third year, since being conceived as a pilot program during a 1986 management meeting conducted by Dick Rossi, Associate Director and Head of the Administration Department, discussions are underway to implement possible program changes. ▲

Presentation to Jim Conover (left) by Aaron Lemonick (right). Seated, left to right, Bob Wilson and Debbie Smith. Photo: JOHN PEOPLES

Thank You to Peer Panelists; The Focus Was Caring

In a follow-up to the Employee Recognition Awards for administration, those who participated in the selection process as Peer Panelists were, themselves, recognized on June 13 in an informal gathering in the Director's Conference Room.

The reception was hosted by Olga Bernett, who coordinated the entire recognition program.

Aaron Lemonick, Deputy Director for Administrative Operations, greeted panelists and said that he was pleased for the opportunity for the management to show appreciation for its employees. He said that expressing good feelings about what people are doing should become more commonplace throughout the Lab.

Peer Panelists were thanked by Lemonick for volunteering their time in a "process that matters." "In a place as large as this," he said "it's harder to feel like a family," but added that, "we should continue to make an effort to achieve that most desirable goal."

When asked for suggestions on future recognition programs, those present responded by saying that Lemonick had been accurate in recognizing that caring — sincerely — is needed. They felt that this could do a lot to boost morale because an employee feels like an important part of the organization when recognized as an individual. ▲

Quotable Quotes

▲▲▲▲▲▲▲

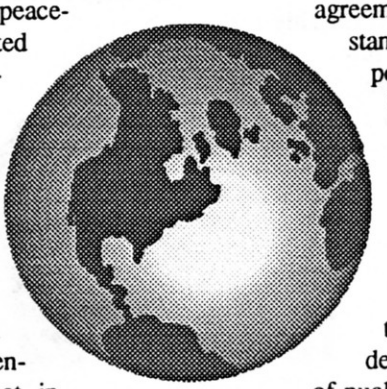
"Do we want the stars?
We can have them. Can we borrow cups of fire from the sun? We can and must and light the world."

Ray Bradbury
"On the Shoulders of Giants"
Zen in the Art of Writing, 1990

Fusion-Related Statements Released at U.S.-Soviet Washington Summit

The following statements were released by Presidents George Bush and Mikhail Gorbachev on June 4, 1990 during their meeting at the U.S.-Soviet Washington Summit:

● At their meeting in Geneva in 1985, the leaders of the United States and the Soviet Union emphasized the importance of the work aimed at utilizing controlled thermonuclear fusion for peaceful purposes, and advocated the widest practical development of international cooperation in obtaining this essentially inexhaustible source of energy for the benefit of all mankind.



The International Thermonuclear Experimental Reactor (ITER) project, involving joint efforts by the USSR, the United States, Japan, and the European Community, under the auspices of the International Atomic Energy Agency, is making significant progress towards this end. A conceptual design will soon be completed.

Noting with satisfaction the results begin attained under this project, the United States and the Soviet Union look forward to continued international efforts aimed at promoting further progress in developing controlled thermonuclear fusion for peaceful purposes.

● During the state visit of Mikhail S. Gorbachev, President of the USSR, at the invitation of George Bush, President of the United States, the sides concluded a new US-USSR Agreement on Scientific and Technical Cooperation in the Field of Peaceful Uses of Atomic Energy. This agreement strengthens the long-standing framework for important research in a number of fields of mutual interest, including controlled thermonuclear fusion, fundamental properties of matter, and civilian reactor safety.

Recognizing the need to manage responsibly the development and utilization of nuclear power, the two sides have agreed on cooperation in the study of health and environmental effects of past, present and future nuclear power generation, and in strengthening operational safety practices in civilian nuclear reactors. The sides intend to develop and implement promptly a mutually beneficial joint program of work in the fields under this agreement. They also agreed to explore the possibilities for cooperation in the management of hazardous and radioactive waste. ▲

NEWS AT PPPL

PEOPLE

Fred Dylla, Principal Research Physicist, has been nominated by the American Vacuum Society to serve a three-year term on the American Institutes of Physics governing board.

George Sheffield, Head of the Engineering Analysis Division, has been elected to serve on the International Thermonuclear Experimental Reactor (ITER) Management Advisory Committee.

NOTICES

During the week of June 25-29, the **Petty Cash Window** hours will be limited to: 9-10 a.m. and 1-2 p.m. Normal hours of 9-10 a.m. and 1-3 p.m. will resume on July 2.

Due to summer vacation schedules, some departments may need your cooperation in planning ahead; rush jobs can be a problem when an office is understaffed.

Please note that vacation schedules may effect turnaround time in the following service offices:

Graphic Arts: July 2-13; July 23-Aug. 3
Photo Lab: July 16-20
Duplicating: July 5-12; July 16-20
Telecommunications: Aug. 20-31

If you know of other departments' vacation schedules which may effect Lab-wide service, please leave a message on ext. 2757.

FREE

Free kittens. Marie 259-3016

FOR SALE

Singer touch-and-sew **sewing machine.** $300. Joseph Stacy ext. 3041

Bolen **riding mowers,** Two-for-One—12hp and 10hp. $500. Jim ext. 2377

BMW **motorcycle.** '82, R65LS, 650cc, very good condition, $1,800. Jim ext 2377.

Air Conditioner — 9,000 BTU Emerson Quiet Cool, wall mount, excellent condition, 3 years old. $100. Rich ext. 3515.

House for sale — Mercerville, 3 bedroom ranch, one bath, eat-in kitchen, full basement, garage, attached addition with one-bedroom, one-bath, living room, private entrance. Call after 4:30, 587-6542.

FOR RENT

Furnished **house in London.** Four bedrooms, garage, garden. Available by arrangement. Dr. Charles Skinner ext. 2214.

If you have something to sell, rent, or give away, put it in the classifieds. If your merchandise fails to move with the first listing, we'll run it again (two time limit). For new listings leave a message at ext. 2757 or mail your ad to HOTLINE.

At Home on the Range

by Ellen Webster

"The competition is really fierce. You're up against these girls from the Midwest with big families, and they're *fantastic* cooks," said Alex DeSantis, Manager of Facilities Engineering, about his second trip to the Pillsbury Bakeoff national finals, this year held in Phoenix, Arizona.

DeSantis said the tension at these contests can get pretty heated. But Alex, a well-seasoned chef who has been cooking competitively for nearly 10 years, takes it all with a grain of salt. "It's a family affair," he said. "My wife, Shirley, entered her first competition because she wanted a stove — and won it! We do it as a hobby. You get nice trips and it's fun!"

Alex DeSantis has been cooking competitively for nearly 10 years.

But it isn't just Alex and his wife who who are creative food connoisseurs. Alex and Shirley and their son, Tony, and daughter, Miranda, have *each* been finalists twice in the Pillsbury Bakeoff.

This year Alex and Tony made history by becoming the first father and son duo to make the finals in the same year, although they were actually competing against each other. According to DeSantis, the notoriety may have hurt their individual chances of winning big. "It works against you because there's too much publicity," he said.

What was the actual bakeoff like?

"Well, they hype you up for a couple of days — wine you and dine you. The day of the competition there's even a band at the hotel," he said. "Then you go into this great big ballroom and there's a hundred stoves set up! You get about 30 inches of working space and only a half an hour to get things organized before they open it up to reporters. That's the hectic part. Marian Burros [of *The New York Times*] kept following me around," he explained. (She later featured Alex and Tony in an article which appeared in the February 21 edition.)

Pillsbury requires that the recipe contain one of their products, and DeSantis met that stipulation by using their brand of spinach in his Spinach-Filled Mediterranean Meat Roll.

The first time he was a finalist his winning recipe was for a microwave meat and bean dish. This year's entry was adapted from a recipe he created for another contest which featured apples as the major ingredient.

So how'd he do?

"Well, there's winners and . . . well, I didn't win," he said with a shrug, and quickly added, "but both years I've been a finalist, the grand prize winner sat to my right at the awards dinner!"

What are his words of advice to would-be competitors?

"Just keep trying," he said. "It's very hard to get into these things. My wife sends out entries for *everything*! You don't always win . . . but who knows!" ▲

(See page 5 for the Spinach-Filled Mediterranean Meat Roll recipe.)

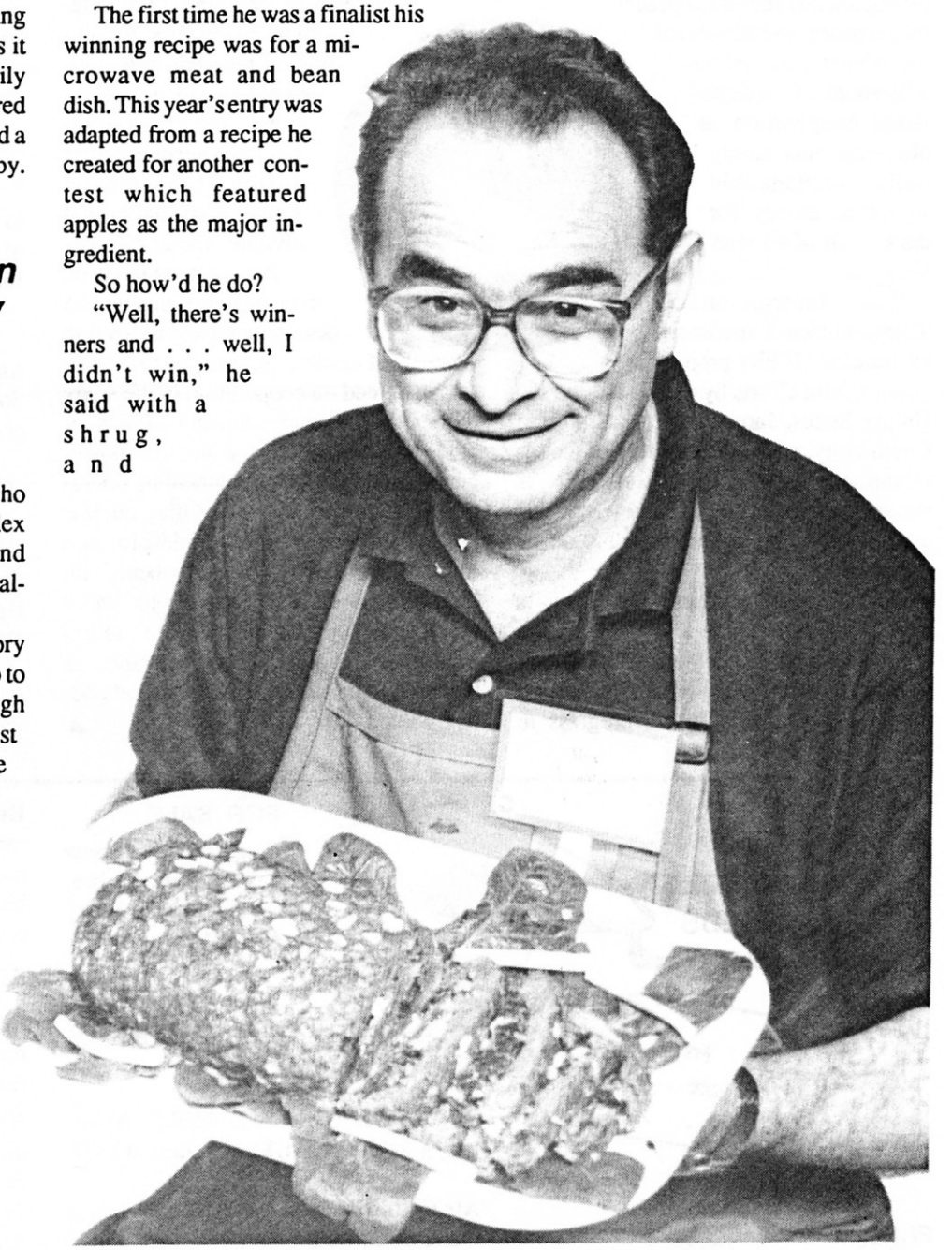


Photo courtesy of the Pillsbury Corporation

Alex DeSantis' Spinach-Filled Mediterranean Meat Roll

Filling:

- 1/2 cup chopped onion
- 2 teaspoon olive oil or oil
- 1/4 cup pine nuts
- 2 garlic cloves, minced
- 1 9-oz pkg Green Giant® Harvest Fresh® Frozen Chopped Spinach, thawed, well drained
- 1/2 teaspoon pepper
- 1/2 teaspoon Italian seasoning
- 1/2 teaspoon basil leaves
- 2 oz. (1/3 C.) crumbled feta cheese

Meat Roll:

- 1 1/4 cups Hungry Jack® Mashed Potato Flakes
- 1/2 cup apple butter
- 1/2 cup chopped onion
- 1 tablespoon Dijon mustard
- 1 tablespoon prepared horseradish
- 1 1/4 lb. lean ground lamb or turkey
- 1 1/4 lb. Italian sausage, casing removed
- 2 eggs, slightly beaten
- 2 to 3 tablespoons pine nuts
- Green onions

Directions:

In small skillet over medium-high heat, cook 1/2 cup onion in oil for 2 to 3 minutes or until tender. Add 1/4 cup pine nuts and garlic. Cook, stirring frequently, for 2 to 3 minutes or until garlic is browned. Reduce heat to medium. Stir in spinach and seasoning; cook an additional 1 minute or until thoroughly heated. Remove from heat; cool slightly. Stir in cheese.

Heat oven to 350°F. In large bowl, combine all meat roll ingredients; mix well. On foil or waxed paper-lined surface, pat meat mixture to form a 12x10-inch rectangle. Spread filling mixture evenly over top to within 1 inch of edges. Starting from short end, roll up meat tightly to enclose filling, using foil as a guide. Pinch edges and ends to seal.

Place wire rack in 15x10x1-inch baking pan. Cover rack with foil; pierce foil in several places with knife to allow grease to drain as meat cooks. Place meat roll, seam side down, on foil-lined rack. Press 2 to 3 tablespoons pine nuts onto top of meat roll. Bake at 350° F for 30 minutes. Cover loosely with foil. Insert meat thermometer through foil and into center of loaf. Bake an additional 35 to 50 minutes or until meat is thoroughly cooked and meat thermometer registers 160°F. Let stand 15 minutes before slicing. Garnish with green onions.

Serves 10.

RETIRED

Eugene A. Steward retired June 1 after 13 years of service. He was a Technical Assistant in the Technical Operations Department.

DEATHS

Ralph Pope died on January 8. He was a employed at the Laboratory from 1976 until his retirement in 1986.

NEW HIRES

Sharon Warkala recently joined the Procurement Division as a Subcontract Administrator. She will be assuming the duties previously held by Skip Schoen who recently moved to the TFTR Planning and Control Office.

For eight years Warkala was with the U.S. Army Material Command's Communications and Electronics Command at Fort Monmouth, NJ, where she was a Contract Specialist.

BIRTHS

A daughter, Christianne, was born to **Jim Faunce** (PBX-M) and his wife Candy on May 2.

MARRIAGES

Anne Palladino (of the Computer Division) and William Stepanek were married on May 12.

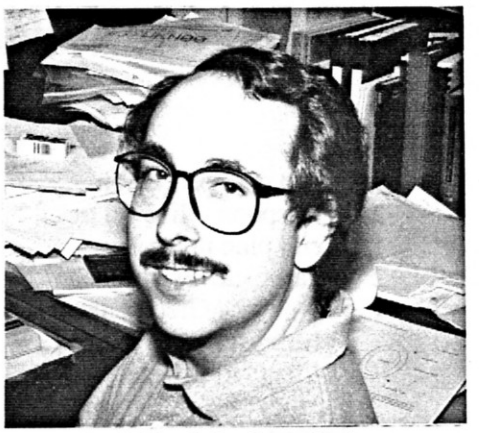
Bill Tighe (with the X-Ray Laser project) and Judith Stevenson were married on June 1.

Vince LoCasale (of the Computer Division) and **Robin Allen** (formerly of the Computer Division) were married on June 9.

What I'm Doing (or Would Like to be Doing) for My Summer Vacation

Madeline McMullen, Payroll Data Operator
"I'm going on a cruise in July to San Juan, St. Thomas and St. Martin."

Mike Spadafora, Safety Technical Writer
"Next year my wife and I want to go sightseeing around the northwestern part of the U.S. This year we plan to take day trips."



David Ward, Graduate Student
"I'm going to be writing my dissertation — 'Studies of Feedback Stabilization of Axisymmetric Modes in Tokamak Plasmas.'"

Yunuen Qin, Physicist
"I'm too busy to travel this summer, but I'd like to be going to Canada."

Terry Greenberg, Technical Secretary
"I'm going to take a few days off at the beach, but what I'd really like to do is spend a month traveling around the country."

Alexander Juhasz, Quality Control Inspector
"We're going camping at the Shore and down around Hilton Head."

Bob Kress, Manager, Engineering and Construction
"I'd like to be in North Carolina playing golf. . . . I'd like to be *anyplace* playing golf!"

Erin Gyenge, Cafetria Food Server
"I'm going to Miami Beach, Florida to visit my husband's 87-year-old grandmother. We're hoping to go in August, and yes, I know it'll be hot!"

Photos: ELLEN WEBSTER

PPPL
PRINCETON PLASMA PHYSICS LABORATORY
HOTLINE

Volume 11, No. 17 July 16, 1990

CIT Mission Revised

A revised mission statement for the Compact Ignition Tokamak (CIT) has been issued to reflect better the full potential of the device. The new statement calls for CIT to "determine the physics behavior of self-heated fusion plasmas and demonstrate the production of substantial amounts of fusion power." Based on input from the fusion community, the revised mission statement and goals (see inset) have been approved by the CIT Steering Committee, whose members represent a cross section of the leading fusion research institutions.

Originally the stated mission for CIT focused on ignition to the exclusion of all other physics goals. Early this year it became clear that in the published goals, too little emphasis was being placed on useful physics information that could be gained from high-Q operation. (Q is the ratio of fusion power output to heating power input.) Also, the original statement overemphasized study of the "burn control" aspect of ignition to the exclusion of other important physics studies. In short, the original mission statement gave an "all or nothing" flavor to the range of CIT's expected performance. The revised mission, while retaining ignition as an objective, focuses on understanding the physics of burning plasmas and on demonstrating the production of significant quantities of fusion power.

The CIT National Design Team is developing a machine design which will provide a toroidal magnetic field strength of 10 tesla and a plasma current of 11 megamperes (MA) with a 7-second duration. The graph shows the projected CIT performance, along with the range of uncertainties associated with this projection. If the performance of CIT (with an 11-MA current) is projected from existing data, a Q of roughly 25 is expected. A pessimistic projection yields a Q of 4, and an optimistic projection puts CIT well into the ignited regime. A Q-value in the range of 25 is expected to be ample for the operation of an economical fusion power plant.

The revised mission, while retaining ignition as an objective, focuses on understanding the physics of burning plasmas and on demonstrating the production of significant quantities of fusion power.

In the deuterium-tritium fusion reaction, alpha particles (helium nuclei) and neutrons are produced. The positively charged alphas carry away about 20% of the fusion energy generated. Because they are charged, the alpha particles remain

continued on page 2

Inside

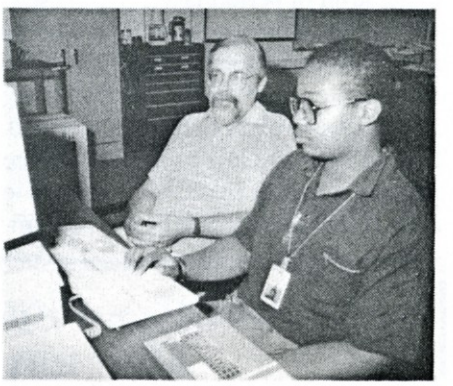
Reviving an Interest in Science: Part 1

PPPL Education Programs Help Local Schools

by Ellen Webster

There's a move in this country to take action. We're all guilty of throwing an occasional critical eye at the systems of government, education and even management of our own company, but few of us do anything about the problems.

In 1983 a report called *Nation at Risk* shook up the country when it pointed out a weak link to our future — that of education. It was reported by this and many other studies that our education system was failing us, especially in the areas of mathematics and science. Not only were students



Willie Smith, a Trenton High School senior, and Jack Abraitis scan for computer viruses. Photo: JOHN PEOPLES

lacking the necessary background to progress in careers in these fields, but perhaps more importantly, competency in these disciplines was being perceived as unattainable, unnecessary, and utterly boring.

Princeton Plasma Physics Laboratory (PPPL) is now taking a stand on this issue. Beginning this summer, a plan to help make educational improvements at the local level is being put in place.

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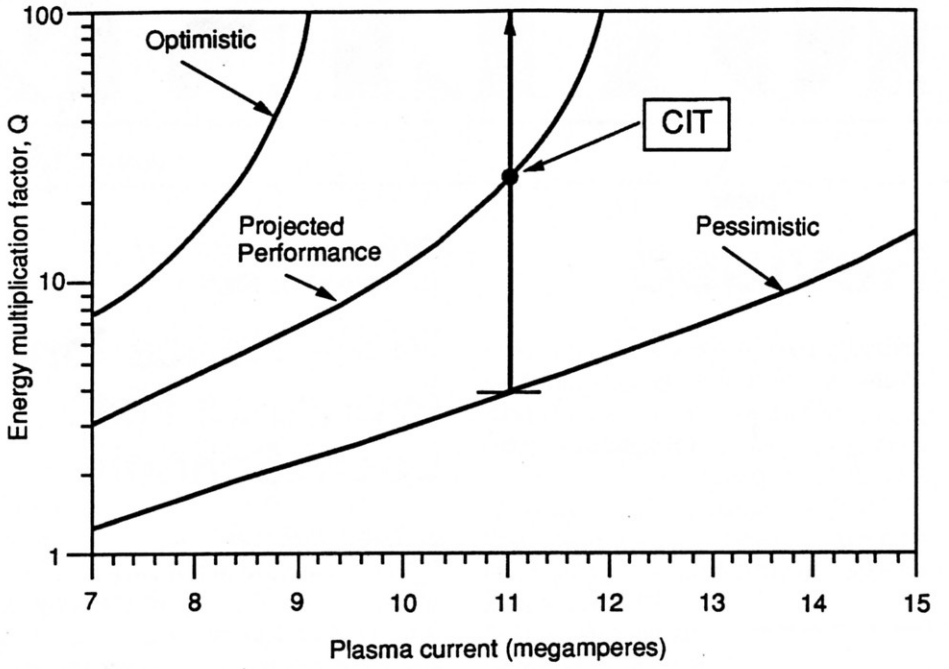

Compact Ignition Tokamak self-heated regime.

CIT continued from page 1

trapped by the magnetic field and impart their energy to the bulk plasma, helping to keep it hot. The TFTR and JET (Joint European Torus) will explore the region of Q=1 (breakeven), while producing in the range of 30 MW of fusion power. However at that level of performance, plasma self-heating by alpha particles amounts to about 20% of the total heating power. To make good measurements of alpha heating efficiency, a Q of 5 or greater is required. This new operational regime of self-heated plasmas is the one that CIT is targeted to achieve with a reasonable degree of confidence. As Q is pushed above 5 toward ignition, physicists will be able to study an expanding range of "burning" plasma operating conditions. Nevertheless, CIT's minimum mission to produce and study self-heated plasmas can be achieved even with the most pessimistic assumptions.

CIT National Design Team members include: Massachusetts Institute of Technology, Oak Ridge National Laboratory, Lawrence Livermore National Laboratory, Idaho National Engineering Laboratory, General Atomics and industry including Ebasco, McDonald Douglas, SPAR Aerospace and Grumman. ▲

Compact Ignition Tokamak Mission Statement

CIT Mission

Determine the physics behavior of self-heated fusion plasmas and demonstrate the production of substantial amounts of fusion power.

CIT Objectives

- Demonstrate the production of fusion power in excess of 100 MW, at fusion-reactor-level power density.
- Determine the confinement physics, operational limits, and alpha-particle dynamics of self-heated fusion plasmas with alpha power greater than auxiliary-heating power.
- Demonstrate heating, fueling, and plasma-handling techniques necessary to produce reactor-level power-density, self-heated plasmas.
- Optimize plasma performance in the range of Q=5 to ignition, with fusion power up to 500 MW.

Education continued from page 1

Education at the Lab

The Laboratory's commitment to education is not new. Graduate and undergraduate programs are offered in plasma physics and materials sciences; the Summer Science Awards provide high-achieving high school students research experiences at the Lab; and Science on Saturday brings students, teachers and parents to PPPL for lectures and demonstrations. The community is invited to our open houses, and thousands of students receive tours each year.

New Emphasis on Teachers

According to Diane Carroll, recently appointed Head of the Science Education Program, these programs will continue and more are being added. A new emphasis is being placed on teachers as the key to students' interests in science. "It has become apparent that students are excited or turned off to science before they reach high school," she said. "Our goal is to help teachers get students to think about science as something that's fun, that's part of their everyday lives, and as something they can do."

Rush Holt, Assistant Director of PPPL, says that not all students helped by the Lab's programs will become scientists, but all must make daily decisions about science in society, even if by default. "I hope we can help students, both directly and through their teachers, distinguish between astronomy and astrology, between controlled studies in nutrition and fad

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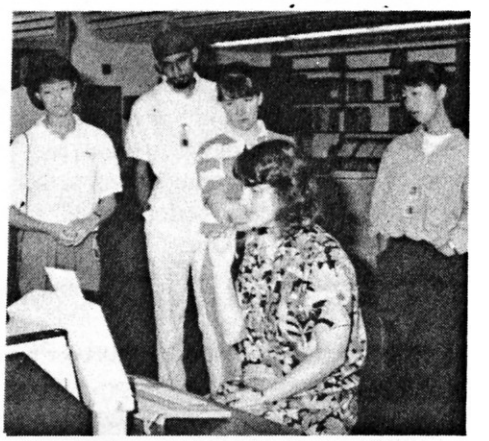


High school students in the Summer Science Awards program are shown library data bases by Jane Holmquist.

Photo: JOHN PEOPLES

What's Doing at PPPL?

PEOPLE

Charlie Staloff has been named acting Engineering Department Head.

Dan Kungl has been named acting Mechanical Engineering Division Head.

NOTICES

Bulletin Board Clean-Up
The Project Planning & Safety Office asks individuals who post notes on bulletin boards around the Laboratory to remove the notices when they no longer apply.

School District Needs Help
The West Windsor-Plainsboro Regional School District is seeking individuals for instructional and noninstructional positions. Contact the superintendnt's office at 799-0200.

Chemical Transportation from College Road
The transportation of chemicals from 305 & 307 College Road East to new facilities is being coordinated by Scott Larson in the Transportation/Hazardous Materials Branch, ext. 3387. Call to schedule pick-up on August 8, or to make other arrangements.

1990 AIP Style Manual Available
The 1990 fourth edition of the *American Institute of Physics* (AIP) *Style Manual* is now available for $10 per copy from Pat Buggs in Information Services. This manual is helpful to physicists and typists preparing manuscripts for publication. It is an excellent source of information on abbreviations, scientific terms, instructions for typing mathematical expressions, and general writing styles including grammar and punctuation.

Replacing I.D. Cards
When your shoes wear out, you replace them by getting a new pair. Why not replace your old, worn out I.D. key card, when it becomes cracked? Tape, glue and odd repair only create additional problems for you and our card readers. We can replace your I.D. card in a matter of only a few minutes. Public Safety is on the 2nd floor of the ESU building.

continued on page 4

PPPL Featured in Prize-Winning Student Video

by Ellen Webster

Last February Dale Meade, TFTR Project Manager, received a call from a 15-year-old student who wanted to discuss fusion.

The caller was Jonathan Brenner, the spokesman for a team of high school students about to begin a project for National History Day. This year's theme was Science and Technology in History and, after reading about TFTR, fusion had become the topic they wanted to pursue.

viewed Dr. Meade."

The project took months to complete, and Brenner said that during that time they gained a substantial amount of knowledge about fusion. "We don't know everything, but after six months we're impressed with fusion's benefits," he said.

The 10-minute tape, full of well-written narrative, presents facts and explanations on the evolution of fusion research. The interviews with Meade and footage provided by the Laboratory were interwoven

V. Mutnick (father of Ian), Mark Klapow, Ian Mutnick (winner in a different category), Jonathan Brenner, Jonathan's father, Dale Meade, Sanjay Pal, Salim Massoud, and Erik Carpenter.
Photo: JOHN PEOPLES

Months later it is easy to see that not only was that call successful, but so was the documentary they produced, *Thermonuclear Fusion: The Dawn of a New Epoch.* The five-student team from Westhill High School in Stamford, Connecticut won the local contest, went on to take first in the state, and competed nationally in Washington, D.C.

Dale said he responded to the initial call because "Jonathan was persuasive, and I wanted to help anyone who was that interested in fusion."

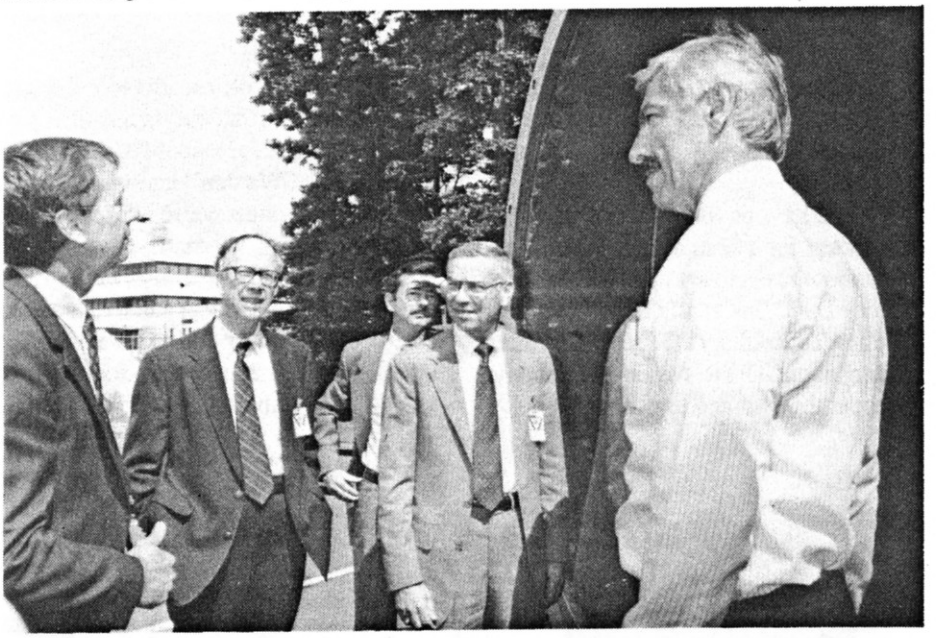
And the enthusiasm worked both ways. "Dr. Meade was very helpful," said Jonathan. "We spent an entire day at the Lab, had a tour, video taped TFTR, and interthroughout the tape and used to clarify historical data and explain fusion processes.

PPPL's own history was documented, as was the relevance of the oil embargo in the '70s which created popular interest in alternative energy sources and as such, became a catalyst for fusion's funding to be stepped up sixfold during that time period.

Recently the five young documentarians, Jonathan Brenner, Erik Carpenter, Mark Klapow, Salim Massoud and Sanjay Pal, once again visited the Lab. They proudly presented Meade with a copy of the tape, the end result of a phone call made several months ago. ▲

What's Doing at PPPL?

What's Doing continued from page 3

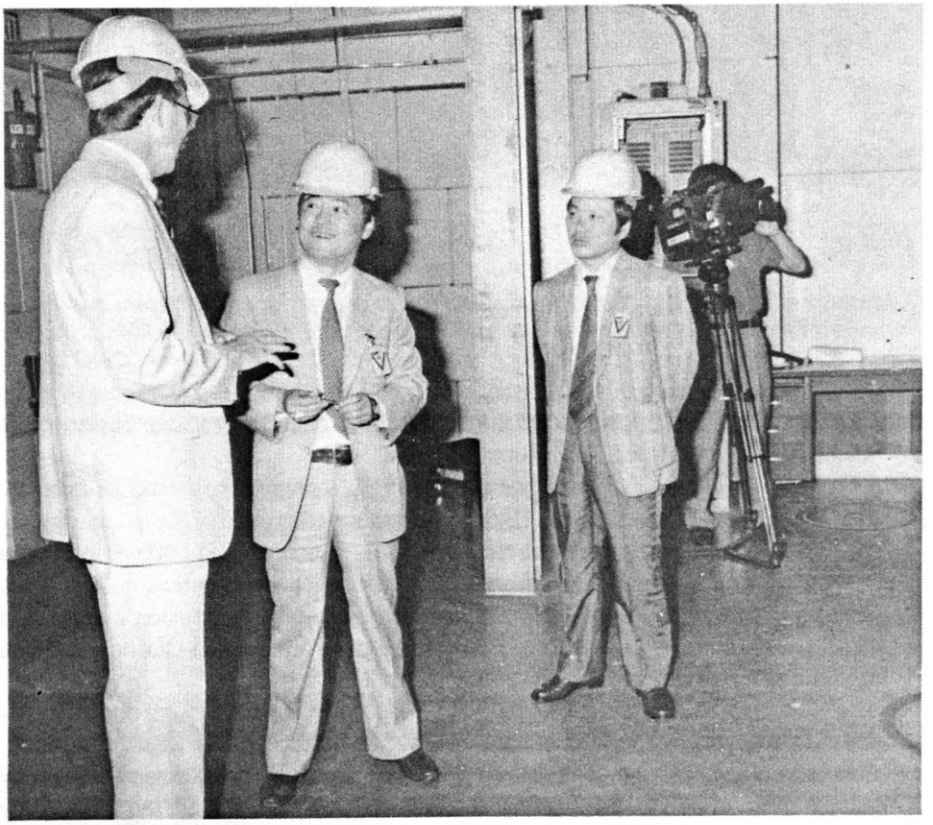


Visitors from the National Aeronautics and Space Administration (NASA) were given a tour TFTR by Dale Meade on June 14. Discussions included PPPL experiments and the possible use of He^3 in the U.S. Fusion and Space Programs.

Photo: JOHN PEOPLES

Princeton University President Harold Shapiro presented a colloquium describing the President's [President Bush] Council on Science & Technology in Gottlieb Auditorium on June 21.

Photo: JOHN PEOPLES



A film and reporting crew preparing a documentary for the Korean Broadcasting System (KBS) visited PPPL and interviewed Doug Post on June 28.

Photo: JOHN PEOPLES

An informal gathering to honor Jack Joyce's retirement was held on June 29.

Photo: JOHN PEOPLES

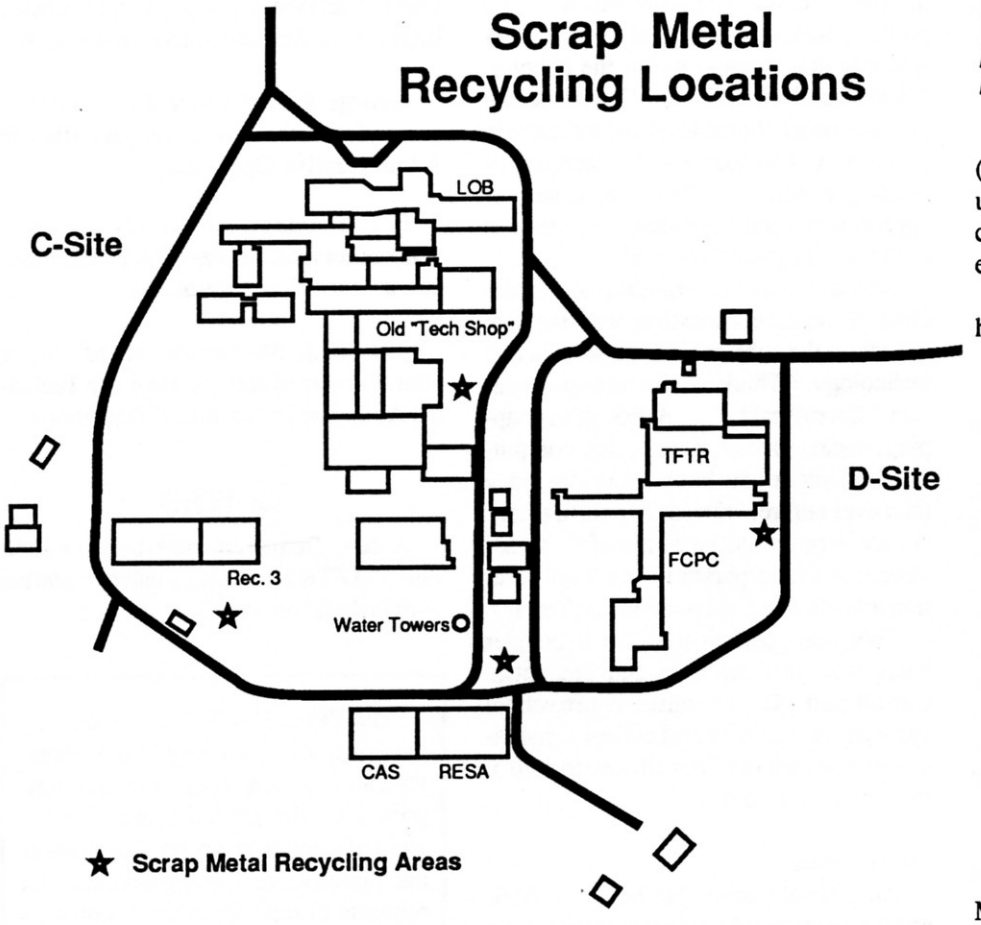
Scrap Metal Recycling Program

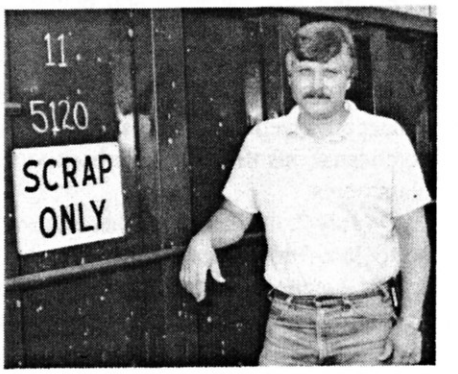
by Ray Camp

Everybody knows that the Laboratory recycles paper, but did you know that we have another recycling program? One that earns money? It's the scrap metal recycling program, overseen by Matt Lawson of Property Administration.

The program centers on those metals we use most: aluminum, copper, stainless steels, tin steels (mostly sheet metal) and wire. The return we get, set by contract scrap prices, can range from $1.30 per pound for clean copper to under a half cent per pound for mixed tin scrap.

According to Lawson, the key to getting the most for our scrap metals is keeping them separate. To do this, scrap metal bins are clearly marked as to their types. The bins are conveniently located at D-Site, behind FCPC; by the fence across the street from the RESA building; and behind the old tech shop by the radio-frequency trestle. (See illustration.)





Matt Lawson oversees the scrap metal recycling program. Photo: JOHN PEOPLES

If you need to scrap a large quantity (100 pounds or more) of something unusual, like a specialty steel or coaxial cable, give Matt a call. It may make more economic sense to have a special pickup.

Whenever you put scrap metals into the hoppers, keep these simple rules in mind:

- **Separate**
  Mixed scrap gives the lowest return.
- **Keep It Clean**
  Skids, reels, trash, etc., reduce the scrap value and can be dangerous to remove.
- **No Appliances, Gas Cylinders or Storage Drums**
  Gas cylinders and storage drums should be cleared through the Safety Office (Bill Slavin, ext. 2533) and theHazardous Materials Office (Scott Larson, ext. 3387), respectively. Appliances should be excessed or trashed.

If you have questions or need help, call Matt Lawson at ext. 2716 or pager 550.▲

Belated congratulations to those who completed the first college credit course in Administrative Office Management offered at PPPL. Twenty employees participated in this series of classes which was offered by Mercer County Community College as part of the Employee Development Program.
Photo: MIKE DIONNE

Education continued from page 2

diets, between extravagant claims for some military technology and more solid scientific work," he said. "Many of us at PPPL, not just scientists and engineers, have much to contribute to this effort."

This summer two new education programs will help teachers with basic physics concepts as well as practical projects and demonstrations they can take back to the classrooms:

On July 2, the PPPL Teacher Research Associate Program began; eight high school teachers started apprenticeships with Laboratory scientists and engineers.

Carroll said this six-week program had its beginning when discussions with teachers revealed that they had an interest in gaining experience in a research environment. "The focus of the program" she said, "is on showing teachers how science is done — letting them participate in the day-to-day life of a research laboratory. To us this may not seem so extraordinary, but it is to them. Teachers say that they need to help prepare students for science in the 'real world.' They say they need help finding out about new developments in science and need accurate information to help guide students' career choices."

"Many of us at PPPL, not just scientists and engineers, have much to contribute to this effort."
— Rush Holt

The Summer Teachers' Institute is bringing teachers from sixth, seventh, and eighth grades to the Laboratory for two weeks from July 9 to 20. The model for this pilot program is the American Institute of Physics' *Operation Physics*, which is based on the concept of teachers teaching teachers. The workshops will use lots of hands-on projects to show students the relevance of science in their lives.

Nation-Wide Cooperation Called For

The idea of targeting teachers is being adapted nation-wide. In October of 1989 a conference was hosted by the DOE for the purpose of designing a national plan to help federal research facilities expand their education programs. The results of this meeting included an agreement to provide kindergarten through high school students with a strong technological foundation on which to base their future education in science and math, and to furnish science and math teachers with "in-depth state-of-the art training" so their teaching can "'spark students' interest and understanding."

The Roots of the Problem

Carroll said the Lab's programs are intended to help remedy the current crisis in education, the blame for which can be partially attributed to a broad attitude about sciences that recently swept the country. "In the late '60s and early '70s, financial pressure on a national level and a change in social values influenced the decrease of funding to science. There was a lack of appreciation for the relevance of science in our everyday lives," she said.

Another factor contributing to the decline of science education was the fast growth in the subject areas of science and technology. "Think of the new information," Carroll said. ". . . AIDS, gene-mapping, nuclear power, fiber optics, computers. Students need to know a lot more today than ever before," she said. In turn, teachers are expected to be aware of these advances and incorporate the new information into already tight academic schedules.

"We need participation on a broader basis than just teachers and students," Carroll said. "Communities, entire school systems, universities and colleges, industry and research facilities all have to help in the effort," she said.

Future Plans

An official partnership between PPPL and the Trenton School District is currently in the works and may be in place by fall '90. Plans include helping a Trenton junior high science magnet school outfit its science laboratory, sending Laboratory personnel to talk with classes, providing career guidance in science and engineering, offering students special tours, and setting up a mentoring and tutoring program where employees with expertise in many areas can participate. ▲

In the next issue: A look at who's attending PPPL's summer schools.

TRANSITIONS

RETIRED

Charles E. Beach, Jr. retired July 1 after 27 years of service. He was a Technical Associate in Technical Operations.

James M. Beach retired July 1 after 31 years of service. He was a Technical Assistant in Technical Operations.

Henry Fallon retired July 1 after 25 years of service. He was a Lead Software Engineer in Administrative Operations.

George F. Hill retired July 1 after 15 years of service. He was Budget Officer in Administrative Operations.

Frank Homan retired July 1 after 33 years of service. He was a Technical Associte in Technical Operations.

Joseph J. Mayercak retired July 1 after 30 years of service. He was a Technical Associate in Technical Operations.

BIRTHS

A son, Benjamin, was born to **Erik Perry** (TFTR Shutdown Manager) and his wife Isabelle on June 26.

The PPPL HOTLINE is issued by the Princeton University Plasma Physics Laboratory, a research facility supported by the United States Department of Energy. It is primarily an internal publication. Correspondence and requests to reprint material should be directed to Carol Phillips, Editor, PPPL HOTLINE, P.O. Box 451, Princeton, NJ 08543 or telephone 609-243-2754; Interoffice correspondence should be addressed to Room B366, James Forrestal Campus, C-Site.

Editor: Carol Phillips
Writer and Layout: Ellen Webster
Photography: John Peoples
Reproduction: Teri Daynorowicz and Dan Klinger

Learning About Life Through Theatre

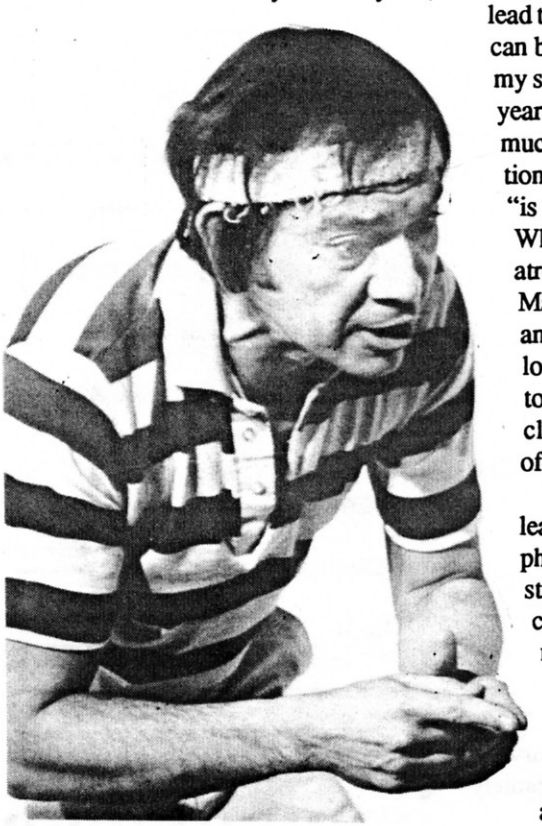
by Ellen Webster

It was during a lunchtime break from rehearsals for *The Glass Menagerie* that Maureen Stapelton taught Don Bumgardner to eat an artichoke.

At that time Bumgardner was the stage manager for the Broadway 20th anniversary revival of the show. He said that the cast and crew went to a small French restaurant, and having never experienced the art of artichoke consumption, Ms. Stapelton offered to teach him. When asked to describe the lesson he said with a bit of hesitation, "Oh well, it was . . . ah . . . all visual."

And while consuming artichokes may have been new to Bumgardner, a Telecommunications Assistant and employee of PPPL for six years, the world of theatre wasn't. He graduated from Michigan State University with a degree in Speech and Drama and over the years has been active in nearly 100 productions.

"I got involved with theatre because I was a shy individual and it gave me a chance to do things as another character that I wouldn't necessarily do as myself," he said. "It gave me a means of expression."



Theatre filled much of Bumgardner's life prior to coming to PPPL. "I tried to make a career of working in professional theatre," he said, "but I found that I like to eat regularly." For many years he maintained work outside of theatre to sustain himself — for such things as food and mortgage payments — but continued to be involved with theatre. Since coming to the Lab, however, he has had less of a desire to lead that dual life. "Somehow at the Lab I can balance making a living and keeping my sanity. Besides that, in my 'declining years' I've become more selective in how much time I feel I can give to an avocation. Theatre, to be done right," he said, "is all consuming."

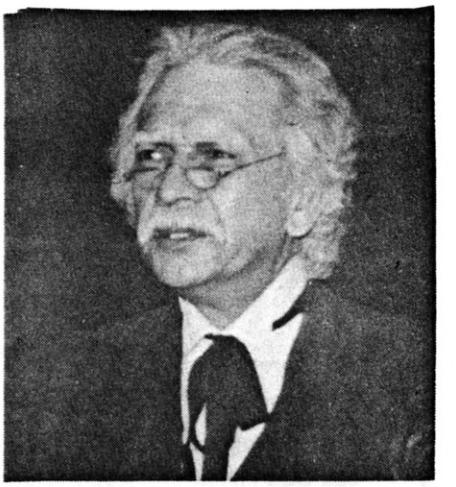
"I got involved with theatre because I was a shy individual and it gave me a chance to do things as another character that I wouldn't necessarily do as myself."

—Don Bumgardner

When reminiscing about his life in theatre, Bumgardner recalled more about Maureen Stapelton. "I found her to be an absolute delight — so filled with love and, in my estimation, very close to a genius in her field. And being close to genius," he said, "she has a lot of hang-ups.

"While working with her I learned very early on that one of her phobias while on stage was that any strange, unexplained noises might cause her to just leave the stage. I'm not sure where the fear came from, but one of my jobs was to move as quickly as possible behind her and explain what the noise was."

He recalled a favorite acting role as that of the theatre owner in the Crossroads Theatre Company production of *One Mo' Time*. Crossroads, nationally renown for producing quality plays that have a particular relevance in black culture and heritage, is located in New Brunswick. Bumgardner played the part of the theatre owner and remembers it as a "wonderful



experience" because of the professionalism of both the theatre and his fellow actors.

In addition to acting and stage managing, Bumgardner has also designed for theatre. He won an award for best set design for *Daughters* at the Edison Valley Playhouse.

Regarding acting again, he said, "If a script comes along that I feel is right for me and if I feel the production as a whole has value, I would definitely consider trying to get involved." He prefers roles that are considerably different from his own personality. "I find it difficult to be myself in a performing situation," he said.

And what type of play might woo him? "It would have to be a play that has definate social significance while at the same time being entertaining. I tend to shy away from light frothy diversion. While they have a definate place, there're not my favorite."

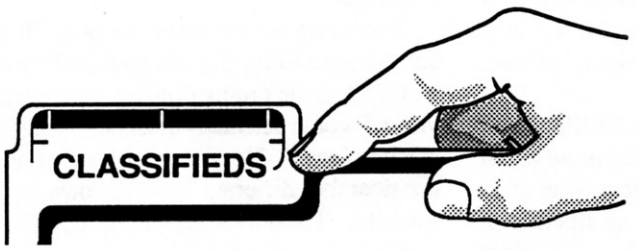
Bumgardner encourages theatre attendance and says that it can be a healthy diversion from one's own perspective and lead to personal discovery. "Theatre can help show you how you feel about life. It can cause people to question others' values and expand their own sense of understanding." ▲

Safety Courses

The Safety Office has scheduled the following safety training courses for July.

Course	Date/Time/Location
Radiation Safety Training	23-25 July, 8:30-12:30 D-Site, Safety Office
This course is required for all who must enter a radiation area.	
Basic Electrical Safety	25 July, 3:00-4:00 p.m. D-Site, Safety Trailer
This course reviews: the effects of electricity on the human body, energy sources, conversion and modification equipment, energy storage devices, energy uses, conductors, protective procedures, wiring methods, devices and tools, and emergency procedures. It is required for all employees working in the electrical field.	

Employees must obtain permission from their immediate supervisor to attend these classes. Supervisors should call Sue Hill at ext. 2526 to enroll their employees.



FREE

Needs a Good Home
A two-year-old fixed black cat named Charlie likes children and needs a good home. Call Eric, ext. 3176.

FOR SALE

Pick Your Own
Used red paving bricks, 25¢ each. Approximately 3,000 total. Call Marilyn, ext. 2656.

Dog Run
A 9"W x 12"L x 5"H carrier. $150. Call Marilyn, ext. 2656.

'84 Dodge Daytona
Turbo, 5-speed leather interior, 34,000 miles. $2,500 OBO. Call Marilyn, ext. 2656.

Physical Fitness Equipment
Bio Dyne universal gym, Nordic Track cross-country ski machine, stationary bicycle, and sit-up board. Will sell separately or as package. Call ext. 3048.

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PPPL
PRINCETON PLASMA PHYSICS LABORATORY

HOTLINE

Volume 11, No. 18 July 30, 1990

Teachers Give Summer Programs A+

by Ellen Webster

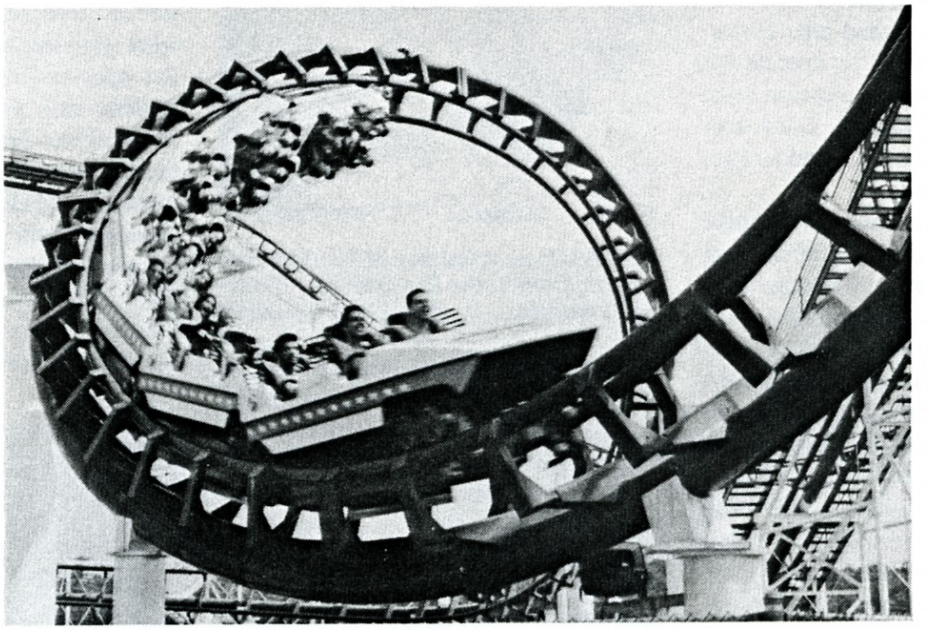
As a result of the recently concluded Summer Teachers' Institute, about 900 area students will be affected by what their teachers learned. Add to that their high school counterparts in the Teacher Research Associate Program, and the number rises to nearly 1,500.

The six-week Teacher Research Associate Program is enabling eight high school teachers to apprentice with Laboratory scientists and engineers. The Summer Teachers' Institute brought sixth, seventh, and eighth grade middle-school teachers to the Laboratory for two weeks of workshops and projects to help them show students the relevance of science in their lives.

If you talk to teachers involved in the programs, it's easy to see that PPPL's attempt to work more closely with educators has been a success for both the teachers and employees.

Kay Widmer, who teaches field ecology and chemistry at Hopewell Valley High School, said she was surprised by the reaction employees had to her presence here — their interest in what she does as a teacher. "These [education] programs are definitely two-way exchanges," she said.

Likewise, employees have said that they are pleased to see so many educators curious about the work being done at the Lab.



Teachers spent a day at Great Adventure learning about the physics of motion. Did you know that 3+ Gs (three times the normal force of gravity) can be felt on the Scream Machine? (More pictures in What's Happening.) Photo: ELLEN WEBSTER

Other teachers have spoken about the friendliness they experienced. "One of the best parts for me," said Lynda Fonde, a science teacher in Trenton, "was the attitude of the people we encountered."

Discussing ways the program will help in the classroom, Liz Welch of St. Mary's Cathedral Grammar School in Trenton, said that the Summer Teachers' Institute has given her "concrete, hands-on exercises to entice my students to explore." To her, though, the human resources were most valuable. "Talking to colleagues has been very comforting," she said. As a direct result of the program, the middle-school teachers are setting up an informal networking group to trade ideas and resources.

Teachers also spoke about ideas they had before coming to PPPL. "We're used to hearing that universities don't care," said Welch, "and it's good to see that they

Continued on page 2

Quick Action Minimizes Water Damage

by Ellen Webster

Employees who have been driving past the guard gate each morning for years say it was a first — being required to stop and pick up a notice, that is. As a result of the June 24 water leak on the third floor of the RF building, an information bulletin explaining the situation was distributed to all employees as they arrived at work.

Without warning, thousands of gallons of water had spilled and subsequently caused delays to experiments and some equipment damage in the area. Primarily affected were diagnostic and experimental equipment for the X-Ray Laser Lab, PBX-M, TFTR RF and the Radio-Frequency Test Facility.

J.W. Anderson, Manager of the Emergency Preparedness Division, said that fast thinking and quick actions of the Emergency Services Unit and security personnel helped minimize damages. Captains Bob Brown and Gregg Tompkins were on duty that day. They were supported by a team which included Tom Brophy, Lloyd Mathis, Tom Ruffin, Bert Allen, and Tom Furman.

"The men should be credited," said Anderson, "for taking action to isolate the

Continued on page 2

Leak — continued from page 1

leak and responding quickly to the alarms which were received by water affecting electrical circuits. The response by everyone, including support from Plant Maintenance, AC Power, Tech Shop and Safety personnel, was excellent."

Anderson said that many experiments housed in the RF building require cooling water which has been drawn from the fire protection system's supply for this purpose, and it was in this part of the system that the accident occurred.

On Monday, June 25, a recovery program was in place to clean up the damages and check all equipment. The fire system in the RF building was subsequently replaced by a temporary stand-pipe device, fire fighters were trained to operate the new system, and the experiments were once again up and running. Long-term actions include a proposed sprinkler system for the RF building.

Anderson pointed out that "we all play a role in preventing this type of incident from recurring. The water line that failed had evidently been leaking for some time, however it was not identified to Plant Maintenance for repair. It is important that we all be aware of the conditions in our work areas and identify such leaks to the Plant Maintenance group for correction."

Improvements lab-wide will help eliminate a potential problem which was uncovered during the leak investigation, that of silt build-up within the piping system. Routine inspections of the piping will be conducted, and, where necessary, pipes will be flushed to remove accumulated sediment. ▲

Education — continued from page 1

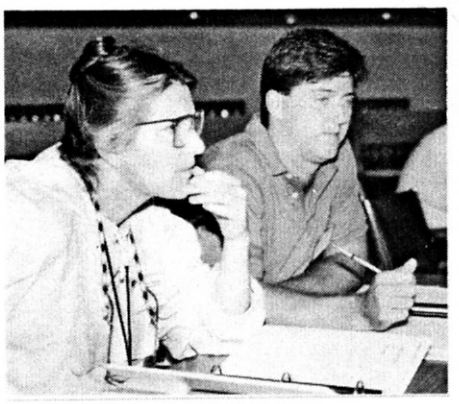
do. This experience has made me feel there's some real true compassion in research, that they do care about children."

Other realizations have brought personal surprises. Marcia Ruhl, a high school mathematics teacher in Hightstown, found problem-solving in a research environment to be an eye-opener. "I never realized how structured my life is," she said. "One day my level of frustration was so high that I went home and did laundry so I could feel like I'd accomplished something!"

Similar comments about the unpredictability of research were echoed by other high school teachers. Kay Widmer said that she had no idea what was involved in the real process of research. "This is not what the students' impressions of research is," she said. "Textbooks teach them that situations are more ideal." She said that as a result of working at the Lab this summer, she'll be better prepared to help guide students' career directions.

Inez Prioleau, a teacher in Trenton, was a participant in the the Summer Teachers' Institute. Photo: ELLEN WEBSTER

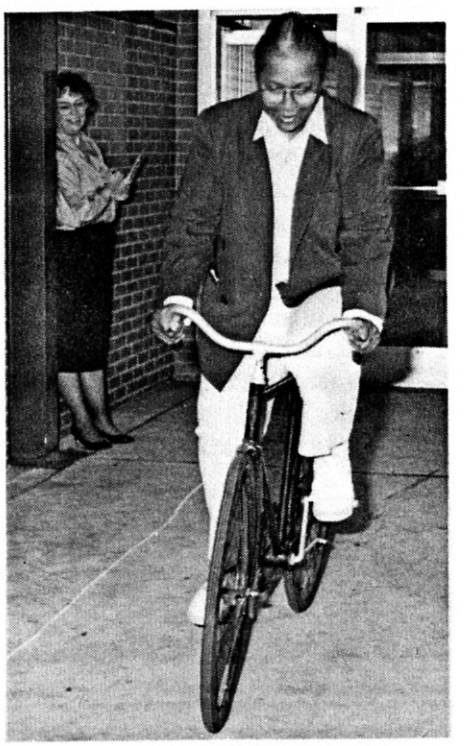
Some middle-school teachers said the real benefits of this sort of program will not be clear to them until they have time to sort out the information and prepare to use it in the classroom. "I do know that its made me very aware that physics is everywhere," said Lynda Fonde.



Educators included Barbara Weiland from the Newark School District, and Scott Hobson, a teacher in Monmouth. Photo: ELLEN WEBSTER

Yvette Van Hise, the Lab's education consultant who teachers physics at Marlboro High School, helped design and coordinate the Summer Teachers' Institute. She said that for the most part the participants came from elementary education backgrounds and have little or no experience in teaching physics concepts. She gave as an example of this one teacher who has taught home economics for 21 years and was recently assigned to science. "You'll find, in general," she said, "that middle-school teachers are probably weakest in the sciences. Many have never taken a physics class so they're uncomfortable with the subject. That's why having this program at PPPL is 100% better than offering it in a school; here they're able to see science in a place where its a day-to-day activity."

Barbara Weiland, a 21-year veteran teacher from Newark says she plans to put what she's learned here to work by taking the open-ended problems she poses to students and "seeing how much physics I can stuff into them." She says her role as a teacher is to be a facilitator, to provide materials and challenges. This year's program has given her ideas for more ways to use play in the classroom. "Creative play is really the basis of all learning," she said. "Discovery puts the process and production into the hands and mind of the child."



Evelyn Harris, from Trenton, tried hands-on experiments related to the physics of motion. Photo: JOHN PEOPLES ▲

A Celebration of Service

On the Job for 35 Years

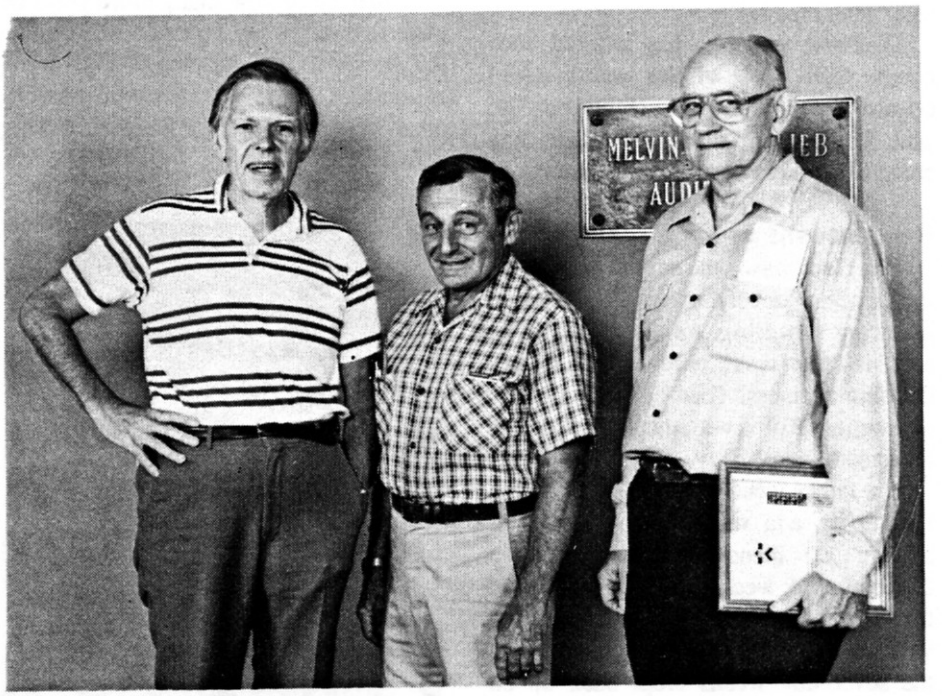
by Ellen Webster

At the eager age of 27, George Depagnier applied for his first job at Princeton University. On another part of the campus, Bob Kneeshaw was beginning a new career making models for the then Aero Department. And over in the remote part of campus now known as A-Site, Russell Kulsrud was anxious to start his first job out of college on a secret project called Matterhorn.

For all three, these beginnings have led to 35 years of personal growth and involvement with the Princeton Plasma Physics Laboratory.

These gentlemen, along with other employees who have marked their 5, 10, 15, 20, 25, and 30 year anniversaries with the Lab, were honored for their service on July 11. The celebration was hosted by Personnel Head, Steve Iverson. Presentations were made by the Laboratory's Acting Director, Tip Brolin.

The jobs of Kneeshaw, Depagnier and Kulsrud have been very different, but all agree on one point — the decision to come to Princeton was a good one.



Russell Kulsrud, Bob Kneeshaw, and George Depagnier share a 35-year involvement with PPPL and Princeton University. Photo: JOHN PEOPLES

Russell Kulsrud

As a young physics student in Chicago, Russell Kulsrud didn't know anything about a job he'd heard about at Princeton, except that it involved plasma physics. He was assured by his professor that it would be interesting, so he traveled to New Jersey to speak with Lyman Spitzer.

Because of its secrecy, he did not find out what Project Matterhorn entailed, but on the basis of what Spitzer was able to tell him, he knew he wanted to get involved. He didn't, however, leave that meeting encouraged about the prospects of a job. "Lyman said that the project was almost finished and they didn't really need any more theory . . . and that was in 1954!" he said.

But a job offer did follow, so he moved to Princeton to work on the theory of fusion — something he has been doing ever since. Kulsrud said that back then the project's 40 employees and one administrator were housed in a round tin building [still standing and for many years used as the printing facility]. Since that time a lot has changed. "I think the draw to stay this long is **because** it keeps changing," he said.

While he's had offers to work elsewhere, the temptations haven't held his interest for long. Over the years there have been sabbaticals to places such as Paris; Cambridge, England; Denmark; Berkeley, California; and Japan, but for permanency, he's always preferred Princeton. "This is a good place because there are smart people and that makes it exciting," he said. "This is the top place in the world for plasma physics."

George Depagnier

At the end of World War II, George Depagnier, who can be found working from 11 p.m. to 8 a.m. at TFTR, decided to take advantage of a veteran's benefit. He left the service and went back to school where he earned his aircraft mechanics license, a decision, he said, that became "a very important part of my life."

He immediately put his new skills to use by serving in the New Jersey Air Guard during the Korean War and then going back into active duty for the Air Force for two years. After his discharge, he checked the local papers for jobs and found that Princeton University was hiring aircraft mechanics. Since that was right up his alley, he applied, was accepted, and has found himself happily working on a variety of projects at PU and PPPL for more than three and a half decades.

> ***"Years go by faster than we expect. You find out that common sense is a big thing in life."***
>
> **— Bob Kneeshaw**

He said that while there may be an employee or two who have been here longer, he believes that he has the second lowest badge number actively used at the Lab, that of #15.

"I've spent most of my life here, and that [loyalty to a company] might be a

Continued on page 4

Service — continued from page 3

passing fad," he said. "I think it'll be rare in the future to go into a job as a young man and leave as an old man. We may be the last of a dying breed."

Over the years he has worked with people from most of the industrialized countries of the world. "I've found out," he said, "that people, no matter where they come from, have a universal humanity."

Bob Kneeshaw

Bob Kneeshaw, who spends most of his time working out of the tech shop, grew up in Ewing Township. As a young man he and his father were partners in a home-building business. Then Bob was drafted and went to Korea with the Army Corp of Engineers.

His father went to work for Princeton University and told his son about an strange phenomenon of this new job — a five-day work week! When Bob returned from the service, he took his father's advice and began working at Princeton. But the seven-day weeks crept back up on them, this time in the form of week-end remodeling jobs at the end of their five-day weeks. Bob finally decided that he had to make a decision about which career he truly preferred. He chose Princeton and said, "I'm pleased that I did it. It's turned out to be a good decision."

He said his time here has been very much like growing up with a family. "Years go by faster than we expect," he said. "People age and grow up. You find out that common sense is a big thing in life."

When asked how many more years he plans to be at the job, he replied, "If I knew the answer to that question, I'd be sitting alongside God. It probably won't be another 35 years though. I'd like to go fishing before that." ▲

Twenty years at the job: Joseph Winston, Ed Hill (front); Muriel Strohl (center); Pat Murray, Joe Rushinski, and John Schmidt (back). Photo: JOHN PEOPLES

Honored for 30 years of service: Wolfgang Stodiek, Paul McCann, Henry Miller, Silas Snead, and William Derry. Photo: JOHN PEOPLES

TRANSITIONS

RETIREMENTS

Richard E. Shamon retired July 1 after 33 years of service. He was Technical Specialist, Quality Assurance, in Technical Operations.

Joseph C. Wood retired July 1 after 31 years of service. He was a supervisor in the Coil Shop in Technical Operations.

BIRTHS

A daughter, Andrea Da-Chen, was born to **Bill Tang** (of the Theory Division) and his wife Mary on July 12.

A daughter, Lisa Marie, was born to **Frank Wasiowicz, Jr.** (in Materiel Control) and his wife Kathy on July 16.

A son, Christopher, was born to **Dolores** (of the Director's Office) and **Matt Lawson** (in Property Administration) on July 20.

A daughter, Michelle, was born to **Ron Strykowsky** (of Project Management and Scheduling) and his wife Kathy.

MARRIAGES

John Luckie (in Materiel Control) and Kathleen O'Callaghan were married on April 28.

HOTLINE

Editor:	Carol Phillips
Writer & Layout:	Ellen Webster
Photography:	John Peoples
Reproduction:	Teri Daynorowicz
	Dan Klinger

Our best ideas for HOTLINE come from you. If you have a story idea, Transition news, What's Happening announcement, or photo ideas, call Carol Phillips at ext. 2754.

What's Happening at PPPL?

PEOPLE

Don Grove, a retiree of PPPL, was recently acknowledged for his contributions to the field of fusion with the Fusion Power Associates' Distinguished Career Award. Other PPPL recipients so honored include Melvin B. Gottlieb and Lyman Spitzer, Jr

*****

Please note: For the next few months when you contact the Director's Office, you will reach **Jeanne Salerno** who is temporarily assigned to the office while Dolores Lawson is on maternity leave.

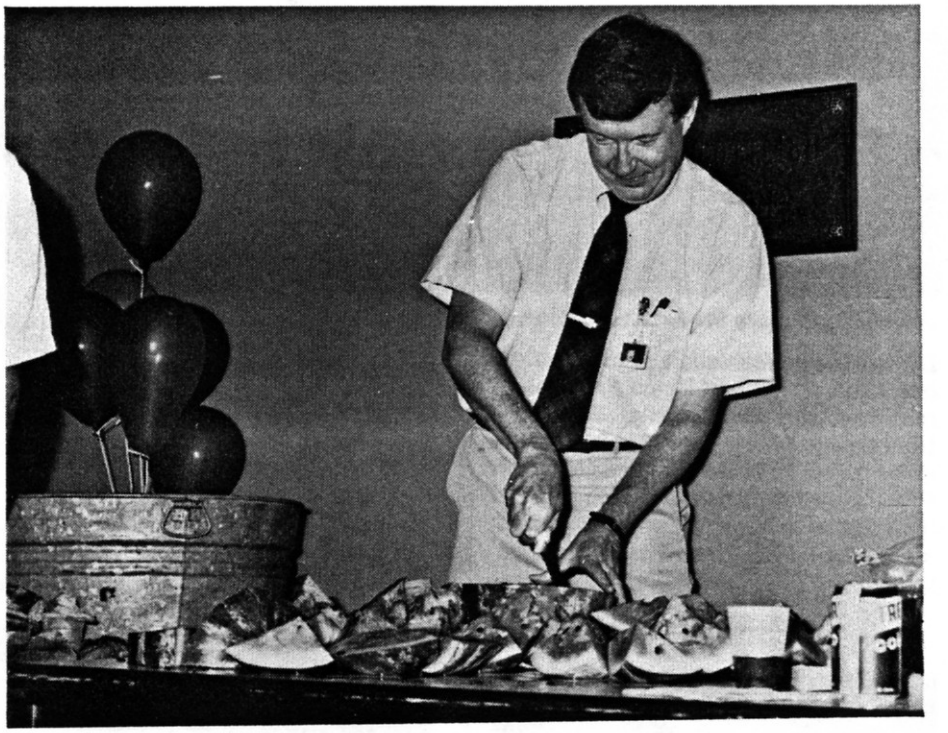
ANNOUNCEMENTS

Have Some Spare Time for Bowling?

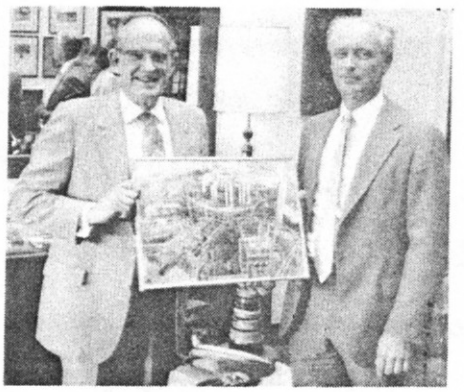
PPPL's Mixed Bowling League will begin its 32-week season on September 5. Both full-time and substitute members are needed. The League bowls at Colonial Lanes on Wednesdays at 6:15 p.m. Call Dick Yager, ext. 3307, or Sarah Thomas, ext. 3711, for more information.

Something Borrowed . . .

Attention professional women. A local organization, Working Wardrobe, needs your help. Women in crisis or transition can often use a helping hand with appearances. By donating items you no longer need — suits, dresses, blouses, jackets, shoes, slips and camisoles, scarves, belts and jewelry — you can help women overcome a big hurdle in any job situation — the first impression. For more information, call Pat Naylor at 258-2825.



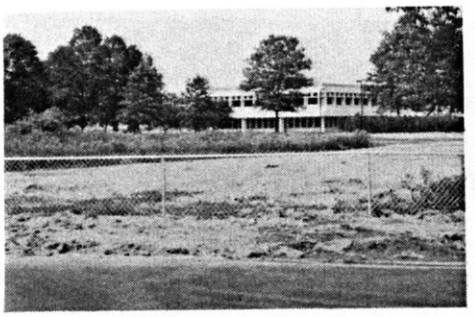
John Schmidt, Head of the Compact Ignition Tokamak Project (CIT), cuts watermelon at the recent Lab-wide celebration recognizing the new CIT mission statement. During the activities, Acting Laboratory Director Tip Brolin announced that the Senate Energy Appropriations Subcommittee approved the full funding requested by the President for the US Magnetic Fusion Program. Photo: MIKE DIONNE



Acting Director Tip Brolin recently visited Rep. Robert Roe (D-NJ) in Washington and presented him with a picture of TFTR in appreciation for his support of the magnetic fusion program.

Physicist Paul LaMarche talks with American Field Service (AFS) students prior to taking them on tour of the Laboratory. The students, representing 18 countries, were on their way home after living a year in California and Alaska with American families. Bill Johnson, Personnel Department, hosted two students during their week-long stopover in Lawrenceville. Photo: ELLEN WEBSTER

What's Happening — continued from page 5



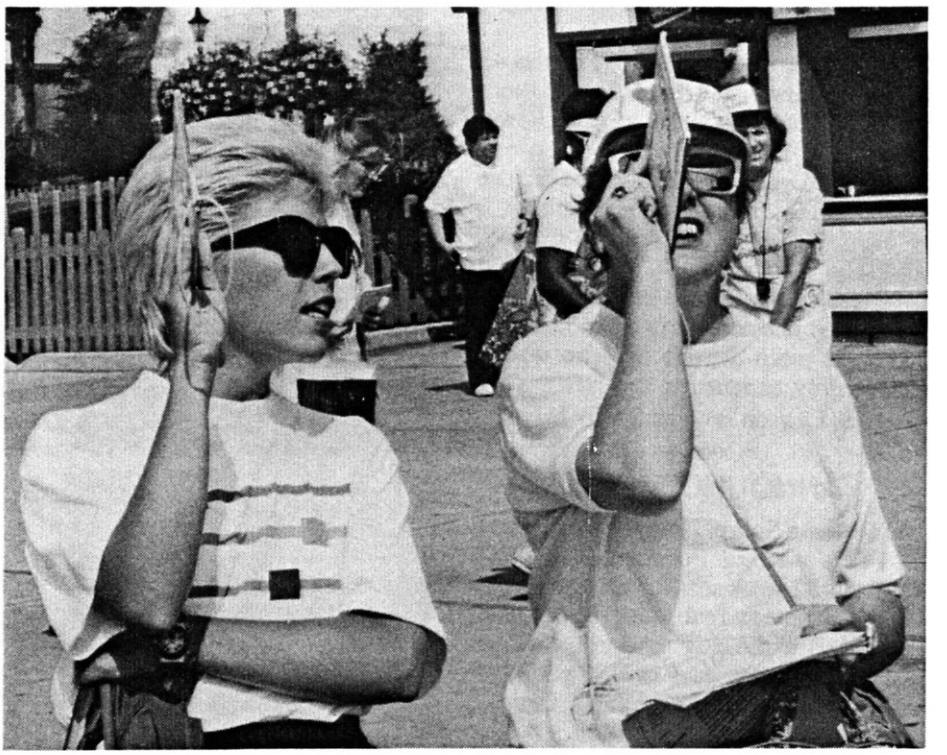
Wondering Where the Road Has Gone?

During the construction of the Route 1 overpass, the Robert Wood Foundation received permission from Princeton University to access their facility through a specially cut path from PPPL's entrance road. Relocation of their entrance has now been completed, so the temporary road has been removed. Photo: ELLEN WEBSTER

Mary Ann Brown is President of the Mercer Chapter of Professional Secretaries International and is currently attending the organization's international convention in Salt Lake City, Utah. Secretaries interested in learning more about this group should contact Mary Ann at ext. 3045 after July 30.

A Conservation Thought: ***Bring your own cup to the cafeteria for coffee.***

Field Trip to Great Adventure



Tracy Carr and Violet Cox of the Trenton School District measured the angle of a ride in order to calculate its height. Photo: ELLEN WEBSTER

The day was videotaped by Yvette Van Hise, a Marlboro High School physics teacher, who helped PPPL's develop this year's Summer Teachers' Institute.
Photo: ELLEN WEBSTER

Barbara Wolff, who teaches physics at Livingston High School, led the day in the park, as she does for groups around the country. Teachers learned about physics of amusement park rides and ways to adapt this information for classroom use.

Inez Prioleau (left), Earl Kim (back), and Violet Cox (right) calculate the forces that are felt on rides with Barbara Wolff (center), the day's "Varsity Physics Coach."
Photo: ELLEN WEBSTER

Gail Robinson, Dorothy Jones, and Bob Zelley — teachers in the Trenton School District. Photo: ELLEN WEBSTER

Scott Hobson, Liz Welch, Inez Prioleau, and Dorothy Jones test the physics principle which predicts that all riders will swing at the same angle. (The angle is only dependent on the speed and radius of the ride.) Photo: ELLEN WEBSTER

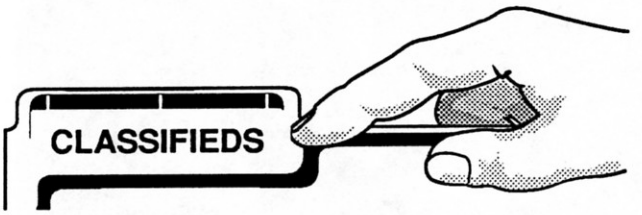
Accidents Waiting To Happen?

by Joe Stencel

While our lost-time accident record is very good this year, the following list of first-aid items during May and June indicates that we have come very close to a real accident. We cannot afford to be careless! Think safety! Learn from the experience of others, and avoid being an accident case. An accident is a cost to all of us.

- An employee received a 2-1/2" laceration on his palm when he prevented equipment from falling.
- While assisting in a hi-pot procedure, an employee received a shock, which caused him to jerk his hand back and hit his lower right jaw area.
- An employee received a superficial abrasion to his forehead while disassembling a vacuum line, and the hose sprung up and smacked the center of his forehead.
- An employee was lifting and moving an electrical transformer with another worker from the ground up, approximately 3 feet to the back of a truck. He suffered an acute lumbar strain.
- As an employee was stepping off the curb into the C-Site parking lot, her foot slid on wet leaves. She suffered a mild abrasion to her left knee.
- While moving wooden bookcases, a splinter became embedded in an employee's right palm.
- An employee entered a building and took off his sunglasses. While his eyes were adjusting to the change in light, he walked into a unistrut frame. He sustained a contusion and abrasion on his right knee.
- While torquing a bolt, a wrench slipped off the nut causing a contusion to a finger to an employee's right hand.
- As an employee was ripping open taped boxes, his right elbow hit the corner of a metal tape cart. He received a contusion to his right elbow.
- An employee's thumb was pinched while installing a breaker. He received a contusion and laceration on his left thumbnail.
- An employee scraped his head on the side of an open car door while bending down to pick something up.
- A subcontractor received multiple bee stings while removing a swarm of bees on a car and in a tree.

All of these first-aid cases could have been more serious and they also could have been prevented. Slow down! Think of the consequences if you do not perform an action properly.



FREE

Needs a Good Home
A two-year-old fixed black cat named Charlie — likes children and needs a good home. Call Eric, ext. 3176.

FOR SALE

Row, Row, Row
Exercise rowing bike. $90. Call Rich, ext. 2312

Pickup
1987, F-150 pickup, 46,000 miles, box, bedliner, dual tanks, great shape. $6,500. Call Andy McInerney, ext. 3444.

Motorcycle
1979, XS 1100 special Yamaha motorcycle. $950. Call Thomas M. Sereni, ext. 3474.

Motorcycle Trailer
Three bay with spare tire. $400 OBO. Call Carol, ext. 3529.

Daysailor
17' daysailor, 2 hp motor and trailer. $1,600 OBO. Call 587-7621.

Fiberglass Century
1971, 21' fiberglass Century with cuddy cabin, I/O 305 engine. $3,200 OBO. Call 587-7621.

Camera
Konica auto reflex TC, 35 mm, wide angle and telephoto lens, flash and case. $175 OBO. Call 587-7621.

Physical Fitness Equipment
Bio Dyne universal gym, Nordic Track cross-country ski machine, stationary bicycle, and sit-up board. Will sell separately or as package. Call ext. 3048.

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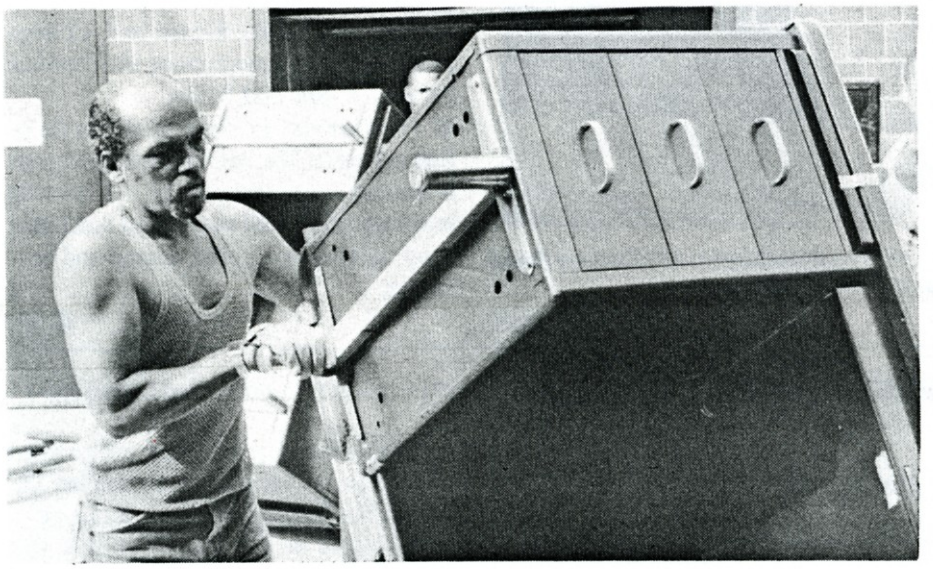
PPPL
PRINCETON PLASMA PHYSICS LABORATORY
HOTLINE

Volume 11, No. 19 August 21, 1990

College Road Move, Right On Schedule

Moving day — the very words conjure up images of dreaded packing, lifting, and stress and strain. And finally, when all energy is depleted, unpacking.

Anyone who has gone through this series of maneuvers will shudder to think of the effort required to move 200 people. But that is exactly what is taking place as the entire contents of Princeton Plasma Physics Laboratory's offices at 305 and 307 College Road East are moved to B-Site and to the old tech shop which has been renovated to house engineering and drafting personnel. (See accompanying article.)



The entire contents of 305 and 307 College Road East are being moved to C- and B-Site. Larry Jones is among the employees executing the move. Photo: E. Webster

The decisions to relocate the offices at College Road were arrived at in two phases. It was determined a year ago July to consolidate the engineering staffs at C-Site. And a study initiated by Dick Rossi, Associate Director and Head of the Administrative Department, resulted in the decision to relocate CIT, Ebasco and the Engineering Analysis Division (EAD) to B-Site.

While individuals may have mixed feelings about being moved after only three years at College Road East (one employee working amid boxes and moving crews said that he'd prefer to see a "move to stay put"), the decisions were ultimately based on economics. The forthcoming fiscal year 1989 Annual Report states that, "The budget pressures and staff reductions in FY89 led the Laboratory to reexamine space requirements."

Ed Winkler, PPPL Controller, estimates that the Lab will save approximately $700,000 as a direct result of moving from College Road. The savings for fiscal years 1991 and 1992 are expected to be about $1.6 million, but the Lab invested $900,000 in fiscal years 1989 and 1990 to cancel the leases and pay for the move.

The first four weeks of the eight-week move will transfer the engineering and drafting staffs to C-Site. This, according to the Annual Report, will benefit the Lab by bringing employees and their activities "closer to scientific staff and experimental devices." Dick Rossi said that consolidating these areas will help "improve the efficiency and effectiveness of the work by unifying the efforts in a centralized area."

Bob Kress, Manager of Project Engineering and Construction, said that the

continued on page 2

New Engineering Wing Completed Early & Under Budget

In a recently completed $1.2 million conversion project, the Project Engineer and Construction Branch, acting as general contractor, transformed a single-level tech shop into a two-story modern office facility for engineering and drafting personnel. The renovation, which is located south of the LOB East Wing and began nine months ago, was completed nearly a month ahead of schedule and thousands of dollars under budget. It will be used to house staff which for the past three years occupied 307 College Road East.

Subcontractors were comprised of small businesses, and according to Bob Kress, Manager of Project Engineering and Construction, were an unusually cooperative group of professionals. "It's gone exceptionally smoothly," he said. "Each of the subcontractors had a liaison person here at the Lab, and I think you'll find that everyone involved with the project is proud of the work that's been done."

continued on page 2

Accident Follow-Up

As a result of last week's accident in the TFTR Hot Cell where acetone and nitric acid were mistakenly mixed, an investigation is underway to report details of the incident and the corrective actions that were taken. A separate report will recommend changes, if needed, to the current system of controlling and handling chemicals in the Laboratory. Both reports are expected the week of August 20th.

Move — continued from page 1

study which helped determine the fate of the 78 employees in CIT, Ebasco, and EAD was based on the examinations of three scenarios: (1) remaining at College Road East; (2) moving to B-Site; and (3) moving to C-Site. In the third option, Procurement, Accounting, and IRM would have been moved to B-Site and construction of an additional module on C-Site would have been required.

"With recent budget reductions, the overriding concern was the conservation of our financial resources to keeping the [Lab-wide] programs moving," Kress said. As a result of the decision, EAD is being relocated to the Aero Lab, CIT and will be housed in the New Guggenheim Building, and employees from Ebasco will move into both Old and New Guggenheim.

Mike Capone (back) and Richard Salm (front) continued working in 307 College Road East amid movers, boxes, and rapidly depleting office furniture.

Photo: E. Webster

Other Changes

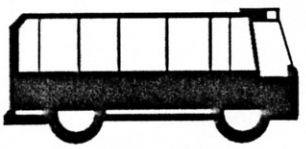
● **Phones** — Molly Tompkins, Telecommunications Manager, says that the logistics of shifting phone service for 200 people from two into three buildings may require patience on the part of employees. While it is expected that service will be transferred within five days of the scheduled move, it may be necessary to dial alternate numbers or use pocket pagers if you are unable to immediately reach an individual at his or her extension.

Most employees' extension numbers will remain the same, but if you experience any problems, call the operator for assistance.

● **Shuttle Service** — Until all personnel have been moved from College Road, a temporary shuttle schedule (see left) will connect the LOB, B-Site and College Road. After this time, service will continue between C-Site and B-Site.

● **Food service** will be available at the B-Site cafeteria. The current plan anticipates a limited operation which will provide morning coffee and snacks and lunchtime soup, sandwiches, salad, dessert and beverages.

— E. W.



Temporary Shuttle Schedule

LOB to B-Site to College Road East

Shuttle Stop	Times of Departure								
LOB	8:00	9:00	10:00	11:00	12:00	1:00	2:00	3:00	4:00
B-Site	8:10	9:10	10:10	11:10	12:10	1:10	2:10	3:10	4:10
307 College Rd E	8:16	9:16	10:16	11:16	12:16	1:16	2:16	3:16	4:16
B-Site	8:25	9:25	10:25	11:25	12:25	1:25	2:25	3:25	4:25
LOB	8:30	9:30	10:30	11:30	12:30	1:30	2:30	3:30	4:30
B-Site	8:40	9:40	10:40	11:40	12:40	1:40	2:40	3:40	
307 College Rd E	8:46	9:46	10:46	11:46	12:46	1:46	2:46	3:46	
B-Site	8:55	9:55	10:55	11:55	12:55	1:55	2:55	3:55	

Notes:

(1) Schedule will be in effect from 27 August 1990 to 30 September 1990 or until all employees have been moved out of College Road.

(2) Time shown is when the shuttle **leaves** the stop.

(3) B-Site pick-up is in front of the New Guggenheim. (The shuttle stop shelter will be moved from College Road East to this location once the move has been completed.)

(4) Questions regarding this schedule can be addressed to Pat Zeedyk, ext. 3108, or Scott Larsen, ext. 3387.

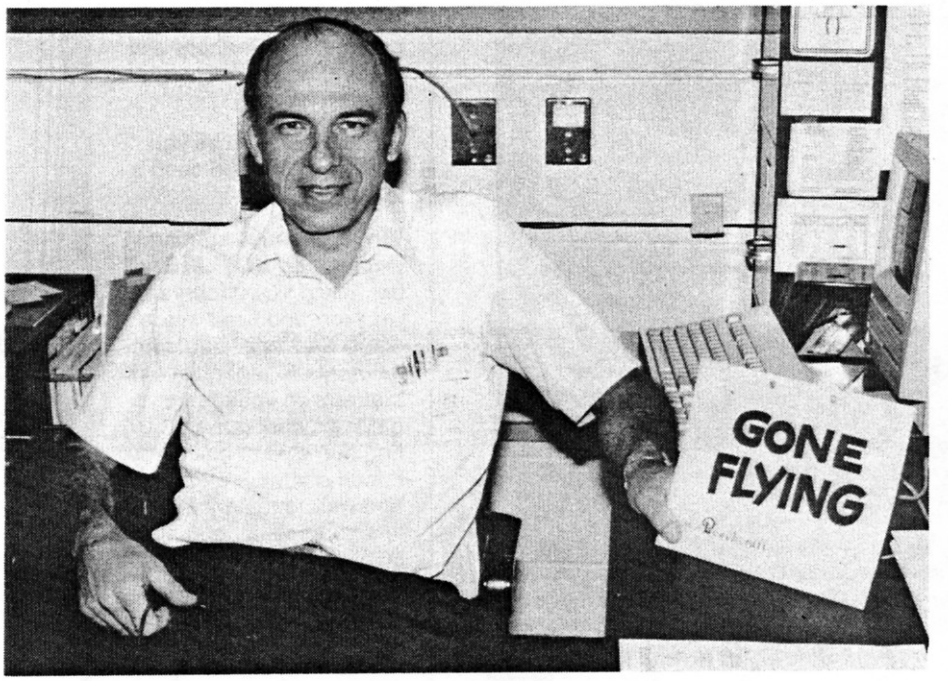
Renovation — continued from page 1

Since both 305 and 307 College Road East must be vacated by September 30, having this building ready for occupancy a month early meant that the move could take place over a eight-week period, rather than four weeks which was originally scheduled. This, in turn, will reduce the amount of overtime required to facilitate the move, all of which is being done in-house rather than through an outside moving company.

In addition to the renovation project, construction of a pedestrian bridge to connect the new engineering facility to the LOB is in the design stages and is expected to be completed by March of 1991. Both of these projects are focusing on compliance with the Uniform Federal Accessibility Standards (UFAS) which will make the Lab easily accessible to handicapped individuals and those needing special assistance in order to move throughout the facility. The bridge will also enhance general pedestrian traffic circulation throughout the Laboratory. **— E. W.**

Ray Jeanes' Weekend Flight to the Mid East: Supplying U.S. Forces in Saudi Arabia

Between Wednesday night and Monday morning (August 8-13), while most of us were wrapping up the work week, enjoying the week-end and preparing to begin it all over again, Ray Jeanes, Plant Engineering Fire Protection Engineer and member of the U.S. Air Force Reserves, was piloting a plane full of Army trucks and tanks bound for Saudi Arabia. During the four-day trek, he logged 36 flight hours and covered a distance of nearly 14,000 miles.



As a pilot in the Air Force Reserves, Ray Jeanes recently flew a cargo plane filled with tanks and trucks to Saudi Arabia. Photo: E. Webster

His trip to the Middle East was handled as a "Stage Operation," a term used to describe moving a plane a long distance in a short amount of time by only breaking up the flight to refuel and rotate the crew.

Ray's trip began at Dover Air Force Base in Delaware, where he received orders which required him to fly to Pope Air Force Base in North Carolina. At this location, cargo was loaded and the plane left the U.S. for Frankfurt, West Germany. In Frankfurt, the three-man pilot team was replaced by a fresh crew; Jeanes' group spent the next 12 hours resting so they could relieve another team of pilots who would arrive from the U.S. the following day. They then flew the final leg of the outbound trip and arrived in Saudi Arabia at 2 a.m. local time.

Only about three hours were spent on the ground in Saudi Arabia — just long enough for the plane to be unloaded, refueled, and for the crew to file its flight plan. At dawn they left for Germany where they once again rested, and then flew the final segment back to Dover.

While on the ground in Saudi Arabia, Ray observed that the military operation was being handled by both Americans and Saudis. He had contact with Saudi citizens who drove the crew from the plane to the location where flight plans were filed while other Saudis were refueling the plane. He found them to be friendly, helpful, and "pleased we were there."

He said, regarding the United States' efforts to secure Saudi Arabia against an invasion by Iraq, "I was impressed with the number of people and amount of equipment already in place. Everyone seemed to be working hard to get the mission accomplished, and that's not always the case." He noted that the Army and Air Force were "working closely and well together."

Ray can't predict if he'll be making another trip to the Middle East, but if the U.S. completes its all-out effort to get troops, supplies and machinery in place within the next week, he probably won't be returning immediately.

During the four-day trek, he logged 36 flight hours and covered a distance of nearly 14,000 miles.

Ray has been in the U.S. Air Force Reserve for 17 years. Prior to that, he was on active duty for seven years, and left with the rank of Captain. While in the Reserves, he has been promoted to Lieutenant Colonel.

During his time in the Reserve Forces, Ray has been assigned to the 709th Military Airlift Squadron at Dover Air Force Base, Delaware. The 709 flys the C-5 (a large, four-engine jet aircraft) and augments the active duty forces to provide airlift for both routine operations and national emergencies. While the C-5 can, and sometimes does, transport people, its main purpose is to move large heavy equipment such as tanks. It has the ability to haul up to 265,000 pounds of cargo. **— E. W.**

Edna Kalmus suggested and contributed to this article.

HOTLINE

Editor:	Carol Phillips
Writer & Layout:	Ellen Webster
Photography:	John Peoples
Reproduction:	Teri Daynorowicz
	Dan Klinger

Our best ideas come from you. If you have a story idea, let us know. Call Carol Phillips at ext. 2754 or simply write a note addressed to **HOTLINE.**

HVAC Class Brings New Ideas to Lab

It's unusual to hear that: (a) an on-site class was interesting, (b) the participants were enthusiastic and would have liked the instruction to go further, and (c) the instructors were exceptionally good at their task. But that's exactly what's being said about a two-day class on heating, ventilation and air-conditioning (HVAC) which was held in May and whose participants recently received certificates for their efforts.

The HVAC Efficiency Improvement Training Program was sponsored by the Department of Energy, hosted by Plant Maintenance and Engineering, and attended by 14 Lab employees, including plant engineers, planners, and technicians in Quality Assurance and the Motor Generator (MG) areas. A Princeton-based DOE representative also participated.

Charles Kircher, a Senior Project Engineer who attended the program, says that it was a combination of the strength of the instructors and the interest of the attendees that made the program such a success. "The instructors did a very good job, especially considering the complexity of our facility. Plus we had people of our own who were knowledgeable, so we had interesting discussions and exchanges of ideas. Some participants even expressed an interest in having it extended, which is unusual and reflects positively on the ability of the instructors."

The class was conducted by the Energy Efficiency Institute of Auburn, Alabama, which has been commissioned to conduct similar training programs at DOE sites around the country. Other locations visited this year include the Nevada Test Site in Las Vegas, Nevada; Lawrence Livermore National Laboratory in Livermore, California; and the Idaho National Engineering Laboratory in Idaho Falls, Idaho.

HVAC Class participants and supervisors: Front—Dick Terhune, Charlie Kircher, Jeff Bennett, Tom McGeachen, and Walt Olkowski. Back—Bob Rodgers (DOE), Alex Melendez, Carl Potensky, Ray Pressburger, Jr., Rick McDonough, Bill Persely, Harry Krotz, and Rich Pfeifer. Photo: John Peoples

According to a DOE statement, the purpose of these sessions is to "reduce energy consumption and costs." But the training, which consisted of both classroom and hands-on instructions, was only part of the job the Institute was hired to do. The representatives also spent an entire day familiarizing themselves with and inspecting the Lab's system. The results will be published in a forthcoming report which, according to a memo from the Department of Energy, will "identify deficiencies, estimate the cost to correct the deficiencies, calculate the expected annual energy and cost savings, and perform a life-cycle-cost-analysis."

Kircher said that because the instructors/inspectors are familiar with other systems, their observations will be extremely useful to the Lab. "It helps to have fresh eyes come in and look at things," he said. "We're constantly trying to come up with ideas, but comments from people who have been to other facilities and know about the problems a variety of systems can have, are especially valuable."

The Institute is scheduled to return to the Lab in the second quarter of 1992 for boiler training. If anyone other than Boiler Operators is interested in attending, contact Plant Maintenance and Engineering.

— E. W.

— MEMO —

Who: You

What: We need information about employees who do volunteer work

Where: Anywhere — Little League coaches, Scout leaders, volunteer rescue or fire workers, PTA members, foster parents, Big Brothers and Sisters, tutors — on, and on, and on

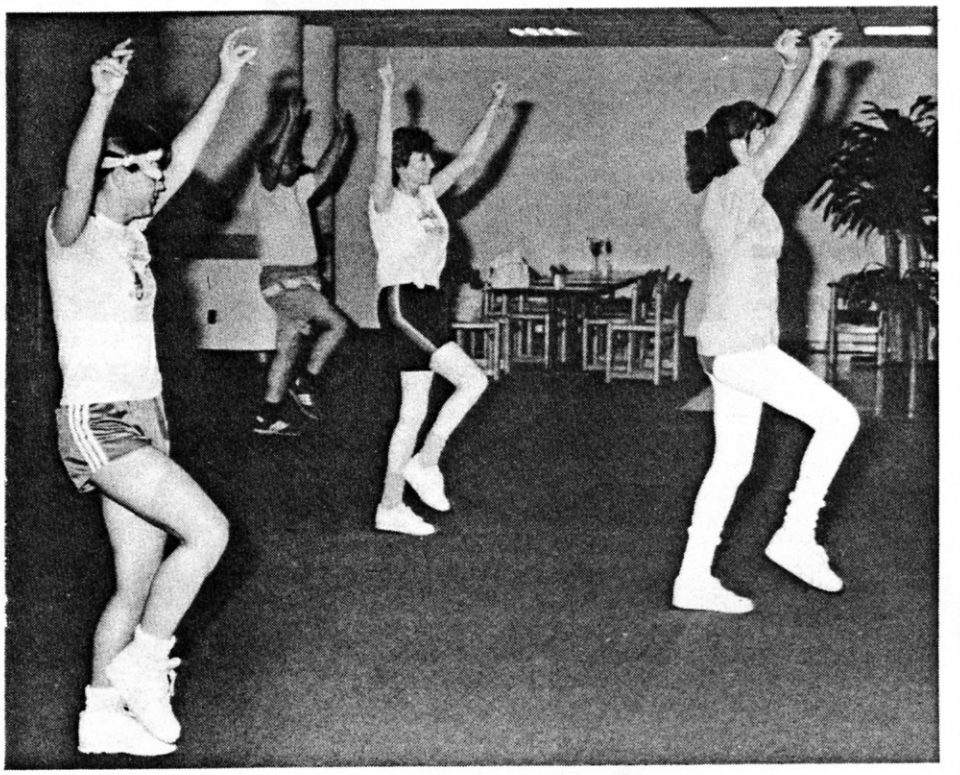
When: As soon as you can jot a note and send it to HOTLINE

Why: Because starting in September, **HOTLINE** will be telling you about fellow workers who have made short- and long-term commitments to organizations that rely on volunteers to get their work done. You'll find out what sorts of work needs attention and why, and who to talk with if you find yourself curious about involvement. And, perhaps most importantly, you'll learn a little bit more about the men and women who are working at PPPL.

In-House Aerobics — No Excuses and Lots of Fun

Huffing and puffing — the sounds of the big bad wolf trying to blow down the three little pigs' house. It's also what you might hear as you pass by the cafeteria on Mondays and Thursdays from 5:15 to 6:15 p.m. No, there's not a reading of the old fable going on inside, but rather employees participating in a program of professionally taught aerobics classes.

Sally Connell, who helped initiate the program two years ago, says, "It's a convenient way to exercise — **no excuses**, because it's right here in the building!" She also says that it's an excellent way to relieve stress. "You feel more invigorated after the class. You may go into it thinking you just can't do it — maybe you had a bad day or you're simply tired, but by the end of the hour you're feeling quite relaxed," she said.



Molly Tompkins, George Christianson, Sally Connell, and professional instructor Kathy Karback, are among the regulars at the bi-weekly aerobics classes at the Laboratory.
Photo: John Peoples

A typical class at the Lab is made up of between 12 and 15 employees. Connell says that while the average age of the participant is around 45, "we do have a few kids in their '30s."

Classes are taught by instructors from The Body Center™ in Princeton. Co-owner Cindy Powell says that they specialize in the 30- to 60-year-old crowd. "We don't want to send a 20-year-old instructor with a perfect body out and give the impression that if you exercise, you'll look like that," she said. "We send instructors of all ages and all body types — just like the people who'll be taking the classes. Our teachers are enthusiastic and portray positive good feelings about themselves and the workouts," she said.

Instructors are certified, which means that they have taken courses in aerobic safety, choreography, physiology and kinesiology. Unlike some studios that allow instructors to design their own classes, those at the Body Center are taught structured routines which change every eight weeks. The benefit of repetition, Powell explained, is that once a student knows the routine, they can then focus on working certain muscle groups rather than keeping up with the instructor.

. . . as in most new things, it's the getting started that is the hardest. To make the beginning a little easier, the first class is free . . .

She says that there is evidence that employees who regularly exercise have lower absenteeism, which is one reason corporations welcome on-premises classes. Besides PPPL, their clients include Merrill Lynch and the United Jersey Bank at Carnegie Center.

Employees benefit from the involvement because in addition to strengthening muscles and improving cardiovascular endurance, they often report that their sleep improves and they become more alert, both on and off the job.

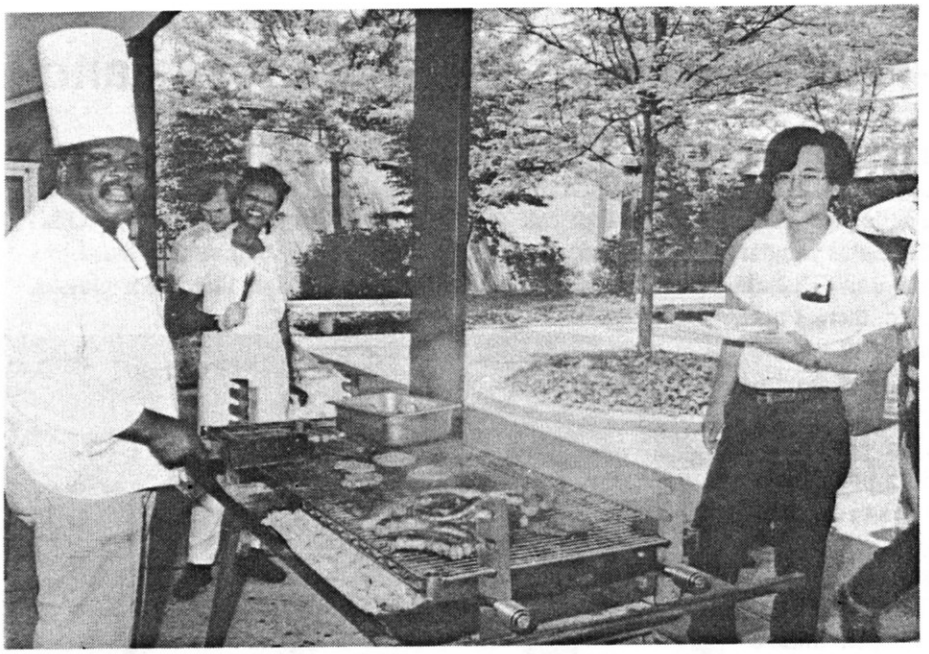
Classes taught at the Lab can be easily adapted for both high and low impact preferences, and both styles can provide the same amount of cardiovascular workout when done properly. (In low impact, one foot is always on the floor; high impact involves more jumping around.)

Powell admits that as in most new things, it's the getting started that is the hardest. To make the beginning a little easier, the first class is free, which even further reduces the excuses you have not to join. Need more convincing? Connell says that above all, "We have a lot of fun!"

Summer classes are Mondays and Thursdays at 5:15 p.m. The monthly charge is currently $32. Beginning in September classes are held three times a week. There is a $40 per month charge for unlimited classes or a $5 per class fee. For more information call Sally Connell at extension 2689.

— E. W.

What's Happening at PPPL?

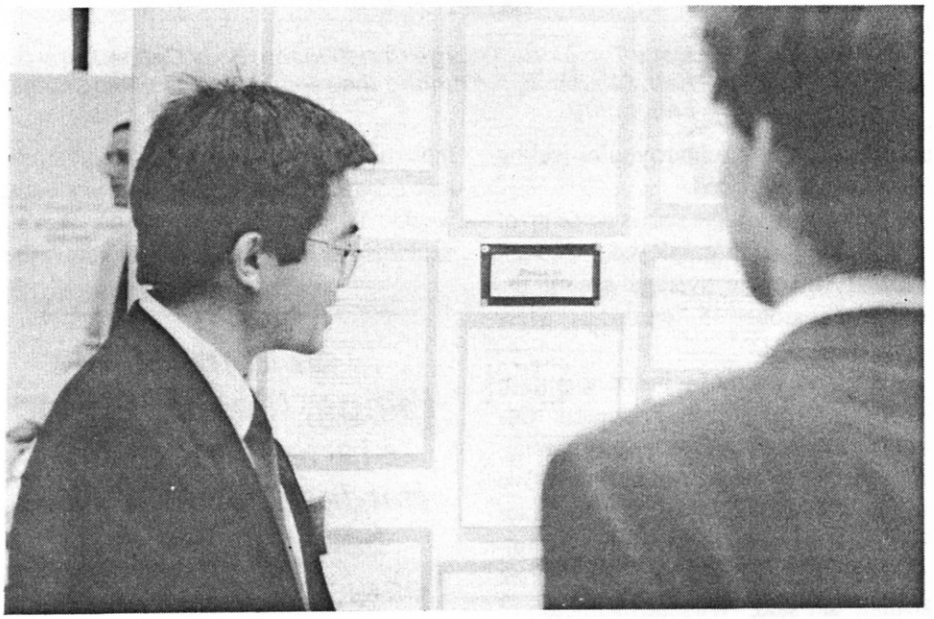


For two sunny weeks the smells of a summer barbecue could be detected throughout the Lab. While renovations were going on inside, the cafeteria was moved to the courtyard. Clarence King and Cynthia Stoddard kept the grill full for employees such as Yoshimori Kusama.

Photo: John Peoples

At a dedication party for the New Engineering Wing (NEW), Bob Kress (right) shakes hands with the main design architect from United Engineers and Constructors in Philadelphia, John Holz (left).

Photo: John Peoples



PPPL physicist Joe Cecchi recently hosted the yearly review meeting of New Jersey's SEMATECH Center of Excellence (NJSCOE) for Plasma Etching. Participants displayed summaries of their work on posters in the LOB Lobby. Members of NJSCOE are Princeton University, Rutgers, the New Jersey Institute of Technology, Stevens Institute of Technology, and the SRI/David Sarnoff Research Center.

Photo: E. Webster

Notices

Meeting Planners

When planning meetings that affect food service (you anticipate extra people will be using the cafeteria) or maintenance (your meeting requires special set-ups or you need additional janitorial services), please contact the following supervisors and alert them of your group's plans: Jerry Williams or Wayne Robinson — maintenance; Olga Bernett and Joseph Hosonitz — cafeteria.

Engineering Refresher Course

The Greater Trenton Section of the American Society of Mechanical Engineers (ASME) is sponsoring a refresher course to begin in November for engineers interested in taking the Professional Engineering (PE) examination in April. Alfred Colabella (609-298-7000) or Alice Cleveland (609-275-5526) may be contacted for more information. William Johnson in PPPL Personnel (ext. 2052/ 2036) also has information as well as registration forms.

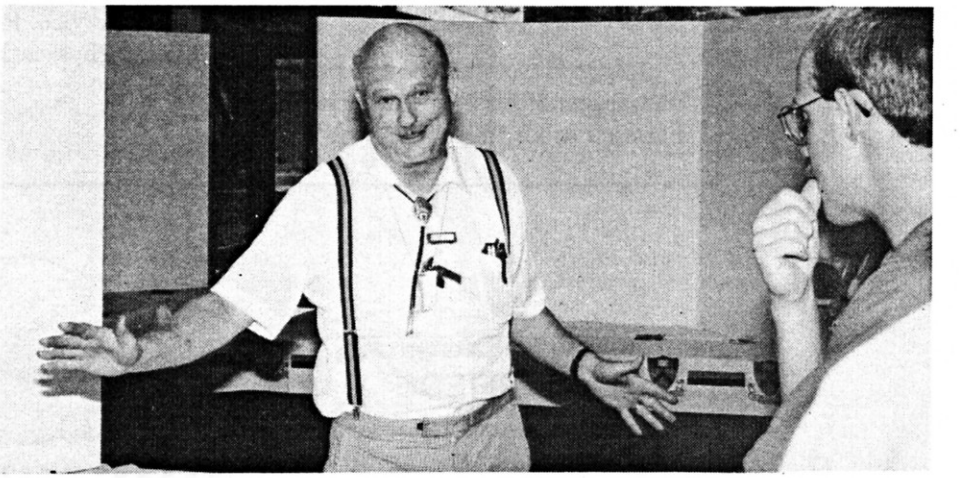
Upon satisfactory completion of the course, it is estimated that 85% of the instruction costs (other than books and materials) is reimbursable through the University's Tuition Refund program.

New Controlled Area

Recent radiation surveys have determined that the TFTR basement is now a controlled area for purposes of radiologial protection. Personnel working in this area, including the Tritium Vault and Upper DARM, are now required to wear a current monthly film badge. Call Health Physics at ext. 2600 for more information.

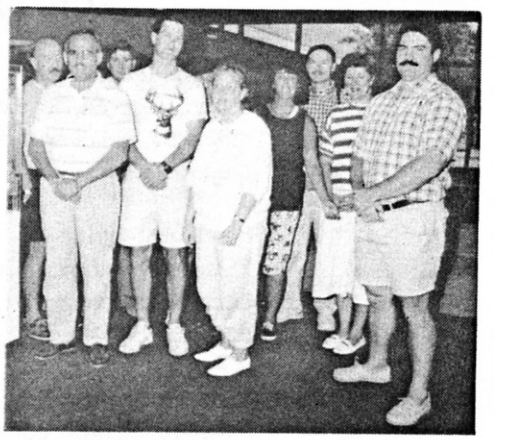
Visiting Groups:

Among the recent tours given of the Lab was one to a group of young scientists from the US, the USSR, China, Britain, India, and Brazil. The students were part of a 10-day International Summer School on Science and World Affairs held at Princeton University. The objective of the school was to help participants better apply science to public policy in their countries. Last year's session was held outside of Moscow.

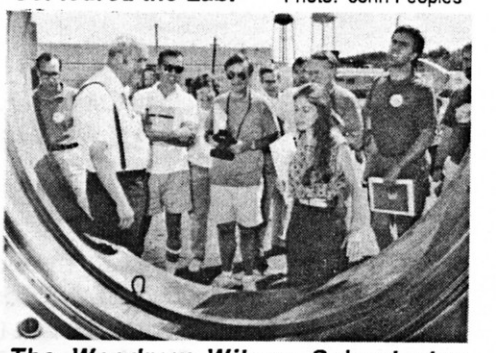


German engineering students were recently treated to George Martin's animated explanations of the Lab's work. Photo: E. Webster

Recently, business leaders from Forrestal Center and representatives from the NJ Sierra Club and Environmental Federation visited PPPL. Shown with Dale Meade (right foreground) are, left to right, Gus Conocente (Information Services, American Reinsurance), Miguel Fernandez (President, Carter Wallace International), Joe Rossiter (Building Engineer, First Boston), and Deborah Keller (Executive Director, NJ Environmental Federation). Photo: John Peoples



Teachers with the Philadelphia Electric Co. toured the Lab. Photo: John Peoples



The Woodrow Wilson School also brough teachers to the Lab this summer. Photo: John Peoples

TRANSITIONS

TRANSITIONS

New Assignments

Dan Kungl has been appointed to the position of Mechanical Engineering Division Head. Prior to this promotion, Kungl held the position of Head of Planning and Control for TFTR.

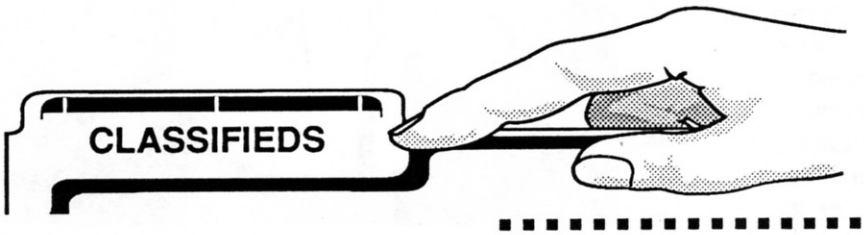
New Hires

Joseph Hosonitz is the new cafeteria manager. His last assignment was at Forrestal Arbor 600.

Retirements

John W. Grabourski retired after 13 years of service. He was an Electrical Planner in Administrative Operations.

Carl R. Oberman retired after 35 years of service. He was a Principal Research Physicist in the Theory Division.



FOR SALE

'84 Dodge Daytona
Turbo, 5-speed, leather interior, 34,000 miles. $2,500 or best offer (OBO). Marilyn, ext. 2656

Sewing Machine
Kenmore deluxe portable sewing machine. Like new. $350 OBO. Rich Alexander, ext. 3515.

Grill
Jenn-Air electric cook-top/grill-30 with ceramic module. $300 OBO. Fred, ext. 2173.

Clothes
Girls clothes, size 3, and women's clothes, size 6. Like new. Best offer. Carol, ext. 3529.

Summer Sale
Wood Record Cabinet, $20; Wood & Glass Decorative Shadow Boxes (3), $30/set; Electric Blanket (queen, like new), $50; Electric Broom, $10; Tiffany Lamp (must see), $150. Daren Stotler, ext. 2063.

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PPPL
PRINCETON PLASMA PHYSICS LABORATORY
HOTLINE

Volume 11, No. 20 September 4, 1990

Hard Work during Shutdown Pays Off

Early shutdown completion, new limiter, and high-power beams leads to record deuterium-deuterium fusion power

by Carol Phillips

TFTR Project Head Dale Meade likes to tell the following story about Chairman of the Fusion Policy Advisory Committee Guy Stever's visit to PPPL:

Dr. Stever was overheard talking with a companion during his visit. He said that he had visited a lot of laboratories and had been on a lot of tours, but he was really impressed with the things he had seen at PPPL — both TFTR and PBX-M. His companion agreed, saying that it had taken many years, a lot of money, and very hard work by lots of people. Turning, Stever answered emphatically, It shows!

"... very hard work by lots of people" are indeed accurate words to describe employees' efforts during TFTR shutdown activities earlier this year. In fact, because of these intense efforts, TFTR shutdown work was completed 16 days ahead of schedule — the first-time this has ever been achieved!

It couldn't have happened at a better time according to Dale Meade. "We're in competition with JET [the European tokamak equivalent to TFTR] to reach breakeven and we'd like to surpass their [most recent] reported results by the time of the International Atomic Energy Agency Conference in October. The quick startup will help us do this," he said.

Erik Perry, TFTR Shutdown Manager, was responsible for planning and overseeing all shutdown activities, which included more than 720 scheduled jobs and 60 unanticipated ones. He was supported by George Barnes and Doug Loesser who directed in-vessel activities and by Rusty Walton, Geoff Gettelfinger, and Harry Bush who directed activities outside the vessel.

In-Vessel Work

Major in-vessel activities included: replacing nearly 40% of the bumper limiter protective tiles, improving mechanical alignment of the limiter to the plasma, and locking the middle limiter plates in place; designing, fabricating, and replacing several radio-frequency (rf) limiter mounts; and feather-edging protective tiles at the organ pipes.

Bumper Limiter

The water-cooled bumper limiter, which protects the inner vacuum vessel wall from the plasma, consists of three plates — upper, middle, lower — that form an 120° arc around the center of the inside vacuum vessel wall (see Fig 1). The front is made of tiles and the back of Inconel plates.

Poco-graphite tiles protecting the middle limiter plates were damaged by high plasma heat loads. During the shutdown, these were replaced with carbon-carbon tiles which are mechanically much stronger and can take higher heat loads. This should allow for better plasma performance. "With poco-graphite tiles you can get 'carbon blooms' — a type of plasma impurity that severely limits plasma performance," explained George Barnes. "With the carbon-carbon tiles you have to try to get the carbon blooms — they don't limit performance anymore — and you can go into the supershot regime at high power," he said.

Tiles on the middle limiter plates were

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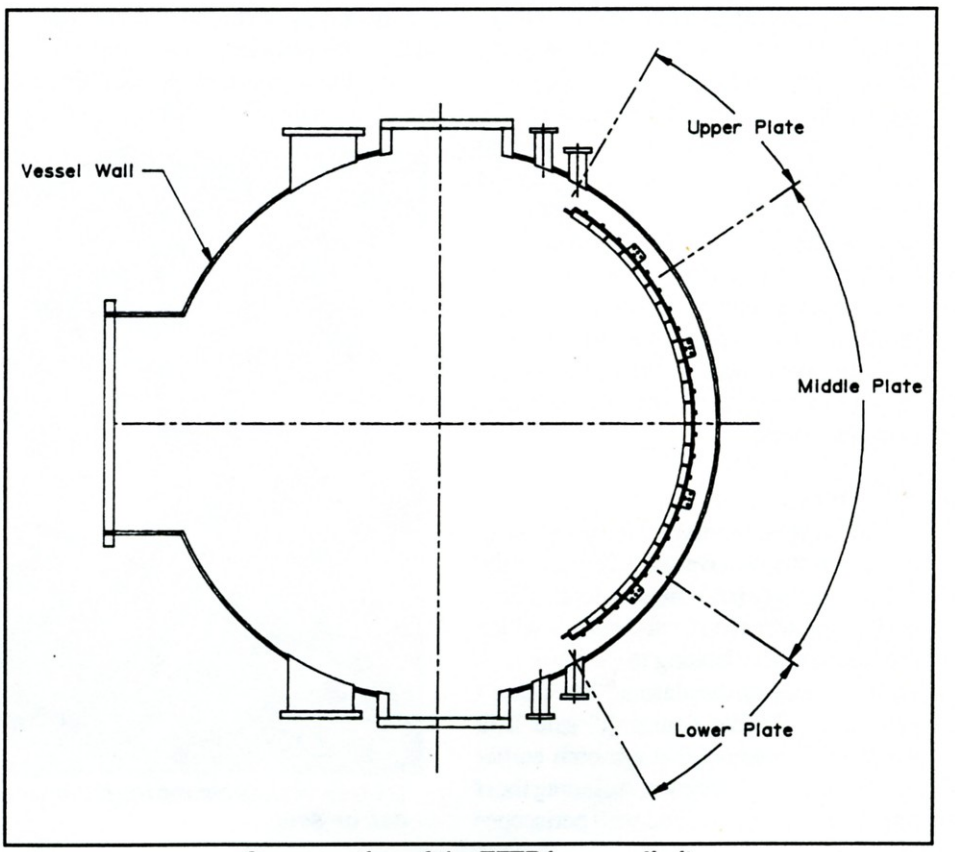
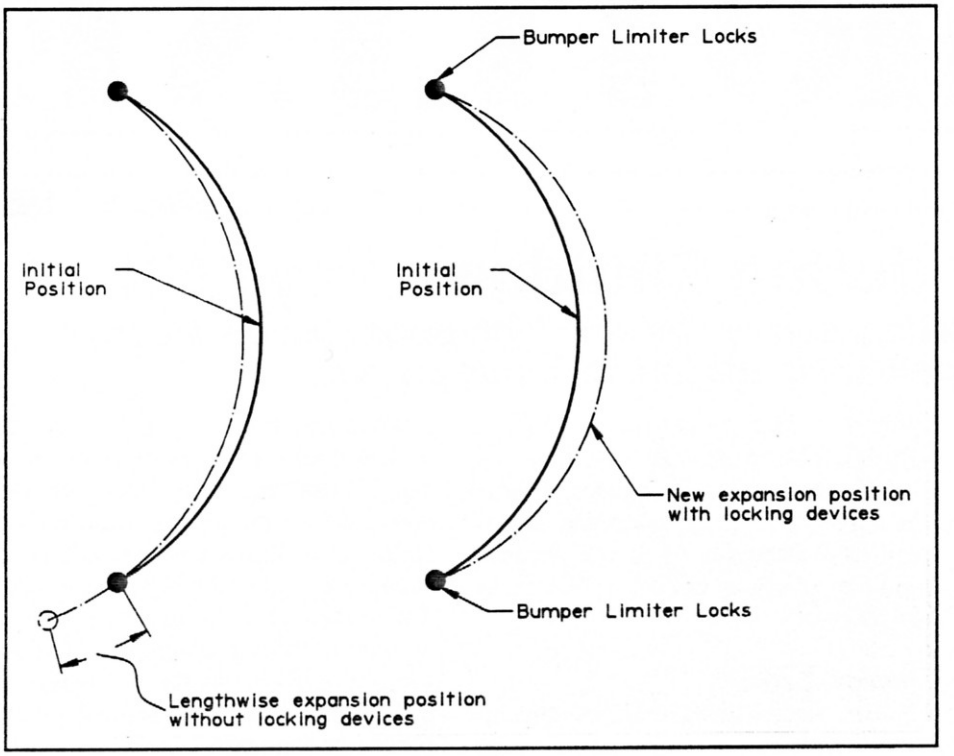


Cross section of the TFTR bumper limiter.



Cross section of the bumper limiter locking system. The "locks" hold the limiter plate in position, keeping the tiles away from the plasma.

also being damaged because they were being hit by the plasma. The plates had become misaligned and the tiles were being "pushed" into the plasma. During the shutdown, the middle limiter plates were realigned and locked into position.

Physicist Kingston Owens devised the unique bumper limiter locking system — a set of custom-made shims inserted into the thermal expansion grooves of each plate to hold it in place. These shims force the plates to bend away from the plasma instead of "growing" lengthwise into it (see Fig. 2). In-vessel technicians took the measurements and installed the locking systems. Jack Mount and the Machine Shop personnel along with Vinny Smith and the Vacuum Shop personnel custom-made the shims.

RF Limiter

The biggest surprise during the shutdown was the discovery of damage to the radio-frequency (rf) limiter mounts. These limiters protect the rf antennas — which provide auxiliary heating to the plasma — from contact with the plasma. "We weren't expecting this [the damage]," said Erik Perry. He explained that a month earlier the vacuum vessel interior, including the rf limiter, had been checked with periscopes and cameras and everything was fine.

After initial inspection it was found that, in some cases, the damage to the mounts was so severe they had to be replaced. "We had to redesign the mounts, get the design reviewed and verified, and then fabricate and install the mounts within the scheduled shutdown period," Erik said. He stressed that this work was in addition to the planned tasks. This activity was overseen by George Barnes, with help from Kingston Owens and Paul Kivler.

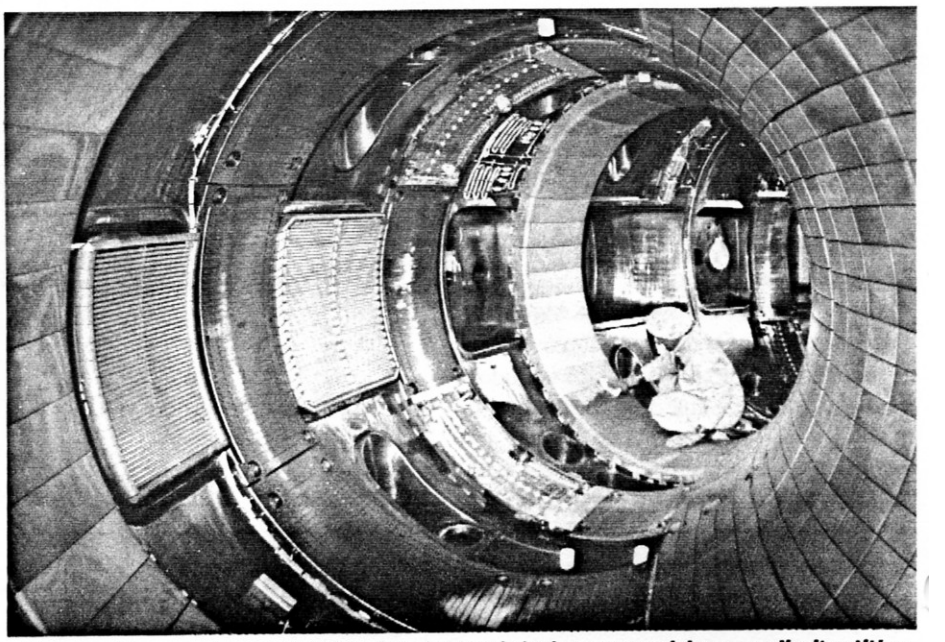
Organ Pipes

An organ pipe is a long tube that connects a diagnostic device to the vacuum vessel. Where the pipe attaches to the vessel, there's a tile that has a hole in it. Sometimes these tiles have sharp edges that the plasma hits and heats up. During this shutdown period, the sharp edges of the organ pipe tiles were "chamfered" or rounded. The work to correct this problem was delicate because it had to be done within glove boxes to protect the workers against contamination. The technique for machining the tiles was designed and worked out by Russ Walton and Jack Mount.

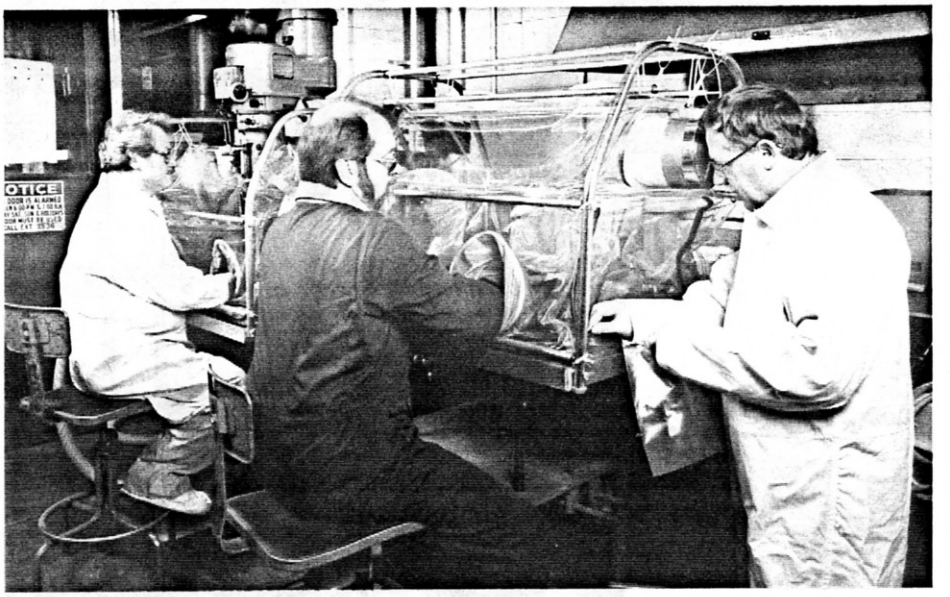
Out-Vessel Work

Major activities outside the vessel included: maintenance and repairs to elements of the neutral-beam heating system including the liquid helium refrigerator and two failed ion sources and the installation of improved cryogenic transfer lines; installation of a new diagnostic — the Beam Emission Spectroscopy (BES); and installation of the mechanical system for the multichannel reflectometer.

Jim Chrzanowski and TFTR technicians, with the help of personnel from the National Nuclear Corporation, also re-



George Barnes cleans the rf limiter. In the right foreground, bumper limiter titles can be seen.



Nick Dereka (left), Jim Benchoff (center), and Frank Polom (right) "chamfer" organ pipe tiles inside glove boxes.

paired water leaks on two toroidal-field coils. "A year ago there was great concern about getting water leaks repaired. Now we have a good system that can handle such activities without too much concern," Erik Perry said.

Neutral Beams

Awareness late in the last run period of two major unexpected and unscheduled repair jobs coupled with nonideal working conditions required a strong personal commitment by everyone to complete the neutral-beam work. Al von Halle, Head of the TFTR Neutral Beams Operations Branch, explained: "A lot of our technicians were already assigned to work on in-vessel activities when two ion sources failed without available replacements and it became apparent that the liquid helium refrigerator would require major overhauling."

The TFTR neutral-beam system is equipped with twelve Berkeley-type long-pulse ion sources which accelerate and focus high-energy deuterium atoms that provide the major component of plasma heating on TFTR. The helium refrigerator liquifies the helium required to cool cryogenic panels in the beamlines. The cryogenic panels are required to provide the high pumping speed necessary to support beam operations. The absence of two ion sources would greatly reduce the number of planned experiments that could be performed on TFTR, while poor operation of the helium refrigerator prevents any TFTR programs that require heating beams.

Ken Wright and his crew were responsible for repairing the failed ion sources. They were able to complete their repairs one week ahead of schedule despite the fact the ion source repair facility was being moved from the CAS building to D-Site, and they had to work in new surroundings where their tools and supplies weren't always readily accessible, using temporary lighting and water hookups.

Repairs to the liquid helium refrigerator, which had been running for 240 uninterrupted days before its shutdown, turned out to be far more extensive than expected. Completing the task was made more difficult because many members of the Cryogenic Operations Group under Mark Cropper had been assigned to in-vessel work. Still, the system was ready twelve days ahead of schedule.

Vic Garzotto spearheaded installation of new cryogenic transfer lines, which bring liquid helium from the refrigeration system to the beamlines. The lines were built and installed in-house and von Halle believes "they are superior to anything available commercially" and that "they will increase the efficiency of the [liquid helium] refrigerator."

Repairs and maintenance to the ion sources and the liquid helium refrigerator and installation of the new cryogenic transfer lines will make the neutral-beam auxiliary heating system more reliable. Other activities during the shutdown will help increase the energy delivered to the the plasma.

The new gas injection system that was installed during the shutdown should improve neutralization efficiency and this, coupled with modifications to the power supplies, should mean more energy delivered to the plasma without the need for addition input power. Additional power and more reliable power will help TFTR plasmas reach the supershot regime.

Talking about his group's efforts during the shutdown, von Halle said, "At one point we were looking at the worst side of things, where we thought we might have to resume operations with less power than we had planned. But, the guys really rose to the occasion. We had people who came back from previously arranged assignments to support our beam efforts every chance they could get."

Record Results

The success of the present experimental run has been due in large measure to the improved bumper limiter, which continues to show no evidence of damage, to the improved neutral-beam performance, and to the overall high availability of TFTR.

It is believed that the new boronization process developed by Fred Dylla and Paul LaMarche and designed and installed by Harry Bush, Geoff Gettelfinger, and Rusty Walton was responsible for significantly decreasing the time needed for pulse discharge cleaning. The number of pulses required was reduced from about 105,000 to about 25,000 and the time from two weeks to two days!

A new TFTR Q_{DD} power record of 1.85×10^{-3} was set only three weeks after resuming operation this spring. (Q_{DD} is the ratio of the power produced by the deuterium-deuterium fusion reaction to the heating power put into the plasma.) This represents an improvement of 8% over that achieved previously.

TFTR has been averaging more than 70 plasma shots per day since the beginning of this experimental run period as compared to the 46 shot per day average in the previous run. Twenty of these shots have been neutral-beam heated. This high availability has made it possible to do work on a variety of physics studies. The neutral

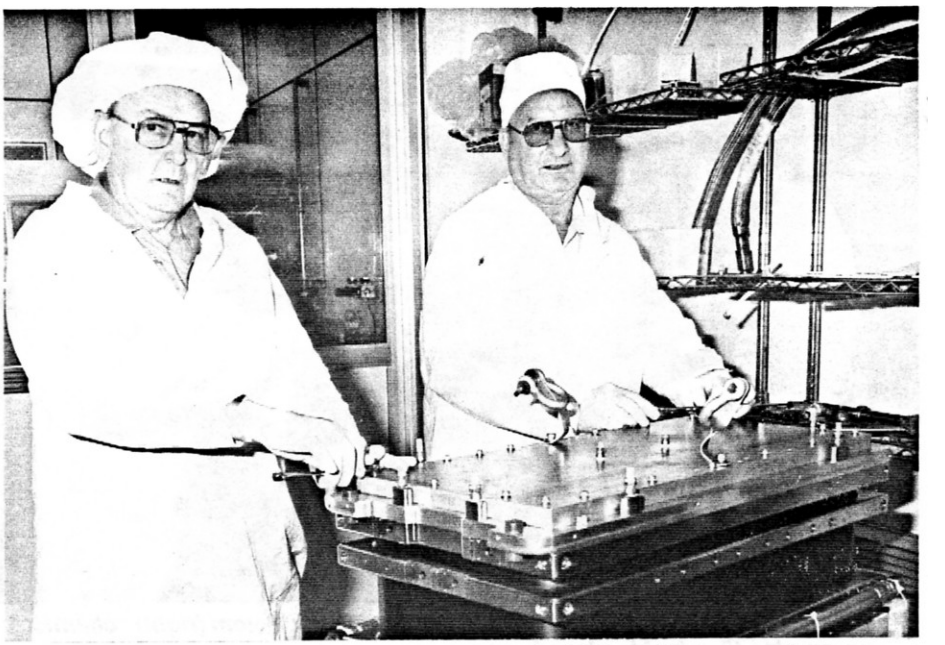
continued on page 4

beams have injected up to 32 MW of power—a world record. Ion Cyclotron Resonance Heating (ICRH) has recently operated up to 6.3 MW—a US record. Increased reliability has allowed routine exploration of significantly higher power operation than was possible in the past.

A Happening

Much has been said many times about PPPL employees' special efforts, but everyone connected with this shutdown sensed something quite "extraordinary" happening.

"I saw activity during this shutdown that I have not seen for a while in the Laboratory — kind of like the first plasma push we had a few years ago — people going all out, making very few mistakes, lots of teamwork and cooperation between groups, and very little wasted time. It was an impressive operation," von Halle said.



Don West (left) and Henry Swiderski (right) refurbish an ion source in the newly commissioned TFTR clean room at D-Site.

The PPPL HOTLINE is issued by the Princeton University Plasma Physics Laboratory, a research facility supported by the United States Department of Energy. It is primarily an internal publication. Correspondence and requests to reprint material should be directed to Carol Phillips, Editor, PPPL HOTLINE, P.O. Box 451, Princeton, NJ 08543 or telephone 609-243-2754; Interoffice correspondence should be addressed to Room B366, James Forrestal Campus, C-Site.

PPPL
PRINCETON PLASMA PHYSICS LABORATORY
HOTLINE

Volume 11, No. 21 September 17, 1990

Senator Lautenberg Visits PPPL

Mideast Trip Spurs Interest in Fusion

A visit to PPPL by Senator Frank Lautenberg (D-NJ) on Thursday, September 6, was scheduled soon after his return from Saudi Arabia where, he said, he was vividly reminded of "how desperate the need for alternatives [energy sources] is."

He said while in the Mideast he gained an alarmingly realistic glimpse "of what it means to have a single person or country take hold [of the world's oil supply] and leave us captive." The potential for this sort of power could, if allowed to continue, Lautenberg suggested, necessitate the restructuring of mankind as we now know it.

As a member of two powerful senatorial committees — Appropriations and Environment and Public Works — Senator Lautenberg's interest in learning more about fusion power could be taken as a positive signal for PPPL and for the development of an energy source which requires a stable, long-term government commitment.

The impact of fusion on areas such as economics, the environment, and international cooperation, were points made in Acting Director E.C. (Tip) Brolin's presentation which seemed to please the Senator who referred to himself as an environmentalist.

Also present at the briefing were more than 300 PPPL employees who came to hear Brolin's presentation and Senator Lautenberg's comments.

And comment, he did.

Initially there was tension in the auditorium, most likely due to the unexplained nature of the Senator's visit which had been arranged only a few days prior. But this was relieved early in the talk. In the midst of Brolin's explanation of fusion Senator Lautenberg noted that his realm of knowledge had just been exceeded. Brolin responded in a similar tone saying, "Suffice it to say, you heat it up to 100,000,000° C [the plasma mixture] and stir."

Senator Lautenberg apologized to the audience for asking basic questions about fusion, and said, "but you have to work with what you've got." He showed attentive interest in the subject by asking questions about the

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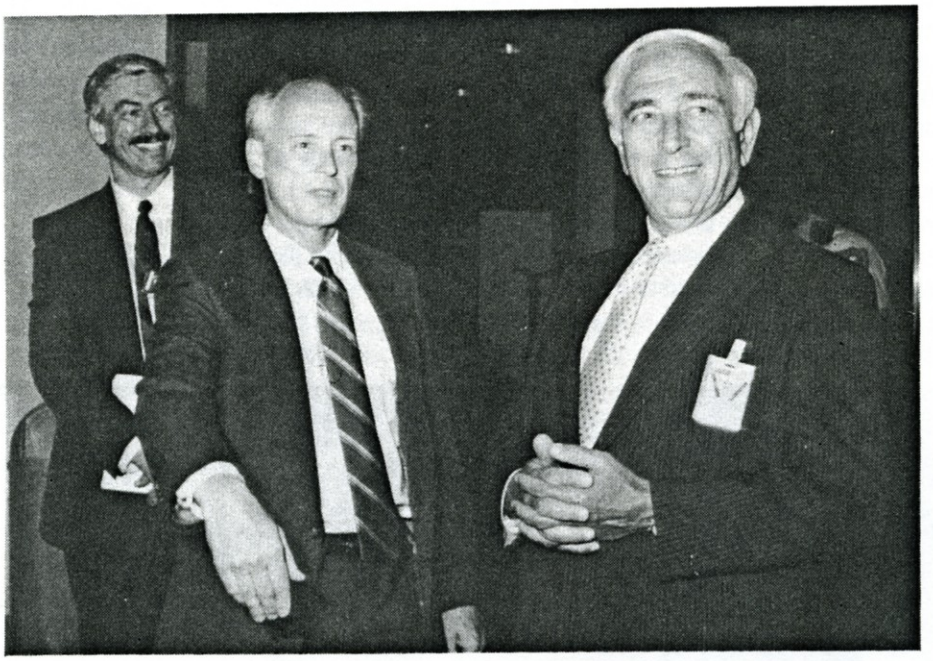


Senator Frank Lautenberg (D-NJ) (right) visited PPPL on September 6. He was given an overview of fusion by Acting Director Tip Brolin (center) and a tour of the Lab by Dale Meade, TFTR Project Manager (left). 90A0331-4

Photo: John Peoples

Let's Give!

Come to PPPL's Red Cross Blood Drive • October 11 • 9:00 a.m. to 2:00 p.m. • In the firehouse • Call the dispensary, ext. 2272, to register

Lautenberg — continued from page 1

history of fusion's growth, its present and anticipated achievements, and the fiscal requirements which are an integral part of its potential success or failure.

Brolin offered a startlingly clear illustration of fusion's inexhaustible fuel supply. He said that the deuterium contained in two inches of water from Lake Erie is equivalent to more than one and a half times that of the world's known oil reserves. Senator Lautenberg was struck with this example. And after hearing the projected budgets that are believed necessary to make commercial fusion a reality, said, "It doesn't sound like a lot of money if the conclusion is as fulfilling as it may be." He prefaced this statement by saying, "Now, don't take this as a statement of promise, but rather an observation." He continued by saying that fusion is the type of research that deserves support only governments can give. Senator Lautenberg has historically been a strong supporter of fusion; in 1989 he was extremely helpful in boosting the FY90 fusion budget.

While addressing the audience he asked, tongue-in-cheek, if it was appropriate to refer to the Lab's researchers as "eggheads," quickly adding, "I told you, beware the humor!" He said he admires people in the scientific community "because progress is measured in very small increments," and scientists, he acknowledged, must be optimists and able to mark small steps forward. He compared scientific progress to his own experiences in government. "Going from business to government is a frustrating experience, but what isn't? The question is, is the goal worth working for?"

"It doesn't sound like a lot of money if the conclusion is as fulfilling as it may be."
— Senator Lautenberg

Before concluding, Senator Lautenberg paused and again apologized for not having a more extensive understanding of science. "While I can't claim the intellect of a scientist," he said, "I can claim the perseverance of a politician," which he likened to that of a researcher, and which is, itself, a crucial element of long-term programs such as fusion. **— E. Webster**

Touring the Lab with Senator Frank Lautenberg — Harold Furth, Senator Lautenberg, Paul Rutherford, Tip Brolin, and Dale Meade. Photo: John Peoples

Fill 'er Up
. . . Less Often

With the cost of fuel rising and the oil supply uncertain, Pat Zeedyk of Transportation Services, offers the following suggestions to all drivers.

- Use the shuttle service whenever possible.
- Do not idle for more than 60 seconds. After one minute it takes less fuel to restart than it does to idle longer, and you can actually drive for one mile on the fuel it takes to sit still for a minute.
- Plan ahead and consolidate trips.
- Use your vehicle only when necessary. A short walk can be refreshing.

By remembering the conservation methods practiced during the last fuel shortage, and by using them now, we may be able to avoid the helpless feelings experienced by many drivers during the '70s.

"Safety belts are like brains— they come as standard equipment, but they work only if you use them."

—Pat Zeedyk
(sent to HOTLINE by Alan Upperco)

Symbol Shows Way

They seem to have mysteriously appeared — overnight — like magic. They're in the hallways, near doors and by elevators. You won't, however, find them at stairwells or next to all bathrooms.

What are they? You've probably guessed they're the blue and white, 4"x4" stickers, located just below eye level on many of the walls around PPPL, indicating wheelchair accessibility. At the Laboratory, this international symbol denotes the safe access routes for wheelchairs through many doorways and corridors.

According to Rich Pfeifer, Head of the Plant Maintenance and Engineering Department, Plant Maintenance personnel placed the stickers throughout the Lab as part of a project designed to make PPPL more accessible to the handicapped and to help bring the Laboratory into compliance with the Uniform Federal Accessibility Standards (UFAS).

But placement of these symbols is only one element of the project. Others include lowering some of the drinking fountains and installing larger, wheelchair-accessible stalls in bathrooms. The pedestrian bridge which will connect the New Engineering Wing with the LOB will also accommodate wheelchairs, thus making it easier for handicapped individuals to move between buildings.

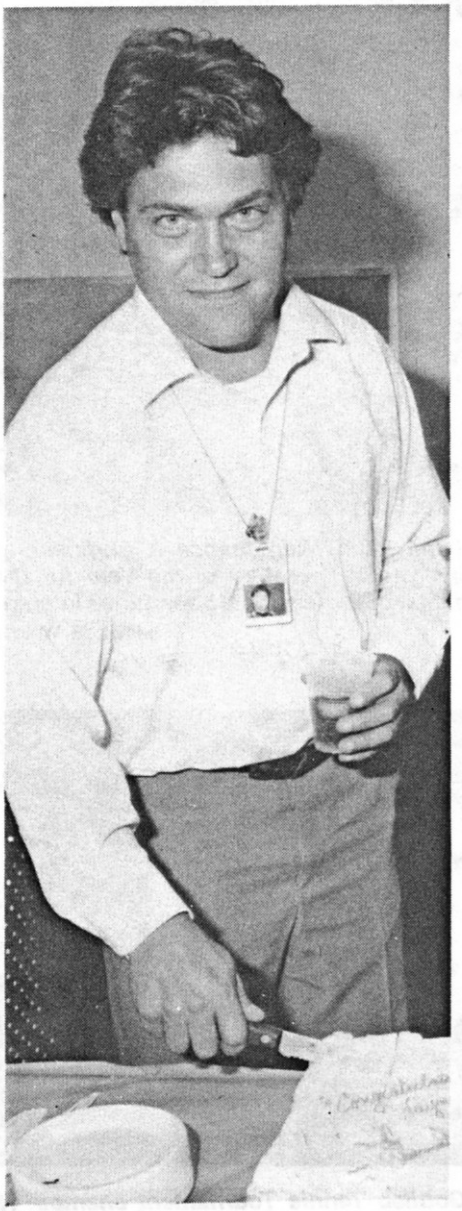
Many day-to-day tasks we take for granted, such as passing through a doorway, moving down a corridor, or getting a drink from a water fountain can be difficult and even impossible for people confined to wheelchairs. Now, with just a little forethought, and a few adjustments, these activities are becoming easier at PPPL.

— C. Phillips

Reiersen Receives International Award

On September 27, Wayne T. Reiersen will be honored by the Fusion Power Associates at its annual meeting in Virginia for becoming the fifth recipient of its Excellence in Engineering Award. This award, according to the inscription which appears on the presentation plaque, is given "for very important contributions to fusion engineering and in recognition of impressive leadership qualities."

Reiersen, the CIT Systems Engineer Manager and a five-year employee of the Lab, said at a celebration held in his honor on August 16, "I consider myself fortunate that I have a job I look forward to coming to every day and that I have the good fortune to work with the people I do."



Wayne Reiersen, 1990 winner of the Fusion Power Associates' Excellence in Engineering Award. Photo: John Peoples

The Fusion Power Associates is an industry-supported education and research foundation. It is international in scope, having members in Canada, Japan and France in addition to the United States.

The Excellence in Engineering Award began in 1987 to honor David J. Rose of the Massachusetts Institute of Technology. Stephen O. Dean, president of the Fusion Power Associates, said it is the only award of its kind intended for professionals in the early stages of their careers. It further distinguishes itself from other awards because "it gives equal weight to technical accomplishment and leadership," Dean said.

Individual nominations are made in a process that begins in January. John Schmidt was among those at the Lab who prepared the necessary papers and letters. He said of the decision to make the nomination, "With Wayne it was very easy."

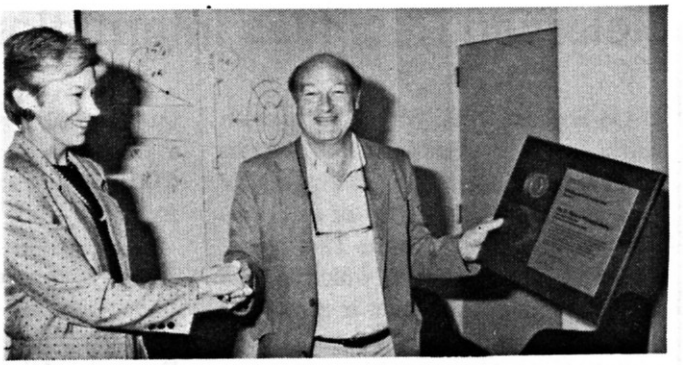
Once nominated, Reiersen became one of eight candidates to be reviewed by an awards committee which consisted of Bill Stacey, of the Nuclear Engineering Department at Georgia Tech; Carl Henning, of Lawrence Livermore National Laboratory; and Steve Piet, of the Fusion Environmental and Safety Group at Idaho National Engineering Laboratory. Their recommendations were then voted on by the Associates' 18-member board of directors, and it was at this stage that Reiersen was officially selected.

Reiersen said that this accolade is especially meaningful because of the efforts required on the part of PPPL employees to present his name for nomination. "Their opinion of the work I do counts," he said.

This year marks the second time a PPPL employee has won this honor. The 1988 award went to Michael Ulrickson.

— E. Webster

What's Happening at PPPL?



Anne Davies, Office of Fusion Energy, presenting Bruce Montgomery, Tokamak Systems Manager at CIT, with the DOE Distinguished Associates Award. Photo: John Peoples

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Edna Kalmus, of the Plant Maintenance & Engineering Department, is this year's Secretary of the Year for the Mercer County Chapter of Professional Secretaries International. Photo: E. Webster

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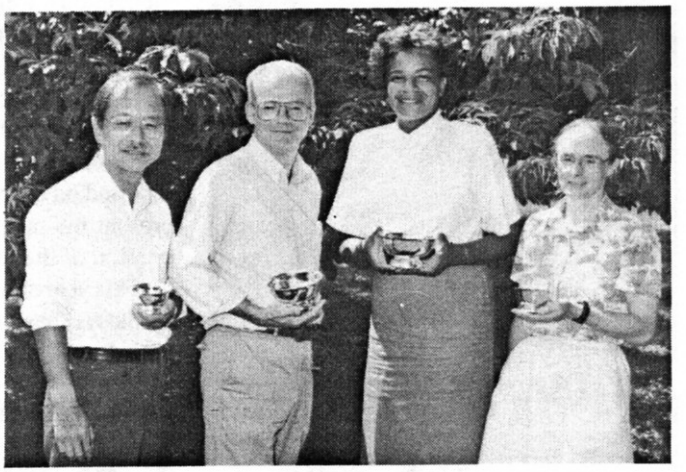

1989 Melvin E. Gottlieb Tennis Tournament champs: H. Takahashi, men's runner-up; J. Bialek, men's winner; J. Roberts, women's winner; and M. Thompson, women's runner-up.

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NOTICES

Oberman Symposium

A 1-1/2 day symposium/celebration, in honor of the retirement of Carl Oberman, will be held on October 7 and 8 at the Institute for Advanced Study in Princeton.

Speakers will address areas of Oberman's interest and work. The tentative list of speakers includes Ira Bernstein, John Dawson, Predhiman Kaw, John Krommes, Martin Kruskal, Russell Kulsrud, Tom O'Neil, Norman Rostoker, Roald Sagdeev, and Ernest Valeo.

For registration information, contact Gale Stevens at ext. 2440.

Holt to Speak on Fusion

On Thursday, October 18, at 11:15 a.m., Assistant Director, Rush Holt, will be a featured speaker in Mercer County Community College's Distinguished Lecturer Series. His topic is, *After the Oil is Gone: Prospects for Fusion Energy.*

Crab Feast

You're invited to an all-you-can-eat feast September 14, 5:00-8:00 p.m. at Prospect. Adults $22.95; children under 10, $11.95. Sponsored by the Prospect Association. For reservations call 258-3455.

Free Woman's Exam

A Breast Self exam (BSE) teach-in will be offered free of charge by the American Cancer Society on Tuesday, September 18 from 6:30 to 9:00 p.m. at the Lawrenceville Branch of the Mercer County Library (Route 1 and Darrah Lane). To register, call Jane Rodney at (609) 394-5000.

Tennis Tournament Sign-Ups

The 14th annual Melvin E. Gottlieb Tennis Tournament begins on September 22. Employees of PPPL and DOE and their spouses and children who are recreational players may register until noon on September 20. The registration fee is $3 plus a can of new balls.

Spectators are welcome to visit the tournament which is being played at the Princeton University Pagoda Courts. Call Hiro Takahashi, ext. 2809, or Madge Midas, ext. 3100, for more information or to register.

A Pat on the Back to . . .

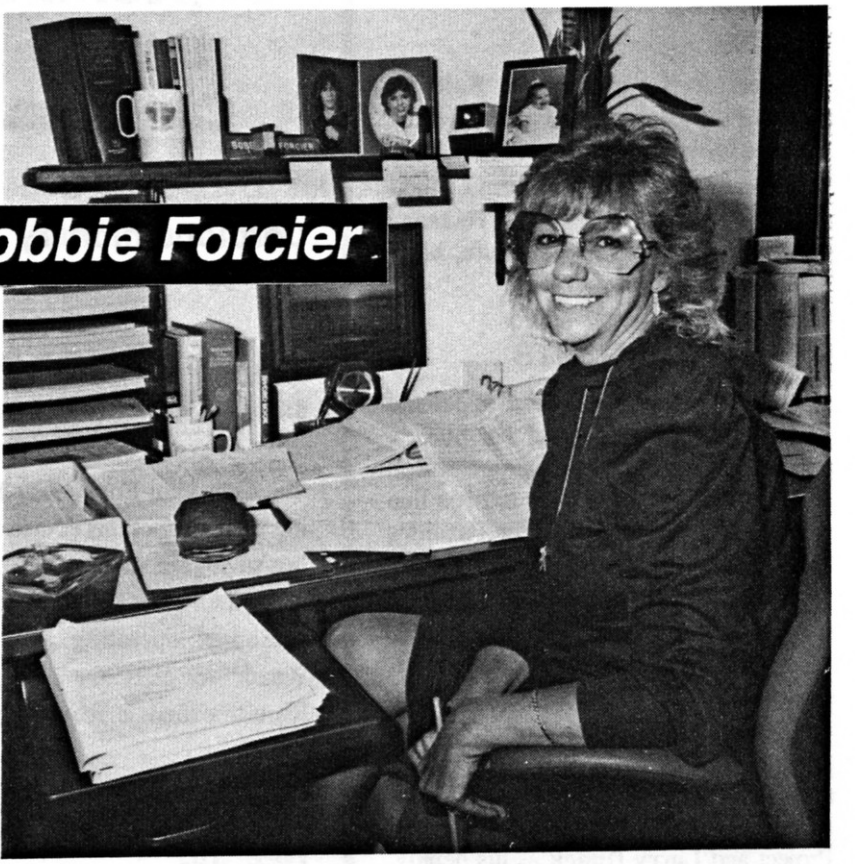
One would think that working a minimum of eight hours a day, five days a week, would be enough responsibility and structure in anyone's life. But many among us would argue that their commitment to volunteerism is not a chore, but rather a pleasure they're happy to add to their busy lives.

The ways that people donate time to projects, causes and charitable efforts are as varied as the individuals themselves. Teaching adults to read, leading a Girl Scout or Cub Scout troop, being a foster parent or big brother/sister, faithfully donating blood, or even offering to paint a municipal building over the week-end, are all ways that people choose to give.

***HOTLINE** would like you to know about these activities. Contact us with news about your (or a fellow worker's) involvement in the community. Upcoming issues will feature PPPL employees who moonlight as volunteers.*

We'd like to give these quiet heroes a pat on the back.

We begin our coverage with a woman who, as a result of supporting her local volunteer fire department for several years, has been elected Fire Commissioner in Jackson, New Jersey!



Bobbie Forcier has been involved with the Cassville Volunteer Fire Department since 1984. Currently, in addition to her job at PPPL as Benefits Administrator, she is an unpaid Fire Commissioner in the district of Jackson, New Jersey. Photo: John Peoples

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One brisk autumn night Bobbie Forcier, PPPL's Benefits Administrator, found herself in the company of nearly 600 community members out combing the woods for a misplaced three year old. Earlier in the day while the family was raking the lawn, the young boy had wandered away from the piles of leaves he'd been happily playing in. In response to the parents' appeal for help, volunteers from the surrounding towns searched until nearly 3:00 a.m. to find their young son. The next day he was spotted not far from his home — an ending that had not been predicted, but one that relieved the sleepy crew's worst fears.

Forcier said that the ordeal, once over, gave her a real sense of involvement, and stands as one of the most rewarding nights of service she's had as a volunteer with the Cassville Volunteer Fire Department in Jackson.

"Once my children grew up," she said, "I wanted to do something in the community." So in 1984 she joined the Lady's Auxiliary and has been busily involved with its work ever since.

Over the years her projects have included overseeing the Ocean County Community Service Workers program which sends first-time offenders to the firehouse to perform free services; raising funds for uniforms; providing warm clothing and refreshments to firemen when responding to alarms; and coordinating the annual Easter Egg hunt, which is one of the ways that children of firemen and auxiliary members become involved with their parents' work.

This past year she became the first elected female Fire Commissioner (another volunteer position) in the Jackson district. As such, she is responsible for the fire department's budget, including the purchase of major equipment including trucks and ladders. The result of this added responsibility is that her volunteer activities have grown to almost the equivalent of a full-time job.

Because Forcier spends most of her time away from home — between PPPL and the fire department — she convinced her husband to become a volunteer fireman. "The guys at the station really tease him," she laughed. "Now that I'm a Fire Commissioner they say that I'm not only his boss at home, but also at the fire company!"

Regarding her overall impression of nearly seven years of unpaid work she says, "You can't beat the satisfaction you get from working for your own community."

— E. Webster

TRANSITIONS

BIRTHS

A son, Ryan, was born to **Kelliann Potts** (of the Controllor's Office) and her husband Jeffrey on August 20.

A son, Kevin John, was born to **Richard Hawyrluk** (Head of TFTR Tokomak Operatons Division) and his wife, Mary Katherine, on September 6.

NEW ASSIGNMENTS

Harry Howard has been appointed Acting General Manager of Facilities, a position vacant since the departure of Bob Smart. In this position, Howard has line management responsibility for Facilities and Emergency Preparedness.

Myron Norris has been selected to serve as Acting Division Head of the Electronic and Electrical Engineering Division.

Changes which have recently taken place within the TFTR Tokamak Operations Division include the appointment of **Erik Perry** as Head of the D-T Preparation Project and **Larry Dudek** as his deputy, and **Dennis Mueller** as Head of the Physics Operations Branch.

Eric Sanders is the new cafeteria manager.

Ned Sauthoff has been appointed Head of Experimental Projects.

Low Cost Spaying (800) 631-2212

Friends of Animals' Breeding Control Program offers low cost spaying for **cats** and **dogs**. Call for a certificate and list of affiliated veterinarians in the area. Costs are: $33 female cats, $20 males; $54 female dogs and $34 males. (Marilyn Hondorp at ext. 2656 can refer you to local veterinarians.)

September Safety Classes

Cardiopulmonary Resuscitation (CPR)

Tuesday, September 25, 1990
8:30-12 noon, LOB Commons

The Center for Emergency Training will conduct this course in the life-saving technique of CPR. CPR is required for all electricians and personnel operating a "Safety Watch" for capacitor bank entry. Recertification is required every year.

Hearing Conservation

Thursday, September 27, 1990
2:00-3:30 p.m.
D-Site Safety Trailer

This one-hour class will train the employee regarding the proper procedures and wearing of hearing protection equipment and for working in noisy areas.

Preregistration is necessary for all courses and can be made by calling Sue Hill at ext. 2526. Insufficient enrollment for any course will result in cancellation of the class.

CLASSIFIEDS

For Sale

Bicycle — Schwinn Stingray, blue, $35. Call Carol, ext. 2754.

Bicycle — 25" men's Peugot racing bike. Like new. $175 OBO. Call Sylvia Reissman, ext. 3577.

Moving Sale — Weight set, bench with leg extender, 160 lbs, cast iron, $260 (OBO); closet with drawer, $225 (OBO); black acrylic full-size bed from Japan, headboard has storage space, $480 (OBO). Call Mike at 298-1884.

Water Bed — Queen size with firm mattress and 4 storage drawers. Excellent condition. Call John Swatkoski, ext. 3601 or 2122.

Old "Shop Smith" — Drill press, lather, etc. Best offer. Call Joe Stencel, ext. 2529.

Boat — 12' aluminum boat, including oars, anchor with rope, life jackets, one-man boat loader for car, plus boat dolly. $350. Call Rich, ext. 2312.

House — In Lawrenceville. 3 bedroom, 1 1/2 bath. Near Lawrenceville High School. Many new features. $149,000. Call Stewart, ext. 3243.

Sell, Buy, Rent, Give Away or Trade

Send your ad to:
HOTLINE Classifieds

Name _____

Extension _____

Item _____

_____

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Price _____