



HOTLINE

PRINCETON PLASMA PHYSICS LABORATORY

Vol. 6, No. 2

August 17, 1984

S-1 RESTART

This summer promises to be a "hot" one for S-1 experimentation. The device has resumed operation with a new flux core liner, and is currently very active while a new system to combat plasma instability is being put in place.

The new flux core liner was installed on the machine in early June. "It presented a lot of tough work for us," said S-1 experimental operation head Dr. Masaaki Yamada. "It was a painstaking task to reinstall the liner, and our engineers and technicians really worked hard to get it done."

The liner is a 0.02-inch thick shell of Inconel 601, with fiberglass applied to its interior surfaces. The liner surrounds the flux core, and serves to maintain vacuum purity by encapsulating the flux core windings.

After some minor problems associated with the new liner, S-1 vacuum levels began steadily increasing from the 10 Torr range to levels of approximately 5×10^{-6} Torr. Initial experimental results showed new liner performance was equal to that obtained with the original liner before cracking forced its replacement. A contract for explosive fabrication of new flux core liners was recently awarded to a Colorado firm. These new liners should allow S-1 to reach its design level on a routine basis.

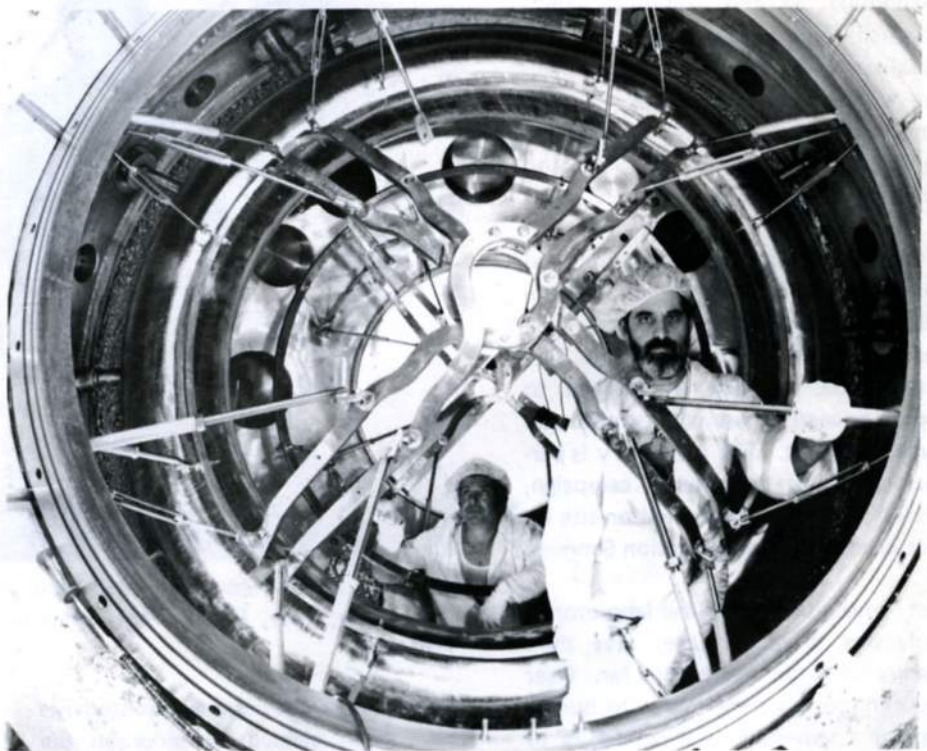
According to Dr. Yamada, S-1 recorded its best run ever on July 31. "We documented the basic plasma and magnetics parameters using all our available diagnostics, which include magnetic probes, Thomson scattering,

soft X-ray arrays, and visible spectroscopy. The plasma parameters we had previously achieved (a 200 kA plasma with a lifetime of 1 msec, a peak temperature approaching half a million degrees Centigrade, and an average density of 1 to 2×10^{20} cm⁻³) were replicated with improved diagnostics. The physicists are carefully examining those results at present. I think we're now ready to begin doing higher quality plasma shots," he added.

Toward that end, two figure-eight coil assemblies are being installed within the S-1 vacuum vessel. The coils are situated on either side of the flux core, and will function as a passive stabiliza-

tion system against most dangerous spheromak magnetohydrodynamic instabilities. As the plasma begins to move within the vacuum vessel, the figure-eight coils force the plasma back to its proper position.

According to S-1 staff physicist Dr. Alan Janos, the figure-eight system is expected to create more stable spheromak plasmas, and to allow the plasmas to be kept intact for longer periods than were previously attainable. The result should be plasmas that are more quiescent, have higher densities, and higher temperature levels. The near-term spheromak experimental goals are temperatures (continued)



Fred Wood (foreground) and Al Marone installing two new figure-eight coil assemblies within the S-1 vacuum vessel.

higher than 50 eV, and plasma lifetimes over 1 msec. New S-1 experimental results should be reported at the IAEA meeting in September.

Dr. Yamada offered his thanks to the engineers and technicians in the Coil and Vacuum Shops for their assistance with the S-1 project. He also commended the unselfish work of the S-1 technical staff, headed by Dick Labaw and Fred Wood. Staff members include Ray Pysher, Tom Holoman, Al Marone, John Bylinski, and Fritz Hoffman.



According to the National Safety Council, approximately 52% of the fatalities that occur on America's highways are easily preventable. Not by any expensive optional equipment: simply by the use of seatbelts and shoulder restraints.

These grim statistics have prompted the National Safety Council to establish an annual "Make It Click" campaign during the summer months. The nationwide program is designed to promote seatbelt use when traffic volume is highest. The laboratory is participating in this year's campaign, which is being coordinated on-site by Pat Zeedyk of Transportation Services.

Pat, who also teaches the laboratory's defensive driving course, says she's happy with the results thus far. Over 130 employees have agreed to buckle up for a two-week trial period, or to keep buckling up if they already use seatbelts.

"The sign-up slips keep coming in," Pat reports. "One thing I'm very pleased with is the number of people who've said they're simply continuing to buckle up. Now if we could only get to some of the people who'd wear seatbelts once they develop the habit. They'll find wearing seatbelts isn't all that bad -- and they could be a lifesaver."

Pat has had to counter a number of concerns from motorists considering seatbelt use for the first time. The major fear centers around being trapped in a burning or sinking car by seatbelts.

However, statistics from the National Safety Council reveal that less than one-half of one percent of accidents involve fire or submersion. And even

in those extreme cases, safety belts can keep both drivers and passengers unhurt, alert, and able to escape quickly.

Wearing a seatbelt will also keep you in your car in the event of an accident. According to statistics, you are five times more likely to be killed if you are thrown from your car in a crash. And making a quick trip to the market is no excuse for skipping seatbelts either. Most accidents involving deaths or injuries occur at speeds of less than 40 miles per hour and within 25 miles of a motorist's home.

There's still time to participate in the "Make It Click" program. Be sure to fill in the program form and return it to Pat Zeedyk, Transportation Services, C-Site by September 1. Additional forms are available from Pat.

Plasma Students Active On University Committees



Graduate student committeemen include (front, left to right) Peter Beiersdorfer, Jay Albert, (rear, left to right) John Lovbert, Chris Kean, Guy Hulbert and Bob Pinsker.

Four plasma physics graduate students have been elected to serve on the House Committee of Princeton University's Graduate College. The 11-member

House Committee is concerned with the quality of residential life at the Graduate College and the Graduate College Annexes. The committee pro-

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vides services ranging from maintaining athletic, computer, and laundry facilities to organizing parties, dances, and free film events. The new committee members are Guy Hulbert (bar czar), Jay Albert (special facilities), Bob Pinsker (films chairman), and John Lovberg (athletics chairman).

Two other plasma physics graduate students, Peter Beiersdorfer and Chris Keane, are serving terms as members of the Council of the Princeton University Community (CPUC). The 50-member CPUC is the senior representative body on campus. It has the authority to question the governance of the University, to review its budget, to oversee the management of financial resources, and to set University policy. Peter Beiersdorfer is also active as a student SECH advisor in the sexuality education, counseling, and health program of Princeton University.

None of the students receive any compensation for their work on these committees.



Rules Are Made To Be Followed:

Some people defy the rules in life, or seem to succeed by stretching those rules to the breaking point to gain an advantage. A touch of the unorthodox may add spice to their lives, and their flashy actions often make them seem like heroes. People who always follow the rules may secretly admire these risk-takers, wishing they had the nerve to laugh at convention and change the accepted order of things.

Living outside the rules may be acceptable elsewhere -- but not here at PPL. On the job, the "straight and narrow" is the only path to follow when safety rules are concerned.

Workers who twist the rules by taking shortcuts and risky chances will not add any spice to their lives. Rather, they may instead add an accident or injury -- and there are no secret admirers of an accident victim.

Be whatever you choose to be in your private life, but stick to the rules while on the job. Do things according to procedures and time-tested guidelines set forth in the Health and Safety Directives (HSD's) and Safety Manual.

By playing by the rules, you'll surely wind up a winner in the safety game.



A mechanical gate was recently installed at the TFTR west entrance to control vehicular access to the TFTR site. Personnel are reminded to follow a few simple rules regarding access at the pedestrian entrances and at the mechanical gate entrance:

1. The mechanical gate entrance is to be used for AUTHORIZED VEHICULAR entrance/exit ONLY. Pedestrians must restrict access to the card reader entrances at the east, west and south gates AT ALL TIMES.
2. Personnel must at no time allow other individuals to enter a card reader-secured area while their own access card is in use. Personnel must at no time make access to a card reader-secured area while another individual's access card is in use. Except for authorized public tours, multi-pedestrian access into ANY secured area without

proper use of each individual's access card is prohibited.

3. A Security direct line telephone is located near the TFTR Security Kiosk, D-Site. Personnel requiring information, gate and/or card reader assistance should use this telephone.

Questions concerning this policy should be directed to the Security Office, Chem. Science, ext. 2894.

Volunteers: People People

The following listings were provided to the HOTLINE by the Voluntary Action Center (VAC) of Morris County. For further information on any activity, please call the VAC at 201-538-7200.

Have you got the gift of gab? Then become a member of the speakers' bureau of a consumer education program. Evening training sessions are scheduled to start in mid-September, and will be held on four consecutive Wednesdays from 7:30 to 9 p.m. The course will include effective speaking tips in addition to consumer education material. Once trained, you can select the times you'll be available to speak before groups.

If writing's your forte, try your hand at researching and writing grant proposals for an organization established to encourage gifted and talented children. Deadlines are set by the grants you're seeking, so you can devise your own schedule.

Do you have experience as an adult trainer or discussion leader? Your talents are needed for a pilot program being prepared for presentation to non-profit organizations' boards of directors. Group (continued)

leaders will receive training, and can schedule their own time. The program is slated to begin this fall.

The next three listings were provided by the Princeton Area Council of Community Services. For further information about volunteer positions, contact each agency directly.

The Mercer County Unit of the New Jersey Association for Retarded Citizens offers a variety of recreational opportunities to mentally retarded individuals and their families. Volunteers are needed to help with parties held on the first and third Fridays of each month from 7:30 to 9:30 p.m.; and the coffee -- house, held on the second and fourth Wednesday of each month from 7:30 to 9:30 p.m. Scorekeeping and coaching assistance are also needed for weekly bowling sessions, held each Saturday at 10 a.m. For further information, call the Unit at 609-393-2483.

Princeton University's International Center provides a service and social focus for the more than 700 foreign students and visiting scholars on the Princeton campus. Volunteers are being sought to host first-year foreign undergraduates, graduate students, and visiting fellows; to tutor conversational English; and to serve as hosts at the weekly International Center luncheons. For more information, call the Center at 609-452-5600.

History buffs can offer aid to the Princeton History Project, which collects local history and publishes "The Princeton Recollector" 10 times a year. The project needs volunteers to type oral history interviews, transcribe tapes, interview senior citizens, address envel-

opes, conduct local research, write articles, and do fundraising. If you're interested, call 609-921-8330.

The following volunteer positions were provided by the Voluntary Action Center of Middlesex County. For more specific information, call the VAC at 201-249-8910.

Minimum-security prisoners need tutors in basic skills, counselors on job-and house-hunting, help with parenting skills on visiting day, and volunteers to teach classes on a wide variety of subjects. Hours are flexible.

Join the hunt for the "big bucks"; lend your fundraising talents to area human services groups to keep the vital aid they provide coming.

Be the difference between institutionalization and independence: help disabled or handicapped individuals with shopping, running errands, and making small home repairs.

Many area organizations are seeking volunteers for their boards of directors. Exercise your organizational skills by joining the team of your choice.

It's Puzzling.....

We've all heard the slogan "Thanks to you, it works for all of us -- the United Way." But did you ever stop to consider just how many programs and services the United Way offers its constituency? See how many you can find in the puzzle below (answers on pg.10). And when you've solved this small puzzle, become part of the solution to a much more vital one: how to provide a wide range of critically needed human services to Princeton area communities. Support the United Way during this year's fall campaign.

SEEK-A-WORD

Alcohol Abuse
Blood Programs
Cancer Care
Counseling
Day-care
Girl Scouts
Help
Hospitals
Information
Red Cross
Referral
Seniors
Therapy
United Way
Visiting Nurses
YMCA
Youth

V	U	Z	A	S	R	N	E	T	R	A	P	Y	E	T
I	N	O	R	T	H	E	R	A	P	Y	L	C	N	O
S	I	B	L	O	O	D	P	R	O	G	R	A	M	S
I	Z	O	A	E	S	I	P	U	G	O	A	N	L	E
T	R	C	L	L	P	K	T	D	X	C	R	C	I	N
I	E	O	Z	D	I	H	E	R	A	P	E	E	X	I
N	F	U	N	I	T	E	D	W	A	Y	D	R	V	O
G	E	N	C	R	A	L	V	E	M	D	C	C	U	R
N	R	S	I	D	L	P	I	C	T	U	R	A	C	S
U	R	E	T	R	S	F	A	X	O	P	O	R	R	D
R	A	L	C	O	H	O	L	A	B	U	S	E	Y	E
S	L	I	V	K	I	C	Y	N	H	M	S	A	L	P
E	I	N	F	O	R	M	A	T	I	O	N	R	C	I
S	D	G	I	R	L	S	C	O	U	T	S	C	U	Y
O	R	E	F	U	N	R	A	R	Z	A	T	H	E	R

WORDS ARE PRINTED HORIZONTALLY, VERTICALLY, AND DIAGONALLY.

SPOTLIGHT ON INFORMATION SERVICES.....

A call to the PPL Information Services Branch won't get you the correct telephone number for the TFTR control room. However, it will connect you with a wide range of services that can help get your message out in a variety of ways.

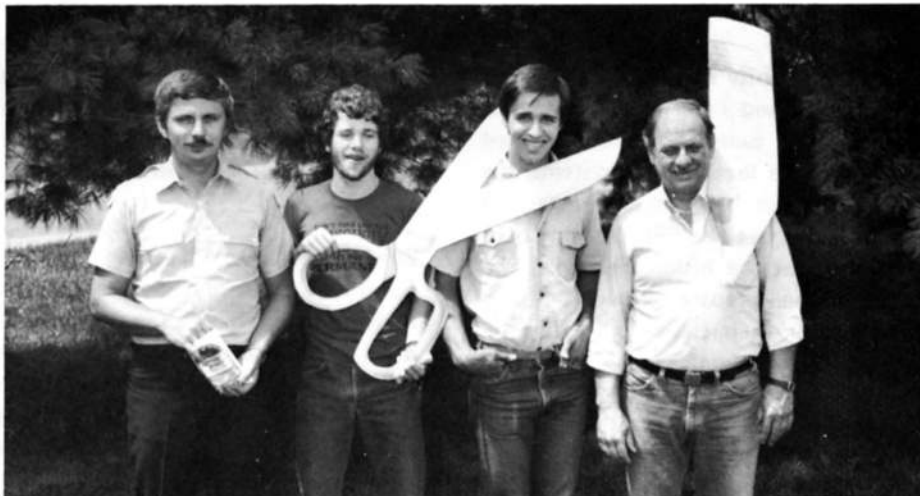
Under the direction of branch head Anthony DeMeo, Information Services has expanded its traditional role of preparing and distributing information on the laboratory. Branch responsibilities now encompass community outreach and a number of special projects.



Public and Employee Information: (left to right) Tony DeMeo, Carol Phillips, Kathy Dunn, Pat Stephens, Diane Carroll.

Helping to meet these objectives are "new" employees Diane Carroll and Carol Phillips. Diane devotes her time exclusively to the laboratory community outreach program.

The main purpose of the community outreach effort, which began almost two years ago, is to make people in the greater Princeton area aware of PPL's availability as a community resource. Contacts were established with a number of community groups and local governments, many of whose members have visited PPL for specialized tours and programs. Officials from Prince-



Graphic Services: (left to right) Greg Czechowicz, Shawn McFadden, Eric Thorsland, Terry Birch.

ton Township, Princeton Borough, South Brunswick, Montgomery, Plainsboro, and West Windsor have seen the lab's experiments firsthand. Programs have also been made available to Princeton University faculty and administrative bodies.

Nor have PPL's neighbors been neglected. Several Forrestal Center tenants, the Robert Wood Johnson Foundation, FMC, RCA, Xerox, and the Princeton Medical Center have all

sent representatives to tour the laboratory during the past year. Each group is given a presentation on fusion energy, emphasizing PPL's place in national and international fusion efforts. A number of laboratory engineers and physicists have volunteered to serve as speakers for these groups.

According to Diane, "This is the first time the laboratory has made an effort to go outside itself." She added that the response thus far has been "excel-



Technical Information: (left to right) Linda Hubbard, Marilyn Hondorp, Meg Harmsen.

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lent. People are very enthusiastic; they say they never knew we were here, or what we did. It's good for the lab."

The community outreach program has also sponsored a teacher/intern for the past two summers. Coordinated through the local school systems, the teacher/intern program allows teachers to spend a week at PPL, learning first-hand about the fusion program. The interns then prepare teaching units on fusion for their classes once they return to their schools.

The scientific interest of local high school students is being encouraged through the Summer Work Grant program. Three students from West Windsor-Plainsboro High School and two more from Princeton High School are spending the summer working with the physicists and engineers on specific areas of fusion energy research.

Community outreach goals for the coming year include renewing existing contacts and expanding the program to other community groups; increasing contact with Princeton University; and offering programs to citizen action and civic groups.

Carol Phillips, the branch's Special Projects Administrator, has been with



Print Shop: (left to right) Densie Stearns, Margaret Goldsmith, Terry Hamilton.

the laboratory for 13 years. Her position provides a centralized source for the services technical conferences and information meetings require. "In the past, there hasn't been any place to turn to coordinate everything for a meeting," she explained. "It involves tending to a lot of details, and I've had quite a bit of experience with that type of thing."

When it comes to organizing meetings, Carol knows whereof she speaks. The multitude of activities required to produce a well-run conference that "makes a favorable impression for the laboratory and sets the tone for a meeting" aren't foreign to her. She administers meeting budgets; negotiates room rates with local hotels; arranges for transportation to or parking space at a conference site; schedules the hanging of posters and signs; arranges for photocopying and typing service during the conference; prepares the meeting registration package, name badges and program; and helps prepare proceedings from the meeting. She also oversees food service, which can range from coffee breaks to full-scale banquets, for meetings hosted by (or held at) PPL. And if conference participants request a tour of the laboratory, Carol can arrange that, too.

In a literary vein, Carol is providing research writing and editorial services to the laboratory. Her major project is the annual report, which she oversees from initial section submissions through finished product.

Media interest in PPL's fusion program has increased dramatically over the past several years. The Public and Employee Information section routinely handles requests from newspaper reporters, magazine writers, and broadcast journalists for information relating to Princeton's role in the U.S. fusion program.

"We currently average two or three visits per month from the media, including video crews, as compared to three per year back in 1977," said branch head Tony DeMeo. "This increased public interest is the result of the pro-

gram's recent successes, beginning with the PLT milestone in 1978. It is now quite common for individual newspaper science writers to call from time to time to check on our progress."

The section recently coordinated a visit from nationally syndicated talk show host Phil Donahue. This visit will result in the laboratory's inclusion in "The Human Animal," a week-long documentary to be aired on the NBC network in the spring of 1985.



Photo Lab: (front, left to right) Debbie Anastasio, Joe DiBartolo, (rear, left to right) Dietmar Krause, John Peoples, Linda Fahner.

PPL will be featured in the "Man, the Innovator" segment of the series.

Increasing public interest requires that PPL's public information materials be kept current. In the Public and Employee Information section, updates of existing publications have been joined by new information bulletins on PBX and TFCX, compiled and written by Senior Writer Kathy Dunn. Kathy, who serves as the branch's Area Safety Coordinator, is also the editor of HOTLINE; all articles or story ideas for future editions should be directed to her.

Pat Stephens handles the laboratory tour program and speakers bureau. During calendar year 1983, tours were arranged for more than 6,500 visitors in approximately 300 groups. This

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record should be topped in 1984; in the first six months of this year, over 4,000 individuals have seen PPL's experiments firsthand.

Tony noted that the laboratory's success in meeting the ever increasing demand for tours and speakers is due to the willingness of the technical staff to serve as tour guides and speakers, especially in the evenings and on weekends. "The cooperation is phenomenal, and allows PPL to put its best foot forward at all times," he added.

Bernie Giehl heads the branch's Graphic Services section, which provides the artwork to complement reports, publications, or presentations. Bernie's talented section, which includes artists Terry Birch and Eric Thorsland, and draftsmen Steve Lengyel, Shawn McFadden, and Greg Czechowicz, can create finely detailed artist's renderings, precise line drawings and graphs, designs and layouts for laboratory publications, or eye-catching posters and displays.

Section members can frequently be found preparing artwork for poster sessions, or for publication at major meetings. Graphic Services personnel are well-versed in the stringent specifications demanded of such artwork,

and coordinate accurate production of these pieces throughout PPL. The section has also worked on presentations to be shown at other laboratories and has prepared artwork for PPL's lobby exhibits.

Despite a 28% increase in workload during 1983, a new feature has been added to the Graphic Services repertoire. A computer terminal enables artists to prepare a computerized perspective drawing prior to starting work on a time-consuming and painstaking artist's rendering. This capability is expected to be expanded in the future.

The Technical Information and Printing Services section of Information Services is supervised by Meg Harmsen. Meg coordinates in-house, commercial, and Government Printing Office (GPO) printing. She also oversees the Print Shop's copying and duplicating production. There supervisor Terry Hamilton, along with Margaret Goldsmith and Denise Stearns, handles the majority of the lab's bulk photocopying and duplicating requests.

Meg's responsibilities also encompass the processing of invention disclosures for patent potential, and chairing the Word Processing Committee in the absence of chairperson Nan Jones.

Report processing and patent clearance is Barbara Pavelec's domain. Barbara prepares PPL reports for printing, obtaining patent clearances for each document and readying it for duplication. She handles the copyright process, and coordinates editing with Meg during the preparation of each report.

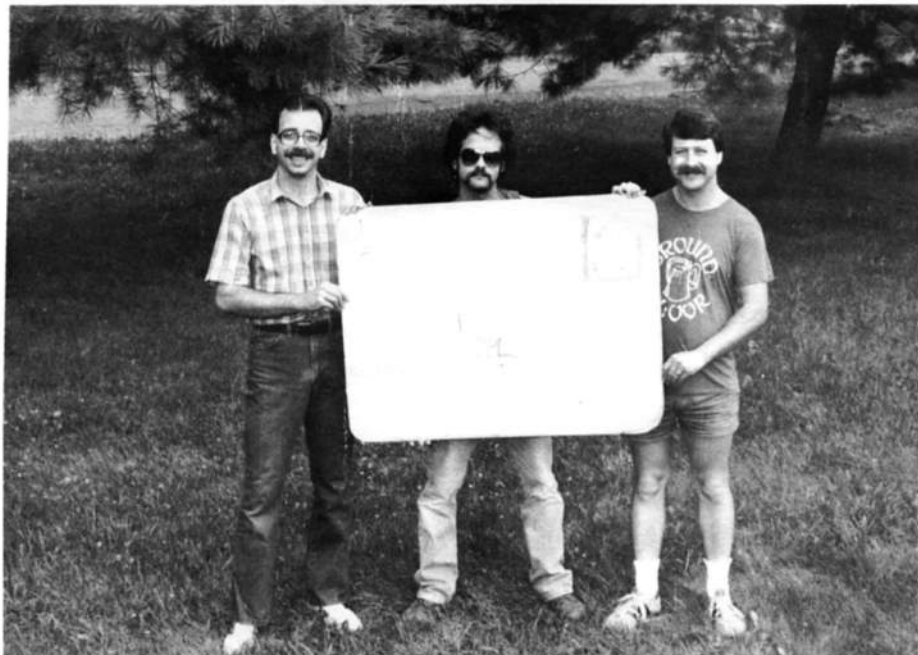


Travel Services: (left to right) Ilse Gusciora, Dolores Reiss.

Word Processing Center Head Marilyn Hondorp, together with operators Ann Lengyel, Chris Ritter, and Linda Hubbard, regularly transforms scrawled research notes into properly formatted manuscripts. In addition to handling everything from memos and mailing lists to the annual report, Word Processing Center personnel help troubleshoot problems that occur in the NBI word processing network. Marilyn also coordinates NBI operator training and terminal installation, overseeing day-to-day operation of the system.

In addition to serving as chairperson of the Word Processing Committee and secretary of the PPL Committee on Inventions, part-time Special Projects Administrator Nan Jones handles numerous editing and records management projects. Nan recently arranged the establishment of a PPL vital records

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Mail Room: (left to right) Tom Fratticcioli, Joe Mattera, Dominic Schioppa.

protection plan. She has also assumed responsibility for the coordination of the annual inventory of records holdings.

Almost every visual image seen throughout PPL, from color slides to continuous tone prints and black-and-white viewgraphs, is produced by the Photo Lab staff. Supervisor John Peoples and photographer Joe DiBartolo take the majority of the photographs, which are printed by lab technician Linda Fahner. Head lab technician Dietmar Krause runs the copy camera (which manufactures viewgraphs) and supervises work flow. Production clerk Debbie Anastasio logs incoming jobs and maintains the Photo Lab filing system.

The Photo Lab handles black-and-white photographs and viewgraphs, line art, and color and black-and-white slides. Color photography and color viewgraphs are sent to an outside vendor for processing.

New this year in the Photo Lab is the capability of shooting three-quarter inch videotapes. Editing of the tapes, however, will be done by an outside contractor. For further information, contact the Photo Lab at ext. 2090.

The responsibility for internal mail delivery falls to Ruth Donald, head of the Administrative Services section. Ruth ensures that Tom Fratticcioli, Joe Mattera, Dominic Schioppa, and Frank DiDonato keep the mail moving to all sites, as well as to Main Campus and the Post Office. Large-volume mailings that require sorting, stamping, and delivery within PPL or in bulk to the Post Office are also handled by the Mail Room staff.

Staffing of the LOB reception area is another of Ruth's responsibilities. The receptionist's duties don't end with greeting guests, however. The receptionist also dispenses stamps; cashes personal checks; maintains records on desk copies of dictionaries, thesauruses, and other reference books; and keeps a log on the multitude of visitors PPL attracts. Gail Marshall and Mary Jane German are currently sharing stints at the receptionist's desk. In



*Administrative Services: (left to right)
Gail Marshall, Mary Jane German.*

addition, Mary Jane is providing typing and filing assistance to the branch. She also keeps the branch's stable of copiers functioning.

Another group reporting to Ruth is Travel Services. Ilse Gusciara and Dolores Reiss completed arrangements for approximately 1600 trips in FY83, ranging from individual airline flights

to large groups traveling to major meetings. Travel Services routinely prepares transportation and hotel reservations, conference registration and cash advances when PPL travelers leave.

Finding economical air fares became easier to do this year, when Travel Services began using the electronic edition of the Official Airline Guide. This computerized listing provides the most current information available on airline fares and schedules. The listing is consulted via telephone lines linked to a Word Processing Center terminal.

A chef's hat is among the many Ruth wears, since she serves as liaison between PPL and its food service subcontractor, Interstate United Corporation. Ruth is responsible for establishing and maintaining policies and procedures for food service for special functions, including the review and approval of all requests.

Last but certainly not least among Ruth's duties is the lab-wide coordination of duplication services. It is Ruth's job to see that PPL is making the most efficient use of its copiers. Ruth reviews and approves requests for new copiers, or for tradeups on existing equipment. She also decides whether equipment should be leased or recommended for purchase, and coordinates the establishment and renewal of leases and maintenance contracts.

"Even though we are quite diversified in the services we provide," branch head DeMeo concluded, "the common element is information. This branch has had several names since its inception in 1977, but its present name -- Information Services -- suits it best."

Johnson Retires



Harold Johnson and his wife, Mary.

On August 1, over 100 people gathered at the Italian American Sportsmen Club to observe the final trip of one of the members of the "World's Oldest Car Pool." Harold Johnson and his wife Mary arrived (really arrived!) in a classic 1933 Buick for an evening of reminiscing and some mild "roasting" of events spanning his approximately 27 years of work here at the laboratory. Other members of the car pool are



Reminiscing about the "good old days" were (left to right) Charlie Bushnell, Harold Johnson, Jack Joyce, and Phil Heitzenroeder.

George Bronner, George Martin, and John Frankenberg.

Harold was the key designer, fabricator and installer of coils for such de-

vices as Model C, ATC, PLT, and TFTR. He and his family will be moving to Vermont, where they are constructing a new home.

Energy Department Official Says The Computer Revolution Hasn't Even Started Yet

There are a lot of people in this country who claim we are in the midst of a computer revolution. Certainly television commercials for personal home computers would have you believe that.

But Dr. Alvin W. Trivelpiece, director of the U.S. Department of Energy's Office of Energy Research, says you haven't seen anything. The computer revolution hasn't even started yet.

It would take about 20 people working full time for a year with hand calculators to do the same number of calculations that one of today's supercomputers does in a second, Dr. Trivelpiece says. While this seems fantastic today, it undoubtedly will be commonplace in tomorrow's small computers. Supercomputers that are at least 100 times faster than that will be required.

The major use of a supercomputer is to solve very large scientific problems in a short time. The Department of Energy's research and development (R&D) programs, which already utilize 35 percent of the supercomputers in use in the United States, could use many more of them with vastly improved computing speed, Dr. Trivelpiece says. Many of the Department's R&D programs have large, complex research and engineering problems that can be only crudely approximated with today's supercomputers, he says.

In addition, many Energy Department research programs that currently do not have access to supercomputers are going to need them in the future to save both time and money.

In the Department of Energy's laboratories across the country, supercom-

puters are used for nuclear reactor safety research, for fusion energy research, for design of nuclear weapons, and for research in energy sciences. For example, in fusion research, computer modeling helps researchers make the right design choices without the necessity of actually building a large number of experimental devices, each of which could cost hundreds of millions of dollars and take years to build.

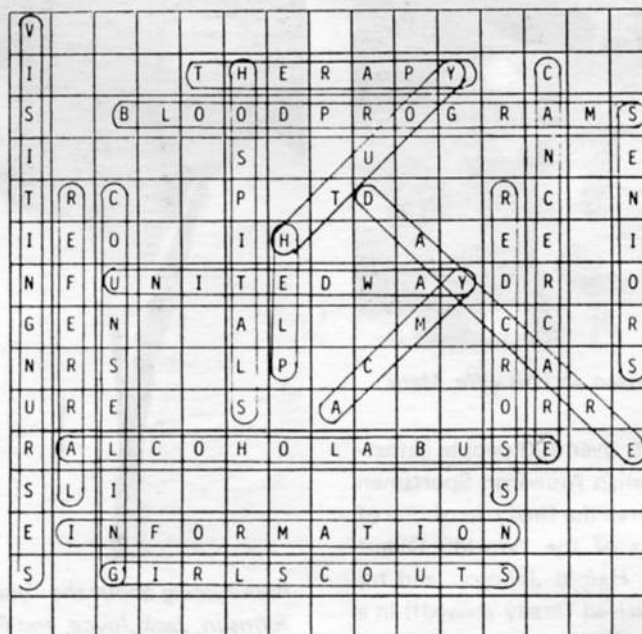
In private industry, use of supercomputers is growing rapidly due to the cost savings associated with applying them to engineering problems. The oil industry, for example, uses them to aid in oil exploration while the electronics industry uses them to design integrated circuits. The auto industry uses them for mechanical design, simulated crash testing, and simulated aerodynamic testing, all of which can reduce the cost of designing a car by 30 per cent.

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One of the more interesting uses of supercomputers, however, is not in science or engineering at all, but in making movies. Computer drawn graphics are now being used to produce scenes from science fiction films like "Tron." With over 1,000 high quality images required for each minute of film, it is easy to see why the supercomputers are valuable for this purpose.

The PPL Hotline is issued by the Princeton University Plasma Physics Laboratory, a research facility supported by the U. S. Department of Energy. Correspondence should be directed to PPL Information Services, Module 2, C-Site, James Forrestal Campus, ext. 2754.

Solution To United Way Seek-A-Word



Health And Safety Training

The following Health and Safety courses have been scheduled for September:

Respiratory Protection	K. Semel (x2531)	Sept. 18, 9 a.m. - noon
Confined and/or Oxygen Deficient Spaces	K. Semel (x2531)	Sept. 11, 1:30 - 4 p.m.
Fork Lift Operating Training	R. Jeanes (x2532)	Sept. 20, 8:45 a.m. - 4 p.m.
Lower Back Injury Protection	F. DiBella (x2135) & M.A. McBride (x3468)	Sept. 14, 8:30 a.m. - noon
Defensive Driving	P. Zeedyk (x3736)	Sept. 11, 18, 25 8:30 a.m. - noon
Basic Electrical Safety	C. McBride (x3434)	Sept. 20, 9:30 - 11 a.m.
Fire Extinguisher Training	S. Larson (x3166)	Sept. 11, 25 2 - 3:30 p.m.
Cardiopulmonary Resuscitation (CPR)	S. Larson (x3166)	Sept. 24, 26, 28 9 a.m. - noon OR 1 - 4 p.m.
Self-Contained Breathing Apparatus	S. Larson (x3166)	Sept. 25, 9:30 - 11:30 a.m.

Employees must obtain their immediate supervisor's permission to attend any of these courses. Supervisors must call the responsible instructor to enroll their employees.