HOTLINE

PRINCETON PLASMA PHYSICS LABORATORY

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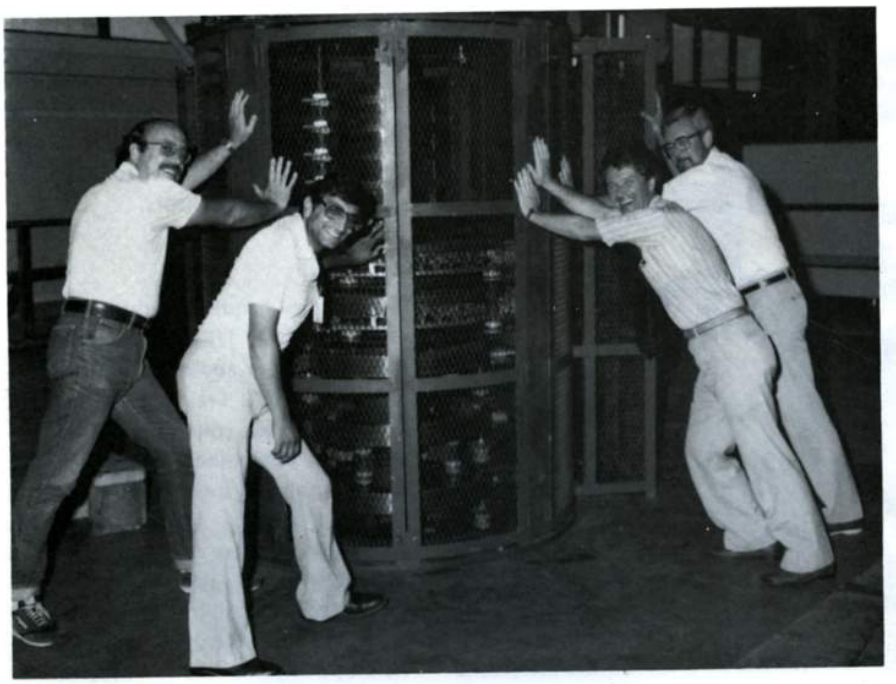
MG #2 START-UP



Gene Baker, Mounir Awad, Aleksandar Ilic and Charlie Ancher (left to right) all had a hand in the "push" to get TFTR MG No. 2 on line by August.

In the near future, the power required to operate TFTR will no longer be drawn from only one motor generator (MG) set. Balancing and acceptance tests are now underway on MG set No. 2, in an effort to bring it on line early this month.

Dave O'Neill and K. Lane were involved with the contract between PPL and Canadian General Electric for installation of MG No. 2. It took approximately 12 hours for the unit's 300-ton stator to be placed in the MG pit. Mounir Awad, cognizant engineer for the TFTR MG sets, said "Dave did an excellent job to assure that the stator was lifted in a safe way."

All auxiliary systems for the second MG unit were commissioned by PPL in parallel with General Electric's installation work on the set. The unit was successfully spun for the first time July 5. Awad said the startup went "nice and smoothly." The 600-ton rotor was run to 20 to 30 revolutions per minute (rpm), then allowed to coast to a halt to allow inspection of areas where components might be rubbing against each other as the rotor turns.

At 30 rpm, some rubbing was found in a swirl vane associated with the air cooling system for the MG set. After a one-day repair of that problem, however, an oil leak on the thrust bearing was discovered. The leak was sealed, and acceptance testing was resumed July 17. The unit is expected to begin supporting the TFTR power supplies August 4.

Awad reported that MG set No. 1 is running "very well after some modifications." Those modifications were made as a result of studies by the PPL Task Force. Jack Joyce and Jim Sinnis authorized task force members John Lowrance (who served as chairman), Peter Bonannos, Graham Brown, Henry Chandler, Wolfgang Stodiek and Ken Wakefield to investigate the balance problems plaguing the first MG set. Their studies revealed that the upper guide bearing on the unit was inadequately damped, producing vibration levels well above the 10 mils called for in design specifications. Several alterations were made, including stiffening the upper bearing bracket on the pit wall with tensioning posts, and reducing the bearing clearance from seven to five mils. The changes reduced the vibration levels, which had previously reached a maximum of 25 mils, to less than 10 mils regardless of the speed of the unit. The level remained constant through MG acceleration and deceleration as well.

Aiding in diagnosing the difficulty were readouts provided by instrumentation installed by Graham Brown. The instruments detected vibration levels, displaying them on a screen in the MG control room. Awad commended the detectors -- and their installer -- for "doing a very good job for us."

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Eugene Baker, Rich Myslinski, Will McQuade, Colin McFarlane, and Harry Krotz also won Awad's praise. "We have a good team here," he said, "with people who really dedicated themselves to their work. Without their support, we couldn't have accomplished as much as we have so far."

Awad also thanked Frank Lawn, Charlie Ancher and Eugene Baker for their work on the MG cycloconvertor and exciter.

Each TFTR MG set has a 600-ton rotor and a 300-ton stator, and is rated at a maximum speed of 375 rpm. Each generator can deliver 475-MVA pulses for six seconds at five minute intervals.

Tritium Handling Course

Dr. Don Grove (left) and Dr. Ernst de Haas (right) presented certificates to (rear, left to right) Richard Yager, Tom Szirtes, Robert Shoemaker, Ken Andreas, M. Getlik, Mannie Waldman, (front, left to right) Bill Pointon, Steven Hendrickson and Gene Mitman. The group recently completed a tritium handling course.

Among the various hydrogen isotopes, the fusion reaction between deuterium and tritium is the most efficient. TFTR is specifically designed to handle this combination of gases; tritium will be introduced into the torus for the first time late in 1986.

Handling tritium, which is mildly radioactive, will require some special skills from operators and their supervisors. To help develop these skills, a three-day tritium handling course was recently held in the Gottlieb auditorium.

The course was taught by five general operations and safety specialists from the Ontario Hydro electrical utility, and from Atomic Energy of Canada Limited. As operators and designers of the Canadian heavy water (deuterium) reactors, each has had many years of experience in handling tritium. In contrast, American reactors operate with normal water (light water), which does not become tritiated in the neutron fluxes of the reactors. The Canadians eventually hope to sell their tritium as a feedstock for fusion reactors.

The course material included units of measurement for tritium; its nuclear, mechanical and chemical properties; methods of monitoring for tritium; and a demonstration of a protective suit designed to prevent tritium handlers from exposure to the isotope. Twenty-one of thirty-two staff members who took the course successfully completed it.

Each student who passed the course "final exam" received a certificate from TFTR Project Manager Dr. Don Grove. Dr. Grove told class participants that laboratory management takes training courses very seriously, not only because the DOE requires them, but also because TFTR cannot be properly run without fully trained operators and supervisors.

The tritium handling course is part of the overall TFTR training program, which includes about 20 topics. According to PPL Training Manager Dr. Ernst de Haas, the class will be repeated in September. There are also plans for a week-long advanced tritium handling course, where participants will work in glove boxes in a tritium atmosphere and clean up a tritiated water spill. That course is currently scheduled for October, and will be held at a tritium facility in the U.S. or Canada. A final site for the course has yet to be chosen.

Dialing Difference

Employees making telephone calls outside the 609 area code will now have to add a digit to complete their connection. As of July 1, callers must dial 9+1 plus the area code and telephone number they are attempting to reach. If the "1" is omitted, a recording will tell the caller to redial the number.

The addition of the "1" also applies to toll-free "800" calls, as well as to directory assistance calls in other area codes. If you have any questions about the new procedure, contact Molly Tompkins at ext. 2694.

Leslie Thompson

Les Thompson

The laboratory recently welcomed a new staff member in a new position, when Leslie B. Thompson was selected to manage the Safety Branch of the Occupational Medicine and Safety Division.

Thompson earned a bachelor's degree in industrial technology from the University of Minnesota, receiving an industrial safety master's degree from the same institution. He has also taken courses in management, OSHA compliance, and human factors engineering at a number of educational centers.

Thompson has been involved in the safety programs at the Westvaco Corporation in Virginia, the IBM Corporation in Florida, and the Minnesota Department of Transportation in Minnesota. Most recently, he served as corporate safety manager for the Atlantic Aviation Corporation in Wilmington, DE. He came to PPL for the "challenge and variety" to be found here. "The laboratory is on the forefront of technology," he enthused, "and that's not something you get the chance to deal with too often!"

As manager of the Safety Branch and of the Industrial Safety Section, Thompson intends to review and update specific PPL safety programs, policies, and procedures. He will be responsible for standardizing safety practices and safety equipment throughout the laboratory, and will assist PPL management in carrying out safety responsibilities. Other duties include accident investigation and review, both to ensure that appropriate corrective action has been taken and to keep management informed of significant accident trends. He will also direct the lab-wide safety training program in cooperation with Bob Bergman.

Among Thompson's goals for his new role are the development of improved storage methods, achievement of a zero lost-time accident rate, revision of health and safety procedures, organization of a safety incentive program, and establishment of safety training programs for management and employees.

Thompson expects to use the Area Safety Coordinator program as the nucleus for future safety efforts. He would like to "increase managers' understanding of their role in our safety program. We all have to work together to make the program a success. With the cooperation of management and employees, I believe we're going to have a very good program."

New Librarian

PPL assistant librarian Jane Holmquist (left) became head librarian following Betty Graydon's June 29 retirement. Betty had been a University employee since 1962.

Composition Change

Due to a change made in the composition of J-88 (a liquid degreaser for electrical equipment manufactured by Cantol Inc. of Philadelphia), some changes should be made in the use of this material at the laboratory.

Cantol's J-88 now contains approximately three parts 1, 1, 1-trichloroethane to one part methylene chloride. This new formula has most of the same properties as the old one -- with a few exceptions. J-88 will now dissolve polystyrene, and may soften some paints and labels.

Because of the body's chemical reaction to methylene chloride, it is extremely important that J-88 ONLY be used in a thoroughly ventilated work area. Splash goggles and neoprene or polyvinyl alcohol (PVA) gloves should be worn when working with J-88; PVA gloves may offer more protection than neoprene, but are more expensive.

The Cantol product data sheet recommends dipping or spraying of small electric motors in J-88 while they are running. PPL's Occupational Medicine and Safety (OM&S) Department DOES NOT recommend this practice, since the rotating parts of an electric motor could easily throw J-88 into a worker's face when the motor is dipped or sprayed. In addition, the ultraviolet light and heat produced by arcing motor brushes may cause J-88 to be chemically changed into phosgene and hydrogen chloride gases, both of which are toxic and irritating.

Finally, J-88 SHOULD NOT be used in areas where arc welding will take place. The same chemical reaction that occurs with J-88 in arcing motors can occur even more easily while arc welding.

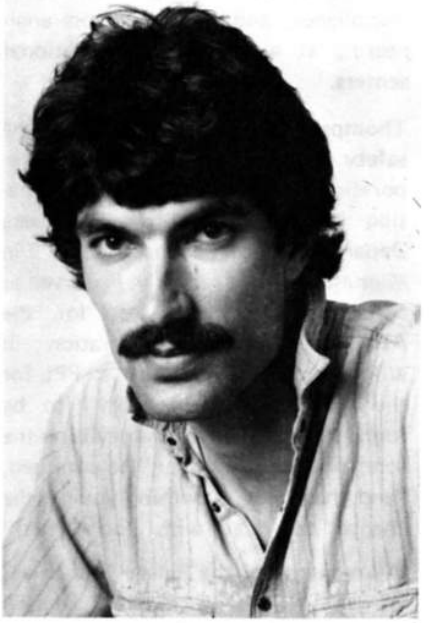
If you have any questions on the use of J-88, the effectiveness of the ventilation in areas where J-88 is used, or personal protective equipment, contact the OM&S office, ext. 2531.

Fellowship Awarded

Steven C. Cowley, a third-year student in the plasma physics graduate program, has been awarded a Charlotte Elizabeth Proctor Fellowship for the 1984-85 academic year. The award cites his "distinguished work in the Department of Astrophysical Sciences."

Honorific fellowships constitute Princeton's highest award, and are offered in recognition of outstanding performance and professional promise. Cowley was one of five Princeton graduate students in the natural sciences to receive a Charlotte Elizabeth Proctor Fellowship this year.

A graduate of Oxford University, Cowley came to Princeton in the fall of 1981. In his research studies with Professor Russell M. Kulsrud over the past two years, he has successfully introduced quantum-mechanical formalism to the Boltzmann-equation analysis of plasmas with polarized nuclei and made new advances in the theory of tearing modes.



Steve Cowley

Cowley's 1984-85 academic year will be devoted to the completion of a doctoral dissertation on anomalous transport in tokamaks.

Sports Equipment

Afternoon athletes can display their prowess by using recreation equipment signed out through Meg Gilbert or John J. Clark. Softballs, quoits, horseshoes, three bases and a home plate are available from Meg; badminton equipment, tarrico, and horseshoes are available from John.

Employees at A- and B-Sites should sign their equipment out from Meg in Sayre Hall. C- and D-Site employees should obtain their equipment from John in the C-Site Maintenance Building. Equipment should be reserved prior to lunchtime. It is the responsibility of the individuals signing out the materials to see that they are returned.

Sports equipment will remain available throughout the summer months.

Health And Safety Training:

The following Health and Safety courses have been scheduled for July and August:

Cardiopulmonary Resuscitation (CPR)	S. Larson (x3166)	July 23, 25, 27 9 a.m.-noon or 1-4 p.m.
Self-Contained Breathing Apparatus	S. Larson (x3166)	July 31, 1984 9:30-11:30 a.m.
Employee Orientation	B. Cohen (x2037)	Scheduled by the University and B. Cohen
Lower Back Injury Prevention	M.A. McBride (x3468) L. Owen (x3533)	Aug. 1, 8:30 a.m.-12:30 p.m.
Fire Extinguisher Training	S. Larson (x3166)	Aug. 14 & 28, 2-3:30 p.m.
Cardiopulmonary Resuscitation (CPR)	S. Larson (x3166)	Aug. 20, 22, 24 9 a.m.-noon OR 1-4 p.m.
Self-Contained Breathing Apparatus	S. Larson (x3166)	Aug. 28, 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.

Student Scientists

Standing before one's colleagues and explaining research results is an everyday occurrence for PPL physicists and engineers. But for the 12 West Windsor-Plainsboro High School students describing their research to an audience of laboratory staff members and classmates, the experience was a novel one.

The presentation marked the culmination of a month-long partnership between high school physics students and PPL physicists and engineers. Laboratory staff provided guidance to the students, who investigated and resolved a variety of plasma physics problems.

The idea for the program grew out of physicist Ralph Izzo's involvement with a one-day energy symposium the West Windsor Regional school district held last year. During a planning meeting for that symposium, Dr. Izzo met teacher Tom Ritter, the organizer of the Scientist/Science Teacher Interaction program. Ritter's senior science class usually studies fusion energy as part of its curriculum. He suggested that his students work with PPL staff to solve real problems that have confronted plasma physicists in designing fusion energy experiments. Dr. Izzo prevailed on colleagues Milt Pelovitz, Phil Heitzenroeder, and Doug Darrow to supply the students with appropriate problems -- and with help in resolving them.

Problems were presented to the class in the same step-by-step sequence scientists used to solve them in the past. Vital pieces of each answer were withheld, however; students were expected to calculate or research their answers and "fill in the blanks" to derive the solution. "It's a manageable process," Dr. Izzo explained, "that certainly was a challenge for them!"

Students spent the first week of their month-long project period researching background materials on their particular problem. Using the PPL library,

West Windsor-Plainsboro High School students Margot Wray (left) and Mike Atkinson (center) discuss their research into plasma physics problems with Princeton Plasma Physics Laboratory engineer Milt Pelovitz (right).

staff members, or graduate assistants as resources, students searched for solutions during the second week of their investigations. Final papers on their findings were presented before an audience in the Theory Conference Room.

Following the presentation, Ritter assessed his students' performance. "At first, I don't think they realized what they were in for. They were certainly challenged (by the problems, which ran the gamut from determining magnetic field forces to calculating the criteria necessary for fusion to occur). But they proved themselves capable of handling them. I think they did very well."

Ritter credited the program with providing "a break from traditional classes. It takes (students) where the action is and where the resources are. They can see the application of what they're learning in class."

Student presenters echoed Ritter's feelings. Ilinca Popescue, who reported on magnetic fields, said the program deserves" an A+; I really enjoyed it! When we got started, I didn't know anything about plasma physics. Seeing the experiments and the people (at the laboratory) made it real to me. I learned a lot from the people (at PPL); they were all very helpful. I was really impressed!" She added that she would encourage other students to participate in the program, "because it's important for students to realize that we can do these kinds of problems."

Senior Margot Wray said she learned "a lot in a very short time. It's been very helpful, because now I can see what all those rules and equations I've been learning can be used for." Classmate Liam Duffy agreed, pointing out that after confronting "little classroom problems," he wasn't sure he was ready for work on plasma physics equations. "It's definitely something I'd recommend to others. I really got interested, and it suddenly didn't seem like hard work!"

Other students participating in the program were Mike Atkinson, Tony Chen, Caroline Fish, Ruth Javick, Neal Miller, Beth Mynatt, Jeff Russo, Rob Schnell, and Daniel Sun.

Science Project Takes Off

When physicist Dr. Ralph Izzo participated in an energy symposium sponsored by the West Windsor Regional school district last year, he never imagined it would lead him into the space program. But thanks to his assistance and that of interested parent Sharon Magee, a group of gifted and talented fifth and sixth graders were able to "launch" their own fusion-powered space shuttle.

Dutch Neck School students David Gene, Charles Magee, Jason Duval, Sherman Wang, and Doug Parvin contacted Dr. Izzo in January, recalling his visit to their district. The students asked for his help in selecting a science project. After some discussion, the group decided to design a space mission, targeted for a May "liftoff." The shuttle was chosen as the most space-worthy vehicle for the trip.

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While figuring out fueling requirements for their mission, the youngsters chose to power the shuttle with a fusion engine. The classmates appealed to Dr. Izzo, and parent coordinator Sharon Magee, for guidance on some of the complicated calculations involved in getting the project "off the ground."

The students obtained the dimensions of the shuttle from a model kit Charles Magee was building at home. Dr. Izzo worked with the students for one hour every other week, while Mrs. Magee assisted them on a weekly basis. With her help, the students wrote a program for a personal computer, detailing the shuttle's launch.

"They had to learn some Newtonian physics," Dr. Izzo marveled, "so they could figure the energy it would take to defeat the earth's gravity and lift the shuttle into orbit. They calculated the deuterium-tritium conversion factor for fusion energy release without using any handbooks, and found that it would take a kilogram and a half of deuterium to power their shuttle. They also had to do preconceptual calculations of aerodynamics, environmental controls, and so on. I was really impressed with their abilities!"

And unlike NASA's recent shuttle woes, the Dutch Neck shuttle program ran without a computer glitch and "launched" on time!

Obituaries

Two PPL staff members have died since February. They are:

- Bertram W. Phillips, a buyer in the Administration/Purchasing Department, died May 15. Mr. Phillips, 62, joined the labo ratory staff in 1980. He is survived by a son and two daughters.
- Edwin Naprawa, a painter in the Maintenance Department, died June 7. Mr. Naprawa, 63, joined the laboratory staff in 1976. He is survived by his wife, three children, and several grandchildren.

Cathy Howard has been appointed Assistant Head for Administration in the Research Department under Associate Director and Research Department Head Paul Rutherford. She will assist Dr. Rutherford in department administration, with particular emphasis on personnel administration, recruiting, visitor programs, the Research manpower system, and budgets administered by the Research Department. Cathy, formerly Manager of Human Resources Information Systems in the Personnel Department, will be located in LOB 370.

Information Services Branch Head Anthony DeMeo presented Printing Services Supervisor George Geherty with a plaque in recognition of his retirement June 29. George, who has been a PPL employee for 32 years, also received a gold watch during a dinner held in his honor In accepting the gifts, George thanked the laboratory staff for making his tenure at PPL "very interesting. It doesn't seem like 32 years, but all good things must come to an end!"

Books For The Blind

John Schivell will never know how many people have seen the intricacies of physics through his eyes. For John is an active volunteer with Recording for the Blind, a national organization headquartered in West Windsor that provides audio tapes of a variety of books to blind readers.

Recording for the Blind was established 34 years ago to give the blind access to books not readily available in braille. Volunteers read the texts of books ranging from current novels to collegiate textbooks onto tapes, which are distributed free of charge by the organization. Often the only way a blind person can "read" a chosen volume is through a Recording for the Blind tape.

"Creating braille books requires an enormous number of pages," explained Anne Young, director of the group's Princeton recording studio (and wife of PPL's Ken Young). "Even by machine, the conversion process is very slow. And not everyone who is blind can learn braille; it's similar to learning a foreign language. Not everyone has the aptitude."

In addition, the organization supplies booktapes to the legally blind (partially sighted individuals who can see with the help of special magnifiers), and to people with severe dyslexia, cerebral palsy, multiple sclerosis, or other handicaps. Anne emphasized, however, that individuals must be certified as handicapped before they are allowed to use Recording for the Blind services.

John's involvement with the program began two years ago with a sign on the PPL bulletin board. He discovered that technical readers for the organization were in very short supply. "It's easier for them to find general readers," John said, "especially since they insist on having someone who is familiar with the materials to read technical books."

Anne concurs. "We always need technical readers," she points out. "There are technical books on our shelves that we can't assign to be converted into tapes because we don't have sufficient readers." Fields with the most critical shortages include computer science, electrical and mechanical engineering, physics, and advanced mathematics.

Knowledge of the field is essential in technical reading, according to Anne, "because you're not only reading the text. There are also diagrams that have to be clearly explained; computer flow charts, for example. In some cases, we supply raised line drawings (figure diagrams similar to braille) with the tapes, but the time it takes to make one is enormous, and many of our clients can't read them. That's why, in addition to the training we provide, we advise new readers to listen to tapes of similar books. They can hear how others have described similar diagrams, and we also provide some written tips on describing figures. But in many cases, readers come upon figures sight unseen, and must describe them off the top of their heads. That requires a thorough knowledge of the subject; it's really not a very easy thing to do."

"The hardest part (about reading technical texts) is describing technical figures," John agrees. "(When dealing with a graph, for example,) I usually describe the scales and ranges, then pick some points on the curve and describe where they are. That's why I like to look through what I'm going to read beforehand, so I can do some thinking about how to describe the figures and not have to struggle through them." He added that "the rules of reading are to simply read the material, not digress from it."

Along with local training, each prospective reader is given a voice test. The test is sent to a committee in New York, where the decision on whether the reader is suited to the reading material is made.

John recalled his own voice test in 1982. "I wanted to be a radio announcer in college," he admits, "but I didn't pass the test. But I did pass my voice test for Recording for the Blind. It's something that lets me have a little fun while I'm helping someone else, so why not get involved? Besides, I'm something of a ham, so I enjoy it!"

It takes eight to nine readers to tape the contents of one book. Each reader devotes approximately one and a half hours to a single reading session; John estimates that he can cover 10 to 12 pages of text in that time. Readers sit in soundproof recording booths, while a monitor outside the booth operates a control board and a reel-to-reel tape recorder. Monitors follow the text along with the reader, pointing out

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A reader/monitor team work together to produce an hour of recorded text at the Recording for the Blind studio in Princeton.

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mistakes or modulating the master tape recording being made as the reader speaks. The master recording is then duplicated onto cassette tapes, which are sent to individuals requesting that particular book.

Those requests are what enlarges the Recording for the Blind tape library. Anyone nationwide may ask for a specific book on tape. If a master tape of the volume exists, a duplicate is made and sent out. If the book requested has never been recorded, it joins an ever-increasing list of texts awaiting qualified readers. Last year, for example, 284 volunteers at the Princeton unit read 246 books, accumulating 5,038 hours of reading time. The majority of books requested are texts for college courses, and since many of them involve technical subjects, they are frequently backlogged.

"We're presently working on the books students will require for the fall semester," Anne said. "We're trying to meet our deadlines, and we're reading approximately 20 books a month onto tape. But there are often texts required for fall courses that stay on our shelves until December because we lack more technical readers."

Anne stressed that while the demand is greatest in the technical area, "we always need readers in all fields. We also need monitors, and volunteers to duplicate the tapes."

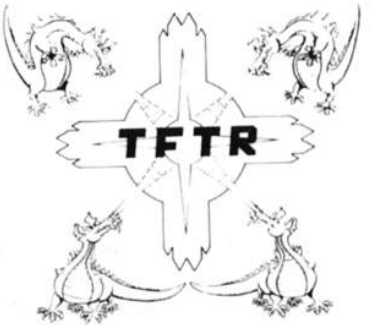
Those interested in volunteering for Recording for the Blind should contact Anne Young at (609) 921-6534.

Award Aid

Attention all service award recipients! Has your Tiffany pen run out of ink, or have you lost the ball closure on your Tiffany keychain? Fear not -- replacements for both items are available through Meg Gilbert in Personnel, Sayre Hall, B-Site.

CORRECTION: In a photo caption for Secretaries' Day in the last issue of HOTLINE, SOSS committee member Dorothy Pulyer was incorrectly identified as Helen Livernoche. The HOTLINE regrets the error.

The Emergency Services Unit added a sixth vehicle to its fleet with the acquisition of a Rapid Intervention Vehicle (RIV). The vehicle features front and rear bumper-mounted turrets, which can dispense either foam or dry chemical extinguishing agents, or a combination of both. The front turret is controllable from the cab of the RIV, allowing firefighters to combat fires in areas where on-foot entry might be dangerous. The vehicle also carries approximately 200 feet of fire hose.



T-Shirt Deadline

August 20 will be the last day orders for TFTR tee-shirts and sweatshirts will be accepted. The shirts, which come in a variety of styles and colors, feature a TFTR logo being "heated" by four neutral beam "dragons." Each shirt is silk-screened in four colors.

For further ordering information or a price list, contact Anne Golden at ext. 2444.

Transitions

BORN -- To physicist Allan Reiman and his wife, a son, Jonathan, on June 10. Congratulations!

BORN -- To Captain John Glasson of the Emergency Services Unit fire department and his wife Sally, twin boys, John Thomas and Robert Jeffrey, on June 28. Congratulations!

BORN -- To Rodney Templon, a son, John on June 29. Congratulations!

BORN -- To Dave Allegretti and his wife, a daughter, Mary Ann, on June 30. Congratulations!

BORN -- To Chuck Bennett of the Diagnostics Division and his wife Patty, a daughter, Marlene Patricia, on July 1. Congratulations!

Suggestions Sought

Have an idea on how to save energy at the laboratory? Send it along to the Project Engineering Branch, and your idea might become a reality.

Branch members are seeking suggestions for reducing energy costs throughout PPL's facilities. Ideas should be limited to a short paragraph outlining the proposed project. Suggestions should be sent to Bob Gulay, ext. 3255, by the end of July.

Once suggestions are received, the Project Engineering Manager will transform each idea into a conceptual project objective, complete with estimated costs. The best of the suggestions submitted will be forwarded to the Department of Energy with a funding request.

Cherin Chaykowsky Wins Pageant Crown

Cherin Chaykowsky

It's not every man who can become the father of royalty. But that's what happened to PPL's Art Chaykowsky last month, when his daughter Cherin was named Miss New Jersey National Pre-Teen pageant queen.

The Miss New Jersey National Pre-Teen contest is open to girls ages eight through twelve. This year's field of 65 entrants was judged on the basis of their applications and scholastic achievements. During the pageant, the contestants were evaluated on sportswear and party dress modeling, as well as on their responses to a variety of interview questions. As a state contest winner, Cherin received a $500 savings bond, a jacket and watch, a competition trophy, and a weekend in the Catskills for her family. She will be given an all-expense paid trip to Florida in October to compete in the national Miss Pre-Teen pageant.

Eleven-year-old Cherin is no stranger to performing before an audience. She has been guest parade marshal at the Disney World Tencentennial Parade in May 1982; was selected 1983-84 Royal Stars Grand Celebrity; and took first place in the Miss New Jersey Talent Hemisphere contest for 1983. She's won over 700 trophies and titles for her baton twirling, taking up the skill at the age of six. The featured twirler for the Lawrence High School marching band for two years, she was recently selected Miss Majorette of New Jersey. Cherin will be traveling to Notre Dame University later this month to compete in the American Youth on Parade National Baton Contest.

Her expertise with a baton stood her in good stead during the Miss New Jersey Pre-Teen pageant. Her jazz-baton routine helped Cherin become the first contestant in pageant history to win both the talent title and the competition crown.

As the current Miss New Jersey Pre-Teen, Cherin will represent the Garden State at pageants in New York, Delaware, and Maryland. She will be making guest appearances at a variety of events during her year's reign. Her most recent appearance was on Channel 9's Arthritis Telethon.

Despite all her achievements, Cherin remains an unaffected fifth grader at the Lawrence Intermediate School. "She's got her feet on the ground," says her proud papa. "She's a straight-A student, and her mother and I have always told her that school is the most important thing. That helps her stay cool in competition -- even if her mom and dad aren't!"

Bowling Results

A look at the final standings of the Princeton University Mixed Bowling League proves that the Pony Express can still deliver in tight situations. The team, paced by captain Ken Strine, finished first among eight squads for the 1983-84 season.

The Express, which includes Fred Dahlgren, Dave Maruso, Debby Simmonds, and Nancy Strine, ended season play just 22 pins ahead of the second-place Strike Force. Colin McFarlane was captain of the Force; his teamates were Harry Krotz, Betty Carey, and Dee and Dick Boscarino.

At the league's June banquet, a number of bowlers were rewarded for their performance throughout the year. High average trophies went to Ken Strine (185), Dick Kopliner (175), Thomasina Abrams (154), and Nancy Strine (151). Receiving High Series awards were Ken Strine (647), Matt Lawson (629), Kim Prutky (550), and Thomasina Abrams (538). Dick Boscarino and Dick Kopliner tied for high game honors with 246's; Nancy Strine (231) and Terry Tempkin (213) also won trophies for their high games.

Dave Maruso and Debby Simmonds both received trophies as the most improved male and female bowlers.

League officers were also chosen during the banquet. The current league officers, which include president Bobbie Cruser, vice-president Matt Lawson, and secretary Dolores Mazalewski, were all reelected to their positions. Joining them will be Dottie Kerr, who will serve as league treasurer.

Bowling Victors

Harold's Hitmen lived up to their name recently by mowing down the Old Men in a rolloff for the Princeton University Mens' Bowling League crown. The victory put the Hitmen, with captain Matt Lawson and team members John Luckie, John Cowell, Jose Aquino, Scott Larson, and Spence Holcombe, at the top of the standings when the 14-team league ended its 1983-84 season in May.

The Hitmen finished the first half of their 34-week season in first place with a 94-42 record. The Old Men, paced by captain Bob Mills and teammates John Tiscione, Fred Dahlgren, Homer Hill, Don Knutson, Harold Johnson, and Bob Silvester, won the second half of the season with an 88-48 mark. The Hitmen's success in the rolloff ended Security's two-year reign as league champions, and put the league trophy in the Warehouse.

At the league banquet, high average awards were presented to Jeff Bennett of the Powerhouse team (192.20) and Bob Popp of Tech I (192.16). Popp was also named the most valuable bowler, while John Tarnecki of the Controllers won the most improved bowler honors. Cleo Williams of C.O.B. rolled a 270 to take first place in the high game category, followed by George Mueller from the School of Engineering team with a 267.

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.

- Wordsmiths are wanted to write news releases or newsletter articles for a group dedicated to alcoholism prevention; a volunteer group that maintains an emergency food supply; or an arts organization. A historical village is also in need of someone to write press releases on a regular basis. For information on specific positions, contact the VAC.
- If you have social work experience, a large social services organization needs someone to review periodicals, direct noteworthy articles to the proper staff, and update its catalog file.
- "In" baskets need to be cleared out at a variety of nonprofit organizations. Two to four hours per week spent typing, filing, coding, ordering, Xeroxing, or answering telephones would be greatly appreciated. Requests for such help have been received from organizations involved with counseling services, health care, consumer affairs, housing, environmental protection, recreation, youth services, government, theatre, indigent aid, and women's centers. Select a skill, and match it with an organization that needs you through the VAC.

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 Carrier Foundation of Belle Meade needs volunteers on evenings and weekends to visit patients, work in the patient library, and help out in the pharmacy and adolescent units. Volunteers receive a tour and general orientation, and devote from three to 20 hours per week to the Foundation. For more information, call 201-874-4000, ext. 468.
- Creative Theatre Unlimited of Princeton is seeking a seamstress to make and mend costumes; a computer programmer to handle the group's mailing list; and a photographer. To volunteer your talents, call 609-924-3498.
- The Eden Institute of Princeton, which works with families of autistic children, needs volunteers for babysitting/respite care. Help is also being sought for the residential program, and for therapy in the education program. Call 609-921-1198 to lend a helping hand.

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.

Tour Guides

It was standing room only for the PPL tour program during the first six months of 1984, as a total of 4,449 visitors got a glimpse of the laboratory's experiments. April was the high-water mark of the period, bringing 1,233 tourists along with its traditional showers. Our thanks to the following staff members, who served as "leaders of the pack" during the first half of this year:

JANUARY

Mounir Awad
Suzen Bayer
Joseph Cecchi
David Ciotti
Robert Ellis
Joseph Fennimore
Harry Howe
Ralph Izzo
Stephan Jardin
Harold Johnson
Naren Kokatnur
Jerry Levine
Roy Little
John McCann
Michael Periera
Joseph Stencil
Phil Thompson
Irving Zatz

FEBRUARY

Dale Ashcroft
Suzen Bayer
Nelson Bowen
Charlie Bushnell
Sal Cavalluzzo
John Coonrod
Ernst deHaas
Michael Diesso
John Doane
Howard Eisenberg
Robert Fleming
Don Grove
Phil Heitzenroeder
Daniel Huttar
John Johnson
Robert Krawchuk
Dennis Mansfield
Peter Materna
John McCann
Raj Mukherji
Holt Murray
Michael Periera
Robert Pinsker
Alan Ramsey
Greg Rewoldt
Michael Viola

MARCH

Halsey Allen
Charlie Ancher
Kees Bol
Fred Boody
John Bradish
Norton Bretz
Graham Brown
Charlie Bushnell
Diane L. Carroll
Sal Cavalluzzo
Liu Chen
Sam Cohen
Pierre Couture
Ernst deHaas
Michael Diesso
Frank Dreher
Larry Dudek
Fred Dylla
Phil Efthimion
Robert Fleming
Jim French
Cliff Fortgang
Boris Grek
Don Grove
Phil Heitzenroeder
Ralph Izzo
Stephan Jardin
John Johnson
Robert Kaita
Mark Kijek
Randall Knize
Naren Kokatnur
Russell Kulsrud
Benoit Leblanc
George Levitsky
Milt Machalek
J. Manickam
Dennis Manos
John McCann
Donald McNeill
Loran Meray
Don Monticello
Harold Murphy
John Murray
R. McDonough
E.B. Nieschmidt
Gary Oliaro
Suzen Owen
Michael Periera
Alan Ramsey
Greg Rewoldt
Stan Schweitzer
Larry Stewart
S. Sesnic
J.R. Thompson
Mike Viola
Al von Halle
M. Yamada
Irving Zatz

APRIL

Halsey Allen
J. Alton
Paul Anbro
Lee Benson
Stefano Bernabei
Fred Boody
Peter Bonanos
Nelson Bowen
Mark Bowles
John Bradish
Charlie Bushnell
Diane L. Carroll
Joe Cecchi
Adrian Cini
Dave Ciotti
Sam Cohen
John Coonrod
Ernst deHaas
Frank Dreher
Larry Dudek
John Edwards
Robert Ellis
Robert Fleming
Robert Goldston
Melvin Gottlieb
Judith Giarrusso
Phil Heitzenroeder
Daniel Huttar
Ralph Izzo
John Johnson
Fred Kloiber
Naren Kokatnur
Robert Kress
Daniel Kungl
Ed Lawson
Milt Machalek
George Martin
Lorand Meray
Sid Medley
John McCann
Donald McNeill
Don Monticello
Dave Mullaney
John Murray
E.B. Nieschmidt
Eric Perry
Greg Rewoldt
Keith Sapp
Stan Schweitzer
George Sheffield
M.L. Shoaf
Fred Tenney
Marilee Thompson
Phil Thompson
Al von Halle
Irving Zatz

MAY

Halsey Allen
Michael Bell
Mark Bowles
John Bradish
Norton Bretz
Robert Budny
Charlie Bushnell
Diane Carroll
Sal Cavalluzzo
T.K. Chu
Dave Ciotti
Ernst deHaas
Phil Efthimion
Boris Grek
Ralph Izzo
Jack Joyce
Harold Johnson
John Johnson
James Kamperschroer
Fred Kloiber
Naren Kokatnur
Randall Knize
Donald Knutson
George Martin
Sid Medley
John Murrary
E.B. Nieschmidt
Michael Periera
Keith Sapp
Jim Stevens
Marilee Thompson
Fred Tenney

JUNE

Halsey Allen
Jack Anderson
Greg Bates
Peter Beiersdorfer
Stefano Bernabei
William Blánchard
Mark Bowles
Charlie Bushnell
David Ciotti
Adrian Cini
Sam Cohen
Anthony R. DeMeo
Frank Dreher
John Edwards
Larry Grisham
Ray Jeanes
Harold Johnson
Jack Joyce
Fred Kloiber
Naren Kokatnur
Daniel Kungl
Ed Lawson
Dennis Mansfield
Dale Meade
George Martin
Robert Mills
James McEnerney
Gary Oliaro
Alan Ramsey
Greg Rewoldt
Stan Schweitzer
Fred Tenney
Marilee Thompson
Mike Ulrickson
Hal Wexler
King-Lap Wong
Nabil Youssef
Howard Zuvers

PPL PICNIC

1984

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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 5x10 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 2x10 cm) 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 stabilization 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 physicst 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

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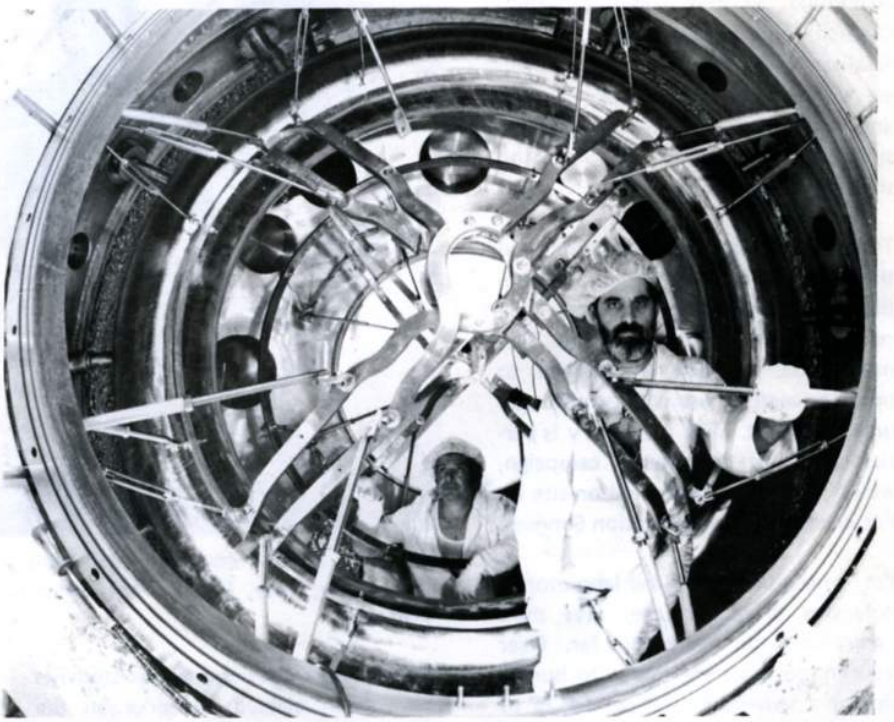


Fred Wood (foreground) and Al Marone installing two new figure-eight coil assemblies within the S-1 vacuum vessel.

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-

(continued)

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.

Security Checkpoints

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 envelopes, 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

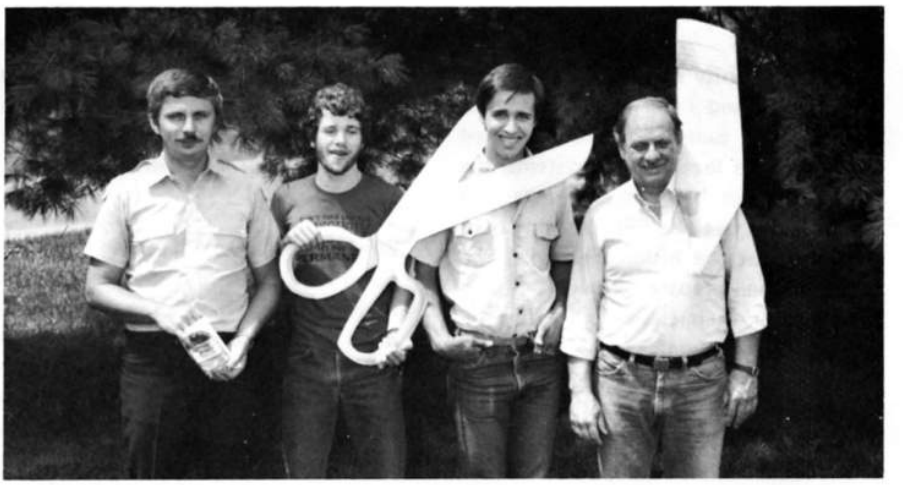
V	U	Z	A	S	R	N	E	T	R	A	P	Y	E	T
I	N	O	R	T	H	E	R	A	P	Y	L	C	N	O
S	I	B	L	O	O	D	P	R	O	G	R	A	M	S
I	Z	O	A	E	S	I	P	U	G	O	A	N	L	E
T	R	C	L	L	P	K	T	D	X	C	R	C	I	N
I	E	O	Z	D	I	H	E	R	A	P	E	E	X	I
N	F	U	N	I	T	E	D	W	A	Y	D	R	V	O
G	E	N	C	R	A	L	V	E	M	D	C	C	U	R
N	R	S	I	D	L	P	I	C	T	U	R	A	C	S
U	R	E	T	R	S	F	A	X	O	P	O	R	R	D
R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



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

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 Princeton 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.

(continued)

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 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."

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

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 program'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 HOT-LINE; 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

(continued)

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.

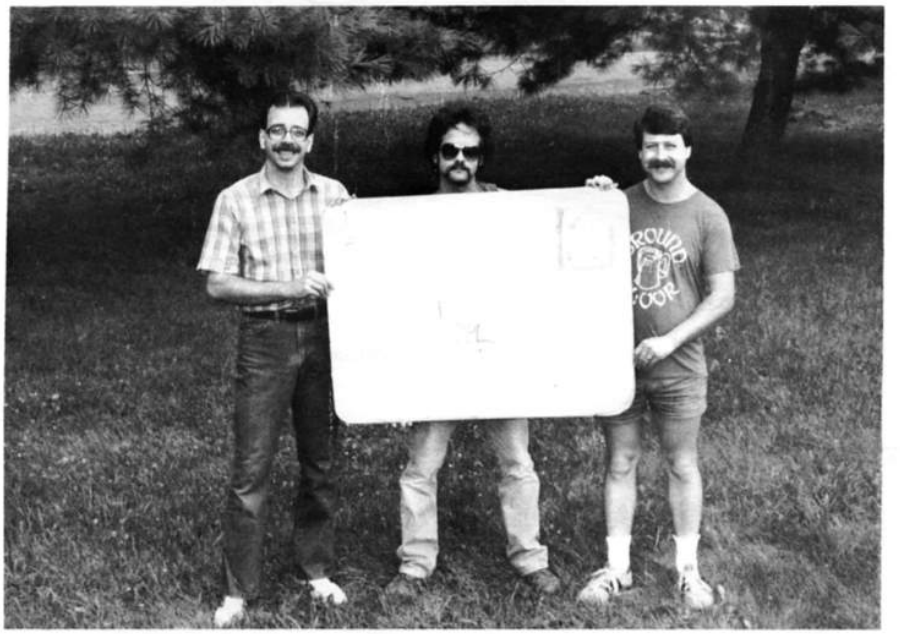
Bernie Giehl heads the branch's Graphic Services section, which provides the artwork to complement reports, publications, or presentations. Bernie's talented section, which includes artists Terry Birch and Eric Thorsland, and draftsmen Steve Lengyel, Shawn McFadden, and Greg Czechowicz, can create finely 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.



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

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

(continued)

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

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

Another group reporting to Ruth is Travel Services. Ilse Gusciora 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 George Bronner, George Martin, and John Frankenberg.

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

Harold was the key designer, fabricator and installer of coils for such devices 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, supercomputers 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.

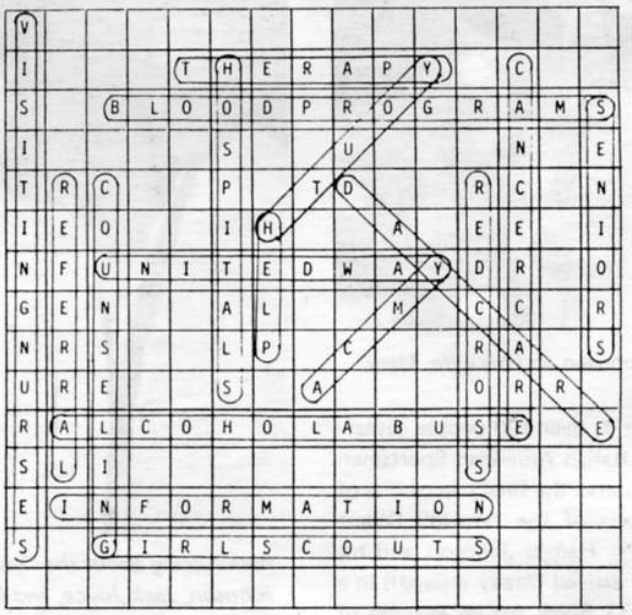
In private industry, use of supercomputers is growing rapidly due to the cost savings associated with applying them to engineering problems. The oil industry, for example, uses them to aid in oil exploration while the electronics industry uses them to design integrated circuits. The auto industry uses 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.

(continued)

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.

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PPL HOTLINE
PRINCETON PLASMA PHYSICS LABORATORY
Vol. 6, No. 3 September 18, 1984

PPL Group Receives APS Award

Six laboratory staff members will share the American Physical Society (APS) Award for Excellence in Plasma Research for their work on a new scheme for driving plasma currents in tokamaks.

This is the second year the APS has presented its annual Division of Plasma Physics award, which consists of $5,000 and a citation certificate. Half of the $5,000 award will be given to the PPL group, with the remainder split between experimental teams at MIT and the University of Kyoto, Japan. PPL award winners include W. Hooke, S. Bernabei, F.C. Jobes, R.W. Motley, J.E. Stevens, and S.E. von Goeler.

The award was presented in recognition of the work all three groups have done in radio-frequency (rf) current drive in tokamak plasmas. The award citation commends the groups for "the experimental demonstration of start-up, ramp-up, and sustainment of toroidal currents by lower hybrid waves."

Previously, tokamak currents had been induced magnetically by a very large system of coils known as the OH (ohmic heating) transformer. Magnetic induction is an inherently pulsed technique; the prospect of replacing part or all of the OH system with rf current drive to obtain longer pulses or possibly steady-state systems significantly enhances the prospects for making the tokamak a practical energy source.

Dr. Hooke explained that prior to 1981, the study of rf current drive in tokamaks didn't exist. "The idea had been around, but it wasn't until the theoretical work of Nat Fisch that there was much hope that rf current drive might possibly be very efficient. We studied rf current drive here at the lab on test machines in 1979, and began working with it on PLT in late 1981 and early 1982."

In principle, RF waves can propel charged particles indefinitely, thus overcoming pulsed mode operation. Dr. Hooke predicted that future tokamaks will use some combination of the two modes, "probably rf-assisted ohmic heating."

In the experiments conducted on PLT, rf-driven current pulses were maintained for three and a half seconds, and currents as large as 400 kA have been driven with lower hybrid waves. Experimentation also revealed that ohmic heating could be eliminated entirely, allowing very effective current ramp-up from 0-100 kA without the OH system.

"We were really surprised by our results," Dr. Hooke said recently. "We hadn't expected the efficiencies for current drive and ramp-up we got; that surprised everyone. First we were surprised to see that we could maintain large currents with no inductive current drive. Then we discovered rf current ramp-up on PLT and found it to be very efficient. Although they are accepted now, both results were initially received with great skepticism by the plasma physics community."

Present PLT experimentation involves an 0.8 GHz system capable of generating a few hundred kilowatts. A new 2.45 GHz rf system, almost completed, will be capable of delivering 1.2 MW to the PLT plasma. "This new system will enable us to operate at higher plasma densities and pulses of up to 10 seconds," Dr. Hooke said. "It should serve as a prototype for a TFTR experiment. In 1986, we plan to run transmission lines to TFTR for a preliminary experiment. In 1987, we hope to have a multimegawatt system installed out there."

The laboratory nominated the PPL group for the APS award. The group's work was then evaluated by an APS committee, which chose the award recipients.

Computer CPR

Emergency Services Unit members Scott Larson (left) and Frank Bozarth review their cardiopulmonary resuscitation (CPR) technique via the American Heart Association's computerized CPR learning system.

Resusci-Annie is no dummy any more.

The familiar mannequin, who has helped teach cardiopulmonary resuscitation (CPR) to so many people, has finally joined the computer revolution. Now outfitted with a series of sensors, and aided by an Apple computer and a Sony videodisk player, Annie has begun "teaching" CPR recertification classes at PPL.

CPR is a lifesaving technique that couples mouth-to-mouth resuscitation with chest compressions. CPR can help revive someone who has had a heart attack by maintaining oxygen and blood flow.

The new integrated learning system, developed and patented by the American Heart Association, is being given a six-month trial by the laboratory's Emergency Services Unit (ESU). The interactive system allows CPR students to renew their qualifications at their own pace, with the computer -- and Annie -- acting as course instructors.

"Right now, we're using the system for recertification," explained ESU Captain Gregg Tompkins. "But eventually we hope to have the system take over all CPR training." The system generally cuts training time, provides more standardized and detailed instruction, and can be used on a 24-hour basis.

The CPR learning system is a self-contained, stand-alone unit. It interfaces the videodisk player and the microcomputer with two video monitors, a computer controlled audio player, a light pen, and the sensor-equipped mannequin. The system's CPR instruction begins with classroom lectures, viewed on the videodisk monitor. Students are periodically tested on course material through multiple choice or fill-in-the-blank quizzes. Questions are presented on the computer monitor; the student responds by using a light pen to select answers. The results of each test are automatically recorded by the computer.

The second portion of the course involves work on Resusci-Annie. Sensors monitor movement of the mannequin, including depth and placement of chest compressions, and the effectiveness of mouth-to-mouth ventilation. A combination of audiovisual coaching, visual computer displays, audio tones, and a computer graphic summary provides students with immediate feedback on their performance. The course concludes with a complete CPR test, which must be completed to the computer's exacting specifications.

Recertification using the new system is estimated to take approximately one hour. To make an appointment for recertification, contact Judy Duffy at ESU Headquarters, ext. 3166.

Health ID Cards

Anyone who has yet to receive their health identification cards from Aetna or any of the four health maintenance organizations (HMOs) should contact Mary Moore at ext. 2043 or Eleanor Schmitt at ext. 2046. Recent new hires and those who have recently changed their coverage should expect a two month delay in receiving their cards.

Fred Tenney

PPL research physicist Frederick H. Tenney, 62, died suddenly at Philadelphia's Graduate Hospital August 22.

Born in New York City and raised in Ridgewood, New Jersey, Dr. Tenney received a B.S. in mechanical engineering from the California Institute of Technology in 1943. Dr. Tenney enlisted as an ensign in the U.S. Navy in 1943, rising to the rank of full lieutenant. During World War II, he was on active duty as a radar officer in the Pacific.

After the war, Dr. Tenney worked in the Naval Ordinance Division of Eastman Kodak in Rochester, N.Y. He received his Ph.D. in physics from the University of Rochester in 1953.

Dr. Tenney joined the Physics Department of Princeton University in 1953, and became a laboratory research staff member in 1955. He was the first to analyze neutral beam injection successfully and quantitatively, and originated the concept of the divertor -- each of which was responsible for the design and construction of fundamentally new test reactors. His experimental and theoretical work was unusual in its range. He published frequently in professional journals, and was recently honored with an invention award from Princeton University.

Dr. Tenney was a member of the American Physical Society, the American Nuclear Society, the New Jersey Academy of Science, the New York Academy of Science, the American Academy of Science, and the Federation of American Scientists. He served on the Review Board for the American Nuclear Society, and was the former president of the Princeton chapter of Sigma Xi.

Dr. Tenney was co-founder and former president of the Ethical Culture Fellowship of Princeton, and former president of the Princeton chapter of United World Federalists. He belonged to the Union of Concerned Scientists, and was a member of the Council for a Liveable World. In recent years, he served as area chairman of the CalTech Alumni Association, and was also an active member of the Peace Education Committee of the Coalition for Nuclear Disarmament. In addition, he had been an enthusiastic performer in many PJ&B musicals since 1972.

Dr. Tenney is survived by his wife of 37 years, Dr. Lillian Baum Tenney, a physician; his children, Steven, David, Susan, and Jonathan; and two sisters, Mrs. Anne Long of Glen Rock, N.J., and Mrs. Margaret Anderson of Ridgewood, N.J.

A memorial service for Dr. Tenney was held at the Princeton University Chapel September 9. In lieu of flowers, contributions may be made to Amnesty International or the Coalition for Nuclear Disarmament.

Ray Grimm

Raymond C. Grimm, formerly Deputy Head of the Theoretical Division and Head of the PPL Computer Center, died suddenly on August 6 in Sydney, Australia. He had been there less than four months, setting up a new plasma physics group at the Australian Atomic Energy Commission, Lucas Heights Research Laboratories.

Ray, 39, is survived by his wife, Elaine, and two children, Natasha, nine, and Toby, six. The family formerly resided at 4 Chopin Lane, Lawrenceville.

A memorial service was held at the Princeton University Chapel August 31. A memorial prize in Ray's name for graduate students at Princeton University is under consideration. Further information is available from Barbara Sarfaty at ext. 2440.

Frederick Miller

PPL technical associate Frederick M. Miller, 61, died August 31. A member of the Engineering and Power Branch Office, he had been a laboratory employee for 16 years. He is survived by three sons, Gary, Frederick Jr., and Bryan C. Miller.

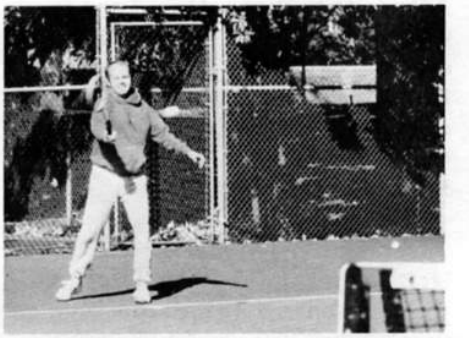
Tennis Tourney

PPL athletes will get the opportunity to demonstrate their "net worth" September 22 by playing in the eighth annual Melvin B. Gottlieb Tennis Tournament.

The tournament is open to all laboratory employees and their families. All entrants must bring a can of new yellow tennis balls and four dollars to their first match.

A single draw will be used to pair opponents regardless of age, sex, or USTA rating. Each match will consist of three sets, with a 12-point tie breaker played if necessary. Winners of two of the three sets will advance, with first round losers entering the consolation bracket.

Participants should be able to play at least the first two rounds on Sept. 22 or 23. As many matches as possible will be scheduled during the morning hours on both days. Subsequent rounds will be played in the evening during the following week, and into the next weekend.



To enter the tournament, send your name, telephone number, and the times when you CANNOT play to Marilee Thompson (C-Site, B135, ext. 3422) or Vern Wu (C-Site, LOB, ext. 3391) by Sept. 20.

Bowling League Signups

The PPL Mixed Bowling League will begin its 1984-85 season September 12 at Colonial Lanes on Route 1. Teams compete in league play each Wednesday at 6:15 p.m. during the 34-week season.

Anyone interested in joining the league should contact Bobbie Cruser at ext. 2101 or Dolores Mazalewski at ext. 3554.

Kopliner Tribute

A farewell dinner honoring Forrestal Campus Security Director James Kopliner was held at Cedar Gardens Restaurant in late May.

A fifty year resident of Princeton, Jim devoted much of his life to his community. Following a stint in the Marine Corps, he joined the Princeton Borough Police Department. He served as juvenile officer, safety officer, and shift supervisor from 1955 to 1965. During this period, he graduated from the FBI Training Academy in Quantico, VA and the New Jersey State Police Academy in Wilbertha, NJ.

Jim became Assistant Director of Security at the University's main campus in December of 1965. He remained at main campus for 14 years, until he was appointed Deputy Director of Security and Director of Security at the Forrestal campus in 1969.

Transitions

BORN -- To Jerry Williams and his wife Cheryl, a daughter, Cheri Nicole, on August 5. Congratulations!

BORN -- To Nick Womak and his wife Judy, a son, Nicholas R. Jr., on July 8. Congratulations!

Radioactivity is one of nature's purest games of chance; no one can predict if a given atom will decay in the next second or in the next century. Students in the recent "Fundamentals of Radioactivity" course taught by Dr. de Haas simulated that randomness by rolling 200 14-sided dice. Any die that landed with a specified face exposed was removed from the sample before the dice were thrown again. Pictured from left to right are students P. Del Gandio, E. Mitman, M. Kijek, S. Vinson, D. Terhune, and Dr. de Haas.

First Call For Help

You've got a problem. You need to find a good childcare agency, help for your aging parents, or a way out of the dead-end job you're in. You need information and assistance, but you don't know who to ask, or where to turn. How will you find the answers you seek? By contacting First Call for Help, a service funded by the United Way -- Princeton Area Communities.

First Call for Help is directed by the Princeton Area Council of Community Services, a United Way member agency. First Call does not deal solely with United Way organizations, however. Its purpose is simply to point people in the right direction for help with their problems or questions. If someone needs services outside the United Way's 13-community service area, First Call will link the individual with the appropriate agency.

The Council began offering information and referral assistance to individuals and agencies in 1976. Callers have been matched with community resources offering aid for problems as varied as job counseling, transportation, divorce, schizophrenia, housing, and care for the elderly. In addition, callers have received valuable help in handling state and local regulations affecting them. In 1983 (the last year figures are available), First Call aimed 284 people at the right agency.

First Call for Help can be reached by dialing 609-924-5865 or 609-799-6033. This service is one of more than 130 services available from the 28 member agencies of the United Way -- Princeton Area Communities. These services are possible thanks to financial contributions made to the United Way.

Security Checkpoints

There are a few simple rules to follow to maintain office security and prevent thefts:

- Lock all doors, windows, desks, or cabinets when you are not in your office. If you don't have keys available, ask your supervisor to obtain them. Be sure to keep all keys out of plain sight.

- Secure small valuables in locked cabinets or drawers.

- Engrave valuables that have no identifying information (such as electric pencil sharpeners, staplers, small desk clocks, and so on). Employees wishing to borrow engravers, or who would like to make an appointment to have their property engraved, should contact the Security Department at the Chemical Sciences Building.

- Record all identifying information, such as government property numbers, serial numbers, and make and model numbers on all valuable items. Keep the records in a secure place.

- Keep personal valuables such as handbags, briefcases, or clothing secured.

Questions concerning theft and crime prevention should be directed to the Security Office at the Chemical Sciences Building, ext. 2894.

HEALTH QUEST

"Life is movement," wrote a 19th century European physical training expert.

Nature didn't intend our bodies to be as sedentary as they have become since we changed from an agricultural to an industrial economy in the 20th century. Our bodies were made to move, to work vigorously.

Before the Industrial Revolution, physical activity was a regular part of everyday life. Today, relatively few physical demands are made on the body, so we must make a conscious effort to achieve and maintain physical fitness through exercise.

Each of the body's cells must have constant access to oxygen. How effectively our cardiorespiratory system transports that oxygen is a direct measure of our physical fitness. Cardiorespiratory efficiency is referred to as aerobic capacity. The easiest way to improve aerobic capacity is to exercise regularly (at least 30 minutes four times a week).

One of the best measures of physical fitness is your heart rate, because an efficient heart beats more slowly than one that is not fit. A fit person's resting pulse rate is generally in the range of 50-65 beats per minute, while an average person's rate is 72. You can check your pulse rate easily by pressing your fingers against your temple, counting the pulses for 10 seconds, and multiplying the result by six.

Exercise makes you look better, improves the quality of your sleep and play, and helps you cope with stress. So, come back to life -- get up and move!

Volunteers: People People

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

- Enjoy working with children? A learning center for special adolescents needs teacher's aides to work on a one-to-one basis with students. Volunteers are also needed to help small groups of students with special projects. If journalism or photography are your passion, this school needs you, too.

- Enhance your knowledge of natural science, dinosaurs, Indians, and Early America while acting as a docent for a local cultural organization. Select your area of interest, then attend a training session which begins September 17. Hours are flexible.

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 Princeton Community Homemaker - Home Health Aide Service provides telephone safety checks for those persons living alone. All telephone calls are made at specific times each day at the mutual convenience of the volunteer and the person being called. All calls are in the caller's toll-free area. Volunteers can also choose to visit isolated people, or provide care to those in need of special attention. Call 609-799-0069 to lend a hand.

- Womanspace, Inc., run by the Mercer County Women's Center, offers shelter for up to six weeks to battered women and their children. The center is in need of volunteers to serve as drivers, interpreters, fund raisers, and board members. Assistance is also being sought for childcare on weekends and evenings, and for locating housing. If you're interested, call 609-394-9000.

- The Holistic Health Association of the Princeton Area seeks to educate the public in the principles of holistic health, providing services that will encourage individuals to assume responsibility for their health. Volunteers are needed to write articles and pamphlets, review books, do telephoning, participate in a speakers' bureau, and much more. To volunteer, call 609-924-8580.

For Sale

FOR SALE: One bedroom, 1-1/2 bath condo in Boynton Beach, Florida. Full-size kitchen with custom cabinets and luminous ceiling, tile baths and floors, marble sills, GE appliances, garbage disposal, central air conditioning. Fully furnished, wall-to-wall carpeting, enclosed Florida room. Clubhouse, pool, and putting green 1/2 block away at Pine Point Villa. Maintenance $71.50 per month, taxes $249/yr. Price $40,000. Call Marilyn McBride, ext. 2779. After 6 p.m., call 609-443-1647.

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HOTLINE

PRINCETON PLASMA PHYSICS LABORATORY

Vol. 6, No. 4 October 8, 1984

Fire Prevention Week–October 7–13

Did you know that 6,700 people died and more than 30,000 were injured in fires nationwide last year? Of those fatalities, 5,500 died in residential fires. Every day, 1,500 American homes burn and more than eight million dollars worth of our possessions go up in smoke. Why?

about them. Whether on the job or at home, we should all be involved in fire safety.

In a home fire, your survival may depend on how well you and your family have learned the dangers of fire, and how well you have rehearsed your escape plan. You must be

Carelessness or the lack of adequate fire education are not acceptable excuses. The needless pain and suffering endured by our neighbors and loved ones, as well as the destruction of their property, must come to an end.

How can we prevent the ravages of fire? It's not as difficult as you might think. Each of us shares the responsibility for recognizing potential hazards and doing something

prepared to react without panic in a calm, deliberated manner. It isn't easy; that's why practice is so important. A small investment of time now may save your home -- or your life -- in the future.

Fire safety on the job is just as important as it is at home. In order for fire control to be effective at PPL, the entire Forrestal Campus must work together. Fire prevention should not be the sole responsibility of the Emergency Services Unit. Everyone at the laboratory can -- and should -- contribute to increasing fire safety for us all.

Each year, fire service professionals have attempted to make America safer by strengthening fire standards and enforcing fire codes more stringently. Here at PPL, it is the ESU's intention to make you more aware of the dangers of fire on a continuing basis.

Do you know the PPL emergency number (ext. 3333)? Do you know a secondary means of escape from the building you work in? How about the types and locations of fire extinguishers?

Of primary importance in a fire, however, is to get out of

the area and call for help. NEVER assume that someone else has made the call; make it yourself. When a PPL Security officer answers, speak slowly and clearly. Provide all the information Security asks for, and let them hang up first.

Remember, every effort is being made to achieve fire safety through fire prevention and fire education. Those resources are available to you through the Emergency Services Unit. The time to seek that information is now!

Captain John Glasson, ESU Fire Prevention Chairman.

Are You Available? We Are!

When you call us for help, we never turn you away. Now we're asking for your help.

The ESU provides fire protection and emergency medical care to the Forrestal Campus. The unit is currently seeking volunteers to staff the fire brigade and medical services unit.

If you have previous fire, first aid, or rescue skills, then the ESU needs you. Training in all aspects of firefighting, as well as first aid and rescue, is provided by the unit. As a member of the ESU, you can learn valuable skills while providing a meaningful service to the laboratory.

If you are willing to show your concern for others, please contact Jack Anderson at Emergency Services Headquarters, ext. 3166, or stop by the Headquarters building during Fire Prevention Week. We will have someone available to take your application and answer any questions you may have about the Unit. Get involved!

DATE	TIME	ACTIVITY	LOCATION
October 8	9-11 a.m. and 1-3 p.m.	Open House: Safety Tips, Brochures, Tot Finder Stickers, Refreshments	ESU Headquarters
	10 a.m., noon and 2 p.m.	Fire Extinguisher Training	ESU Headquarters
October 9	9-11 a.m. and 1-3 p.m.	Open House: Safety Tips, Brochures, Tot Finder Stickers, Refreshments	ESU Headquarters
	Noon-1:30 p.m.	Films and Slides on Fire Safety; Free Handouts	Sayre Hall
October 10	1-1:30 p.m.	Emergency Preparedness Plan Fire Drill	LOB
	1:30 p.m.	Demonstration of Rapid Intervention Vehicle	LOB
	1:30 p.m.	Hazardous Materials Team and Heavy Rescue Team Displays	LOB
October 11	9-11 a.m. and 1-3 p.m.	First Aid Demonstration; BloodPressure Tests; Free Handouts	LOB Lobby
	11 a.m.-1 p.m.	First Aid Demonstration; Blood Pressure Tests; Free Handouts	B-Site Cafeteria

Bus Service Begins

A commercial firm -- Princeton Area Transport (PAT) -- is now providing scheduled bus transportation between local Route 1 hotels and downtown Princeton. At present, hourly service is available from approximately 10 a.m. to 4 p.m.; PAT hopes to expand this to cover 8 a.m. to 8 p.m. at some future date.

The laboratory has made arrangements for PAT to add a bus stop to serve Forrestal Campus. A bus shelter, located near the Forrestal Gun Club, serves as the "transfer point" for the PPL shuttle and the new service. PAT will make hourly stops at Forrestal beginning at 9:55 a.m. and ending at 3:55 p.m. Copies of the PAT schedule and route are available from the C-Site receptionist.

Mary Dyson is coordinating graduate student use of the PAT system for transportation to Main Campus. Any comments or suggestions that will make the service more beneficial should be directed to her at ext. 2489.

Airport Transportation

Scanticon-Princeton recently announced that Salem Transportation is providing service to three metropolitan airports for the convenience of Scanticon guests and area corporations.

Salem Transportation makes daily scheduled trips that link Scanticon with Newark, Kennedy and LaGuardia airports. The Scanticon stop is the only one Salem Transportation makes in the Princeton/Plainsboro area.

Direct service to Newark Airport begins daily at 5:45 a.m.; the last run to the airport is made at 7:45 p.m. Return trips from Newark to Scanticon are made every other hour beginning at 9 a.m. and concluding at 11 p.m. Each one-way trip costs $14 per person.

Direct daily trips are also made between Scanticon and New York's Kennedy Airport. Outbound trips are scheduled at 2:15 and 4:15 p.m.; the only return trip from Kennedy occurs at 6 p.m. There is a $24 one-way charge on the Kennedy-Scanticon run.

No direct service is available from Scanticon to LaGuardia Airport, but travelers may connect with a Newark-Scanticon departure and continue on to LaGuardia from Newark.

For a complete trip and price schedule, contact Scanticon at 452-7800.

Thank You

Pat Zeedyk of Transportation Services offered her thanks to all those who participated in the National Safety Council's annual Make-it-Click campaign. The campaign focused on increasing seat belt use, with drivers pledging to buckle up for a two-week period. Pat, who coordinated the campaign at the laboratory, received 180 pledges between July 24 and September 1.

Pat extended special thanks to Meg Gilbert "for helping us to reach as many people as possible," and to Gail Marshall, "our sweetheart receptionist, who made pledges available to all those who passed her way."

New Cafeteria Hours

Operating hours at the C-Site cafeteria have been expanded on a trial basis. Snacks and beverages are now available from the cafeteria during break time. The new cafeteria hours are:

Breakfast	7:00 a.m.	-	8:45 a.m.
Snacks & Beverages	8:45 a.m.	-	11:30 a.m.
Lunch	11:30 a.m.	-	1:30 p.m.
Snacks & Beverages	1:30 a.m.	-	3:30 p.m.

Despite the expanded service hours, breakfast and lunch menus are only available during those scheduled times. If employees make use of the cafeteria during the trial period, C-Site cafeteria hours will be permanently expanded.

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

VDT Breaks Can Revitalize

Breaks from work can be a time for stretching muscles, or slipping away for a quiet moment of solitude. Work area "minibreaks" can help keep your eyes, mind and body refreshed and energized.

The National Institute for Occupational Safety and Health (NIOSH) suggests that video display terminal (VDT) users have a scheduled break after every couple of hours of uninterrupted VDT work. You can make the most of your break time by stepping outside or exercising to restore circulation and revitalize tired muscles.

While at work, you can reduce eyestrain by taking vision breaks. Simple eye "exercises" can be done for less than a minute, every twenty minutes or so. One valuable exercise is palming; simply cup your hands and place them lightly over your closed eyes. Relax for one minute.

Changing focus is another way to give your eye muscles a chance to relax. Simply glance across the room or out the window from time to time, and look at an object at least 20 feet away.

If you would like a copy of exercises for VDT minibreaks, contact Mary Ann McBride at ext. 3468.

Squash Champ

Neil Pomphrey of the Theory Division quashed five opponents on his way to first place in a squash tournament sponsored by the Central New Jersey Squash Racquet Association (CNJSRA).

Squash is an indoor sport, played with a racquet similar in length to a tennis racquet, but with a head size more closely resembling a racquetball racquet. Players carom a squash ball around a four-walled court; the ball must strike the front wall above an 18-inch high line. Points in the "international" game are scored only by the player serving; the first player to score nine points wins a game.

Although squash is similar to racquetball, there are some essential differences. "In squash, the ball is easier to control, so it doesn't return off the back wall so often. That allows a player to more consistently hit to any corner of the court," Neil says, "and creates more movement of the players on the court."

"It's a game in which movement is at a premium," he continued. "Many shots are made when the player is fully stretched out. You take two or three quick steps to reach the ball. You're often playing when your lungs are hurting because you're in oxygen debt."

Neil was seeded number two in the 32-player CNJSRA tournament field. After five matches, two of which his opponents forced to five sets, Neil captured the tournament crown.

Tournament contestants were seeded on the basis of their winter league performance, as well as their summer play. Approximately 100 players participate in winter squash leagues, which generally run from November through March. "In fact, one of the largest squash complexes is located right here in Princeton's Dillon and Jadwin Gyms," Neil pointed out. "That's where the annual state tournaments are held."

Anyone interested in learning more about squash, or in playing in the CNJSRA league, can get further information by contacting Neil at ext. 2604 or league president Brad Caswell at 609-683-0060.

Harold's Hitmen

Harold's Hitmen lived up to their name during the championship game of the PPL Intramural Softball League. The Hitmen, who had lost to the CICADA team twice during regular season play, blanked CICADA 4-0 to capture the league crown for the third time in four years.

The Hitmen finished on top of the four-team league with a 7-2 record. Other teams playing in the league were Power Engineering, the RF Sluggers, and CICADA.

Members of the Hitmen, captained by Matt Lawson, were John Luckie, Jose Aquino, Scott Larson, Frank Wasiowicz, Peggy Fisher, Jim Watson, Rich Meagher, Andy Vanisko, John Opperman III, Buddy Kearns, Ed Bush, Sal Brizuela, Jerry Siminoff, Jack Thompson, Jerry Williams, and George Dowers.

Volunteers: People People

The following volunteer listings were supplied to the HOTLINE by the Voluntary Action Center (VAC) of Morris County. For further information on any activity, contact the VAC at 201-538-7299.

Habla Espanol? If you speak fluent Spanish, the speakers' bureau of a consumer education program needs you. You will receive training on effective public speaking and consumer education. Your speaking schedule can be tailored to your availability.

If you're a good organizer, try out your talents as local chairperson of a national health group. You'll chair a committee, set policy guidelines, schedule training programs, and plan publicity. An office and desk are available, or you may work out of your home if you prefer.

Interested in interviewing? Then volunteer as a doctor's assistant in the women's clinic of a local agency. The only skill you need is the ability to respect and maintain patient confidentiality. Training sessions will be held October 9 and 16 from 6 to 9 p.m. After training, donate only three hours of your time any Monday, Tuesday, or Saturday.

The following volunteer listings were provided by the Princeton Area Council of Community Services. For further information on any volunteer position, contact each agency directly.

The Better Beginnings Child Development Center is an educational preschool program in Hightstown/East Windsor. The center needs chaperones for trips, assistants during parties and storytime, English tutors for Spanish-speaking children, and workshop leaders. To lend a hand, call 609-448-6226.

The Family Counseling Service of Somerset County is a nonprofit private social agency helping families under stress by providing professional counseling and family life education programs. Individuals from Montgomery, Rocky Hill, and Griggstown are being sought to serve on the agency's board of trustees. To volunteer your abilities, call 201-356-1082.

The Forum Project operates an emergency food program, providing free food to Trenton area residents in crisis situations. The Project also offers counseling, job readiness training, and various referral services to the disadvantaged. Volunteers are needed to do clerical work, record keeping, emergency food package preparation, and fund raising planning. A volunteer certified public accountant is also being sought to conduct the organization's annual audit. To offer your aid, call 609-393-3544.

An exhibit of wood and linoleum block prints created by Erika Wagner are on display in the Dorothy Brown Room at the Princeton University League offices, 121 Broadmead. The exhibit, which runs through November 1, may be viewed from 9 a.m. to 1 p.m. Monday through Friday.

"Wind Waves," an exhibit of translucent drawings and sculptures by artist Caroline Greenwald, opened the thirteenth season of The Squibb Gallery. The artworks have been created from the translucent handmade Japanese paper called washi.

The Squibb Gallery is located in the Squibb Corporation on Route 206, three miles south of Princeton. Gallery hours are 9 a.m. to 5 p.m. Monday through Friday, with extended hours until 9 p.m. Thursday. The Gallery is open on weekends from 1 to 5 p.m.

Transitions

The HOTLINE staff congratulates these staff members, who have recently become proud parents:

Greg Nixon, whose son, Greg, was born June 19;

Kathy and Pete Haney, whose son, Ryan, was born July 17;

Ned Sauthoff, whose daughter, Ana Maria, was born August 2;

Sharon Hughes, whose daughter, Elizabeth, was born August 14;

Mark Tanenbaum, whose daughter, Heather, was born August 23; and

Ed Semeta, whose son, Brian, was born September 12.

United Way Agency Eases Fears Of Latchkey Children

The massive increase in both housing and business development in the greater Princeton area has been accompanied by a problem that threatens children's lives and safety. The problem concerns parents, harms entire communities by increased vandalism and school discipline problems, and affects businesses by distracting employees from their work.

This is the problem of latchkey children -- youngsters who are left alone before or after school while their parents go to work. The situation has always existed, but its scope has blossomed as more mothers join the workforce, more single-parent families are formed, and after-school programs remain unavailable or unaffordable. In fact, statistics reveal that nearly one out of three children are left alone during some part of each day.

Responding to the growing number of latchkey children in the greater Princeton area, the United Way-Princeton Area Communities funds the Camp Fire agency. Camp Fire offers programs to help parents and youngsters cope with the special challenges associated with latchkey children.

Camp Fire's latchkey program provides information, instruction and reinforcement for children who are, or may be, left at home alone. It offers professionally taught self-reliance courses for youngsters, which include:

I CAN DO IT: Designed for children ages five through 12, I CAN DO IT involves small groups of children in meetings with a trained instructor one and a half hours a week for five weeks. Topics such as walking to and from school, identifying strangers, being at home alone, asking for help, answering the door or phone when alone, reacting to emergencies, and basic first aid are covered.

CAUTION WITHOUT FEAR: This is an in-school program for children in kindergarten through sixth grade. Youngsters learn how to handle advances by strangers, possible abduction by a stranger, separation from their parents while shopping, answering the phone or door when alone, and self-defense techniques.

CORPORATE EMPLOYEES SEMINARS: These seminars can be arranged during lunch hours, or before or after work hours. They are designed to help parents prepare children for being alone, handling threatening situations, getting help, and handling stress. Self-protection for the child is demonstrated, along with ways of preventing child abduction.

More information on these programs is available by contacting Camp Fire at 609-392-6138.

The United Way has also compiled this parents' checklist for dealing with the special problems latchkey children encounter:

1. Explain to youngsters why they are being left at home alone. Don't pass your fears or anxieties on to your children; talk about your concerns and their fears.

2. Discuss what your children should do if they lose their keys, become ill, cut themselves, or cannot reach you. Give instructions to every child, not just the eldest. Each child should know what to do in an emergency.

3. Leave your work number beside the telephone, along with the numbers for the police, the fire department, and a neighbor.

4. Practice what to do in an emergency. Teach your children how to dial emergency phone numbers and ask for help. Let them practice these procedures by calling a friend or neighbor acting as the operator or fire department. Make sure your child does not tell callers your name or address, or that you are not home.

5. Parents should arrive home on time. Children feel somewhat secure as the expected time of their parents' arrival approaches, but become frightened after that time. A child's imagination is especially vivid; if you are going to be late, call your child to prevent unnecessary fearfulness.

6. Organize your child's time. Try to arrange for after school activities at the library, at a youth club, or with a friend. If you prefer your child to come home and stay home, leave a note and preplan games, simple household chores, or school work as a time filler.

7. Adopt a pet. Even a small animal will reduce a child's loneliness and help cope with fear.

8. Praise your child when responsibilities such as feeding the cat, making the bed, doing homework, or answering the phone properly are completed.

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PPL HOTLINE

PRINCETON PLASMA PHYSICS LABORATORY

Vol. 6, No. 5 October 25, 1984

TFTR Limiter Plate Program

Final fabrication of the armor plating that will protect both the TFTR vacuum vessel walls and bumper limiter is nearing completion.

The basic design work on the TFTR protective armor began as a joint venture between PPL and General Atomic Technologies, Inc. in 1979. General Atomic fabricated approximately half the amount of the internal protective plate armor required; it was installed in the vacuum vessel during the last shutdown, in preparation for initial TFTR neutral beam experimentation.

A vendor competition for the design and fabrication on the remaining plates was held last year. A good project team, relatively low cost, and the ability to meet a short schedule helped McDonnell-Douglas win the contract.

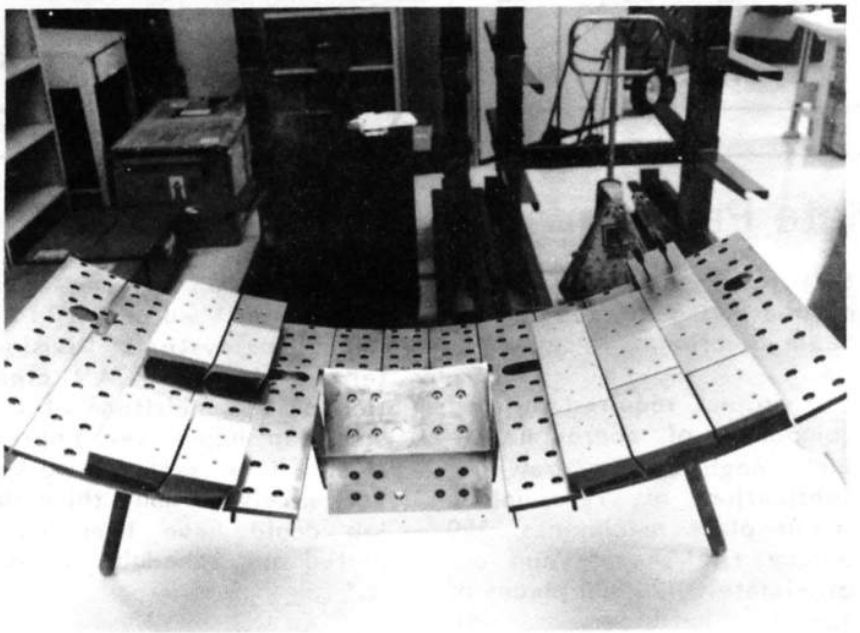
The current project involves fabricating an additional 25 square meters of carbon tiles and associated backing plates. Each plate is composed of high-strength steel, with tiles attached to its front side and water cooling tubes brazed onto the reverse side. The 69 plate assemblies and 2400 graphite tiles, which should be installed within TFTR during its next vacuum vessel opening, will help protect the vessel walls during plasma disruption and neutral beam injection.

The project required the development of approximately 600 engineering drawings, fabrication of 129 unique major plate machinings, 550 unique tile shapes, and approximately 120,000 pieces of special hardware. All McDonnell-Douglas detailed tile design work was completed on a computer-assisted design (CAD) system; fabrication was accomplished by a computer-assisted manufacturing (CAM) system. Dr. Roy Little, head of the TFTR Technical Systems Division, termed the CAD/CAM creation of the multitude of tile sizes and shapes "very impressive. (The system) worked very nicely. I don't think the job could have been completed on schedule without it."

Dr. Little recently visited McDonnell-Douglas facilities in St. Louis to observe test fittings of several carbon tiles

McDonnell Douglas Project Manager Clarence A. Trachsel, TFTR Technical Systems Division Head Roy Little, and McDonnell Douglas Advanced Device Development Manager Dale A. DeFreece (left to right) assembling final TFTR protective plate tiles at McDonnell Douglas.

to their steel backing plates. The $9 million project should be completed on schedule, with delivery of the first completed protective plates expected this month.



A TFTR protective plate, which will be used to protect the vacuum vessel wall from plasma disruption and neutral beam impingement.

Check Cashing

Personal checks for $15 or less, made payable to M. Doran, may now be cashed in Module II.

Mary Jane German will be available in the Module II reception area to cash personal checks from 8:30-10 a.m. and from 3-4:30 p.m. daily. She will also be selling postage stamps; however, stamp purchases are limited to two stamps per customer.

Although both these servives were previously provided throughout the day at the C-Site reception desk, they are now being provided ONLY during the hours listed above.

Golden Golfer

Subcontractor administrator Bill Caldwell became a golden golfer when he won a golden putter for shooting a hole in one.

Bill's prize came from an Anheuser-Busch-sponsored contest for golfers at the Princeton Meadows Country Club. Players who aced a designated hole received golden putters from the company.

Bill's ace came on the sixth hole of the country club course, which is a 160 yard par three hole.

Bus Schedule

In an effort to better serve graduate students and PPL employees, two trips between downtown Princeton and the Forrestal Campus have been added to the Princeton Area Transport (PAT) bus schedule.

The PAT bus will leave the Graduate College from the parking lot next to Cleveland Tower at 8:15 a.m. daily. The bus leaves Lawrence Apartments at 8:20 a.m., and departs from the Butler Apartments stop on Hartley Avenue at 8:30 a.m. The bus arrives in front of the LOB at 8:45 a.m.

On the afternoon run, the PAT bus will leave the LOB at 5:25 p.m., arrive at Butler Apartments at 5:35 p.m., stop at the Lawrence Apartments at 5:45 p.m., and return to the Graduate College at 5:50 p.m.

Unemployment Compensation

New Jersey officials have announced that the maximum weekly benefit rate for unemployment compensation has been increased to $192.00, and temporary disability has been increased to $180.00, effective October 1, 1984. Effective January 1, 1985, the maximum weekly benefit rate for temporary disability will be increased to $189.00

Questions about unemployment and temporary disability benefits should be directed to Mary Moore, ext. 2043, or Eleanor Schmitt, ext. 2046.

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

Training Courses

The following Health and Safety training courses are scheduled for November:

Course	Responsible	Date Scheduled
New Employee Safety Orientation	M.A. McBride Ext. 3468	November 28, 9-10 a.m.
Chemical Handling (Support Engineer Physicists)	K. Semel Ext. 2531	November 13, 9 a.m.-noon
Respiratory Protection	K. Semel Ext. 2531	November 20, 9-11:30 a.m.
Back Injury Protection	M.A. McBride Ext. 3468	November 15, 8:30 a.m.-noon
Rigging	H. Miller Ext. 3109	November 7, 10 a.m.-noon
Fire Extinguisher Training	S. Larson Ext. 3166	November 13 and 27 2-3:30 p.m.
Cardiopulmonary Resuscitation (CPR)	S. Larson Ext. 3166	November 26, 28 and 30 9 a.m.-noon OR 1-4 p.m.
Self-Contained Breathing Apparatus	S. Larson Ext. 3166	November 27, 9:30-11:30 a.m.

Employees must obtain permission from their immediate supervisor to attend any course listed. Supervisors must call the responsible instructor to enroll their employees.

Virtually all chemicals used at PPL constitute hazardous wastes upon disposal. These include solvents (such as Philsolve, Inhibisol, J88, acetone and so on), uncured epoxies, varnishes, nonwater base paints, acids, caustics, alkali metals, and asbestos. They CANNOT be disposed of down the drain, in sewers, or in dumpsters.

Identification cards, available at both stockrooms and from Materiel Control, are an integral part of PPL's hazardous waste program. Since the lab's hazardous waste contractor cannot dispose of an unknown substance, proper labeling of such waste is essential.

When disposing of any substance, make sure you know what the waste is. It should be placed in a suitable container and properly labeled; unlabeled containers will not be disposed of. It would be wise to keep the original container for the chemicals and use it to hold any waste material.

If the waste is hazardous, fill out both halves of the hazardous waste identification card as completely as possible for each waste. Leave the space for the number blank, but be sure to include the location

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where the waste can be found. Attach the top half of the card to the container and send the bottom half to Material Control. Material Control will then contact you to arrange pickup of the waste material.

If you are not sure whether a substance is a hazardous waste, contact Ken Semel of Occupational Medicine and Safety at ext. 2531, or Material Control at ext. 2328.

Spotlight On: Chief Operations Engineers

Chief Operations Engineers (standing, left to right) John McCann, Mike Viola, and Mike Pereira (seated).

Keeping a major project like TFTR operating on its stringent experimental schedule calls for careful coordination of resources. The responsibility for maintaining that delicate balance lies with a trio of chief operations engineers (COEs).

While the overall TFTR project goal has been established by the Department of Energy, monthly experimental goals are set by Don Grove, Dale Meade, and Jim Sinnis. Chief operations engineers Mike Viola, Mike Pereira and John McCann then orchestrate the facilities, personnel, and equipment required to achieve the daily and weekly portions of those goals.

That may sound simple, but in reality it demands the reflexes of a juggler. According to COE John McCann, a successful chief operations engineer must contend with the rapid tempo of operation which a large machine requires, be able to hold two or three conversations at once, and keep track of a plethora of paperwork. "A COE must be capable of thinking on his feet, considering the safety of staff and equipment, and responding appropriately to developing situations," he maintains.

Since TFTR operations alternate a test week with an operations week, those situations may involve reconciling conflicting scheduling demands with the overall experimental plan. John explained that "it's the chief operations engineer's job to stand back and keep the big picture in mind while he coordinates the little things that make the big picture happen. However, you can't get so involved in the little things that you lose track of your objectives."

"The chief operations engineer is the focal point for operations," John continued. "We're expected to think of things that could go wrong, and to take the necessary action to see that they won't. It's a hard job, and we haven't

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got it perfected yet -- but we're working on it!"

Mike Viola pointed out that as a COE, "Keeping track of details has to be something you like to do. You have to have a knack for it, coupled with a rounded professional background. The COE must constantly be thinking of how he can most effectively use every minute of time, given the available resources at his disposal. For example, if the diagnosticians need to access the machine areas for an adjustment or repair during the course of a run, the COE must use knowledge gained from past experience, estimate the downtime, and take advantage of it by fixing other problems which may have cropped up earlier and been placed on the back burner."

"Fortunately," Mike added, "the TFTR technicians are an extremely dedicated group of individuals who put the operations of TFTR high on their priority list. It is through their willingness to fully respond on a monent's notice that we can achieve the maximum use of time."

Mike Pereira pointed out that "We're dealing with operation of the machine on an hour to hour basis, and objectives can change at any moment. We can also be faced with conflicting requests for facility or manpower use. So we have to rely on each other to keep on top of the situation."

All three COEs are former Navy men, and feel their service training prepared them for their current position. "Being in the Navy develops a certain discipline, an approach to operations, and a certain formalized chain of command that this position requires," John contends. "That's important when you're operating big machines like TFTR, as opposed to projects where the same people design, build, and run the machine."

One of the Navy carryovers that has been most helpful to the trio is the pass-down log. "Since we each work on a different shift," Mike Viola said, "it's difficult for all of us to individually keep track of the large scope of operations because information may come in to any one of us. That's why we established the pass-down log; it ensures that the man on the next shift knows what problems were encountered on the shift before his, what he can expect to have to deal with, and any changes in the schedule." The pass-down log also serves as a cross-reference document, detailing what occurred on a specified shift on a given day.

One COE also participates in a rollover meeting every Monday, during which goals are incorporated into the operations schedule, and suggestions on how to efficiently implement the schedule in light of the time and resources available are made.

This summer's TFTR vacuum vessel opening emphasized the importance of teamwork among the COEs. Once the decision to open the vacuum vessel had been made, Mike Viola recalled, "John prepared a preliminary opening schedule off the top of his head, and I broke it into segments. Mike Pereira kept the ball rolling inside the vacuum vessel. We stayed on that schedule to the hour until we began doing leak checking."

TFTR was opened on a Sunday morning. On Wednesday, the vacuum vessel was closed and pumpdown to vacuum began. Only half a dozen port covers had been removed during the opening; time for replacing and leak checking those covers had been incorporated into the schedule. But stresses encountered while releasing the machine from vacuum, allowing it to attain normal pressure, and pumping it down to vacuum again are suspected to have caused two other leaks to occur in areas untouched during the opening. Finding and sealing those leaks proved to be a major undertaking.

Once all leaks were sealed, the heating system was turned on to allow the vacuum vessel to "bake out" at approximately 150°C. Pulse discharge cleaning followed, during which low-power plasmas are created every four to eight seconds. The machine was cooled, and despite the delays encountered during leak checking, operation resumed just 12 days after shutdown.

"It was a good experience for us," John reported some weeks later. "We devised a plan, and executed it as efficiently as possible. That was really gratifying."

In addition to their duties as chief operations engineers, all three men have other responsibilities. John is formalizing TFTR procedures. Mike Pereira's specialty is the vacuum vessel internals, while Mike Viola deals with crew technicians and machine grounding.

The trio share another responsibility that "gives us all

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telephone calls in the middle of the night," according to Mike Viola: alternating as TFTR duty officer. During nonoperating periods, the duty officer makes frequent contact with key personnel in any TFTR sections that might be conducting ongoing test programs. The duty officer also attends scheduling meetings, ensuring his awareness of up-to-the-minute scheduled activities. The duty officer is contacted at the beginning and end of scheduled test activities, so that communication, coordination, and safety are improved throughout the project.

During actual machine operations, the "TFTR Operations Hotline" (ext. 2300) or the duty officer's pager is available for any calls requiring immediate coordination or configuration changes at D-Site.

All three are also working to standardize the duties of their position by acting as trouble-shooters for each other, reporting on breakdowns and failures so the day's plan can be adjusted accordingly. "Our days are becoming more routine as we work to make them that way," John said.

Tour Guides

The torrid pace set this spring by the laboratory's tour program cooled a bit over the summer months. A total of 703 visitors viewed PPL's progress between July and September, with almost half of them arriving in July. We'd like to thank the following guides who kept those tourists in tow:

JULY

Jeff Alton
Dave Ciotti
Diane Carroll
Fred Dylla
John Doane
Ernst deHaas
Austin Erlich
Nate Fisch
Cliff Fortgang
Melvin Gottlieb
Harold Johnson
James Kamperschroer
Naren Kokatnur
Sid Medley
Tom Meigham
George Martin
Dale Meade
Donald McNeill
Michael Periera
Greg Rewoldt
Hank Rozenbroek
Stan Schweitzer
Terry Snyger
Irving Zatz

AUGUST

Kees Bol
Mark Bowles
Charlie Bushnell
Diane Carroll
John Coonrod
J. Caulavan
Fred Dylla
Ernst deHaas
Cliff Fortgang
Ralph Izzo
John Johnson
Robert Kress
John Lovberg
Milt Machalek
Hank Rozenbroek
Robert Smart
Wolfgang Stodiek
Mike Ulrickson
Shoichi Yoshikawa
Irving Zatz

SEPTEMBER

Mark Bowles
Diane Carroll
Joseph Cecchi
Robert Ellis
Fred Kloiber
Naren Kokatnur
George Levitsky
Ed Lawson
George Martin
Lorand Meray
Holt Murray
Raj Mukherji
Ernest Neischmidt
Jim Reedman
Jean Schwob

Womanspace Aids Abused Women

United Way Offers Battered Women Places to Call for Help

Once every 18 seconds, a woman somewhere in America is beaten by her husband, boyfriend or companion. In fact, violence occurs in one out of every two marriages.

Women and children, often helpless to defend themselves and without financial resources to escape, have been battered -- and sometimes killed -- in 58 percent of New Jersey homes.

The victims of domestic violence are of all ages, racial, and ethnic groups. Violence occurs among the wealthy, educated, and privileged as often as it does among the poor and disadvantaged.

Women who are dating or living with individuals displaying characteristics of childhood violence, alcohol or drug ad-

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diction, insecurity, dislike of women, emotional problems, cruelty to animals, or family pressures probably need outside help.

In the past year, about 250 women living in the Princeton area contacted the Mercer County Women's Center for help and information. About 30 women from the area actually fled to the center for temporary shelter.

The Center, also known as Womanspace, is a member agency of the United Way-Princeton Area Communities. The United Way began funding the agency because Womanspace offers alternatives for battered women in the United Way's 13-community service area.

Abused women can contact Womanspace 24 hours a day, seven days a week, by calling 609-394-9000. They can also go directly to police stations or hospitals, where Womanspace can be contacted.

Services offered by Womanspace include:

Shelter -- Emergency temporary, safe housing for women and their children is available for up to six weeks .

Telephone Hotline Referrals -- A trained counselor will respond immediately to a request for shelter admission, counseling services, legal aid, child abuse services, and referrals to other agencies.

Counseling and Advocacy -- A staff member will aid women with transportation to and assistance with medical, legal, welfare, housing, and employment appointments.

Child Advocacy -- The child care staff can assess the health and educational needs of children of battered women who stay at the shelter.

Support Services -- Meetings are held on nutrition, legal assistance, health, parenting, and living independently.

Children of battered women are also welcome at Womanspace. If child abuse is part of the problem, however, additional help is available by contacting the 24-hour Child Abuse Hotline of the State Division of Youth and Family Services (DYFS). The Hotline number is 800-792-8610; the Mercer County district office of DYFS can also be reached by calling 609-984-6300 between 9 a.m. and 5 p.m.

In addition, information on any issues related to women is available from the Women's Referral Center. A state service, the Center can be reached 24 hours a day by calling 800-322-8092.

Many of the services of Womanspace are possible thanks to the financial contributions made by people and businesses to the United Way.

Volunteers: People People

The following volunteer listings were supplied to the HOTLINE by the Voluntary Action Center (VAC) of Morris County. For further information on any activity, contact the VAC at 201-538-7299.

Do you have professional experience in filing health insurance claims? If so, you can help families with seriously ill members cope with the maze of health insurance forms. Offer your aid on an "on-call" basis.

Are sports your game? Then lend your expertise to a youth organization dedicated to sports for handicapped children. The post requires attendance at monthly meetings, and arranging one aspect of a sports meet.

Are you a media maven? Writers, editors, layout specialists, graphic artists, or photographers are in demand to assist nonprofit organizations in publicizing their services. Assignments are matched to your availability and skill. Share your talents and build your portfolio; both you and the community will benefit!

The following volunteer listings were provided by the Princeton Area Council of Community Services, a member of the United Way - Princeton Area Communities. For further information on any volunteer position, contact each agency directly.

Interim Homes, a service of the Princeton YWCA, offers emergency shelter for adolescents who need a temporary alternative living arrangement due to stressful home situations. A youngster is placed with an interim family within the community for up to 30 days while reconciling family problems through counseling. Families, single parents, or single individuals of any age who will open their homes to young people in Princeton, Hopewell, Montgomery, East and West

(continued)

Windsor, and Hightstown are being sought. Placement in an interim home is at the convenience of the interim family on a regular, once a year, or emergency basis. Volunteers are also needed for the group's advisory commitee, which meets approximately four times yearly. To offer your assistance, call coordinator Linda Loberg at 609-924-5571, ext. 20.

The Princeton Senior Resource Center offers hospital and home visits, housing aid, Saturday hot lunches, and a variety of counseling services to the elderly. The Center is seeking volunteers with talents in music, recreation, or arts and crafts, as well as assistants to help with the lunch programs, transportation, or food shopping. Call 609-924-7108 to lend a hand.

The Princeton Joint Commission on Civil Rights is responsible for eliminating illegal discrimination on the basis of race, religion, color, sex, age, and national origin from every phase of public and community life. The Commission is active in housing, public accommodation, and employment, and maintains a skills bank for unemployed or underemployed women and minorities. The Commission needs volunteers with typing, filing, and telephone skills, as well as someone to maintain the Commission's scrapbook. To get involved, call 609-924-7138.

The following volunteer opportunities have been supplied by the Voluntary Action Center of Middlesex County. For further information about any listing, contact the VAC at 201-249-8910.

A new shelter facility for single women and homeless families in Edison needs tutors to help children with homework, recreation leaders for children and adults, workshop leaders, and housing volunteers to aid individual families in obtaining housing. Training is available.

John F. Kennedy Hospital is seeking aides to watch children in the pediatric rehabilitation department during classes on Mondays from 7 to 9:30 p.m. Workers who will unload trucks, assist buyers, oversee try-on booths, and help keep merchandise neat are also needed for the hospital's November 30 winter new clothing sale.

The Arthritis Foundation is searching for an assistant volunteer coordinator, assistant program coordinator, and speakers for their speakers bureau. Training is available.

Many agencies are in need of tutors for youngsters and adults, and drivers to transport sick or elderly clients to doctor's appointments. To offer your help, contact the VAC.

Transitions

The HOTLINE staff congratulates these staff members, who have recently become proud parents:

Rich Borusovic and his wife Diane, whose son Jonathan Ryan was born September 20;

Tom Carr and his wife Marjorie Lynne, whose daughter Kimberly Ann was born September 24;

Jim Taylor and his wife Candy, whose daughter Ashley was born October 8.

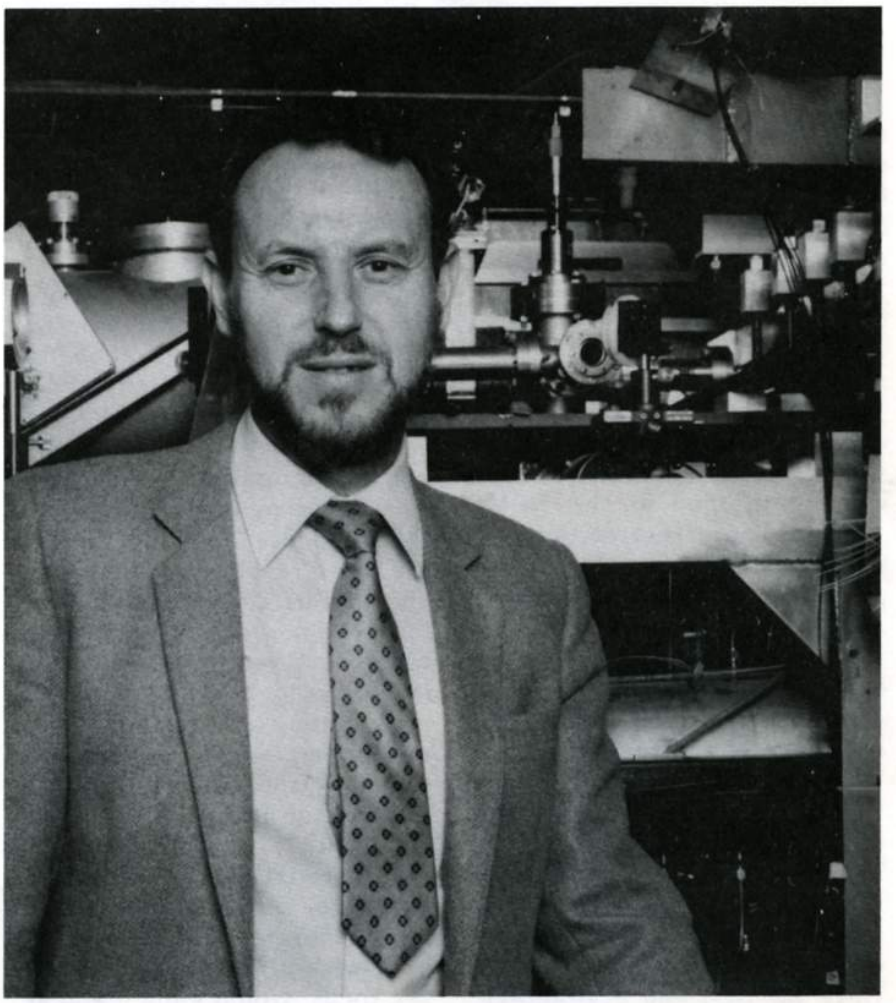
PPL HOTLINE
PRINCETON PLASMA PHYSICS LABORATORY
Vol. 6, No. 6 November 8, 1984

Progress Toward Soft X-ray Laser Reported

At last week's annual meeting of the Division of Plasma Physics of the American Physical Society (APS), Dr. Szymon Suckewer announced that his group has made significant strides toward a demonstration of the X-ray lasing process. Their current goal is the development of a soft X-ray laser which can be used as a diagnostic tool in PPL's magnetic fusion energy research.

Suckewer and his team of researchers have been using a CO_2 laser to produce a dense carbon plasma column of 2-5 cm length, which is held to a 1-2 mm diameter by confinement in a strong magnetic field. They have observed a 100-fold increase of the 182-Angstrom X-ray line in the direction along the plasma column, which is due to the desired stimulated-emission process. This result corresponds to an amplifier 'gain' of about 6.5. A gain of 10 is considered characteristic of entry into the full laser regime.

At the heart of the Princeton method is the utilization of a fast recombining plasma. Temperature is increased to a point at which the carbon atoms become completely ionized, or totally stripped of electrons. The plasma then cools rapidly by intensive radiation losses, causing ions to recombine with free electrons. Because recombination occurs primarily on the higher energy levels (outer orbits) while lower levels (inner orbits) do not capture electrons, an unstable condition known as population inversion occurs. Electrons in the higher energy levels then avalanche to the lower levels to bring about a more stable electron configuration. In the process, each electron loses energy in the form of a photon of X-ray light. The lasing process oc-



Dr. Szymon Suckewer

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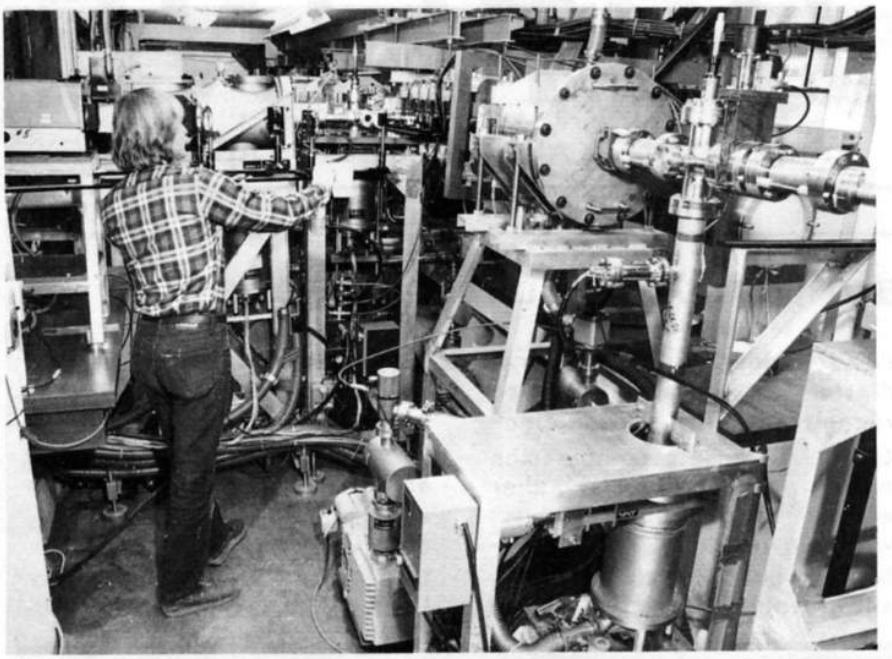

David Voorhees adjusts a mirror on the x-ray laser. The experimental device is close to achieving lasing action.

curs when the photons produced in this fashion stimulate the emission of additional photons from other ions, initiating a chain of such events. The result is an intense, coherent X-ray pulse of a single wavelength.

The search for possible ways of building X-ray lasers began soon after visible light lasers were developed in the early 1960's. The effect of the development of X-ray lasers on physics, medicine, biology, and on technology in general may surpass that of existing lasers with wavelengths in the ultraviolet, visible, and infrared range of the spectrum.

Plasma physicists would make extensive use of X-ray lasers in measurements of temperature, impurity densities, and ion transport in fusion plasmas. In the area of solid state physics, the availability of lasers in the X-ray region would allow a substantial improvement in the ability to analyze the structure of crystalline solids grown for a multitude of uses in electronics, especially in the computer industry.

Two new physics applications, X-ray holography and microscopy, might emerge allowing the availability of three-dimensional pictures in all present-day and future X-ray imaging applications, including medical diagnostics. X-ray microscopes would allow greater resolution than achieved by present-day electron beam systems. In medicine the finely focused X-ray laser would allow a substantially improved degree of localization in the use of CAT scanners and similar devices. Only tissue under study would be expose to radiation, greatly minimizing the patient's exposure. The short wavelength nature of X rays, coupled with a high degree of laser focus, would yield medical X-rays with greatly enhanced detail over those currently available.

Dr. Suckewer's interest in X-ray lasers dates back to the early 70's. The idea of using the fast radiation cooling of a magnetically confined plasma column for X-ray laser development grew from observations made on PPL's Floating Multipole Experiment (FM-1) in which Dr. Suckewer participated. Strong population inversions were observed for the first time in a magnetic fusion device during the final weeks of FM-1 operation in late 1975. This led to extensive theoretical investigations, during which Dr. Harold Furth provided the support and encouragement that allowed the experiment to commence in September 1979. Funding was obtained from the US DOE Office of Basic Energy Sciences.

In looking to the future, the group's near term goal is to increase gain by increasing the effective length of the plasma column and installing a state-of-the-art multilayered mirror, recently developed and supplied to Princeton by Dr. T. Barbee of Stanford University. For the long-term, the PPL team is planning the development of a system which will permit high gain and lasing action in a shorter wavelength region.

Members of Dr. Suckewer's experimental team include physicist Charles Skinner and assistant engineer David Voorhees, who have been with the project since its early days, and two graduate students, Howard Milchberg and Christopher Keane. Recently, engineer Lewis Meixler and theoretical physicist Ernest Valeo also joined the group.

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The word Laser is an acronym for Light Amplification by Stimulated Emission of Radiation. Scientists begin the lasing process with a group of atoms, each of which has electrons circling its nucleus at various levels, or orbits. By exposing these atoms to an energy source (such as an electrical charge or a flashlamp, for example), the atoms are "excited." That is, an electron from a lower energy orbit in the atom is boosted into a higher energy orbit. The atom is unstable in this state, and the displaced electron soon drops back into its former orbit to regain stability. When that transition occurs, energy is released in the form of a photon, or particle of light.

The photons initially released by the electron transition travel towards the ends of the laser cavity, where they may strike a full or partial mirror and be bounced back into the laser cavity. As the photons traverse the cavity (oscillation), they stimulate many other high energy electrons to return to their low energy orbits simultaneously. The large quantity of photons thus released drops into phase and frequency with the initial photons, rather like a marching band following a drum major. When conditions are right, the effect multiplies to produce the high-intensity, coherent light beam that emerges from the laser cavity through the partial mirror.

Computer Assisted Design

The laboratory has enhanced its drafting and design capability by acquiring a Computer Vision Corporation Computer Aided Design and Computer Aided Manufacturing (CAD/CAM) system. The new system is housed in a converted high-bay area of the New Guggenheim Building on B-Site.

CAD/CAM systems have been available in industry for approximately 15 years, according to CAD/CAM Project Head Nick Krisa. Fusion community interest in CAD/CAM grew approximately five years ago, resulting in a recommendation by the Magnetic Fusion Computer Users' Advisory Committee for further investigation. The Office of Fusion Energy authorized $315,000 in FY83 as CAD/CAM system seed money for each of the five major national fusion laboratories, which include Lawrence Livermore, GA Technologies, Los Alamos, Oak Ridge, and Princeton. Additional monies were contributed by each laboratory to enhance the basic CAD/CAM configuration.

The Office of Fusion Energy appointed Krisa chairman of the CAD/CAM Committee, which was chartered to provide compatible systems to these major laboratories. A key requirement for the systems was the capability to interchange design data from one facility to another. This requirement stems from the recognition that future fusion devices may include design features which are incorporated into fusion experiments at several different fusion laboratories. Also, future fusion design efforts promise to be so large as to require extensive cooperation between laboratories. It is intended that designers will do work on the CAD/CAM system, communicate information between laboratories through the National Magnetic Fusion Energy (NMFE) satellite network, and perform large scale analyses at the NMFE Computer Center at Livermore, CA.

It took almost a year to finalize the specification, evaluation criteria, and performance

Designers working on the CAD/CAM system can rotate, enlarge, reduce or add color to the three-dimensional images on their workstation monitor screen by entering a simple set of commands.

(continued)

tests. It was a monumental task to get all five labs to agree; however, a consensus was necessary on each detail, so there would be no misunderstanding during the evaluation phase. Of the twenty-two vendors who requested a copy of the solicitation, seven vendors actually submitted bids. A Performance Team traveled to each of the selected vendors, testing the functionality of the bid hardware and software. These results, coupled with the results of the technical evaluation of the original bid, determined the vendor's score. The CAD/CAM Committee ultimately selected Computer Vision Corporation of Bedford, MA as the successful bidder.

Operators use a stylus on a digitizer board as one way of entering information into the CAD/CAM system.

The CAD/CAM system is expected to standardize and automate electrical and mechanical engineering design and drafting work. Currently, design work on printed circuit boards (PCB) can take months to complete. With the CAD/CAM system, the schematic diagram is developed on the computer. The software will perform autoplacement of components on the PCB and optimize electrical routes. The completed board design will then be sent to an outside vendor for fabrication.

The system also provides the ability to edit each design manually, and can isolate sections of the circuit board for closer inspection.

The CAD/CAM system contains mechanical, electrical, and plant design applications software. The hardware consists of multiple processors performing specific functions: one main processor responds to interactive commands typed by the workstation operator, while another high speed processor provides the modeling and analysis. Other processors generate graphics and allow images created at the workstations to be rotated, color shaded, enlarged or reduced, and repositioned on the monitor screen.

Each workstation includes a high resolution color monitor screen (1024x1280 pixels), digitizer local plotter. A Versatec 36" plotter is also available to produce large drawings and plots.

Two-dimensional CAD/CAM mechanical drawings usually begin as a three-dimensional model. The basic structure of a component can have as many as 256 layers entered into the system. The process is similar to examining viewgraphs piled atop one another; views can be "peeled" back to expose the structure beneath. Designers can also add color to their diagrams, or simply apply color to various sections of the design.

At present, Krisa is establishing a group of eight trained operators to run the CAD/CAM system. Staff members from the Mechanical Engineering, Electronics and Electrical Engineering, and Engineering Design and Analysis Divisions are being sent to two-week Computer Vision training courses. The group will then return to PPL and practice applying what they have learned. Krisa estimated that it will take three to four months for the CAD/CAM operators to become capable in using the system.

The eight trainees will work five and a half hour shifts on the work stations, spending the remainder of their time coordinating system input and output with design engineers.

Princeton is the first of the laboratories to receive the system; other deliveries are contingent upon its successful operation here. It is anticipated that the remainder of the systems will be delivered this month.

Anyone interested in a demonstration of the CAD/CAM system should contact Krisa at ext. 3402 to arrange an appointment.

FOR SALE: 1974 BMW 2002; new engine and clutch. Good running condition. $2800. Call 737-0232 evenings.

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

Carpooling

In an attempt to stimulate ridesharing, the HOTLINE is publishing the names of the following employees who are interested in carpooling:

Michael Koenig	70 Martin Road Livingston, NJ	x3232	8:30 a.m.-5:30 p.m.	LOB
Lee Ratzan	4 Arbit Road E. Brunswick, NJ	x3228	9 a.m.-5 p.m.	LOB
Don Greene	Newark, NJ area	x3717	8 a.m.-4:30 p.m. (Rider Wanted)	LOB
Bruce Pierce	800 Trenton Road Langhorne, PA	x3102	8 a.m.-4:30 p.m. (Driver Wanted)	PM&O
Diego DeBonis	119 Frace Street Phillipsburg, NJ	x2349	8 a.m.-4:30 p.m.	Bldg. 1-N
Pat Stephens	846 Riverside Trenton, NJ	x2750	9 a.m.-5 p.m.	Module 2
Leo Lambert	Cliffwood Beach	x2779	8 a.m.-4:30 p.m. (Rider Wanted)	Maintenance
Charles Braswell	10 LaSalle Drive Burlington, NJ	x2893	8 a.m.-4 p.m.	Chem. Science
Roy Jensen	RDI, Rt. 527 Jackson, NJ	x2811	8 a.m.-4:30 p.m.	Aero Lab
John Coulahan	999 Carteret Road Bridgewater, NJ	x2591	8:30 a.m.-5:30 p.m.	D-Site
Doug Bucknum	Solebury, PA	x3263	8 a.m.-4:30 p.m.	C-Site MG
James Simmons	Princeton Junction	x2417	7:50 a.m.-5:10 p.m. (Driver Wanted)	Trailer 1
Michael Mizopalko	71 Harrison Avenue Morrisville, PA	x3223	8 a.m.-4:30 p.m.	LOB

Employees are reminded that carpooling matches can also be made by using the ridesharing map system, located near the C-Site Security booth.

Breakfast Is Important!

What are the criteria for a healthy breakfast? According to the New York Times "Guide to Personal Health," a good breakfast should include fruit or fruit juice, bread or cereal, protein-rich food, and a beverage. If you eat a skimpy breakfast (or none at all), you are likely to experience fatigue from a drop in blood sugar. A healthy breakfast should be low-sugar and high-protein to sustain a steady supply of blood sugar throughout the morning. Beware of eating a doughnut and coffee for breakfast; they give you a quick, sharp boost -- then let you down with a thud!

Plant Maintenance Needs Your Help!

In an effort to reduce wasted energy, the Plant Maintenance and Engineering Department will be monitoring steam leaks and vents throughout the winter. Even small leaks can represent hundreds or thousands of dollars if allowed to continue indefinitely.

Employees aware of a steam or hot water leak, or of steam vapor being vented to the atmosphere, should contact Dick Terhune at ext. 3099, 3416, or 3384. Dick will investigate and initiate appropriate corrective action for each situation.

If you spot other energy-wasting practices or conditions throughout the laboratory, contact Frank Fumia at ext. 2465.

Transitions

The HOTLINE staff offers its congratulations to the following proud new parents:

Rick Galeone and his wife, Patty, whose son, Richard Thomas, was born October 18.

Steve Hendrickson and his wife, Jane, whose son, Steven J. Jr., was born October 12.

PPL Mailrooms No Place For Personal Mail

Rather than simply complaining about the PPL mail system, there's something we can all do to help speed both our personal- and business-related mail service: use the Gun Club mailbox for personal mail.

Mail room personnel pick up and deliver mail to the U.S. Post Office late each afternoon. When personal mail is channeled through the laboratory mailrooms, it is delayed at least one day due to the afternoon dispatch.

However, when mail is deposited in the on-site U.S. mailbox near the Gun Club early in the day, a postal carrier collects it at 10 a.m. The mail is delivered directly to the Roswell Road post office, which dispatches it shortly thereafter.

The Gun Club mailbox was installed specifically to serve laboratory employees. Please use it for your personal mail, rather than the PPL mailrooms.

Safety Training

The following Health and Safety training courses are scheduled for December:

Course	Responsible Instructor	Date Scheduled
General Industrial Hygiene (for Managers and Supervisors)	K. Semel Ext. 2531	December 6 9 a.m.-noon
Back Injury Prevention	M.A. McBride Ext. 3468	December 13 8:30 a.m.-noon
Fire Extinguisher Training	S. Larson Ext. 3166	December 11 2-3:30 p.m.
Cardiopulmonary Resuscitation (CPR)	S. Larson Ext. 3166	December 10, 12, and 14 9 a.m.-noon OR 1-4 p.m.
Self-Contained Breathing Apparatus	S. Larson Ext. 3166	December 19 9:30-11:30 a.m.

Employees must obtain permission from their immediate supervisor to attend these classes. Supervisors must call the responsible instructor to enroll their classes.

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PPL HOTLINE
PRINCETON PLASMA PHYSICS LABORATORY
Vol. 6, No. 7 November 15, 1984

United Way Fund Drive Underway

Volunteers for PPL's United Way fund drive were selected from all laboratory areas.

Giving more than ever before was the message delivered at last week's kickoff meeting for volunteers participating in the annual United Way fund drive at the laboratory.

"By helping the United Way, we're really helping ourselves," Administrative Operations Deputy Director James Clark told the assembled volunteers. "Our own families and neighbors use United Way services in time of need." He added that in the past, laboratory support of the fundraising campaign was "not indicative of our interest (in the community and in the United Way)," and asked that all employees make an increased effort to give this year.

Princeton University President William Bowen pointed out the United Way's "tremendous importance" in caring for "the humane needs of the community." The current fund drive provides an opportunity for staff members "to give as well as take." He urged employees to "give what you can, and even a little bit more."

This year's University-wide "giving goal" has been set at $84,400, a 15% increase over last year's total.

PPL United Way givers will be eligible for one of six prizes provided by the University Store and Toto's Market in cooperation with an anonymous donor. Contributors who return their pledge cards by December 14 may win a cordless telephone, a tape recorder/player, an FM-AM digital clock-radio, or one of three 10-pound turkeys. Prize winners will be announced in Murray-Dodge Hall at 12:30 p.m. December 18.

Volunteers from various PPL "neighborhoods" have distributed pledge cards to employees in their work areas. Anyone who needs additional pledge cards can contact Bobbie Cruser in Personnel at ext. 2101.

United Way Dollars

Before people contribute to any charity, they want to know that their donations are going to provide a direct service -- not be gobbled up by excessive administrative costs. The United Way has the lowest possible campaign and administrative costs, so the major share of the money raised goes to serve people who need help.

The reason for this cost moderation lies in the year-round involvement of volunteers. Volunteers, of course, work for free -- and that saves countless thousands of dollars annually. The result is that the United Way ranks among the most efficient of all charitable organizations.

There are several advantages to supporting the United Way:

1. It eliminates multiple fund-raising drives, reducing them to only one a year.

2. It saves people the trouble of determining what agencies are worthy of support, because each member agency must meet the high standards set by United Way volunteers.

3. It is the most effective means of satisfying local community needs, because the volunteers have determined what agencies warrant community support.

4. Any person who lives or works in the United Way service area can seek assistance from the agencies.

5. The United Way family of agencies changes as community needs change.

Member Agencies

Your contribution to the United Way-Princeton Area Communities will allow the following 28 member agencies to continue providing their invaluable aid:

Princeton Area Chapter of The American Red Cross

Mercer Chapter of the Association for Advancement of Mental Health

Better Beginnings Child Development Center

Big Brothers/Big Sisters of Mercer County

George Washington Council, Boy Scouts of America

Camp Fire/Lenni Lenape Council, Inc.

Catholic Welfare Bureau (Child Abuse Program)

Children's Home Society of New Jersey

Community Guidance Center of Mercer County

Crawford House

Deaf Contact

Delaware Raritan Girl Scout Council

Eden Institute

Family Counseling Service of Somerset County

Family Service Agency of Princeton

Florence Crittenton Home

Hightstown/East Windsor YMCA

Jewish Community Center of Delaware Valley, Inc.

Jewish Family Service of Delaware Valley, Inc.

Mercer County Women's Center of Womanspace

Mercer County Unit of the New Jersey Association for Retarded Citizens

Princeton Area Council of Community Services

Princeton Community Homemaker -- Home Health Aide Services

Princeton Nursery School

Princeton YMCA

Princeton YWCA

Rolling Hills Girl Scout Council

University N.O.W. Day Nursery

United Way Q&A

OBJECTION: WHY SHOULD I GIVE?

ANSWER: One reason involves our moral obligation to help others who need our aid. Giving is also a form of self-protection; we never know when we, or someone we love, may need the helping hand United Way agencies offer. Your "policy" of giving to the United Way serves as the "premium" that helps "insure" vital services will be available in times of need.

OBJECTION: THERE'S NO NEED FOR ME TO CONTRIBUTE TO THE UNITED WAY; THE GOVERNMENT TAKES CARE OF EVERYBODY.

ANSWER: Since the job of helping is so massive, it takes the government's tax-supported programs coupled with the contribution-supported programs of the United Way to meet the total community need. We all realize that the government is cutting back on its role in providing human services, but that doesn't mean the need for services will disappear. It just means that services will have to be provided by other sources -- such as United Way agencies.

OBJECTION: THE UNITED WAY HAS ALL OF THE MONEY IT NEEDS -- BIG BUSINESS SUPPORTS IT.

ANSWER: Over 130 services are provided through United Way dollars. Raising the money needed to fund that wide range of human services would be a financial impossibility without individual contributions. In fact, in 1982 (the last year for which figures are available), one-half of all contributions to United Ways nationwide came from company employees. Total individual contributions totaled 63%; total business contributions came to 28%.

OBJECTION: I FEEL THAT I AM BEING PRESSURED TO GIVE TO THE UNITED WAY.

ANSWER: The United Way is completely opposed to any type of pressure in a campaign. It regards giving as a personal decision. Coercion defeats the very idea of voluntary giving.

OBJECTION: I DON'T LIVE IN THE AREA, SO I'M NOT GOING TO GIVE.

ANSWER: Since you work in the area serviced by the United Way-Princeton Area Communities, you and your family are eligible for services from all United Way member agencies.

If everyone contributes to the United Way where they work, all communities will be assured of the availability of necessary services. Giving where you work also allows you to use payroll deduction, which is a "painless" way of contributing.

OBJECTION: I'M NOT GOING TO CONTRIBUTE BECAUSE UNITED WAY AGENCIES CHARGE FOR THEIR SERVICES.

ANSWER: Of course they do, since the United Way cannot support all the financial needs and expenses of its member agencies. The fees charged by agencies are determined by an individual's income; United Way dollars ensure that no one will be refused services simply because they cannot afford to pay the full cost.

OBJECTION: WHY DIDN'T SOMEONE I KNOW RECEIVE HELP FROM A UNITED WAY AGENCY?

ANSWER: The United Way agencies never turn down anyone who needs help. So get all the facts -- names, dates, all the relevant information -- then call the United Way. It will thoroughly check out all complaints. In the past, United Way investigations have proved such complaints unfounded.

How Your Contributions Help

Giving to the United Way is one of the best investments you can make. Just look at how much a modest investment can buy:

$5 will help pay for a telephone counseling session with a parent who fears he will batter his children.

$6 will provide blood pressure monitoring for a year for a person 60 years old or older.

$10 will subsidize a child in family day care for one week.

$15 will pay part of the cost of training parents to deal with an autistic child.

$17.50 will provide two meals a day for a senior citizen for an entire week.

$20 will pay for one full day of day camp for a retarded or developmentally disabled child.

$25 will allow a teenager to participate in a drug and alcohol program.

$40 will supply medicine for battered women for about one month.

$48 will provide two hours of counseling to a family struggling through a marital and child-care crisis.

In this year of federal budget cuts, your United Way dollars can purchase a lot of hope for those who need it. Somebody has to help; be that somebody by contributing to the United Way through the payroll deduction plan.

A Brilliant Deduction

Now all taxpayers -- itemizers and non-itemizers alike -- can take a tax deduction for their charitable contributions. Even if you use the 1040 short form, a 1981 law makes it possible to deduct 25% of your charitable contributions. By 1986, you will be able to deduct 100% of your charitable gifts.

For verification purposes, the United Way recommends keeping accurate records, receipts, canceled checks, and other proof of your charitable gifts or activities. For contributions other than money, such as clothing, furniture, or securities, indicate their original cost, their fair market value at the time of contribution, and the method of determining this value.

By giving to the United Way, you're using your tax advantage to everyone's advantage. You may call it a tax break; the United Way calls it a brilliant deduction.

United Way Tips

Most Americans give two percent of their pretax income to charitable organizations. Individual giving is responsible for 83 percent of the $64.93 billion raised by charities last year.

Yet the problem increasingly faced by the potential giver is coping with the rising tide of requests, sifting responsible and accountable groups from the fraudulent and mismanaged.

To help people through the maze, the United Way-Princeton Area Communities has developed the following list of questions people should ask before making a donation:

1. Does the organization publish an annual report, and provide it upon request? Does it contain a detailed annual budget certified by an independent public accounting firm?

2. Is there a clear statement of purpose, and do the organi-

(continued)

Leading this year's PPL-Princeton University United Way fund-raising campaign are (left to right) PPL Personnel Director Steve Iverson, Bobbie Cruser of PPL Personnel, PPL Administrative Operations Deputy Director James Clark, Princeton University President William Bowen, United Way Director Joseph Horsley, and United Way Publicity Executive Gil Phillips.

zation's programs and services address that stated purpose? Does it have a reasonable program, management, and fundraising expenses?

3. Who decides how your charitable donation is spent? For example, money given to a local United Way goes through a committee of volunteers who make funding decisions based on an assessment of community needs.

4. Are the charity's publicity and promotional materials ethical and accurate? What does it claim -- and does it deliver?

Givers can also check with several watchdog organizations before making a contribution. Those organizations include:

Local United Ways. Agencies receiving funds from a local United Way have undergone a rigorous review of their budgets, programs, and services. This review is conducted by local volunteers, with support from United Way staff. You can contact the the United Way-Princeton Area Communities at 609-924-5882.

Internal Revenue Service (IRS). Check with the IRS to determine whether or not the organization you are considering contributing to has 501 (c) (3) tax exempt status. If it does not have this status, then your gift is not tax deductible.

Better Business Bureau (BBB). The BBB maintains an active monitoring program, and an aggressive philanthropic advisory service that promotes standards for charitable groups. The BBB Philanthropic Advisory Council is located in Washington, D.C., and maintains files on 10,000 national charitable organizations. You can contact the BBB at 703-276-0133.

National Information Bureau (NIB). The NIB evaluates charitable groups against its own eight basic standards. The NIB advises contributors about individual agencies through its reports. NIB does not advise donors to contribute, but instead encourages donors to request detailed reports about the national charitable organizations in which they are interested.

Any individual can obtain the list of organizations meeting NIB's published standards, and as many as three free reports, by writing NIB, 419 Park Avenue South, New York, NY 10016.

United Way Editorial

It sometimes seems we're constantly being besieged by fund drives. Public broadcasting stations ask for our help in our living rooms, Girl Scouts bring their cookies to our doors, and our mailboxes are crammed with requests for aid from a myriad of groups.

We'd like to help, but how can we be sure these charities are reputable? Will our donations really go to the needy, or towards administrative costs? And how can we pick one or two organizations from the dozens who need our aid?

All these problems are easily solved when you contribute to the United Way-Princeton Area Communities. The United Way isn't a charity; rather, it unites a large group of service agencies in the Princeton area into a cohesive unit. You'll find day care, family counseling, disaster relief, drug abuse treatment, help for the physically and mentally handicapped, and many other vital services under the United Way banner. Yet not every agency is accepted; stringent screening guidelines ensure that member groups are ethical, legitimate service organizations that will answer community needs or problems.

The United Way is also one of the most cost-effective means of charitable contributions. Since the organization is run by volunteers, 87 cents of every dollar contributed is channeled into member agencies. Citizen review committees make funding decisions, keeping the United Way responsive to the changing requirements of its service area.

But in order to keep those services coming, the United Way needs our help. The annual fund drive is in progress; PPL United Way volunteers are distributing information and donation envelopes. Payroll deduction plans are available to keep your giving going all year 'round, or you

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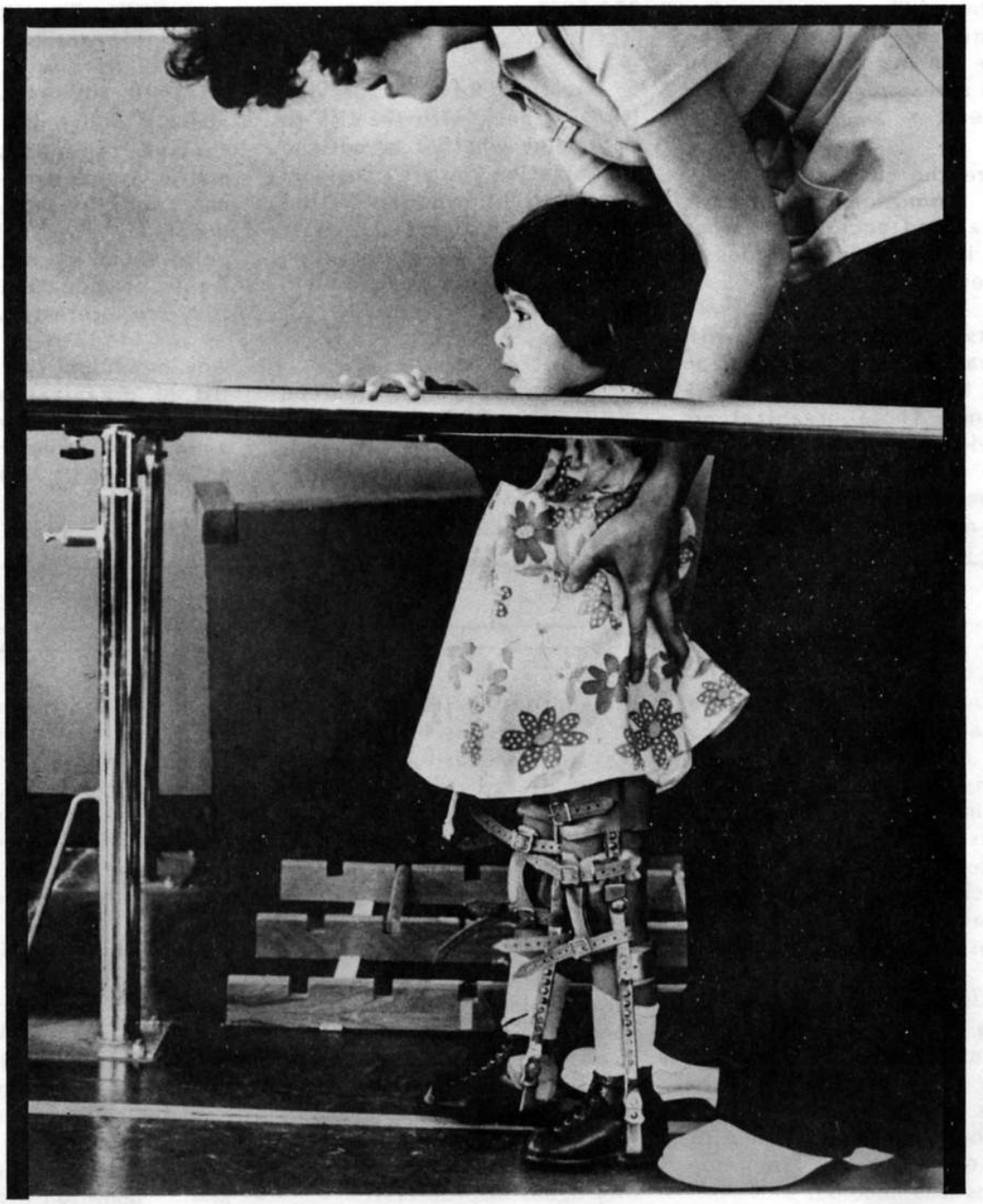
can return your donation to your area volunteer in the envelope provided.

In light of federal budget cuts in human services programs, contributions from the United Way may be the only way beleaguered social agencies can continue to offer vital services. Please take advantage of the opportunity to make a distinct difference in someone's life when your United Way volunteer contacts you.



This year, it may be the only way

HOTLINE

PRINCETON PLASMA PHYSICS LABORATORY

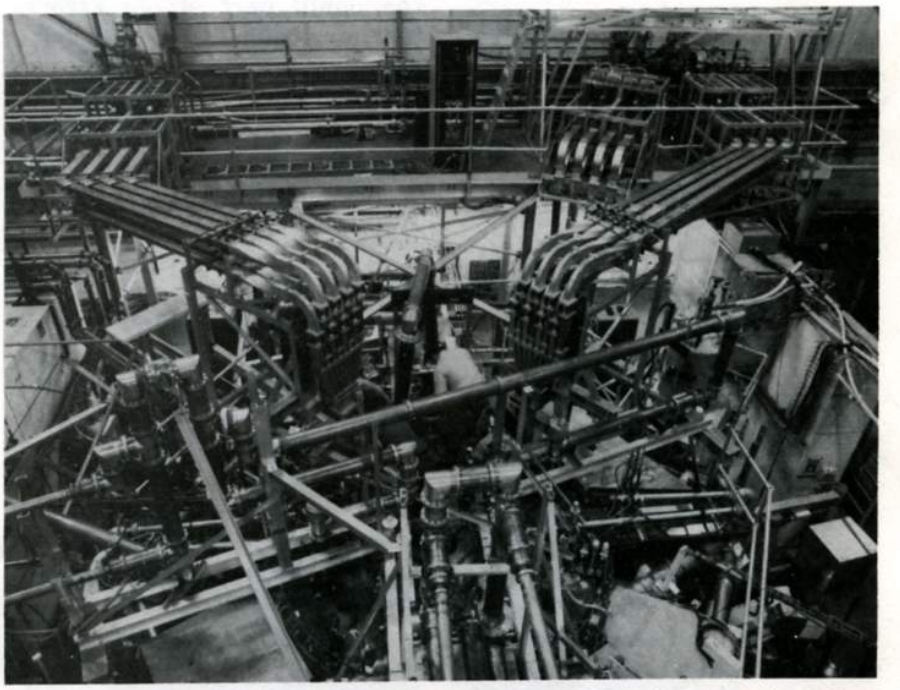
Vol. 6, No. 8 December 20, 1984

PLT Sets RF Heating Record

Two very significant achievements have been obtained recently in the PLT radio-frequency (rf) program. 5 MW of 30 MHz ion cyclotron radio frequency (ICRF) power has been delivered to a six coil antenna array, and the new 2.45 GHz lower hybrid current drive (LHCD) system has been made operational into three 8 waveguide grill launchers. Both achievements are the culmination of over two years of concentrated effort by the several hundred people from many parts of PPL who support the PLT project. The results represent hallmarks in the development of rf heating and current drive techniques for potential use in fusion reactors.

The ICRF power delivered to PLT is the highest applied on tokamaks thus far in the world fusion program. With ~ 4.2 MW of power actually transferred to the plasma, the ion temperature rose to around 5 keV (~ 60 million ° C) at a plasma density approaching 4×10^{13} cm^{-3}. This ion heating efficiency is comparable to that achieved with neutral beam injection (NBI) at lower density on PLT in 1978. In addition, the electron heating with ICRF has been found to be more efficient than with NBI at the higher density on PLT. The electron temperature touched peak values of 4 keV at the 5 MW power level, and the total energy stored in the plasma exceeded 100 kJ.

At a frequency of 2.45 GHz, the LHCD system will ultimately deliver 1.5 MW, or 0.5 MW to each of three couplers. It is designed to extend the PLT current drive operation to higher densities up to ~ 5×10^{13} cm^{-3}. Also, top port and midplane port launcher geometries are being used to investigate the coupling physics. An individual coupler has already operated at 60% of full power, and for the first time a top launcher has been shown to drive current somewhat more efficiently than previously obtained with a midplane 800 MHz system. Moreover, currents have been driven at a density 1.5×10^{13} cm^{-3}, which is twice the value at which current could be driven with the lower frequency system. These results are not only important for current drive over a wider



The PLT rf heating system is visible in this photograph, taken in September 1984.

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range of densities on PLT, but also contribute significantly to the data base for the TFTR LHCD design study.

In the future, the PLT group will study rf heating and current drive, separately and together, under conditions more representative of reactor scenarios than in previous years. Efforts will focus on improving rf heating and current drive performance, and on explaining the underlying basic physics to permit extensions of these techniques to the reactor regime. With the continued excellent support of the PPL personnel involved, the PLT group expects to achieve these important goals on the way to developing a fusion reactor.

New PBX Beta Mark

PBX passed a milestone September 14 when a 540 kA bean-shaped plasma with a beta value of 5.3% was created within six months after the experiment was initiated. The result topped the 4.5% value reported by GA Technologies, Inc. at the International Atomic Energy Agency conference held in Baltimore two years ago.

Commenting on the PBX progress, project co-head Dr. Michio Okabayashi called the achievement "a physicist's milestone" rather than a program milestone. The record-setting plasma had a current of 540 kA, a magnetic field of 0.87 tesla and a density of above 5×10^{13} particles/cm^3.

"This is not a milestone to the DOE," Dr. Okabayashi emphasized. "We did try to surpass the GA record, but our goal is to push the beta still higher."

Neutral beam injection on PBX was begun in May, and the plasma control system was improved in August. Since that time, PBX has been operating "quite productively," according to Dr. Okabayashi. "The plasmas have been quite well-behaved. We haven't seen any instabilities so far that would prevent pushing up the beta level."

After having set the new beta record, PBX continued operation through the middle of October. The machine was then shut down for three weeks to allow for repairs to the passive limiter plates. Installation of additional plasma diagnostics, such as a CO_2 interferometer, was also scheduled.

Dr. Okabayashi pointed out that this was PBX's first major opening. He added that the alterations made during the opening "will let us run easier in the future. The real challenge (for PBX) comes from now on. We've reached the uphill part of our effort. But we can't push (the beta level) up with brute force; we have to be smart enough to rearrange our hardware and to continue improving the plasma parameters."

After the opening, Dr. Okabayashi estimated it will take several weeks to clean up the vacuum vessel interior again. "But we should be able to get back into the high beta regime before Christmas," he continued. "I feel quite confident in that, and in our ability to push the beta up in the following months."

He pointed out that it took five months after the start of PBX neutral beam injection to reach the 5.3% beta region. "We should now be able to get back into that region in about three months or so."

"All the physicists are working hard, and we've had very nice cooperation from the theorists and from our technical people. This kind of achievement can't be done by a small group, and everyone's collaboration made it possible."

The PBX configuration should theoretically permit formation of stable plasmas with beta values exceeding 10 percent.

S-1 Improvements

A passive stabilization system has led to a significant improvement in the parameters obtained by spheromak plasmas, according to S-1 Experimental Operations Head Dr. Masaaki Yamada.

This summer's installation of a figure-eight coil system has led to "dramatic improvements" in the stability of S-1 plasmas, according to Dr. Yamada. The coils are located on either side of the flux core, and protect the plasma against magnetohydrodynamic instabilities. As the plasma begins to move within the vacuum vessel, the coils force it back into its proper position.

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The shifting and tilting instability modes previously found in spheromak plasmas have been quelled since the coils were installed in August. Plasmas with 1 msec lifetimes are now routinely created. "The difference is that now we have more reproducible, well-behaved plasmas," Dr. Yamada said.

After the figure-eight coils were installed, plasma current increased from the 200 kA range to over 300 kA. Plasma temperatures also rose from the 15 to 50 eV range to the 40 to 80 eV region. A half-dozen S-1 plasma shots attained temperatures topping the 100 eV mark; more thorough measurements must be conducted to verify the reproducibility of that result, however.

The newly installed S-1 pumping system, which includes cryopanel pumping as well as titanium gettering, has already improved the base plasma pressure by approximately a factor of four. Dr. Yamada foresees S-1 plasmas with temperatures topping 100 eV being produced following the completion of vacuum system improvement.

"The S-1 group feels very confident that we can routinely reach higher electron temperatures than previously obtained," Dr. Yamada said. "This is mainly due to having a high current in a clean plasma. With our continued improvements, we should exceed the initial objectives of the S-1 experiments."

The S-1 experimental team is also investigating whether the scaling confirmed in RFP (reverse field pinch) devices can be applied to spheromak plasmas as well.

Dr. Yamada also commended the teamwork of the S-1 group, "which is the most important part of our improvement!"

Heating Guidelines

In an effort to combat increasing energy costs and deal with budgetary restrictions, PPL is continuing the winter heating policy it has followed for the past several years. The policy has resulted in significant savings through conservation efforts by the laboratory community.

The policy requires thermostats to be set to maintain a minimum of 65 degrees Fahrenheit. Heat will also be turned off or cut back on weekends, weather permitting. Exceptions will be made for designated experimental areas, but unannounced inspections will be held throughout the heating season to ensure compliance with temperature restrictions.

Space heaters, which can only be purchased with the approval of Plant Engineering, or individual room controls should be set to maintain a maximum temperature of 68 degrees. Unneeded lights should be turned off.

If you have an office or space you feel requires supplemental heat, or know of any energy wasting situations, call. Plant Maintenance at ext. 3092.

X-Ray Laser Grant Approved

PPL physicist Dr. Szymon Suckewer has received a $1.2 million grant from the Department of Energy for research into the development of a short wavelength x-ray laser.

The proposal for the project, which stemmed from an idea Dr. Suckewer developed last year in cooperation with his colleagues from Princeton University, Maryland University, and the National Bureau of Standards, was recently approved by the Division of Advanced Energy Projects, Office of Basic Energy Science of the DOE. Dr. Suckewer will receive $700,000 in the first year of the two-year grant period.

The proposal calls for the pairing of two lasers, one for creating a fast recombining plasma and the other for selective excitation of ions in the plasma, in an attempt to reach the shorter wavelength regime.

Aetna Forms

All Aetna claim forms for employees participating in the Princeton University Health Care Plan may be picked up at the C-Site reception area in the LOB, or at the B-Site reception area in Sayre Hall. All forms include simple instructions for their completion, as well as a self-addressed envelope for mailing.

Employees are asked to refrain from requesting that Personnel Division staff complete and mail their claim forms for them.

New Safety Record Reached

PPL patted itself on the back December 3 during a ceremony held to highlight the laboratory's new safety record. Director Dr. Harold P. Furth changed the numbers on the C-Site safety sign to reflect the one million manhours PPL employees have worked without a lost time accident.

Dr. John Tobin, head of the Occupational Medicine and Safety Division (OM&S), pointed out that the achievement has significantly lowered PPL's accident performance index (P.I.) The P.I. is used by DOE as a measure of its contractors' safety experience. It is calculated by dividing the occurrence rate of specific accidents by 200,000 manhours of work.

In 1981, PPL's performance index was 7.3, dropping to 7.0 in 1982 and 1983. The lab's current performance index stands at 1.9, which is under the year-end goal of 3.0. The average P.I. for contractors reporting to the DOE Chicago Operations Office is 3.0, rounded off to the nearest whole number. PPL's performance index on this basis would be 2.0.

Dr. Tobin acknowledged the part increased emphasis on safety training, periodic safety meetings, and the lab-wide Area Safety Coordinator program have played in reducing PPL's accident rate. But he gave most of the credit for the reduction to "the tremendous development of safety consciousness on the part of laboratory employees, assisted by the active leadership of laboratory management. People are working more safely, and supervisors are conducting periodic inspections of their areas to identify unsafe conditions."

Dr. Tobin pointed out that the performance index goal for calendar year 1985 has been set at 2.0. "With continued interest and effort on the part of employees, supervisors and managers alike, we can achieve it," he asserted.

Added precautions during the winter months will go a long way toward achieving that goal. "Each year, we have a lot of ice-slipping injuries," Dr. Tobin explained. "We have asked the University to intensify efforts for the early cleaning of ice and snow from laboratory roads, parking lots and sidewalks." Employees are urged to be extra cautious of their footing in bad weather conditions.

Continued vigilance will also keep the laboratory accident rate low. Unsafe conditions should be brought to the area supervisor's attention, and a Safety Report on the situation should be completed. Reports are sent to OM&S, where they are logged and the responsibility for acting on each situation is assigned to an appropriate supervisor. Employees receive notification of all follow-up action on their reports.

According to Dr. Tobin, all safety reports submitted to date have been processed and disposed of, with the exception of those that entail major work.

In the coming years, the PPL safety program will reinforce the belief that safety is the responsibility of line management. Safety should be based in each individual work group, with employees initially voicing their safety concerns to their supervisors. OM&S staff members serve primarily as

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resource people, providing technical expertise and assistance while the responsibility for safety is distributed throughout the line organization.

Dr. Furth (left) and Don Carden of the DOE Princeton Area Office (right) raised a National Safety Council banner commemorating PPL's new safety record during the ceremony.

Access Control

In order to upgrade PPL's access control system to meet expanding laboratory needs, a new computer system has been installed. However, as in most cases of transition to a new system, certain unforeseeable problems arise. For example, some employees are having difficulty gaining access to certain areas with their ID cards.

The Security Department is making every effort to solve these "settling in" problems. Employees are requested to be patient, since these problems are rapidly being resolved.

Should you have any problems gaining access into areas which you were previously allowed to enter by using your PPL ID card, go to the C-Site Security Desk and request a personnel ID application form from the officer. Fill out the entire form completely, including your driver's license number and the numbers of the license plates for all your vehicles. Your ID sequence number (the one embossed on the back of your ID card, which begins with #199-) should also be entered on the form.

When the form is completed, return it to the desk officer. The information will be placed into the computer, and your problems with area access should be resolved.

Employees who continue to encounter access difficulties should contact Doug Watson or Lori Trani at ext. 2895.

Administrative Achievement

In addition to the overall improvement in the PPL safety record, the Administrative Department has posted a safety milestone of its own. As of November 29, the department had not had a lost time accident in 220 days. In fact, only two lost-time accidents occurred in the department during all of FY84.

Patents

PPL has a Patent Awareness Program designed to recognize creative inventors, and to raise the patent-mindedness of laboratory staff. A Committee on Inventions, consisting of chairman John Johnson, secretary Nancy Jones, and members Frank Bennett, Peter Bonanos, Schweickhard von Goeler, and Richard Rossi, makes cash awards to inventors for their new or novel ideas. Additional monies are awarded if DOE files a patent application on the discoveries.

Invention disclosures filed since June include:

- Symmetric Tandem Mirror, by S. Yoshikawa
- Disruption Control Passive Conductors, by J. Murray
- Method and Apparatus for Fast Ramp-Up of Tokamak Current with Waves, by N. Fisch and C.F.F. Karney
- Protection for Probes, Limiters, Etc. in Toroidal Fusion Devices, by S. Yoshikawa and D. Manos

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- Compact Torus Stellarators Hybrid Configuration, by H. Furth and C. Ludescher
- Bonding of Powders to Substrates by Plasmas, by S. Cohen and S. Yoshikawa
- Coil to Maintain Equilibrium in Stellarators with Large Transform per Period at High Pressure, by A. Reiman and A. Boozer
- Laser Optical Pumping-Spin Exchange Production of Large Quantities of Highly Polarized Hydrogenic Isotopes, by R. Knize, W. Harper, and J. Cecchi
- Cross Potential in Tokamak Configuration, by J. Murray and G. Bronner
- Current Maintenance by Charged Fusion-Product Particle Production in Toroidal Fusion Devices, by S. Cohen, R. Budny, and S. Yoshikawa
- Carbon Heated Lanthanum Hexaboride Cathode, by J. Goree, R. Horton, and M. Ono
- Toroidal Midplane Neutral Beam Armor and Limiter for Indented Bean-Shaped Plasmas, by H. Kugel, S. Hand, and H. Ksayian
- Cyclotron Acceleration Enhancer of Muon Fusion, by R. Kulsrud
- Lathe Tailstock Rotatable Support, by K. Mann

For further information about invention disclosures or the patent process, contact Meg Harmsen at ext. 2659.

Two Named to APS Exec Committee

Laboratory staff physicists Douglass Post Jr. and Francis Perkins Jr. have been elected to the Division of Plasma Physics executive committee of the American Physical Society (APS). Dr. Post will serve as a three-year committee member, while Dr. Perkins was elected to a four-year term as councillor for the group.

Dr. Post, who received his Ph.D. from Stanford University, has been a PPL staff member for 10 years. A principal research physicist working on computer modeling of tokamaks, he heads both the Tokamak Modeling Branch of the Applied Physics Division, and the Physics Division of the Ignited Studies Project.

In addition to his new post on the APS executive committee, Dr. Post also sits on the executive board of the American Nuclear Society's fusion section.

Dr. Perkins, who joined the laboratory staff in 1966, heads the PPL Theory Division. He is currently researching both the theory of heating magnetically confined plasmas with electromagnetic waves, and the theory of small-scale plasma instabilities and the turbulent heat conduction which they cause. He is also a lecturer in the Princeton University Astrophysical Sciences Department, and teaches in the University's graduate education program.

Dr. Perkins received his Ph.D from Cornell University in 1964. In addition to his recent election as an APS councillor, he has served as APS Plasma Physics Division Chairman in 1980 and as an APS Fellow.

Each APS divisional executive committee sets policy for and runs its respective division, organizing the annual divisional meeting. Division of Plasma Physics committee members also organize the plasma physics sessions held at other APS meetings, provide oversight on articles submitted to a variety of APS publications, and serve on the committees that elect APS Fellows and make appointments to APS prize committees. They also participate in APS human rights activities where plasma physics issues are concerned.

APS members must be nominated for an executive committee, and are elected through secret balloting by the general membership.

"Perfect" Bowler

PLT specialist/technician Fran Dodd attained perfection November 12 when he rolled a perfect 300 game in the Princeton University Men's Bowling League at the Colonial Lanes.

Dodd, 57, has been a bowler for 40 years. He has been a member of the League since its inception in 1964, and currently bowls on the COB team with teammates Don Grove, Art and Jerry Gething, Cleo Williams, and Marty Perron.

Fran's perfect performance came in the middle of a three-game series. After

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finishing the first game with four strikes (giving him a 208 score), he threw 12 more to give himself a perfect second game. "I wasn't really worried until the last ball," Fran recalled. "At that point, I realized that that last ball was for all the marbles, and I got a little concerned. So I lined up where I always do, threw the ball almost from reflex, and hoped for the best!"

Although Fran has had 300 games before, they all occurred during exhibition matches, "and they don't count," he explained. This time, however, he will receive a ring from the American Bowling Congress to commemorate his achievement. In addition, his name will adorn an alley flag at Colonial Lanes.

Transitions

The HOTLINE offers its congratulations to the following PPL employees, who are proud new parents:

Sandy Phillips of PM&O and her husband Don, whose daughter Quincy was born October 29;

Peggy Kamperschroer of PLT and her husband Jim, whose daughter Amy Leigh was born November 16;

Masauki Ono of the Research Division and his wife Sakiko, whose son Hiroyuka was born November 22.

Correction

In the last issue of the HOTLINE, a word was omitted from a caption accompanying the story on the X-ray laser. The caption on Page 2 should read "Engineering associate David Voorhees adjusts a monochromator mirror on the X-ray laser experiment. The experimental device is close to achieving lasing action." The HOTLINE regrets the error.

FOR SALE -- Dodge 1978 Tradesman 300 window van. $1895 or best offer. Call Dee at 201-658-3664.

FOR SALE -- Contemporary style Thomasville sofa and chair. Off-white background

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Safety Training Courses

The following Health and Safety training courses are scheduled for January:

Course	Responsible Instructor	Date Scheduled
Confined and Oxygen Deficient Space	K. Semel Ext. 2531	January 22 9-11 a.m.
Back Injury Prevention	M.A. McBride Ext. 3468	January 10 8:30 a.m.-12:30 p.m.
Fire Extinguisher Training	S. Larson Ext. 3166	January 8 and 22 2-3:30 p.m.
Cardiopulmonary Recuscitation (CPR)	S. Larson Ext. 3166	January 21, 23, and 25 9 a.m.-noon OR 1-4 p.m.

Employees must obtain permission from their immediate supervisor to attend these classes. Supervisors must call the responsible instructor to enroll their employees.

with paisley print in Herculon fabric. Hardly used. $400 or best offer. Call 201-658-3664.

FOR SALE -- Complete tropical fish set-up. Ten gallon tank and all accessories. $65 value, will sell for $40. Call Tony DeMeo, ext. 2755.

FOR SALE -- Colonial dining room furniture. Buffet, hutch, table with four chairs. $350 or best offer. Call Tony DeMeo, ext. 2755.

FOR SALE -- Toyota AM-FM car stereo w/speakers. Brand new, never used. $125 or best offer. Call Meg at ext. 2659.

WANTED TO BUY -- Old slide rules and old calculators for my collection. Call Ernst de Haas at ext. 2290.

Transitions

Adrian V. Cini, 53, of the PPL Engineering/Diagnostics Section, died November 6. Mr. Cini was born in Philadelphia, and had been a laboratory employee since 1978. He is survived by his wife, Helen; three sons, Carl J., Paul P., and Mark J.; and two daughters, Irene Rodill and Faith A. Cini.

Volunteers: People People

The following volunteer listings were supplied to the HOTLINE by the Voluntary Action Center (VAC) of Morris County. For further information about any position, contact the VAC at 201-538-7200.

Work best under pressure? Then volunteer for a weekend shift at a hospital emergency room. Shifts can be scheduled for three or four hour intervals.

Inventive? A therapy program for handicapped children needs battery-driven toys specially adapted for the childrens' use. You can concoct the conversions at your convenience.

Enjoy being in charge? A therapy program for muscularly impaired adults needs an administrator to oversee formation of new Morris County chapters. Coordinating volunteers, delegating tasks, and promoting the program are just a sample of the tasks to be accomplished. Your expertise will be required for four to five hours per week.

The following group of volunteer opportunities was supplied by the United Way of Somerset Valley. For further information about specific listings, contact each agency directly.

The American Heart Association needs volunteers to direct program areas, stuff envelopes, and develop, publicize and implement activities. To offer your assistance, call Richard Reuzuilli or Russ Stanley at 201-685-1118.

The Association for the Advancement of the Mentally Handicapped is seeking volunteers to teach mentally handicapped adults recreation or life coping skills. Contact Patrick Breslin or Marilyn Peluso at 201-685-1444.

The Delaware Raritan Girl Scout Council, Inc. needs indi-

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Snow Closing

During the winter months, it may become necessary for the laboratory to delay opening or close entirely due to heavy snow, icy conditions or floods. On those occasions, special announcements will be made over the following radio stations:

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

In additional, the Answering Service of Princeton will provide emergency closing information at 609-924-1760. When calling, individuals should identify themselves as Plasma Physics Laboratory employees. This number should be called ONLY if you are unable to receive information by radio broadcast. Callers will only be told whether PPL is open or closed; the answering service will provide no other information.

If the laboratory remains open, employees who find it impossible to report to work because of hazardous conditions should notify their immediate supervisors.

viduals to help out with publicity, community and media relations, graphics, fund raising, and work on obtaining grants. If you're interested, contact Barbara Guidice at 201-821-9090.

The next group of volunteer opportunities was supplied by the Princeton Area Council of Community Services, a member of the United Way-Princeton Area Communities. For information about any listing, contact the agency directly.

Big Brothers/Big Sisters of Mercer County offers children ages six to 16 the friendship and guidance of a responsible, mature adult. The program, which is supervised by professionals, needs individuals to provide one-to-one, long-term guidance to youngsters from single parent homes. To volunteer, contact the agency at 609-695-2447.

The Chamber of Commerce of the Princeton Area helps maintain or increase the economic viability of the 14 communities it serves. Chamber committees are involved with legislation, education, economic development, tourism, and the quality of life in the area. Assistance is needed for typing, answering telephones, writing letters, responding to tourist mail, answering requests for area information, filing, and a variety of research projects. If you're interested, call the Chamber at 609-921-7676.

The Historical Society of Princeton runs a small museum focusing on Princeton history. The museum includes a children's museum, library, photo archive, and book and gift shop. The Society also sponsors trips to historical places and evening lectures. Volunteers are needed to serve as guides for Bainbridge House, teaching docents for the Children's Museum, library researchers, or exhibit organizers. To find out more, call the Society at 609-921-6748.

Violation Review

The following safety reminders are drawn from a list of common OSHA violations:

- All places of employment, passageways, storerooms, and service rooms shall be kept clean, orderly, and in a sanitary condition.
- The floor of every workroom shall be maintained in a clean, and so far as possible, dry condition. When wet processes are used, drainage shall be maintained, and false floors, platforms, mats, or other dry standing places should be provided where practicable.
- When mechanical handling equipment is used, sufficient safe clearances shall be allowed for aisles, at loading docks, though doorways, and wherever turns of passage must be made. Aisles and passageways shall be kept clear and in good repair, with no obstruction across or in aisles that could create a hazard.

If you encounter what you believe to be an unsafe situation, contact your supervisor or your Area Safety Coordinator.

United Way

AT WORK

For those who think the biggest problem in the greater Princeton area is heavy traffic, it may come as a shock that abused and battered children are also a part of local life. In fact, over 20 families from Hightstown, Princeton, East Windsor, Cranbury, West Windsor, Plainsboro, and Lawrenceville received help for this problem from the Catholic Welfare Bureau last year.

This Trenton-based agency uses funds provided by the United Way-Princeton Area Communities to deal with problems of family violence (child abuse and neglect, spouse abuse, and elderly abuse). It provides clinical treatment, parenting education, and social services in an attempt to develop strength and resources within the family.

The United Way advises that families seeking help with family violence, or any person who suspects its existence, contact the New Jersey Division of Youth and Family Services (DYFS) at 800-453-1000. This special hotline is devoted solely to family violence problems. Even if visible signs of abuse are not evident, referrals for known or suspected incidents of child abuse or neglect should be made to DYFS first.

If an individual prefers, the Catholic Welfare Bureau can also be contacted by calling

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609-394-5181. In addition, Parents Anonymous, a self-help group primarily concerned with child abuse cases, can be reached by calling 800-352-1000.

Catholic Welfare Bureau's family violence program is one of the many crucial services that is provided thanks to individual and business contributions to the United Way.

DOE Uses Special Microscope to See Atoms

Ordinarily, we see things by probing them with light rays. The amount, intensity, and form of light an object reflects back to our eyes determines how we see that object.

But the wavelength of a light ray is about five thousand times larger than an atom. That means an atom will not reflect ordinary light, so we can't see it in the same way we see other things.

Since atoms are the fundamental constituents from which all material is constructed, the Department of Energy (DOE) believes the ability to see atoms will permit scientists to devise ways of making better semiconductors, to develop materials with improved properties to substitute for metals, and to learn more about the behavior of proteins — the fundamental building blocks of life.

Because the wavelength of a light ray is too big to illuminate an atom, an atom can only be seen when illuminated by rays with wavelengths smaller than the atom. Electrons accelerated to high speeds by high voltages possess the required short wavelength.

On September 30 of last year, a new $8 million National Center for Electron Microscopy was dedicated at DOE's Lawrence Berkeley Laboratory in California. The Center contains the most advanced electron microscopes in the world, including the only one in the United States that permits scientists to see a single atom. That very special microscope actually exceeds its design specifications, letting scientists see individual atoms even more clearly than they had anticipated.

How does a researcher's ability to see an atom benefit the average person?

Thus far, the capability to see an atom hasn't been available long enough to answer that question in specific terms. But, because of the interrelation of a material's properties and its chemical and atomic structure, the capability to see individual atoms will help scientists understand the behavior of various materials more completely.

The ability to determine the arrangement and kind of atoms of which proteins are composed should help scientists understand why proteins provide the essential ingredient of life.

In the same way, scientists should be able to determine why some materials are good conductors of electricity while others are not, and why silicon is useful for making solar cells and transistors -- perhaps even how to make better materials for that purpose.

The new atomic resolution microscope will be used by researchers from industry, the academic world, and government laboratories nationwide to determine in greater detail the ways materials fail, how new materials with improved properties can be created, and how atomic structure can be altered.

The Department of Energy makes the microscope available for a wide variety of research involving the structure and chemistry of atoms. As a result, it expects to reap results that will benefit us all.

INFORMATION SERVICES WISHES YOU ALL A HAPPY HOLIDAY SEASON!

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HOTLINE
PRINCETON PLASMA PHYSICS LABORATORY
Vol. 6, No. 9 February 7, 1985

S-1 ACHIEVES INITIAL GOALS

Perhaps from now on the S-1 spheromak should be billed as "the reborn S-1." The device recently reached the initial milestones established when the S-1 project was proposed in 1979. Those early milestones have now been followed by an even more ambitious experimental plan for the coming years.

The initial goal of the S-1 program was to obtain hot (100 eV) plasmas with lifetimes of 1 msec or more. With passive stabilizing coils, these spheromak plasmas were also expected to be stable against gross magnetohydrodynamic (MHD) instabilities. S-1 has accomplished all those achievements in the past three to four months.

Dr. Masaaki Yamada, who serves as co-head of the S-1 project with Dr. Robert Ellis, credited the dramatic improvement in machine performance to improvements made during last summer's machine opening, and to the perseverance and enthusiastic performance of the S-1 team. The program had been stalled by problems resulting from cracks in the flux core liner. Experimentation was halted while the original liner was replaced by a 20 mil thick, epoxy-backed Inconel liner. The flux core power feedthrough was strengthened during the same period, allowing more coil current to be fed through the core. Members of the Coil Shop and the Vacuum Shop designed and carried out the flux core modification with enthusiasm and dedication to minimize S-1 down time. After the repairs, the vacuum faults which had plagued the program disappeared, and S-1 began functioning very reliably.

Other hardware refinements continued to improve S-1's performance. The installation of figure eight coils during the fall made a significant improvement in S-1's ability to resist gross MHD plasma instabilities. The coil system had been successfully tested on the Proto-S-1 device, but worked even better when installed on the S-1 machine itself.

Prior to installation of the figure eight coil system, the plasma was subject to constant shifting and tilting instabilities, affecting not only plasma lifetimes but also the diagnostic reproducability of S-1 results. Once operation resumed with the figure eight system, creation of well-defined spheromak plasmas detached from the flux core which formed them became routine. Instabilities were suppressed, allowing for formation of cleaner, hotter plasmas with lifetimes over 1 msec. S-1 is now reaching toroidal currents of over 300 kA, electron densities in the mid to upper 10^{13} range, and measured peak temperatures often exceeding 100 eV.

The S-1 device

The most important observation in recent S-1 experiments is that the electron temperature is no longer limited by the impurity radiation loss. After the S-1 vacuum condition and the gross MHD plasma stability were improved, there was strong evidence that the temperature increases with plasma current. This observation is very similar to the scaling observed in RFP (reverse field toroidal pinch) machines. This is a very promising sign, according to Dr. Yamada; if S-1 follows this trend with increased plasma current, as well as with current density increased by adjusting the plasma size, the machine should be able to achieve electron temperatures in the 200-300 eV range "in the foreseeable future."

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Dr. Yamada said that the S-1 spheromak may eventually exceed RFP performance, since spheromak plasma surfaces can be kept away from the first wall, thus reducing impurity contamination. He added that the spheromak has great potential to be the most promising alternate magnetic fusion concept.

Another significant finding is that the S-1 spheromak plasma always adjusts its configuration by means of "flux conversion" toward the minimum energy state predicted by a theory of J.B. Taylor. On February 6, Dr. Alan Janos will present a PPL colloquium covering these results, together with many other plasma physics observations from S-1.

The discovery of the flux-conversion mechanism has created an opportunity to push the parameters of the S-1 machine towards the 1-MA, 500-eV level by means of a relatively small modification: introduction of a poloidal-field transformer coil. This idea will be tried out on Proto S-1C this summer, and work on a S-1 modification could begin next year. In the future, still further parameter advances will be made by adiabatic compression of the spheromak plasma.

According to Dr. Harold Furth, "The spheromak flux conversion mechanism is of first-rate plasma-physics interest, and has also greatly improved the prospects for making high-powered spheromak fusion devices."

Although S-1 has met many of its experimental objectives thus far, the most important goal for the project lies ahead, according to Dr. Yamada. "We hope to discover the physics confinement features of S-1 which are no longer obscured by impurity radiation. We're into the real physics research on that now; the next several years should be very exciting. We will listen to the machine very carefully, and we hope that S-1 will answer our questions."

The S-1 Team includes physicists Grant Hart, Alan Janos, Fred Levinton, Mikio Mimura, Steve Paul, and Peter Young; technicians John Bilinski, Fred Hoffman, Dick Labaw, Al Malone, Ray Pysher, and Fred Wood; and graduate students Dave Mayerhofer and Fred Wysocki.

Computer Classes

Building on the success of the basic computer courses run last year, the PPL Training Center is offering monthly classes on the use of IBM personal computers.

The classes, taught by Phil Jones, have been structured with the beginner in mind. Instruction begins with turning the computer on, and progresses to topics such as copying and formatting floppy disks, editing files, and the fundamentals of the BASIC computer programming language.

Each of the four class sessions lasts approximately one and a half hours. The January and February classes are filled, but those interested in signing up for the March and April sessions should contact Ernst deHaas at ext. 2290.

Benefits

In accordance with Social Security Act legislation, the rate of tax withheld from salaries is 7.05%, beginning January 1, 1985. The taxable base increased from $37,800 to $39,600 at the beginning of the new year.

Those individuals whose taxable salary for 1984 was in excess of $37,800, and therefore had no Social Security tax deducted during a portion of that year, are reminded that this tax is reimposed at the beginning of the new calendar year.

Retirement Notification

Anyone planning to retire should notify Mary Moore of the Personnel Office, Sayre Hall, IN WRITING three months prior to the effective retirement date. If you have any questions regarding your upcoming retirement, call Mary at ext. 2043.

Aetna Claims

The University's Aetna Health Care Plan will allow you to carry over bills from October, November and December 1984 to help satisfy your deductible for 1985. In addition, once the first deductible has been met under the family plan, other family members' medical bills can be combined to satisfy the second family deductible.

For further details about either procedure, call Eleanor Schmitt in Personnel, ext. 2046.

EMT Training

Beginning and experienced first aiders alike will be coming to PPL to attend two spring classes being offered here by the Princeton EMT (Emergency Medical Technicians) Association.

The Association will begin its basic first aid course January 30 at 7:30 p.m. in the LOB. Classes will meet on Monday and Wednesday evenings at 7:30 p.m. in the LOB. Several Saturday sessions will also be included in the course. The $15 class fee is payable on the first night of the session.

The Association will also begin its Emergency Medical Technician (EMT) refresher course February 6 at 7:30 p.m. Classes will be held on Wednesday nights only, although the course does include several Saturday sessions. The fee for the refresher course is $10, payable at the first class.

Both classes will be based on the Brady Third Edition of Emergency Care, which can be purchased on the first night of class. The course textbook costs $17, and the companion workbook costs $8. Both books are required for the basic course; however, refresher class members are not required to purchase the workbook.

Those wishing to take either course should write to the Princeton EMT Association, 59 Andrew Street, Trenton NJ 08610. Prospective participants should list their name, address, telephone number, and whether they will require a textbook, a workbook, or both.

Health and Safety Training

The following Health and Safety training courses are scheduled for February:

Course	Responsible Instructor	Date Scheduled
New Employee Safety Orientation	M.A. McBride Ext. 3468	February 20 9 - 10 a.m.
Back Injury Prevention	M.A. McBride Ext. 3468	February 14 8:30 a.m. - 12:30 p.m.
Fire Extinguisher Training	S. Larson Ext. 3166	February 12, 26 2 - 3:30 p.m.
Cardiopulmonary Resuscitation (CPR)	S. Larson Ext. 3166	February 18, 20, 22 9 a.m. - noon OR 1 - 4 p.m.
Self-Contained Breathing Apparatus	S. Larson Ext. 3166	February 13 9:30 - 11:30 a.m.

Employees must obtain permission from their immediate supervisor to attend these classes. Supervisors must call the responsible instructor to enroll their employees.

SPOTLIGHT ON:

Calibration Lab

John Krzywulak troubleshooting a computer terminal in the Calibration, Repair and Maintenance Lab.

When a vital piece of electronic equipment breaks during an experiment, the time spent waiting for a repairman or a replacement unit can become an expensive proposition. Measured by that criteria, the swift service provided by the Calibration, Maintenance and Repair (CM&R) Lab makes it one of the most cost-effective groups in PPL.

Part of the Diagnostic Services group of the Engineering Division, the Calibration, Maintenance and Repair Lab has provided in-house maintenance for PPL's broad array of electronic equipment since the research effort here began. At that time, most electronics equipment contained vacuum tubes and required regular recalibration. The advent of solid state electronics, which typically need much less recalibration, changed the group's major emphasis from calibration to maintenance and repair. Today only a small percentage of lab work involves strict calibration. The majority of its time is spent repairing malfunctioning equipment.

The Calibration Lab constantly aims at providing accurate and efficient service, rapid repair turnaround time, and the assurance that repaired equipment meets manufacturers' specifications when it leaves the work bench. "In many cases," explained lab supervisor John Gennuso, "the need for a repaired piece of equipment is immediate. When such instances arise, the men of CM&R do everything possible to get the equipment up and running."

Calibration Lab staff members include Gennuso, Robert Ericsson, Jakov Gavrushenko, John Krzywulak, Frank Pecht, Sam Pellitteri, and Howard Richter. Most of the equipment they are asked to repair has failed in use. Gennuso emphasized that although PPL purchases quality equipment, "failures are inevitable. (Voltage transients) can damage an instrument, or magnetic fields can disrupt video displays, and so on."

While repairs to test instrumentation and computer peripherals comprise the bulk of the Calibration Lab's work, more than 2,000 items needing repair have passed through the lab during the past year. If on-site repairs are added to that total, the figure rises to approximately 4,000.

Due to the large volume of work processed by the Lab, thorough records are a necessity. Record keeping assistance comes from a computer system, which also tests computer peripherals after repair; keeps track of inventory; and monitors National Bureau of Standards (NBS) recalibration schedules for specialized equipment.

In order to maintain a high level of confidence in readings produced by certain test equipment, this equipment must be traceable to the National Bureau of Standards. Some of these items are shipped to an outside calibration facility traceable to NBS for periodic recalibration. Equipment is collected and shipped to this facility on the second and fourth Tuesday of each month.

Bob Ericsson calibrating a digital multi-meter.

The Lab also works closely with the Warehouse, checking out a variety of electrical equipment as it comes in. When a new piece of electronic equipment arrives at PPL, the Receiving Department delivers much of it to the CM&R Lab for initial testing and proper operation. Gennuso pointed out that this ensures that the equipment is operating properly. "In addition," he said, "it gives us the opportunity to note the warranty dates and collect maintenance documentation on the equipment."

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CM&R staff members include (standing, left to right) Howard Richter, John Krzywulak, Jakov Gavrushenko, Robert Ericsson, John Gennuso, (kneeling, left to right) Frank Pecht, and Sam Pellitteri.

The Calibration Lab also serves as a resource for PPL personnel in need of electronics equipment or technical support. Lab employees can direct individuals to sources for equipment, or loan them equipment the lab has on hand. Approximately 800 to 1,000 items are available for loan to staff members who need them. Information and advice on the application of test equipment is yet another service the CM&R Lab staff does its best to provide.

The lab deals with a broad array of electronics, which is what keeps the job interesting, according to Gennuso. "The guys do a great job," he says. "They're very dedicated and very professional. Lab employees have developed good technical relationships with various service representatives of equipment manufacturers. In addition, the Lab staff has amassed a total of 97 years of electronic experience here at PPL."

In order to efficiently handle the volume of repairs, the CM&R Lab divides its work into classes. Individual workers have become "specialists" in certain areas. For example, John K. and Jake do the majority of the lab's computer peripheral work. Frank does the majority of oscilloscope and CAMAC module work. Howard does vacuum controller and vacuum pump system repairs, residual gas analyzers, and safety breaks on PLT/PBX. Bob and Sam work on the majority of power supplies, analog and digital meters, and a large cross-section of the smaller jobs the CM&R Lab receives. John handles the administrative work, keeping everyone free to concentrate on the constant flow of repair work.

What keeps the job interesting after all that time? Gennuso, a PPL employee since 1966, says it's the "challenge of trouble-shooting, and the satisfaction that the job we are doing is not only supportive but important to the fusion effort."

Fire Rule Reminder

As the weather gets colder, many of us will begin using supplemental heating systems to combat the chill. But that welcome heat may become a fire unless safety procedures such as these are followed:

- Have fireplaces, wood burning stoves, and chimneys inspected once a year. Use the proper fuel for each fireplace or stove, and avoid overfiring.

- Make sure all combustible materials, such as paper, kindling, or furniture and draperies, are kept away from stoves and fireplaces. Kerosene space heaters should be located well away from any combustible material.

  Smoke can be a deadly prelude to any fire. Make sure smoke detectors are properly maintained. Replace batteries as suggested in the detector's operating instructions.

- Keep all exits clear, and plan secondary escape routes in case your primary path becomes impassable during a fire. Hold periodic fire drills to practice these routes.

- In case of fire, keep close to the floor -- where the cleanest air is. A few breaths of the superheated fire gases at head level might be enough to kill you. Drop to all fours and crawl to safety.

Community Services Directory

The 1984-85 edition of the Directory of Community Services is now available from the Princeton Area Council of Community Services.

A resource guide for individuals and professionals seeking services in their communities, the Directory has descriptive listings of over 250 public and private agencies, organizations, and governmental departments. Service agency listings include the agency name, address, telephone number, operating hours, geographical area served, eligibility criteria, sources of financial support, and cost of services. The new format includes both an alphabetical and functional listing of agencies and organizations.

The Directory identifies services in Mercer, Somerset, and Middlesex Counties, and is prepared for people who live or work in Cranbury, East Windsor, Griggstown, Hightstown, Kingston, Montgomery Township, Plainsboro, Princeton Borough, Princeton Township, Rocky Hill, West Windsor, and adjacent parts of Hopewell, Lawrence, and South Brunswick Township.

The Directory costs $1 plus postage, and may be obtained from the Princeton Area Council of Community Services, 25 Valley Road, Princeton. The Directory may also be ordered by calling the Council office at 609-924-5865 or 609-799-6033.

The Council is supported by the United Way-Princeton Area Communities.

Volunteers: People People

The following volunteer openings were supplied to the HOTLINE by the Voluntary Action Center (VAC) of Morris County. For more information on any of these listings, contact the VAC at 201-538-7200.

- A handicapped young adult, interested in a future career as a journalist, is learning to use the computer. His volunteer mentor is leaving, and the staff at the rehabilitation center where he resides is anxious for him to continue his progress. If you can help him learn to program the computer on weekends or evenings, call the VAC.

- Many departments in local hospitals have slots for volunteers willing to serve as couriers or receptionists. Help is also needed in the transportation department, gift shop, and emergency room. To join the volunteer corps, contact the VAC.

- An organized person with volunteer experience is being sought to head the volunteer personnel program for the local chapter of a national health care agency. If you think you'd fill the bill, call the VAC.

The next three volunteer listings were provided by the Princeton Area Council of Community Services, a member agency of the United Way-Princeton Area Communities. For further information on any volunteer position, contact each agency directly.

- The Tri-County Chapter of the Juvenile Diabetes Foundation, Belle Mead, needs volunteers to work as family counselors and fund raisers, as well as to assist in distributing educational materials. To offer your aid, call the Foundation at 201-359-6248.

- The Hub, located at the United Methodist Church on Nassau Street in Princeton, provides a social center for area residents who feel isolated due to mental or emotional disorders. Volunteers work as hosts or hostesses at all Hub gatherings, which are held on Saturday evenings, and on Friday and Sunday afternoons. Volunteers should be prepared to commit themselves to a minimum of one afternoon or evening a month. For more details, call 609-924-0781.

- The Family Resource Infant Center of Princeton is a parent education and support center for families with children from birth to three years of age. The Center offers group discussion courses, parent-child education programs, and an informal atmosphere for parents to share their concerns and interests. Assistance is needed for answering telephones, conducting mailings and fundraisers, and working with youngsters in a child care setting. For more information, call the Center at 609-896-0891 or 609-924-2167.

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The next three volunteer listings were supplied by the United Way of Somerset Valley. Additional information is available by contacting each agency directly.

- The Hunterdon Occupational Training Center in Flemington needs volunteers to perform clerical, carpentry, maintenance, receptionist, bookkeeper, and janitorial tasks. Call the Center at 201-782-1480 to lend a helping hand.

- Lutheran Social Services of New Jersey matches volunteers with refugee clients, offering one-to-one assistance in their resettlement in the United States. If you have a flair for English language training, cultural orientation, or job development, call 609-393-3442.

- The Martin Luther King Youth Center in Bridgewater is seeking tutors for students ages 5 through 13, tutor aides, and van drivers. Call 201-526-3688 for more information.

The following volunteer opportunities were provided by the Voluntary Action Center (VAC) of Middlesex County. For further information about any listing, contact the VAC at 201-249-8910.

- Jewish Family Services of Raritan Valley needs crisis listeners for its widows' support group. Training is available; contact the VAC to offer your assistance.

- An agency is seeking an individual to keep track of legislation on child and elderly adult abuse. To peruse the political scene, call the VAC and volunteer.

- Volunteers are required to survey public buildings for accessibility. Hours are flexible, and training is available. Contact the VAC to begin work in your local area.

Winter Storm Warnings

Winter storms -- blizzards, heavy snow, ice storms, freezing rain, or sleet -- can present serious hazards to people in many parts of the country. Storm-proof yourself by following these suggestions from the United Way-Princeton Area Communities. Your life, or the lives of those you love, may someday depend on it.

- Make sure you could survive for a week or two in your home in case a severe storm makes it impossible for you to leave. This is especially important if you live in a rural area.

- Stock up on supplies such as food, water, fuel, flashlights, candles, and spare batteries. Have a portable radio handy. If a power failure occurs, use a fireplace or a camp stove (with proper ventilation) for heat. If necessary, conserve fuel by keeping the house cooler than usual, or by closing off some rooms temporarily.

- If you must go outside, dress in lightweight, loose-fitting layered clothing. Beware of hidden ice and fallen trees, branches, and wires. Avoid overexertion from walking, pushing cars, or shoveling snow.

- Drive your car only in an emergency. Keep your gas tank full. Use chains or snow tires, and travel only on main roads. Notify someone of your destination and estimated arrival time.

- If your car becomes disabled, stay in the car and wait for help. Run your engine and heater sparingly, and open a window a bit for ventilation. Keep blankets, flares, a first aid kit, and emergency food (non-perishable) in the trunk of your car.

Remember, your first line of protection is to know when a winter storm is approaching. Keep posted on weather conditions in the surrounding area through television, radio, and newspapers. If you know of an approaching storm, you can avoid being caught in it -- or at least be better prepared to deal with it.

Irradiator Improves Transplant Success

A young boy with a defective kidney lies in a hospital while a dialysis machine cleanses his blood. In another wing of the hospital, a girl the same age has just died of a head injury suffered in a car accident.

The girl's parents offer to donate her kidneys, but doc-

(continued)

tors decide against a transplant for the boy since the youngsters are not related and their blood types do not match.

While this scene is fictional, scenes like it occur all too frequently. Doctors often decide against kidney transplants from unrelated donors because the body's defense mechanisms will reject the transplant in about 40 percent of such cases. The problem is that white blood cells, known as lymphocytes, fight not only the infection but also any foreign bodies they encounter -- including the "foreign" donor organ.

Currently, chemotherapy and single, massive doses of radiation to flowing blood are the only alternatives available to suppress transplant rejection. Both approaches have drawbacks, however. Chemotherapy damages all cells, not just the immune system, and makes patients very ill. Massive radiation, given days or weeks before the organ transplant, permits new cells to generate. It is these cells that often initiate rejection.

A team of scientists at the Department of Energy's Pacific Northwest Laboratory has developed a portable blood irradiator that shows promise of improving the odds of a successful transplant.

The device -- developed by Dr. Frank P. Hungate, L. Roy Bunnell, and William F. Riemath -- uses radiation from an isotope of the element thulium to suppress the levels of lymphocytes. Treatments would start two weeks before a planned transplant, continuing for four weeks after its completion.

The irradiator is about the same diameter and half the length of a pencil. With its shielding, it becomes a cylinder about 1¼ inches in diameter and five inches long, worn on the wrist or ankle. Blood flows from an artery through the irradiator and back into a vein.

"The kidney will resume its functions, including normal clotting of the blood, in about two weeks," Dr. Hungate says. "As clotting is resumed, it shuts off blood flow to the irradiator, and the device is then removed."

The most pleasant surprise in the research, which has been conducted only on animals so far, has been the lack of infections or side effects from bacteria while the animal's lymphocytes are lowered by the radiation.

"We believe there are antibodies that are not directly reliant on lymphocytes, but are the basis for fighting bacterial infection," Dr. Hungate said. "We haven't checked it thoroughly yet, but irradiated goats we turned out to pasture have had no problems with disease or infection."

"If our only achievement is a five percent improvement in the success rate of kidney transplants, the money the taxpayer saves and the improved life for the transplant recipients would be worth it," Dr. Hungate said.

Caregivers Confrence

The Princeton Area Council of Community Services is sponsoring a Family Caregivers Conference on March 2 from 9 a.m. to 1 p.m. at the West Windsor-Plainsboro High School.

Conference workshop sessions, planned by the Council's Health and Aging Committees, have been designed to address the needs and concerns of individuals who care for an impaired and homebound family member. The conference will provide information on community services and resources, physical care techniques, and equipment and products available to help the caregiver. Opportunities to learn coping skills for handling the stress of this physically and psychologically demanding role will be offered, along with sharing of experiences in an atmosphere of mutual support.

Anyone who wishes to attend the conference is asked to pre-register. A buffet lunch will be provided, and both respite care and transportation for the conference can be arranged through the Princeton Area Council of Community Services. Further information about the conference and preregistration forms may be obtained by calling the Council office at 609-924-5865 or 609-799-6033.

The Princeton Area Council of Community Services is a voluntary non-profit organization of public and private health, welfare, recreation, and education agencies and representatives of the general public concerned with improving the quality of life in their communities. The Council is funded by the United Way-Princeton Area Communities, and serves 13 communities in Mercer, Middlesex, and Somerset Counties.

NO FREE RIDE

People can be injured trying to hitch rides on trucks, cranes, or other vehicles. Others get hurt stepping on or off stationary equipment such as ladders.

Why does this happen so often?

For one thing, people often get in too much of a hurry. They don't take the time to step on the bottom rung of the ladder, or they skip the bottom stair step. They're in such a hurry that they don't watch how or where they're stepping, and they end up becoming an accident statistic.

Another reason these kinds of accidents occur is impatience. Walking to their destination seems to take too long for some people. These individuals are used to driving instead of walking a couple of blocks to run a short errand, and this attitude carries over into the workplace.

The next time you're tempted to grab a free ride, think again. The minutes you lose going the safe way may actually add years to your life.

Employment Verification

Verification of employment is necessary when applying for mortgages, credit cards, and so forth. The Personnel Office will comply with these requests ONLY when the request is received in writing and authorization for information release is granted by the employee. Employment WILL NOT be verified over the telephone.

Requests for employment verification should be sent to Eleanor Schmitt in care of the Personnel Office.

Transitions

The HOTLINE offers its congratulations to the following employees, who recently became proud parents:

Steve Landau of the Vacuum Shop and his wife Paula, whose son, Steven Alexander, was born January 8;

Carol Goldenbaum of Accounting and her husband Gary, whose daughter, Kristy Lynne, arrived on December 28.

Benefits Meetings

Beginning this month, PPL's Benefits Administrator Mary Moore will be conducting small group benefits meetings around the laboratory. The purpose of these meetings will be to explore employees' questions and concerns about the laboratory's benefits programs. Employees with questions or concerns about their personal benefits status should contact Mary at ext. 2043.

Seat Belt Benefits

Although New Jersey's mandatory seat belt law doesn't go into effect until March, it's never too early to develop the habit of buckling up each time you get into your car.

Using your seat belts makes good sense, even when you're only going on a quick local errand. Most accidents that kill or injure occur at speeds of less than 40 miles per hour, and within 25 miles of the motorist's home.

And although many drivers feel they'd rather be thrown clear of their vehicle in case of a collision, statistics show your chances of being killed are five times greater when you're thrown from the car. Seat belts keep you in place and in control during an accident.

No excuse is good enough for not protecting yourself, your family, and your friends. Buckle up!

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.

OSHA Violations

The following safety reminders are drawn from a list of common OSHA (Occupational Safety and Health Administration) violations:

- Every infrequently used pit or trapdoor floor opening must be guarded by a floor opening cover of standard strength and construction, which should be hinged in place. While the cover is not in place, the pit or trap opening must be protected on all exposed sides by removable standard railings, or monitored by a guard posted at the site.
- If someone could accidentally walk into a floor hole, it must be guarded by a floor hole cover of standard strength and construction.
- Every open-sided floor or platform suspended four feet or more above the adjacent floor or ground level must be guarded by a standard railing on all open sides, except where there is an entrance to a ramp, stairway, or fixed ladder. The railing must be provided with a toeboard wherever people can pass, machinery can move, or material can fall beneath the open side.

For Sale

The following items are being offered for sale by Meg Gilbert of Personnel:

Test-Rite 100-DC diffusion enlarger, 135mm lens, with 4x5, 2-1/4 x 2-1/4 carriers. Good condition, crude but sturdy. $125.

Eico 460K oscilloscope, 5MHz vertical bandwidth, recurrent sweep. Works; $50.

"Legacy of Blood," 16mm movie, starring John Carradine and Faith Domergue. Color, 90 minutes. Very good condition; $100.

If you are interested in any of these items, call Meg at ext. 2036.

Tour Guides

October, November, and December certainly didn't constitute a holiday season for the PPL tour program. Almost 900 visitors viewed our facilities, with 323 tourists arriving in December alone. Our appreciation is offered to the following tour guides, who shepherded our sightseers during the recent holiday season:

OCTOBER

Art Brooks
Lee Benson
Kees Bol
Peter Bonanos
Diane Carroll
Dave Ciotti
Larry Dudek
John Doane
Ernst deHaas
Cliff Fortgang
Richard Jensen
Russell Kulsrud
Naren Kokatnur
Roy Little
George Levitsky
George Martin
Don McNeill
Don Monticello
Lorand Meray
Dennis Manos
Carl Pierce
Hank Rozenbroek
John Robinson
Alan Ramsey
Stan Schweitzer
John Tobin
Al von Halle
Shoichi Yoshikawa
Irving Zatz

NOVEMBER

Halsey Allen
Dale Ashcroft
Charlie Ancher
John Bradish
Dave Ciotti
Sam Cohen
Sal Cavalluzo
Ernst deHaas
Jim French
Robert Fleming
Ralph Izzo
Naren Kokatnur
Russell Kulsrud
Janardhan Manickam
Michael Periera
Eric Perry
Alan Ramsey
Joe Stencel
Randy Wilson
Hal Wexler
Irving Zatz

DECEMBER

Halsey Allen
Robert Budny
Lee Benson
Peter Beiersdorfer
Jim Chrzanowski
John Coonrod
Robert Forester
Ralph Izzo
John Johnson
Naren Kokatnur
Randy Knize
George Levitsky
Benoit Leblanc
Loran Meray
Robert Mills
Michael Periera
Greg Rewoldt
Irving Zatz

HOTLINE
PRINCETON PLASMA PHYSICS LABORATORY
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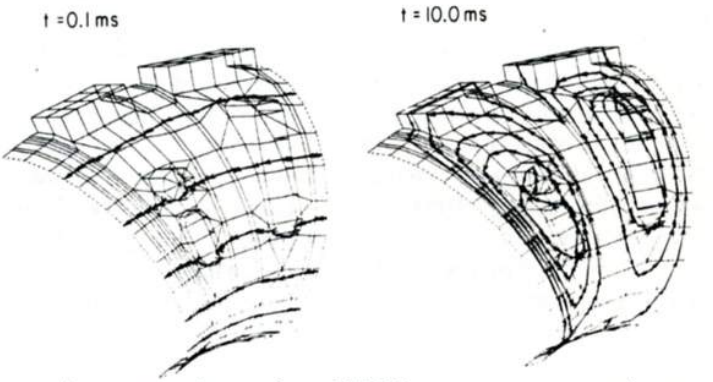
SPARK Code Developed At PPL



SPARK code rendering of a TFTR vacuum vessel segment during a plasma disruption.

Designing a machine as complex as a tokamak is no easy task. Any alteration to one device parameter may adversely affect other design considerations. One major design difficulty comes from eddy currents, which can have devastating effects on delicate machine components. Fortunately, a PPL-designed computer code named SPARK has significantly simplified the designer's job.

For fusion devices such as TFTR, normal operation of a coil system can induce large electrical eddy currents in surrounding metallic components. Moreover, plasma disruptions can result in the formation of very large eddy currents.

Eddy currents are undesirable secondary electrical currents, caused by rapidly changing magnetic fields. The rate of magnetic field change is important: the faster the change, the stronger the eddy currents produced. Eddy currents are generally unwanted because they waste energy, and can cause both arcing (which can ruin diagnostic results) and resistive heating (which contributes to thermal stress) in the structure of fusion devices.

In addition, eddy currents create force when they flow through a magnetic field. If the forces in a particular component are great enough, significant mechanical stresses can in turn be produced in the components. The resulting pull could be strong enough to damage components, such as the graphite tiles within the TFTR vacuum vessel. Repairing such damage can involve considerable time and money.

Since eddy currents run in closed electric circuits, every effort is made during the machine design phase to eliminate structural loops which can carry them. Yet overdesigning to compensate for every imaginable eddy current occurrence is impractical.

The SPARK code, which is a highly automated, general geometry computer program, was developed in an effort to study the forces acting on conductors with large surface areas. By using SPARK, designers can better predict many of the damaging effects that eddy currents may produce during machine operation, thus saving money by designing to counteract those effects.

The SPARK code was devised entirely at PPL by members of the Electromagnetics Branch of the Engineering Analysis Division. Staff members work on designing and analyzing magnetic field systems, examining their interaction with associated electrical and mechanical systems. The branch also researches the optimization of magnetic configurations, along with analyses of transient eddy currents and their related magnetodynamic effects.

The initial research spark for SPARK was provided by basic circular coil analyses Uffe Christensen conducted prior to 1979. Don Weissenburger

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began eddy current analysis for the TFTR vacuum vessel in early 1979, devising a dedicated, less flexible computer code after approximately six months of work. It demonstrated the success of the computer eddy current analysis method, and provided the research foundation SPARK was eventually built on.

In its initial form, SPARK took Don approximately 18 months to develop. This preliminary code was used to analyze several designs of the TFTR internal vacuum vessel hardware, including limiters and protective plates. Refinements and improvements to the code are ongoing; since the initial version of SPARK, Don has improved the speed of the major code steps from 10 to 100 times (depending on the system it's being used on). He's also working on increasing the size of the problems the code can handle, as well as SPARK's "user-friendliness."

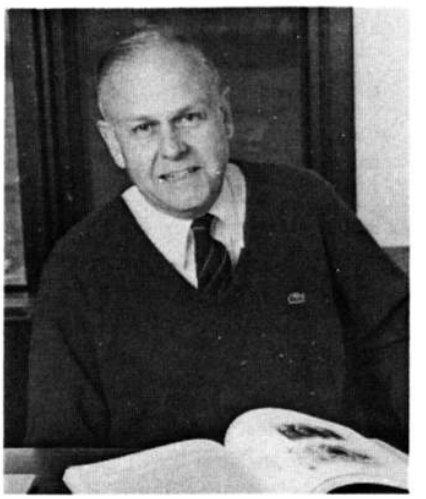
SPARK is not a tokamak-specific computer code, nor is it dedicated solely to the magnetic fusion program. It can be used for other applications in the field of magnetics, and is currently being used in research projects at Sandia and MIT.

The SPARK code simplifies the myriad complex of mathematical equations needed to calculate transient eddy currents and their resulting fields by employing a mesh network system. The mesh network reduces the number of equations to be solved during analysis, using geometry input to calculate mechanical load output compatible with existing structural analysis programs, such as NASTRAN. The code permits calculation of the force on specific machine areas so the results can then be "plugged into" a structural analysis code with a minumum of reworking. For example, SPARK was used to develop a detailed TFTR vacuum vessel model for analyzing the combined effect of the principal eddy currents that occur during plasma disruptions.

SPARK also takes advantage of symmetry; it can extrapolate the eddy currents and forces on the entire vacuum vessel from input recorded for only one segment of the vacuum vessel.

In 1983, SPARK was used in the design of the TFTR bumper limiters. It has also been utilized in advanced studies of proposed devices such as the TFCX, and is now on the NMFECC (National Magnetic Fusion Energy Computer Center) Cray computer system, where it was used to analyze the effect of eddy currents on the TFTR toroidal-field coil system in more depth. The Joint European Torus (JET) team was expected to have a tailor-made version of SPARK operational by the end of February.

EARL TANNER



Former PPL Assistant Director Dr. Earl C. Tanner, 65, died February 11 in Florida Hospital, Orlando, Fla.

Dr. Tanner joined the laboratory as Assistant to the Director of Project Matterhorn in November 1958. He became Assistant Director in 1964, and was named PPL's Assistant Director of Special Projects in 1977. He authored three books on the history of PPL: "Project Matterhorn," "The Model C Decade," and "The First Princeton Tokamaks."

A member of the American Physical Society, Dr. Tanner served as assistant dean of the Princeton University Graduate School from 1968 to 1969. He retired from the University staff three years ago.

Born in Providence, R.I., Dr. Tanner lived in Lawrenceville for over 25 years before moving to Lake County, Florida in 1982. He received a bachelor's degree in physics from Brown University in 1941, earning his master's degree from the same school in 1947. He was awarded a Ph.D. in history from Harvard University in 1951.

Dr. Tanner is survived by his wife, Mary Nelson Tanner; a son, Harold M. Tanner; a daughter, Martha C. Tanner; and his mother, Kate Cushman Tanner.

Private memorial services were held in Providence, R.I. Memorial contributions may be made to the Mohonk Preserve, Mohonk Lake, New Paltz, NY, 12561; or to the Florida Hospital, 601 E. Rollins St., Orlando, Fla.

Janitorial Awards

The crew that cleans up your lab or office can now "clean up" with commendations, thanks to the new Janitorial Department awards program.

The program, which officially begins in March, was the brainchild of Janitorial Supervisor Jerry Williams. The program also has the support of Plant Maintenance and Operations Branch Manager Ray Pressburger, Plant Engineering Division Head Connie Stout, and Bob Smart, Associate Head of the Administration Department and General Manager of Facilities.

The program is part of an effort to acknowledge the contributions members of the PPL janitorial staff make toward enhancing their department's overall productivity. To be eligible for the monthly award, staff members must have a 100 percent attendance record during the month. Weekly inspections are made by Jerry Williams and a janitorial foreman, with points awarded for the completeness of a variety of maintenance operations. Points can also be earned for working accident free, making suggestions that are adopted, and by keeping personal appearance, equipment, and work orders tidy. At the end of each month, point totals are tallied and a winner chosen.

The monthly award winner's photo is posted on a special bulletin board near the employee entrance to C-Site. In addition, monthly winners receive an award certificate, a special badge to be worn during the month, and a letter of commendation entered in their personnel file.

Monthly award winners are also eligible for a semi-annual award, which will consist of a gift certificate to a local merchant or a complementary dinner at an area restaraunt. Semi-annual winners will be featured in future editions of HOTLINE.

For further details about the janitorial awards program, call Jerry Williams at ext. 3595.

Directories Available

The Princeton Area Council of Community Services has reprinted three popular directories: Volunteer Opportunities Directory, Child Care Directory, and Senior Directory.

The Volunteer Opportunities Directory identifies and describes volunteer positions available with human service organizations in Princeton area communities. The Child Care Directory provides a wealth of useful information about area pre-school, day care, cooperative, extended day, and after-school programs. And the Senior Directory offers a comprehensive listing of services for older people who live in Mercer, Middlesex, and Somerset Counties.

All three directories are free to the public. Copies may be obtained at local libraries; the Princeton Area Council of Community Services office at 25 Valley Road, Princeton; or by calling 609-924-5865 or 609-799-6033. The Council is supported by the United Way-Princeton Area Communities.

Security Checkpoints

The Forrestal Security Office welcomes suggestions from employees for improving security measures in either a small area or lab-wide. Employees may write a memo or telephone the Security Office with their ideas. Each PPL employee can contribute to the security of the lab by practicing a few simple preventative measures:

- Make certain that your office or lab is locked whenever you leave.
- Always lock your office or lab before going to lunch or leaving for the day.
- Attractive personal property or sensitive items should never be left unattended. Take such items with you, or lock them in your desk or filing cabinet whenever you are leaving.
- Keep a record of the serial numbers of your personal peoperty, including sensitive items, and secure it in a safe place for possible future reference. You may want to include information on brand name, model number, serial number, or other descriptive information.
- Check the whereabouts of your personal property frequently. Mislaid items are easily stolen.
- Keep your auto locked and avoid leaving property where it is visible. Never leave the keys in the vehicle.

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Security will engrave your personal property with your name, initials, and/or Social Security number if you desire.

Remember, once you have something stolen the best chance for recovering it is a rapid and accurate reporting of ALL the information to the Security Department. Don't wait -- report any thefts immediately!

First Call For Help

Need help and don't know where to turn? FIRST CALL FOR HELP provides free confidential social and health services information and referral to those who live and work in the greater Princeton area. A service of the Princeton Area Council of Community Services, the helpline is staffed from 9 a.m. to 4:30 p.m. Monday through Friday. Call 609-924-5865 or 609-799-6033.

TRANSITIONS

The HOTLINE offers its congratulations to the following employees, who recently became proud parents:

Mike Serediuk of the Tech Shop and his wife Paula, whose daughter, Christina Marie, was born on December 29;

Jim Corl of TFTR and his wife Diane, whose daughter, Jamie Lee, was born on January 13;

Jo Crosby of Plant Maintenance and Operations and her husband John, whose daughter, Nicole Elizabeth, was born on February 19.

University League Notes

The International Center's annual International Festival will be held on Sunday, April 21. Anyone interested in planning for or participating in the Festival should call Paula Chow of the University League at 609-452-5006.

Meg's Guinea Pigs

FREE TO GOOD HOME --

Healthy adult guinea pig. Comes with all accessories and three months' supply of food and litter. Call Meg Gilbert in Personnel, ext. 2036.

Safety Training

The following Health and Safety training courses are scheduled for March:

Course	Responsible Instructor	Date Scheduled
Defensive Driving	P. Zeedyk Ext. 3736	March 12, 19, and 26 8:30-11:45 a.m.
Fire Extinguisher Training	S. Larson Ext. 3166	March 12 and 26 2-3:30 p.m.
Self Contained Breathing Apparatus	S. Larson Ext. 3166	March 13 9:30-11:30 a.m.
Back Injury Protection	M.A. McBride Ext. 3468	March 14 8:30 a.m.-12:30 p.m.
Cardiopulmonary Resuscitation (CPR)	S. Larson Ext. 3166	March 18, 20, and 22 9 a.m.-noon OR 1-4 p.m.

Employees must obtain permission from their immediate supervisor to attend these classes. Supervisors must call the responsible instructor to enroll their employees.

United Way

AT WORK

What to do with the children is a problem facing a growing number of working parents in the greater Princeton area. Even when a child care agency is found, how can parents be confident that it is reputable?

To help solve this perplexing problem, a free child care directory listing nearly 50 local programs is available from the Princeton Council of Community Services. The Council is a member agency of the United Way-Princeton Area Communities.

The directory lists child care programs and agencies by community, as well as by the type of program available (day care, extended day, or after-school). Programs are currently listed for Cranbury, East Windsor, Hightstown, Lawrenceville, Montgomery Township, Rocky Hill, Princeton, and West Windsor.

The name, address, and telephone number for each program is included, along with the director's name, the age group served, total enrollment, length of school year, and hours of operation. Details on staff composition, holidays, food service, registration requirements, tuition cost, registration deadlines, and other distinctive features are also listed.

The directory offers detailed guidelines on how to select a good preschool program. For example, the directory recommends that parents visit at least three schools for an entire morning or afternoon class session prior to comparing programs. When visiting, parents should observe the teachers, the children, and the physical appearance of the building. Parents should also request a sample of the curriculum.

Copies of the directory are available from the Council's office at 25 Valley Road, Princeton, or at any of the libraries in the 13 communities served by the Council and the United Way. These communities include Cranbury, East Windsor, Griggstown, Hightstown, Kingston, Montgomery Township, Plainsboro, Princeton, Rocky Hill, West Windsor, and adjacent areas of Hopewell, Lawrence, and South Brunswick Township. The Council can be reached by calling 609-924-5865 or 609-799-6033.

This directory is possible thanks to contributions to the United Way, which support the services of its member agencies.

Volunteers: People People

The following volunteer listings were provided to the HOTLINE by the Princeton Area Council of Community Services, a member agency of the United Way-Princeton Area Communities. For further information on any volunteer position, contact each agency directly.

- The Mercer County Unit of the American Cancer Society is seeking ex-smokers, nurses, and sales personalities to help with their educational programs. Drivers are also needed to transport patients to and from treatment, as are fundraisers to work on a variety of year-round events. More details are available from the Unit by calling 609-394-5000.

- The Citizen Advocacy Program is designed to help integrate people suffering from mental retardation, cerebral palsy, or epilepsy into society, and to help insure their legal rights. Volunteers are screened, trained, and matched on a one-to-one basis with a handicapped individual. Volunteers offer practical assistance, such as teaching a client to cook, shop, use public transportation, or learn money management skills. Lend your assistance to the Program by calling 609-443-1733.

- The Florence Crittenton Home in Trenton is a residential maternity care facility for unwed mothers. Volunteers are needed to teach arts and crafts, as well as other subjects of interest to teenagers. If your interest is piqued, call the Home at 609-695-8579.

The next three volunteer positions were furnished by the United Way of Somerset Valley. Additional information is available by contacting each agency directly.

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- Big Brothers/Big Sisters of Raritan needs volunteers willing to establish a one-to-one relationship with a child from a single parent household. To become a child's "special someone," call 201-722-3630.

- The Carrier Foundation of Belle Mead is seeking volunteers to help out in the patient library, at the registration desk, and in the pharmacy. Admission and clerical aides, crafts teachers, and patient visitors are also needed. To offer your aid, call the Foundation at 201-874-4000.

- The Douglass Developmental Disabilities Center of Douglass College, New Brunswick needs volunteer tutors to work with one or two autistic children. Supervision will be provided by members of the Center's professional staff. To lend a helping hand, call 201-932-9137.

The next volunteer opportunities were supplied by the Voluntary Action Center (VAC) of Middlesex County. For further information about any listing, contact the VAC at 201-249-8910.

- Is finding money your forte? The United Campus Ministry at Rutgers University needs volunteers to work with its board on financial management, fundraising, and budgeting. Call the VAC for more details

- A number of agencies need clerical assistance, and many also need drivers to take their clients shopping, to the doctor for treatment, and so on. For a list of specific agencies, call the VAC.

These final volunteer openings were submitted by the Voluntary Action Center (VAC) of Morris County. For more information on any of these listings, contact the VAC at 201-538-7200.

- Enjoy bowling? Spend a Sunday morning at the lanes with an eager group of handicapped bowlers. Call the VAC to get the ball rolling.

- Experienced adult trainers, as well as group and discussion leaders, are being sought for a fall pilot program. The program will be presented to boards of directors of non-profit organizations. Discussion leaders will receive training, and can schedule their own time. To offer your aid, contact the VAC.

- A national health organization will be conducting their annual fund drive in April. Community chairpeople are needed now to help organize the campaign. This short-term assignment requires organizational experience rather than solicitation. To lend a hand, call the VAC.

OSHA Violations

The following safety reminders are drawn from a list of common OSHA (Occupational Safety and Health Administration) violations:

- All wood parts shall be free from sharp edges and splinters, as well as visually sound and free of shake, wane, compression failures, decay, and other irregularities. Low-density wood shall not be used.

- Ladders shall be inspected frequently, and those which have developed defects shall be withdrawn from service for repair or destruction, and tagged or marked as "Dangerous, Do Not Use."

- Ladders must be maintained in good, useable condition at all times. Hardware fittings and accessories should be checked frequently and kept in good working condition.

- Every automatic sprinkler, fire detection, or other alarm system, exit light, fire door, or other emergency equipment must be continuously maintained in proper operating condition.

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.

HOTLINE

PRINCETON PLASMA PHYSICS LABORATORY

Vol. 6, No. 11 April 11, 1985

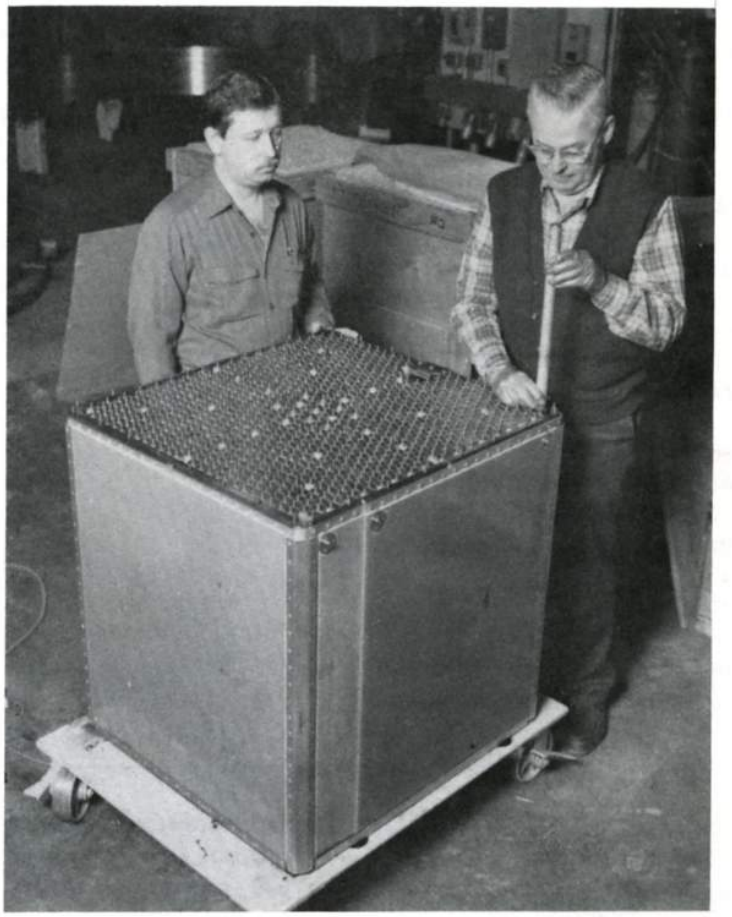
LITHIUM BLANKET MODULE ARRIVES AT PPL

The Lithium Blanket Module (LBM) recently arrived at PPL for acceptance testing.

The LBM experiment, funded by the Electric Power Research Institute (EPRI), will examine a method of breeding tritium from lithium for use as fusion reactor fuel. Although tritium is rare in nature, lithium is plentiful. One way of converting it into tritium is by creating a lithium "blanket" around a reacting tokamak plasma. The blanket would be bombarded by the high-energy neutrons produced in the fusion process. Reactions between the lithium atoms and the neutrons would produce tritium, which could then be extracted from the blanket and used to fuel the reactor.

The LBM was fabricated by GA Technologies Inc. (GA) in San Diego. The unit contains over 900 stainless steel tubes, filled with cylindrical pellets of lithium oxide. A number of these tubes, located in the center of the array, contain pellets clad with aluminum. It is from these center tubes that tritium bred by neutron irradiation of the aluminum-clad pellets will be extracted.

In-plant testing of the LBM was conducted at GA in early March. The unit was then dismantled, leaving GA for its four-day trip to PPL on March 14. The unit was shipped disassembled in specially prepared crates to protect the rods from damage during their cross-country road trip.



Workmen carefully installed rods containing lithium oxide pellets into the Lithium Blanket Module (LBM), which arrived at PPL in mid-March. The module, which will be installed on TFTR next year, was shipped disassembled to prevent damage to the rods.

The 920 rods each fit into the LBM in a particular sequence and location. Once the unit arrived at PPL, the rods were reinstalled within the LBM. The entire two-ton assembly was then lifted by crane and mated to the Engineering Test

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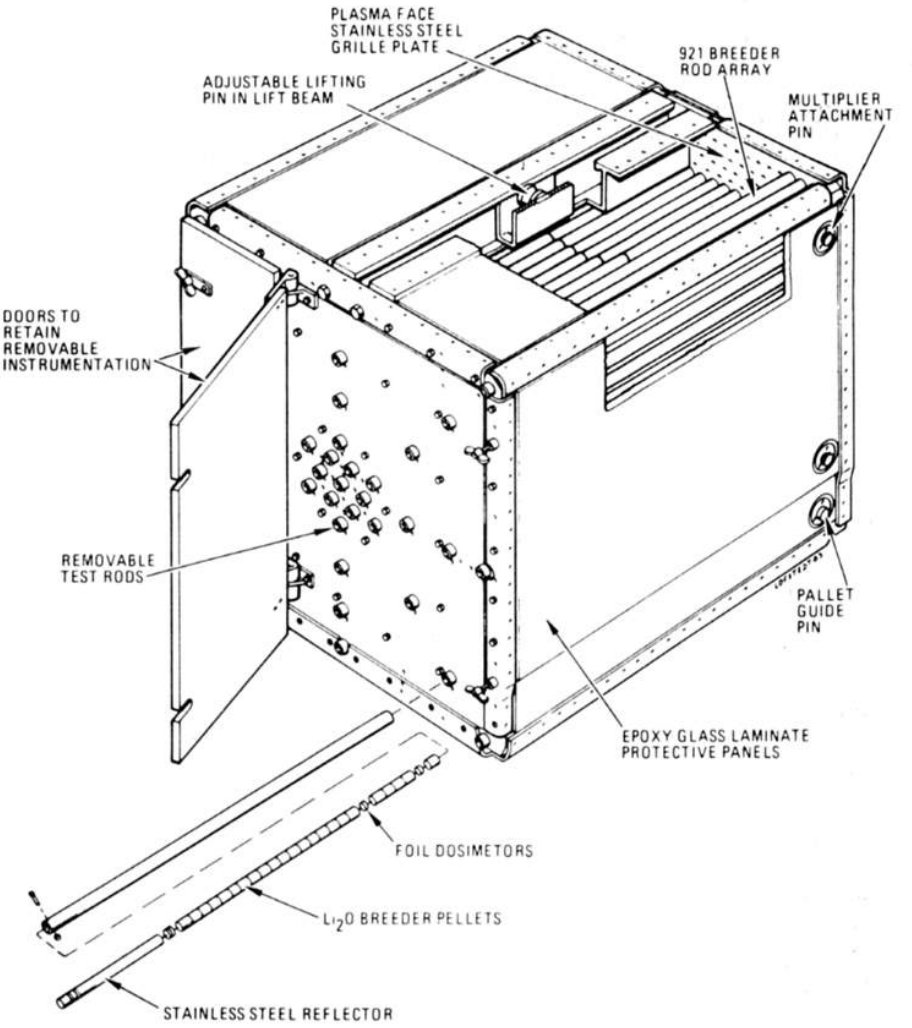
Station (ETS) for fit checking.

The ETS consists of a fiberglass and stainless steel girder supported by a stainless steel base. During TFTR operation, the LBM will slide forward on the ETS until the front face of the unit is adjacent to a vacuum vessel port. The DOE has paid for the fabrication of a special "neutron-transparent" port cover. High-energy neutrons released by the TFTR plasma will enter the LBM rods, interacting with the lithium atoms within them to form tritium. After each run producing large neutron fluence (either deuterium-deuterium or deuterium-tritium), several of the central rods will be removed from the LBM. The rods will be sent to the PPL Chemical Engineering laboratory, where the amount of tritium bred within them can be measured.

Preliminary acceptance testing of the unit was conducted in the 1-H Building at the end of March. In late 1986, the LBM and ETS will be installed in TFTR Bay D.

Rather than putting the LBM into storage until that time, the unit may be shipped to the École Polytechnique Fédérale in Lausanne, Switzerland, for approximately one year. That institution has a well-defined point-neutron source facility especially designed for neutronics experiments with blanket modules, and has offered to do experiments with the LBM. Testing would involve removing pellet samples after neutron irradiation and assaying them at PPL for tritium content. The master comparison code for comparing neutronics predictions with measurements would also be tested out using data obtained in the Lausanne facility. In late 1986, the unit would be reassembled and returned to PPL for installation on TFTR.



Cutaway view of the Lithium Blanket Module (LBM)

First Aid Course

If a co-worker or family member gashed a hand, or was badly burned, would you know what to do? You would if you had taken the basic first aid course now being offered to all PPL employees.

The course provides employees with the training and equipment necessary to handle emergency situations until the Emergency Services Unit (ESU) arrives. At the completion of their training, students should be able to recognize the difference between an injury requiring simple first aid treatment, and an emergency requiring ESU intervention.

The course, taught by Scott Larson of the ESU, consists of three two-hour classes. Students use the book "The First Minutes: What to Do Until the Ambulance Arrives" as their basic text. They learn what

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Handling foot injuries is just one of the topics that will be covered in the basic first aid course now being offered to all laboratory employees.

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constitutes an emergency, as well as how to treat injuries such as shock, bleeding, burns, convulsions, or possible heart attack. Readings are supplemented with audio-visual and practical instruction in emergency procedures, such as cardiopulmonary and artificial resuscitation.

Classes are open to all employees on a first come, first served basis. Course sessions are repeated monthly, and usually begin during the third week of each month. The next course session begins April 8; upcoming course schedules will be listed in future issues of the HOTLINE.

For more information about the course, call Scott Larson at ext. 3166.

Safety Training

The following Health and Safety training courses are scheduled for April:

Course	Responsible Instructor	Date Scheduled
Fork Lift Operators	R. Jeanes Ext. 2532	April 9 8:45 a.m.-4 p.m.
Fire Extinguisher Training	S. Larson Ext. 3166	April 9 and 23 2-3:30 p.m.
Self-Contained Breathing Apparatus	S. Larson Ext. 3166	April 17 9:30-11:30 a.m.
Capacitor and Capacitor Bank Safety	F. Beane Ext. 2530	April 19 9:30-11:30 a.m. and 1:30-4 p.m.
Basic Electrical Safety	R. Bergman Ext. 2223	April 19 1-2:30 p.m.
Cardiopulmonary Resusitation (CPR)	S. Larson Ext. 3166	April 22, 24, and 26 9 a.m.-noon OR 1-4 p.m.
Oxygen Deficient Spaces	K. Semel Ext. 2531	April 23 9-11 a.m.

Employees must obtain permission from their immediate supervisor to attend these classes. Supervisors must call the responsible instructor to enroll their employees.

Security Checkpoints

The development of local businesses has caused an increase in the volume of traffic on U.S. Route 1. It should also be apparent that the possibility of motor vehicle accidents increases with the growing number of vehicles. The New Jersey Motor Vehicle laws were established to prevent accidents and protect individuals using public roadways.

Recently, more and more motorists have been misusing the outer shoulder lane on Route 1 as a third lane of traffic. When vehicles on Route 1 are approaching off ramps, drivers frequently pull over to the shoulder, traveling down the shoulder to the off ramp. This particular procedure is illegal; you must remain in the proper lane until you reach the appropriately marked off ramp. By riding on the shoulder, you risk being cited with a motor vehicle summons that can add two points to your motor vehicle driving record and subtract a $60 fine from your wallet.

Not only is riding the shoulder of the roadway illegal, it is also very dangerous. Information from local police departments has shown this illegal act to be the cause of many serious accidents which have recently occurred on Route 1.

The Traffic Division of the Plainsboro Police Department is asking for your help in preventing such serious accidents. Let's all try to make our crowded highways a little safer.

For those of you who do not use seat belts: New Jersey's mandatory seat belt law (which requires the driver and all front seat passengers to wear seat belts) took effect March 1, 1985. The law is being enforced, so remember to buckle up.

Anyone with questions about either of these motor vehicle laws should contact Security at ext. 2894 or 2895.

Intramural Softball

Heavy hitters are still in demand by PPL's co-ed intramural softball league. Teams will compete every Wednesday night during the 10-week season, scheduled to begin at the end of May.

Last year's league champions, the Warehouse team, will be returning, as will the CICADA and Engineering squads. Three more teams, with a minimum of 10 players each, are still being sought. Interested individuals can call Ed Bush at ext. 3309 or Frank Wasiowicz at ext. 3568 to be placed on a team.

TRANSITIONS

The HOTLINE offers its congratulations to the following employees, who recently became proud parents:

Doug Bucknum of the MG Room and his wife Chris, whose daughter, Lacey, was born February 19;

Rosemary Fuchs of the Theory Division, whose daughter Alecia Jennifer was born March 6.

Congratulations are also due to Ken Wakefield, who retired from laboratory service on March 1.

OSHA Violations

The following safety reminders are drawn from a list of common OSHA (Occupational Safety and Health Administration) violations:

- Exits and exit accesses shall be located and arranged to make exits readily accessible at all times. Where exits are not immediately accessible from an open floor area, safe and continuous passageways, aisles, or corridors leading directly to every exit must be provided. Access to at least two different exits should be maintained for each area occupant.

- Exits and exit pathways should remain free of all obstructions that would prevent full, instant use of the exit in case of fire or other emergencies.

- Every exit sign shall be lighted, either by internal illumination or by artificial lighting. If artificial lighting is used, translucent lenses of red (or another specifically designated color) should be installed to show red (or another specifically designated color) on the approach side of the exit sign.

For Sale

FOR SALE: Eico 460K oscilloscope, 5 MHz vertical bandwidth, recurrent sweep. Works; $25. If interested, call ext. 2036.

Invention Update

PPL has a Patent Awareness Program designed to recognize creative inventors, and to raise the patent-mindedness of laboratory staff. A Committee on Inventions, consisting of chairman John Johnson, secretary Nancy Jones, and members Frank Bennett, Peter Bonanos, Schweickhard von Goeler, and Richard Rossi, make cash awards to inventors for their new or novel ideas. Additional monies are awarded if DOE files a patent application on the discoveries.

Invention disclosures filed since December include:

- High Voltage High Current RF Bushing, by G. Grotz
- Z Pinch Modified by Helical Coils, by H. Furth and D. Monticello
- Penetration Fire Seal, by S. Cavalluzzo
- Method and Apparatus for Ramp-Up of Tokamak Current Using RF Waves Together with Inductively Driven Relativistic Electrons, by N. Fisch, C.F.F. Karney, and A. Boozer
- CAMAC Link Data Monitor, by P. Sichta
- High Current Capacity Electrical Joint, by P. Bonanos
- Arc Suppressors for Waveguide Grills, by R, Motley and W. Hooke
- Compact Waveguide Power Divider with Multiple Isolated Outputs, by C.P. Moeller
- Poloidal Flux Transformer for Spheromak Current Drive and Heating, by A. Janos, M. Yamada, and H. Furth
- Flux-Amplifying Inductive Spheromak Gun (Generator), by M. Yamada, A. Janos and T. Uyama
- Annular X-Ray Laser Target, by H. Milchberg
- Axial Thick-Fibre Target for X-Ray Laser Production, by H. Milchberg, S. Suckewer, and D. Voorhees
- Trimmable Limiter, by R. Budny and D.K. Owens
- Disc-Blade X-Ray Laser Target, by S. Suckewer, C. Skinner, and D. Voorhees
- Soft X-Ray Laser, by S. Suckewer
- High Temperature Brazing of Al_2O_3 to Ti 6242, by R. Walls and H. Evans
- Radio-Frequency Coupler for Enhanced Production of Runaway Electrons to Stabilize MHD Instabilities and Reduce Transport Loss in Toroidal Plasmas, by T. Chu
- Anomalous-Viscosity Current Drive, by T. Stix and M. Ono

For further information about invention disclosures or the patent process, contact Meg Harmsen at ext. 2659.

United Way Wrap-Up

The Princeton University United Way campaign accomplished a little bit more with a little bit less in 1984.

According to final campaign figures, 12 percent of all Plasma Physics Laboratory employees contributed to the University's United Way fund drive. A total of $78,749 was raised University-wide, constituting 93 percent of the $84,400 goal set at the start of the campaign. The figure represents an approximately eight percent increase in total dollars contributed this year, despite almost 90 fewer donors participating in the drive.

Employee participation in the campaign throughout the University totaled 22 percent, as compared with United Way contribution rates of 78 percent from the Squibb Corporation, 74 percent from RCA Labs, 72 percent from McGraw-Hill, and 55 percent from Cornell University.

United Way campaign coordinator "Bud" Vivian offered his thanks to all those who volunteered to organize the fund drive in their areas. PPL volunteers included Arthur Allen, Mike Anderson, Jim Bates, Tim Bennett, Olga Bernett, Joyce Bitzer, Debra Breza, Mike Brooks, Betty Carey, Dottie Conner, Bobbie Cruser, Robert Cutler, Joe Davenport, Kathy Dunn, Gary Estepp, Jim Faunce, Janet Felt, Elsie Ferreras, Meryl Finkelstein, Carolyn Foster, John Gennuso, Mel Gensamer, Carol Gill, Jean Hurley, George Kalesky, Charles Kircher, Elaine Kozinsky, Scott Larson, Joyce Lawton, Carl Lindenmuth, Robert Longmuir, Milt Machalek,

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Marie Maruso, Dolores Mazalewski, Ann McKee, Pat Melsky, Madge Mitas, John Mount, John Pacuta, Bill Pointon, Gloria Pollitt, Sheryll Poris, Kim Prutky, Dottie Pulyer, Sheryl Robas, Barbara Sarfaty, Heidi Schmitt, Walter Schwarz, Nadirah Shakir, Claire Siflinger, Gail Stevens, Grace Taliaferro, Louise Tindall, Edna Willis, Sandy Winje, Roseann Wurst, and Ginny Zelenak.

Beverages can not only quench our thirst, but can also provide energy and nutrients. We often forget, however, that drinks can contain lots of calories. Juices are often the most surprising calorie culprits. Take a look at the following fruit and vegetable juices and try ranking them in order of their calorie content (with one indicating the lowest in calories, and seven the highest -- there is one tie):

( ) Apple juice
( ) Cranberry juice cocktail
( ) Tomato juice
( ) Unsweetened grape juice
( ) Unsweetened grapefruit juice
( ) Unsweetened orange juice
( ) Unsweetened pineapple juice
( ) Vegetable juice

(Answers on Page 8)

New APS Fellows

Three PPL staff members -- Michio Okabayashi, Samuel A. Cohen, and John A. Krommes -- have recently become Fellows in Division of Plasma Physics of the American Physical Society (APS).

In notifying the three of their selection, the APS Fellowship Committee cited Dr. Okabayashi for "outstanding contributions to the theoretical and experimental study of the magnetohydrodynamic equilibrium and stability of hot plasmas." Dr. Cohen's citation commended his "pioneering research on plasma-wall interactions, impurity transport in tokamaks, and the advancement of surface physics in tokamaks." Dr. Krommes' "fundamental contributions to the description and understanding of plasma turbulence and nonlinear statistical physics" were commended by the Committee.

Candidates for APS Fellows are nominated by Society members, and chosen by a selection review committee.

United Way Agencies Fighting Alcoholism

Slurred speech or lack of coordination are often among the most obvious physical symptoms of alcoholism. However, there are other clues to the presence of the disease, such as a hoarse voice, nicotine-stained fingers, and changes in skin and hair texture.

The United Way-Princeton Area Communities notes that misconceptions about alcoholism abound. Many people erroneously believe that to be an alcoholic, one must drink during the day every day, get drunk frequently, or drink hard liquor. None of these assumptions are necessarily true. Alcoholics may not drink daily, and may drink only beer or wine. And the alcoholic is more likely to be able to drink a great deal without getting drunk than is the nonalcoholic.

Behavioral changes in the alcoholic may be even more noticeable. Alcohol reduces inhibitions, and has been implicated in many cases of violence, homicide, and suicide across the United States.

There is evidence that the disease has biological roots, and can be passed on genetically from parents to children. This fact does not mean that the child of alcoholic parents is destined to be an alcoholic; rather, it indicates that the child may be prone to develop the disease.

Alcohol, which poisons human cells, is also related to premature death and disease. Experts still do not understand all the ways alcohol causes its damage, but they do know it can cause scarring to liver tissue, and death to brain cells.

If the brain cell damage is extensive enough, Korsakoff's syndrome--an irreversible dementia--develops. With signs of memory loss, loss of communications skills, and an inability to make rational judgments, Korsakoff's syn-

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drome can be as difficult for families to deal with as Alzheimer's disease.

For answers to questions about alcoholism, call a counseling agency and seek professional help. The professional rule of thumb is: if you are concerned, there is probably a problem. The sooner help is sought, the sooner wounds can heal.

The United Way funds two agencies--the Family Service Agency of Princeton and Crawford House--based on their work with the victims of alcoholism. Family Service offers counseling sessions to assist people dealing with alcoholism. The groups include education for new clients, especially those who have been arrested for drunk driving; an early sobriety group; and groups for women from families where alcohol has been abused. The Alcoholism Unit of Family Service can be reached at 609-924-2577.

Crawford House is a halfway house offering a program for women recovering from alcoholism. Its goal is to ease the return of women to their home communities, with support from Alcoholics Anonymous. It provides a transitional experience between detoxification, initial recovery, and reentry as a functioning member of the community. Women can stay at Crawford House for two to six months. The agency can be reached at 201-874-5153.

The Princeton Area Council of Community Services, also a United Way agency, can be reached at 609-924-5865 or 609-799-6033 for additional information on other programs that are available.

Einstein Explained (by Dr. Ernst de Haas)

At the end of each month, I always gratefully remember the late Albert Einstein, whose $E=mc^2$ permits the University to send me a paycheck. And when I act as a tour guide, the visitors often know the same formula. Since the square of the speed of light is such an enormous number, they figure out that the destruction of one kilogram of matter could keep all of Public Service humming for decades. But Einstein did not mean it quite that way. What he really said was more subtle and more elegant:

> "Every package of energy E has a mass m associated with it according to $E=mc^2$. If a reaction develops energy and that energy leaves the scene, it takes its mass with it."

Take, for example, the chemical or nuclear reaction A+B --> C+ Energy, where A, B, and C are single atoms or nuclei.

At the moment of the reaction, the energy is usually kinetic, i.e., C is moving at high speed. It bounces around, heating up the surrounding material as it slows down. Eventually C is just lying still or moving very little, and the energy leaves the immediate reaction area.

According to Einstein: $m_A + m_B = m_C + m_E$. But since the energy has left, the associated mass has gone too. Therefore, $m_C < m_A + m_B$.

Because c^2 is so large, the "mass defect," $m_C - (m_A + m_B)$, is impossible to measure in chemical reactions. It does show up in nuclear reactions, however. The masses at rest for all isotopes are accurately known; a comparison yields the mass defect.

For fusion of deuterium and tritium, the equation is:

$$_1D^2 + {}_1T^3 \rightarrow {}_2He^4 + {}_0n^1 + \text{Energy}$$

and the mass numbers are:

$$_1D^2 = 2.014735 \text{ AMU (Atomic Mass Units)}$$

$$_1T^3 = 3.016997 \text{ AMU}$$

$$\text{TOTAL} = 5.031732 \text{ AMU}$$

$$_0n^1 = 1.008982 \text{ AMU}$$

$$_2He^4 = 4.003873 \text{ AMU}$$

$$\text{TOTAL} = 5.012855 \text{ AMU}$$

Comparing both totals yields a mass defect of 0.018877 AMU. So the energy package carried approximately 0.38% of the original.

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If we fuse 1 kilogram of fuel, i.e., 400 grams of deuterium and 600 grams of tritium, the actual mass that is converted to energy (heat) is 3.8 grams. If we apply $E = mc^2$ at this point, the result is 3.4×10^{14} J (Joules), or 95 million kWh (kilowatt hours) of heat. An electric power plant can turn this into 33 million kWh of electricity, worth about $3.5 million in the retail market.

If we had burned the deuterium and tritium with oxygen, the resultant heat would be 58×10^6 J, or 16 kWh. The corresponding electricity would retail for 60 cents. Thus, the ratio of nuclear to chemical energy is about six million to one.

Similar calculations were made in the 1920's and 1930's for uranium. The results were similar; what was unknown back then, however, was whether fission or fusion reactions could ever be created in the laboratory.

In 1938, when Hahn and Strassman discovered that uranium could actually fission, many people realized that here was a source of energy millions of times greater per unit of mass than regular chemical reactions. This led to military interest in bombs, and civilian interest in nuclear power plants.

The military effort got started in 1939 through a letter from Einstein to President Roosevelt. It is interesting to note that he was asked to sign the letter, not because of his $E = mc^2$, but because he was the best known physicist in the country at that time.

HEALTH QUEST

Answers

Each 6 oz. glass of fruit or vegetable juice contains the following calories:

1. Vegetable (30)
2. Tomato (35)
3. Unsweetened grapefruit (75)
4. Apple (85)
5. Unsweetened orange (90)
6. Unsweetened pineapple (105)
7. Cranberry juice cocktail (125)
8. Unsweetened grape (125)

Volunteers: People People

The following volunteer listings were provided to the HOTLINE by the Princeton Area Council of Community Services, a member agency of the United Way-Princeton Area Communities. For further information on any volunteer position, contact each agency directly.

- The Mercer County Chapter of the American Diabetes Association needs volunteers to serve as program chairpersons, typists, or general office workers. Health care professionals are also being sought to serve on the Association's speaker's bureau. Call 609-392-1810 to offer your assistance.

- The Children's Home Society of New Jersey is a private, non-sectarian child care and placement agency. The Society provides counseling, temporary foster family care, and adoption services. Assistance with library and clerical work would be greatly appreciated, as would drivers to transport foster parents and children. To lend a hand, call the Society at 609-695-6274.

- Eden A.C.R.E.s has three private, non-profit group homes for autistic adolescent boys and adult men. Caring individuals are needed for the weekday and weekend recreation programs, as well as to help out with emergency care. To volunteer your time, call 609-448-6400 or 609-921-1198.

The next three volunteer positions were furnished by the United Way of Somerset Valley. Details of each position are available by contacting each agency directly.

- The Somerset County Unit of the American Cancer Society is seeking volunteers to work as drivers, or to participate in the Unit's residential, public education, and special events programs. Office workers are always welcome. Call 201-469-8666 to offer your aid.

- The Arthritis Foundation needs volunteers to serve as speakers, public information assistants, and assistant program coordinators. Help is also needed with bulk mailings and public relations. Call 201-388-0744 to help out.

- Catholic Charities volunteers work closely with adolescents in recreation and other activities. Volunteers organize, plan, and supervise various club activities. For the details, call 201-722-1881.

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HOTLINE

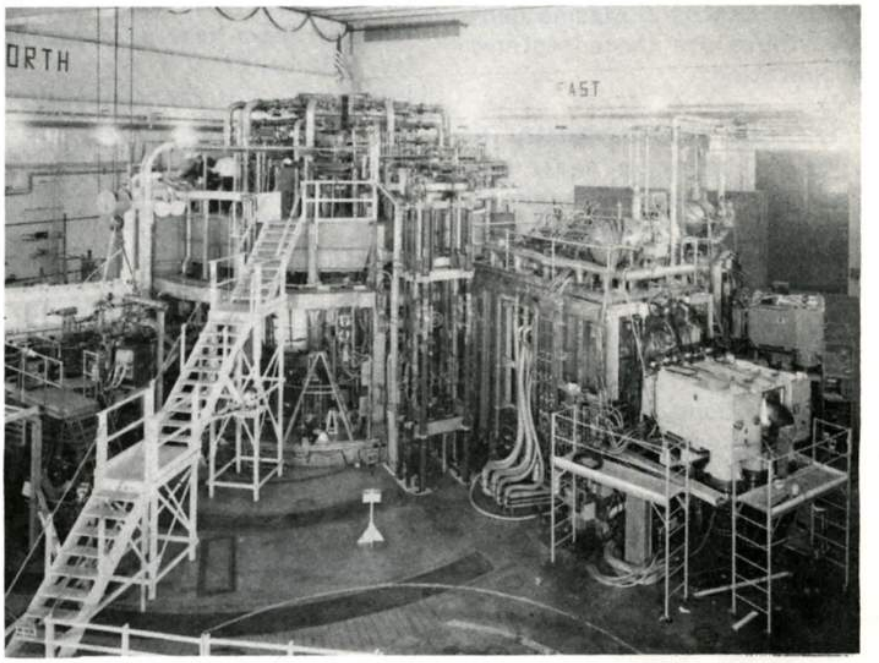
PRINCETON PLASMA PHYSICS LABORATORY

Vol. 6, No. 12 May 3, 1985

TFTR RESULTS

With only 20% of its final heating power capability, TFTR has gathered new confinement physics knowledge over an unprecedented range of plasma parameters -- from high $n\tau$ values to very high ion temperatures -- according to Dr. Dale Meade's April 26 report to the Spring Meeting of the American Physical Society in Arlington, VA.

TFTR experiments conducted between June 1984 and April 1985 have successfully accomplished essentially all their objectives. A major achievement has been the operation of the TFTR tokamak at its design magnetic field strength (5.2 T, or 52 kG) and at its design plasma current (2.5 MA) -- almost six months ahead of schedule.



The Tokamak Fusion Test Reactor, Spring 1985

OHMIC HEATING: The toroidal plasma current in tokamak devices such as TFTR provides magnetic confinement and also heats the plasma, just as electric current heats a copper wire. This ohmic heating provides about 2.5 MW of plasma heating for TFTR. Studies of plasma confinement in this ohmic heating regime have found maximum energy confinement times (τ_E) of 0.4 sec.

In tokamak experiments, room temperature deuterium gas is usually injected into the plasma to raise the plasma electron density. In TFTR, a maximum density at the center of the plasma of $n_e(0) \sim 7.5 \times 10^{19}$ m^{-3} has been achieved by this technique. The corresponding $n_e(0)\tau_E$ value was 3.3×10^{19} $m^{-3}s$.

PELLET INJECTION: In the most recent TFTR experiments, a pellet injector developed by the Oak Ridge National Laboratory Fusion Energy Division was used to inject 3-mm-diameter solid (i.e., frozen to ~ 12 ° Kelvin) deuterium pellets at speeds of 1.4×10^3 m/s into the plasma. Using this technique, which allows the deuterium fuel to penetrate more deeply into the plasma, the maximum central plasma density was increased by ~ 50%. The confinement quality $n_e(0)\tau_E$ reached a maximum of about 4×10^{19} $m^{-3}s$ -- well into the range that will be required for TFTR breakeven experiments. In terms of a commonly used figure of merit, $n_e(0)\tau_E T_i(0)$, this ohmic regime has achieved 8-9 $\times$ 10^{19} keV m^{-3} sec, which is close to the record value of ~ 12×10^{19} keV m^{-3} sec which was achieved by Alcator C.

NEUTRAL BEAM HEATING: Tokamaks and mirror fusion

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devices can be heated by energetic neutral beams. In this process, an energetic neutral atom is injected from the outside, passing readily through the magnetic field and becoming a "hot" ion near the center of the plasma. Depending on the density of these hot ions relative to the warm background plasma density, there are three regimes of operation:

1. The hot-ion density is low. The beam heats the warm plasma to a temperature T, and essentially all of the fusion reactions are produced by the warm plasma itself.

2. The hot-ion density equals about 10% of the warm plasma density. (This is the so called two-component case, which TFTR was designed to utilize in order to facilitate breakeven.) Here the reactions of the hot-ion component with the warm-ion component are roughly equal in number to the reactions produced by the warm ions with each other.

3. The hot-ion density is roughly equal to the warm plasma density. In this case, most all of the reactions are due to the reactions of hot ions with each other.

As the hot-ion density is increased, the $n\tau$ value required to achieve a given fusion power multiplication factor Q is reduced. Near $Q \sim 1$, this can be an important effect, reducing the $n\tau$ requirement by up to a factor of three relative to the case with low hot-ion density for TFTR. TFTR will explore the physics of each of these reactor plasma regimes.

The initial exploratory neutral beam heating experiments were carried out with two neutral beam injectors, providing beam powers up to 6 MW and beam energies of up to 80 keV. The final TFTR neutral beam heating capability will be 27 MW from four injectors. For the conventional high-plasma-density regime, the plasma ion temperature was raised from 2 keV to approximately 6 keV (1 keV equals approximately 11.6 million degrees C). In terms of the ignition parameter $n_e(0)\tau_E T_i(0)$, this TFTR regime has reached 7×10^{19} keV m^{-3} sec, a value roughly twice that of previous neutral beam experiments.

TFTR also operated in a low-plasma-density regime, where hot ions comprise almost 50% of the total ion density. This type of hot-ion regime was first produced on the 2XIIB mirror machine at Livermore in 1976 and later on the PLT and PDX tokamaks (here) in 1978 and 1982. The hot-ion regime represents another mode of TFTR D-T operation, which has been discussed as a possible model for a steady-state D-T tokamak reactor.

The ions in TFTR can be grouped as hydrogenic fuel ions, which are heated up by the neutral beam; impurity ions which are preferentially heated by the beams and are in partial equilibrium with the hydrogenic fuel; and the primary beam ions, which are injected at high energy and are cooled to an average energy of about 35-40 keV. The impurity-ion temperatures are in the range of 10-14 keV, and the hydrogen temperatures are in the range of 6-9 keV. The most relevant parameter for fusion neutron production is the average ion energy in the plasma, which is 20-30 keV and would correspond to an effective hot-ion temperature of 14-20 keV. The best high temperature case has hydrogenic temperatures around 9 keV, which corresponds to temperatures of 100 million °C.

This regime is also of interest because the neutral beams have driven almost 400 kA of plasma current, indicating that this concept could be extended to a steady-state beam-driven tokamak.

Two additional neutral beam injectors will be placed on TFTR during the current shutdown, in preparation for high power experiments with deuterium plasmas near plasma breakeven conditions in 1986. Preparations also continue for actual breakeven experiments, using deuterium-tritium plasmas, scheduled for late 1988.

Obey Posted Signs

When individuals at PPL disobey posted signs, they jeopardize their own personal safety, and perhaps the safety of others. Warning signs are posted for employee safety

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and must be observed. For example, areas where radioactive materials signs are posted might have a potential for radioactive contamination of unauthorized or untrained personnel. Disobeying laser hazard signs presents the potential for personnel eye or skin exposure. Disregard of high voltage signs could result in an electrical shock.

Unless you are authorized to enter posted areas, and have the required training -- stay out! If you feel that posted warning signs in certain areas are no longer applicable, point the situation out to your supervisor or safety representative for solution.

Safety Training

The following Health and Safety training courses are scheduled for May:

Basic First Aid	S. Larson Ext. 3166	May 13, 15, and 17 1-3 p.m.
Fire Extinguisher Training	S. Larson Ext. 3166	May 14 and 28 2-3:30 p.m.
Self-Contained Breathing Apparatus	S. Larson Ext. 3166	May 15 9:30-11:30 a.m.
Cardiopulmonary Resuscitation (CPR)	S. Larson Ext. 3166	May 20, 22, and 24 9 a.m.-noon OR 1-4 p.m.
Employee Orientation	M.A. McBride Ext. 3468	May 22 1-2 p.m.
Back Injury Protection	J. McCormick, R.N. Ext. 3200	May 24 8:30 a.m.-noon
Respiratory Protection	K. Semel Ext. 2531	To Be Announced -- Contact Instructor

Employees must obtain permission from their immediate supervisor to attend these classes. Supervisors must call the responsible instructor to enroll their employees.

Patent Changes

A dramatic change concerning rights to inventions made with Federal assistance occurred November 9, 1984, when Public Law 98-620 was signed by President Reagan. The key change for laboratory inventors is that for the first time, if a patent is issued, the inventor and the University will share in royalties obtained from licensing the patent to commercial interests.

However, the DOE will have a nonexclusive, nontransferable, irrevocable, paid-up license to practice any subject invention throughout the world on behalf of the U.S. government.

Any procedural changes in the laboratory's invention program required to conform to this new law will be clarified when PPL's contract with the DOE is amended. Meanwhile, the lab's report processing, invention disclosure, and Patent Awareness Program procedures will remain the same.

However, if you have an invention or an idea that you think may be attractive for use in the private sector, please emphasize its commer-

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cial viability in your invention disclosure. A clear message to Princeton University will speed the receipt of a waiver from the DOE, the patent search, and the patent application process to your benefit.

TRANSITIONS

The HOTLINE offers its congratulations to the following employees, who recently became proud parents:

Dennis Mansfield of TFTR Diagnostics and his wife, Beverly, whose daughter Jill was born March 21;

Bubba Vinson of TFTR Operations and his wife, Lori, whose son Ryan Michael was born April 9;

Bill Allen of Maintenance and his wife, Theresa, whose son David Edwin was born April 14.

Volunteer For United Way Budget Committee

The United Way-Princeton Area Communities is looking for volunteers for its Budget Committee, which determines United Way funding levels for its member agencies.

Approximately 90 people participate in this annual effort. Volunteers are divided into panels of five or six committee members. Each panel reviews the budgets, programs, and financial support requests submitted by two member agencies. Panelists must then determine what the United Way can and should allocate.

A Budget Committee volunteer does not have to be a financial whiz to be an effective committee member. The United Way has volunteer accountants on each panel to assist members in their deliberations.

An orientation and training session for the committee will be held on May 4. During the following week, volunteers will be asked to visit the agencies they have been charged with reviewing. During the weeks of May 13 and May 20, volunteers meet with agency representatives for budget review. The committee determines allocations on May 29 and 30, submitting them to the United Way's Board of Trustees for final approval on June 19.

Anyone interested in more information about the committee, or those interested in joining the group, should contact the United Way at 609-924-5882.

Marianne Weissenburger (left), the first chairwoman of the Secretarial and Office Support Staff (SOSS) Seminar Committee, helps current chairwoman Chris Ritter select a door prize winner at the SOSS luncheon held April 17 in conjunction with National Secretaries' Week. Members enjoyed both a buffet luncheon at the Ramada Inn (right), and a talk delivered by Rosemary Yaecker of the Blessing-White Corporation.

Benefits Administrator Mary Moore explains the finer points of the PPL benefits program to members of the Procurement and Purchasing Departments. The meeting was part of a continuing series of discussions with groups throughout the lab aimed at answering employee benefits questions.

Spray Gun Danger

All spray guns, whether airless or compressed air type, are dangerous. The spray guns that shoot a thin line of oil, gas, paint, or other chemical compounds are especially dangerous. The introduction of the airless sprayers brought on an increase in spray gun accidents.

That thin line propelled by the gun can pierce a leather glove and enter a finger or hand from as far away as eight inches. Poisonous liquids can travel into fissures of connective tissue and muscle and into the bloodstream if the injury isn't treated promptly. Chemical infection can result in massive tissue damage and amputation of the body part can result.

The initial injury is often painless and looks like a small puncture wound. Many don't bleed, often causing victims to ignore treatment until an infection sets in. At that point, treatment may not be effective.

If you suffer such an injury, report for treatment at once. Take any spray gun injury seriously.

Nursery Openings

The University-NOW Day Nursery, located at 171 Broadmead Street in Princeton, currently has openings in the four- and five-year-old classes for the 1985-86 school year.

The school is dedicated to providing a lively learning experience for its students, in which all aspects of a child's growth are equally important. The Nursery is also committed to providing children with an environment free of sex-role stereotyping, prejudice, and authoritarianism.

With the exception of the last week in August, the Nursery is open from 8 a.m. to 6 p.m. on a yearly basis. Students range in age from 21 months to six years. Classes include a state-certified kindergarten.

Staff members interested in these current openings, or in future openings at the school, should call 924-4214.

TRANSITIONS

The HOTLINE offers its congratulations to the following employees, who recently became proud parents:

Charles Skinner of the Experimental Division and his wife, Dagmar, whose son Patrick was born March 15;

Carl Bunting of TFTR and his wife, Laura, whose daughter Alanna was born March 17;

Ken Brink of the Vacuum Shop and his wife, Dawn, whose daughter Kristal was born March 22.

Jetlag Diet

You've planned for weeks, gone into hock, and flown halfway around the world for your vacation, and have to spend the first three days exhausted, mentally foggy, and perhaps even nauseous from jet lag. Happens all the time -- except to people who use the Argonne Jetlag Diet.

Jet lag is caused by your body's efforts to adjust to drastic changes in time zones. The signals the body receives from stimuli such as temperature, food, activity, and exposure to light are occurring on an unfamiliar schedule. The more time zones you cross, the longer the jet lag lasts.

But hundreds of thousands of travelers, including President and Mrs. Reagan and the Minnesota Vikings football team, have beaten jet lag with the Argonne Diet.

The diet was developed at the Department of Energy's Argonne National Laboratory as a direct spinoff of basic research by biologist Charles F. Ehret, who has studied the effects of diet, chemicals, and environment on the biological clocks of bacteria and animals for 35 years.

All animals, including humans, have biological clocks. They follow a circadian rhythm, a sort of 24-hour pattern that reflects changes in temperature, amounts of light, body temperature, food intake, and exercise. When you move quickly across several time zones, that biological rhythm becomes confused. Your body reacts in part to your normal timing pattern, and in part to the signals it receives in your new environment.

Based on Ehret's studies, a regimen was developed using natural cues, particularly type of food and eating cycles, to help travelers quickly adjust their body clocks to match the time zones at their destination.

Here's how it works: if you plan to leave Washington, D.C. at 8 a.m. February 1 for a vacation in Paris, you start the regimen on January 28 by feasting on proteins at breakfast and lunch and on carbohydrates at dinner. On January 29, you fast on light meals of salads, soups, fruits, and juices. January 30 is another feast day, and January 31 is another fast day. The fast is broken at 2 a.m. on February 1, which would be 7 a.m. (or breakfast time) in Paris. You then eat normal meals on a Paris schedule until you're ready to prepare for the trip back home.

Hundreds of travel agents distribute copies of the diet with overseas tickets, and scores of private corporations have reproduced it for their executives who travel. It has appeared in more than 500 publications, and the Argonne Laboratory has distributed nearly 150,000 free copies of the diet. In return, the laboratory has thousands of letters from happy users.

The President and Mrs. Reagan have used the diet to prepare for two trips to the Orient and one to Europe. The Minnesota Vikings used it before flying to London in August 1983 for a pre-season game, in which they beat the St. Louis Cardinals 28-10.

Travelers can get a free wallet-sized card summarizing the diet by sending a self-addressed stamped envelope to Jet Lag Diet, Argonne National Laboratory, 9700 S. Cass Ave., Argonne, IL 60539. It's one way taxpayers can get an individual payback for their support of basic research.

United Way

AT WORK

Deaf Are Heard by United Way Service

If you live alone and wake up one morning too sick to go to work, you simply call the office and say you will not be in. How would a deaf individual, alone and sick, make that same phone call? For that matter, how do deaf people make appointments, call family or friends, or check on schedules? It is much more difficult for them than it is for those of us who can hear.

A service now available in Mercer County helps the deaf and hard of hearing over these obstacles. DEAF CONTACT is a seven-day-a-week, 24-hour service staffed by trained volunteers, who are on duty to answer the calls that put the deaf in touch with the rest of the world.

Without this free service, the only one of its kind in Mercer County, the deaf would either have to communicate with people in person, write to them, or ask relatives to place calls for them. DEAF CONTACT offers its clients anonymity, confidentiality, convenience, and personal independence.

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DEAF CONTACT, which is partially funded by the United Way-Princeton Area Communities, handles 200 calls a month from and for the deaf and hard of hearing. The process begins when a deaf person uses a teletype to call DEAF CONTACT, typing out a request that a phone call be made. A volunteer communicates with the deaf client by typing on a teletype. Once the client's desired message is received, the phone call is placed.

Thanks to its United Way funding, DEAF CONTACT has been able to expand its important service by opening a telephone office at the Katzenbach School for the Deaf on Sullivan Way in West Trenton. To continue expanding its service area, however, the program needs more volunteer staff members. The two job requirements are minimal typing skills and a willingness to lend an ear to help the deaf. For more information, call DEAF CONTACT at 609-585-2244, 609-888-2111, or 609-896-2120.

This service is possible in large part because caring people, businesses and other organizations contributed to the United Way.

Volunteers: People People

The following volunteer opportunities were submitted to HOTLINE by the Princeton Area Council of Community Services, a member agency of the United Way-Princeton Area Communities. For further information on any volunteer position, contact each agency directly.

- The Association for the Advancement of Mental Health needs assistants to tutor mentally handicapped adults in life skills, or to accompany them to a variety of recreational activities. Typing and clerical assistance, transportation, and aid with educational group activities are also needed. For more details, call 609-924-7174.

- The West Windsor Recreation Department is responsible for administering all township recreation programs. The group also takes an active role in the planning and development of township owned parkland. Volunteers are needed to serve as either voting or advisory members of the recreation policy-making Recreation Commission. Interested individuals may also serve on one of the Commission's many subcommittees, or may choose to help plan or direct a variety of programs throughout the year. To offer your aid, call 609-799-2400.

- Volunteers in Probation needs individuals willing to be a friend and counselor to a troubled juvenile who has become involved with the police and the court system. Training is available for volunteers who pledge one hour per week to a child for one year. A call to 609-989-6260 will get you the details.

- The Riverside Elementary School PTO needs volunteers to share their expertise in science, music, art, or literature during special school programs. Volunteers may also help tutor children, or serve as a resource in their field of expertise for the school's teachers. Call 609-924-5600 to lend a hand.

The next three volunteer positions were provided to the HOTLINE by the United Way of Somerset Valley. To learn more about any listing, contact each agency directly.

- The Easter Seals Adult Training Centers need caring individuals willing to assist instructors in any of the five program areas for retarded adults in a prevocational setting. Volunteers could become involved in kitchen work, arts and crafts, ceramics, woodworking, personal awareness, and daily living skills. Call 201-363-6677 for more information.

- Middle Earth is a Somerville-based group that teaches decision making and self-awareness skills to teenagers. Volunteer threshold counselors accompany small groups of teens on weekend retreats, where they can participate in a program designed to help change their self-conception. To lend your support, call 201-725-7223.

- Vision of Peace, Incorporated is seeking volunteers to do research or office work. Individuals willing to speak at schools are also

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being sought. Call 201-271-1506 for the particulars.

The following volunteer posts were supplied by the Voluntary Action Center of Middlesex County. For more details about any listing, contact the VAC at 201-249-8910.

- An agency that serves the handicapped is seeking both writers and photographers to develop a slide presentation, while another group needs writers and graphic artists to develop a brochure. A wide variety of agencies are also need public relations assistance. If you think you can help tell their stories, call the VAC.

- Volunteers are needed to participate in a speaker's bureau on diabetes. The organization will train all volunteers, and can provide sample topics, slides, and other materials to illustrate your talk. To get involved, begin by talking to the VAC.

- A foundation that makes dreams come true for terminally ill children needs fundraising volunteers. The group meets every third Tuesday in the North Brunswick library.

- A master of ceremonies, a house manager, a stage manager, and registration desk workers are being sought for a teen arts festival, scheduled for May 28 through 30.

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.

Tour Guides

It was standing room only for the PPL tour program during the first three months of 1985, as a total of 1,217 visitors got a glimpse of the laboratory's experiments. March was the high-water mark of the period, as warming weather brought 691 visitors with it. Our thanks to the following staff members, who served as "leaders of the pack" during the start of our new tour year:

JANUARY
Charlie Ancher
Ernst deHaas
Robert Fleming
Naren Kokatnur
David O'Neill
Hal Wexler

FEBRUARY
Lee Benson
Kees Bol
John Bradish
Norton Bretz
Harold Bush
Diane L. Carroll
Dave Ciotti
John G. Edwards
Robert Fleming
Robert Forester
James French
Jeff Gettlefinger
Don Grove,
John Johnson
Naren Kokatnur
Benoit Leblanc
Dennis Mansfield
Dale Meade
Loran Meray
Ernst Neischmidt
David O'Neill
Michael Periera
Greg Rewoldt
Robert Smart
Irving Zatz

MARCH
Charlie Ancher
Jeff Alton
Lee Benson
Nelson Bowen
Charlie Bushnell
Diane L. Carroll
John Coonrod
Fred Dahlgren
Ernst deHaas
Anthony DeMeo
John Doane
Larry Dudek
Robert Ellis
Robert Fleming
Robert Forester
James French
Jeff Gettlefinger
Boris Grek
Phil Heitzenroeder
John Johnson
David Kaufman
Randy Knize
Naren Kokatnur
Don Knutson
George Levitsky
Thomas Locke
Peter Materna
Dale Meade
David Meyerhofer
Robert Mills
Don Monticello
John Murray
Donald McNeill
Ernst Neischmidt
Michael Periera
Allan Reiman
Ken Young
Neil Young
Irving Zatz
Howard Zuvers

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HOTLINE

PRINCETON PLASMA PHYSICS LABORATORY

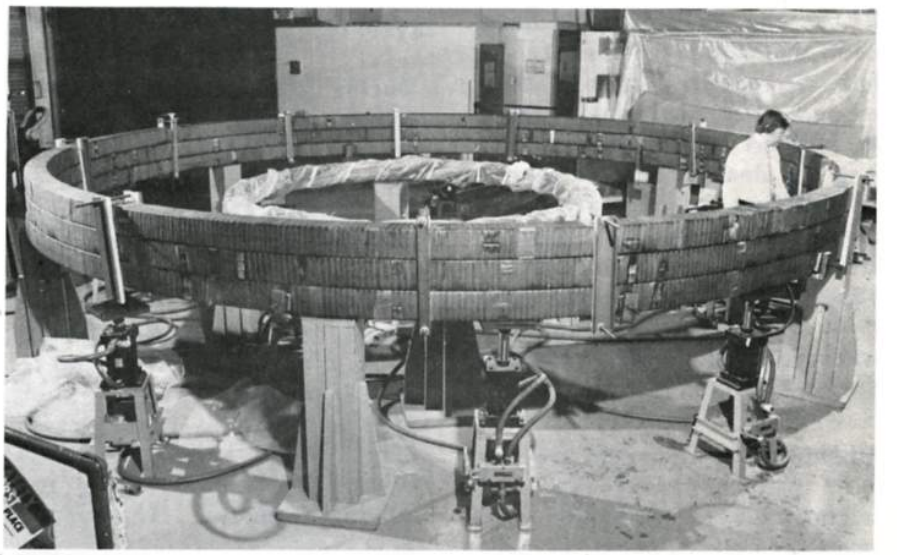
Vol. 6, No. 13 June 10, 1985

PPL CONTINUES WINDING ATF COILS

The PPL Coil Shop is busily fabricating coil windings for a major fusion device, but those coils won't be installed on any Princeton machine. Rather, the shop is completing vertical field windings which will be incorporated into the Advanced Toroidal Facility (ATF) at Oak Ridge National Laboratory.

The ATF is an advanced alternate concept. (For a description of the device itself, see the box on page 3.) Assembly of the ATF should begin in the latter part of this year, with final assembly and initial operation now scheduled for late 1986.

Due to the availability of tooling and facilities acquired during the TFTR large poloidal field coil manufacturing program, as well as the lab's experience in designing and building large coils, Princeton was invited to participate in the design and fabrication of the ATF vertical field (VF) coils. Many of the programs Oak Ridge sought in conjunction with the actual coil winding, such as quality control, had been established here during previous work on the TFTR large coil systems. Coil Shop engineers were instructed to approach the project as if it were their own, and to design the coils accordingly. Oak Ridge provided overall design parameters, and PPL added the engineering, cost estimates, and schedule to accommodate those conditions. The task included the design of the three coil pairs and their supports, fabrication of the coils, and fabrication of some additional supports. The total estimated cost for the project is $2.1 million.



Jim Chrzanowski, cognizant engineer for the ATF program, examines the outer vertical field coil bundle wound in the 1-K Coil Shop. The bundle consists of a trim coil "sandwiched" between upper and lower main coils.

The inner ATF VF coil weighs 1750 pounds and operates at 8.2 kA during steady-state operation, or at 16.4 kA in a five-second pulse. The mid VF coil, which weighs 4670 pounds, is only used during steady-state operation at a current of 12.75 kA. Each outer VF coil consists of two groups of two three-turn "pancake coils" connected in parallel, and one 15-turn "trim" coil. The "main" coils operate at 62.5 kA steady state, or 125 kA in a five-second pulse. The trim coils nominally operate at 15.6 kA.

The VF coil support system must counteract the attraction and repulsion forces the coils exert during normal machine operation. In addition to structural support, the system must allow the coils to be

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aligned to within 1 cm. Shim packets are incorporated throughout the design, with insulation providing two electrical breaks in the supports.

The ATF's outer main VF coil required an exceptionally large copper conductor, which made the winding process somewhat more difficult than coils previously wound at PPL. The ATF VF coils have been designed to operate at half current in a steady-state mode, or at currents as high as 125 kA in a pulsed mode. A great deal of heat is generated during steady-state operation, requiring high coolant flow rates. Approximately 1500 gallons of water per minute will flow through the water-cooled copper VF coils during this operational mode.

Once the final design for the ATF was approved, PPL was authorized to proceed with the VF coil fabrication program. The program is scheduled for completion in late September.

Since the main tooling was compatible, much of the equipment used for TFTR coil winding was used for the ATF project. For example, the TFTR winding mandrel was modified to permit ATF winding. This tooling compatibility, coupled with the availability of the large oven used for TFTR coils to provide heating, pressure bonding, and final curing for the ATF coils, resulted in a significant savings to the project.

The machine's VF coils are being fabricated from silver bearing extruded copper bars. The extrusions have a centrally located hole for cooling. Coolant hole sizes are tested for uniformity by rolling a ball bearing of specific diameter down the cooling passage for the entire length of each copper bar. The bars are then degreased inside and out and wrapped with Mylar and B-stage polyester-glass tape, which provides turn-to-turn insulation and bonds the turns together.

During the winding process, either a base plate or coil frame (depending on the coil being wound) is attached to the winding table. The end of a copper bar is clamped to the winding mandrel, and is wound under tension. The bars are connected by brazed joints; each joint is tension tested to 14,000 pounds per square inch (psi) and helium leak tested. Coil leads are induction brazed into place during the winding process. The wound coils are ground wrapped with additional insulation and are placed into a press-mold. The coil and mold are then heated and cured in PPL's large coil oven.

Once removed from the mold, each coil is cleaned again and receives a coating of ground plane varnish. Final acceptance testing is conducted, and the finished coils are crated for shipment to Oak Ridge.

The ATF project has had a minor impact on the Coil Shop schedule, absorbing only 20% of the shop's capabilities. The Coil Shop is accomplishing all its other tasks for PPL in parallel with ATF coil winding.

The inner VF coils will be shipped to Oak Ridge in June, followed by the outer coils in July. The mid coils will be shipped in late September.

Glenn Northey, lead ATF technician, monitors the winding of one of the main VF coils.

Advanced Toroidal Facility (ATF-1)

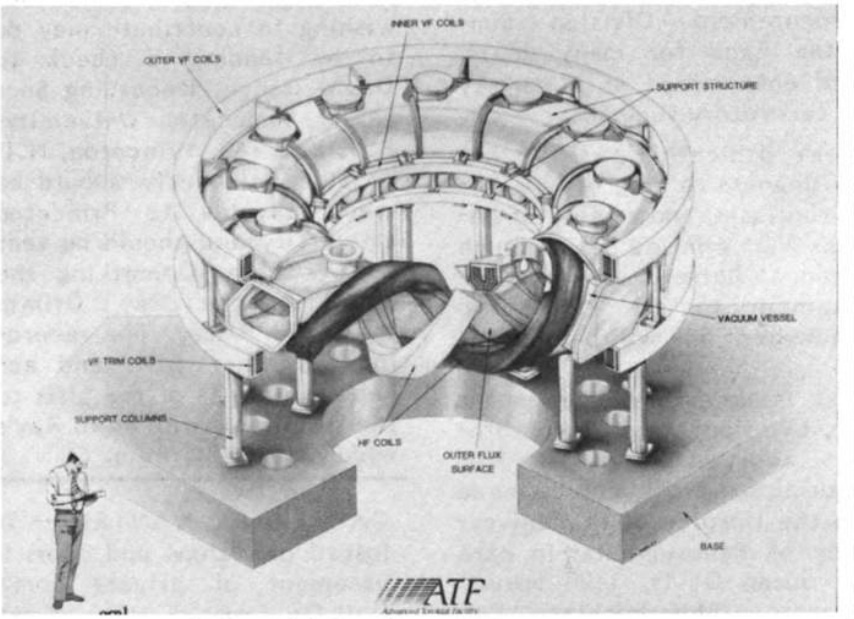
Oak Ridge National Laboratory proposed the Advanced Toroidal Facility (ATF-1) to the Department of Energy in late 1982. The new device is to serve as a replacement for the laboratory's Impurity Study Experiment (ISX-B) tokamak.

The ATF is based on the torsatron confinement scheme, a variation on the stellarator concept, which was originated at Princeton University in the early 1950's by Lyman Spitzer. In a torsatron, both the toroidal and poloidal fields are generated solely by helical coils. The ATF, a moderate aspect ratio torsatron, is designed to explore improvements in toroidal confinement. Emphasis will be placed on investigating the principles of high beta, steady-state operation, as well as reactor concept improvement. The device will have the flexibility to vary its configuration, providing fundamental information on the effects various configurations have on plasma performance.

The ATF coil system is being fabricated of water-cooled copper. The system consists of two helical windings of 14 turns each, and an inner, middle, and outer set of paired vertical field (VF) coils. The helical coils will be fabricated in upper and lower segments together with their support structure; the VF coils will be pancake-wound.

The ATF vacuum vessel will consist of 12 identical sections welded from 0.25-inch stainless steel plate. Two large ports will be provided at the top and bottom of the vessel, with another large port on the side. The ATF cost goal for major device fabrication is $20 million.

ATF is a torus with a 2.1 m major radius. It will operate at a magnetic field of 20 kilogauss for a five-second pulse, or 10 kilogauss steady-state.



The Advanced Toroidal Facility (ATF)

Effective immediately, all personal checks cashed in the Petty Cash and Emergency Travel Advance office must be made out to PPPL. Checks made out to M. Doran will no longer be honored.

The hours for the Petty Cash and Emergency Travel Advance office are from 9 to 10 a.m., and from 2 to 3 p.m. daily. The office is located in Room 107 of the 1-E Building.

This change also affects checks cashed at the Module II reception area from 8:30 to 10 a.m. and from 3 to 4:30 p.m. daily.

TRANSITIONS

The HOTLINE offers its congratulations to the following employees, who recently became proud parents:

Tom Steer of the Engineering Services Group, and his wife, Laura, of the Personnel Division, whose twin sons, Luke and Matthew, were born May 17;

Joe DiBartolo of Photo Lab and his wife, Judy, whose twin daughters, Jenna and Lauren, were born May 20;

Paul LaMarche of the Research Division and his wife, Deirdre, whose daughter, Casey, was born May 24.

The HOTLINE would also like to congratulate Howard Holzbaur, John Kane, and Marcos Paula, who all retired from laboratory service on June 1.

Obituary

Dolores (Dee) J. Rudy Hurley, 53, died May 6 following a lengthy illness.

Born in Detroit, Dee was a resident of Bensalem, Pa. She had been a laboratory secretary in the Procurement Division since 1978. During that time, she organized the entertainment portion of several Secretarial and Office Support Staff (SOSS) annual Secretaries' Week programs. She produced the comedy skit, "The Winds of PPL," for the 1983 program. She also composed and performed a variety of PPL-oriented songs, including "TFTR" (sung to the tune of "New York, New York"), which she reprised in inimitable fashion at last year's SOSS party. She also served as publicity secretary for the group during 1983.

Dee organized and ran the Procurement Division Sunshine Fund for many years, and entertained at a variety of laboratory functions.

Dee's dedication to PPL, her willingness to help others, her enthusiasm, and a sense of humor that allowed her to laugh even at herself, served as an example to all those who knew her. She will be missed.

Dee is survived by her mother, two daughters, two brothers, and two grandsons. Memorial donations may be made to the Hospice of the University of Pennsylvania, in care of Susan Davis, 3400 Spruce Street, Philadelphia, PA, 19104.

Ray Grimm Prize

In an effort to honor Ray Grimm, whose premature death last summer saddened many of his friends and colleagues, the Raymond C. Grimm Memorial Prize has been established. A Princeton University graduate student will be selected annually to receive the Prize, which awards significant achievement in computational physics.

A substantial contribution to the Prize has been made by Cray Research, Inc. In making the gift, the corporation recognized "the important contributions of Raymond C. Grimm in the area of computational plasma physics, and his support of the National Magnetic Fusion Energy Computer Center. We are pleased to participate in this tribute to a distinguished scientist and teacher."

Donations to this fund in Ray's memory are now being solicited. Any PPL friends wishing to contribute may do so by sending a check to David Dodge, Recording Secretary, Princeton University, P.O. Box 140, Princeton, N.J. 08540. All checks should be made payable to Princeton University and should be sent with a note earmarking the gift for the Ray Grimm Memorial Prize. The recording secretary will send acknowledgments of the gifts to the donors, as well as to Ray's widow, Elaine Grimm.

CARPENTER WANTED -- To install partitions and doors in basement of private home. Call Dr. Ernst de Haas at ext. 2290 if interested.

Right to Know Q & A

As of June 30, PPL must comply with the New Jersey Worker and Community Right to Know Act. The Act stipulates that all hazardous substances used in the workplace be properly labeled, and that employees working with these chemicals be trained in safe handling techniques.

Specific provisions of the Act are explained in question and answer form below. If you still have questions after reading these answers, call Ken Semel at ext. 2531 for more information.

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Q: Why do we have to spend time labeling all these chemicals?

A: The laboratory has no choice; the Right to Know Act was signed in 1983, and became law in August of last year. Therefore, the labeling program is now mandated by state law.

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Q: Is this something new for PPL?

A: Not really. The laboratory has been conducting a chemical training program since October 1983. In fact, the Occupational Medicine and Safety Division (OM&S) has already compiled a list of items commonly used at PPL which contain chemical substances appearing on the N.J. Workplace Hazardous Substance List (WHSL).

Q: Does OM&S determine whether a substance is hazardous or not?

A: No; that determination has been made by the New Jersey Department of Health, which published the WHSL. However, a substance or compound not appearing on the list doesn't mean that no hazard exists. For more information, contact OM&S, ext. 2531.

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Q: Who's responsible for making sure everything is properly labeled?

A: Division heads are responsible for making sure the program is followed. Line supervisors must be sure all substances on the WHSL being used in their area of responsibility are properly labeled. Line supervisors must also ensure that their employees receive proper training in the use of these substances, and that Material Safety Data Sheets (MSDS) are available for their personnel.

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Q: Why does Materiel Control need the labeling information?

A: Because Materiel Control is responsible for making sure all incoming shipments of chemical substances, as well as all such materials signed out from the stockrooms, are properly labeled.

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Q: Then what will OM&S be doing?

A: Keeping PPL's MSDS and hazardous substance list updated; reviewing incoming requisitions and identifying contents and Chemical Abstract Service Numbers (CASN) to the user and to Materiel Control for labeling; conducting training sessions for employees; and auditing the laboratory's compliance with the Act.

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Q: What information has to be on the label?

A: The chemical ingredients of the substance, and the CASN for each ingredient. In the case of mixtures, the chemical ingredients and CASN for the five most predominant substances must be listed.

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Q: What if I find a container full of some unknown chemical?

A: It must be labeled "Contents Unknown" or "Contents Partially Unknown," as appropriate, by June 30. If the contents of the container are identified at a later date, however, the label should be changed in accordance with the Act.

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Q: What kind of labels do I need?

A: That's up to you. The way the chemical containers are labeled is up to the individual. Self-adhesive labels, available through the stockrooms, are one suggested way of attaching the information to the containers.

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Q: Is there a deadline for this labeling to be completed?

A: Yes. By June 30, all containers holding any hazardous substance from the WHSL must be labeled. And by August 29, 1986, every container holding any chemical must be labeled, regardless of whether the chemical inside it is on the WHSL or not. These deadlines can't be delayed, since they were mandated by the Act.

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Q: What kind of employee training are you talking about?

A: Employees must be trained about the health risks of hazardous chemicals, as well as the safe procedures for handling hazardous substances. Training courses will be coordinated by the Industrial Hygiene Section of the OM&S Division.

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Q: Where can I get copies of the MSDS for my employees?

A: MSDS are available at the stockrooms or from OM&S for stockroom items. All other MSDS are available from OM&S.

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Q: How are these procedures being distributed?

A: Health and Safety Directive (HSD) 5014.1 explains the program, and will be distributed shortly. This new HSD replaces an old HSD, which has been deleted. If you are not an HSD recipient, contact OM&S, ext. 2531, for a copy or for further information.

Spring Cleaning

Spring time is cleaning time. How much time you invest in making your house beautiful is up to you. However, safety should dictate how much you do to clean away clutter, remove unnecessary flammable materials, improve your storage areas, and fix potential hazards. You should also take steps to avoid injuring yourself while making your home safer.

Here's a checklist to help you through this task:

- Dress for the job. Wear protective equipment -- safety shoes, goggles, gloves, and so on -- when needed.
- If children are around, keep them supervised while you're busy.
- Don't leave buckets of liquid unattended, not even "just for a minute."
- Some liquid cleaners and solvents produce harmful vapors. Read labels carefully and use these only in well-ventilated areas.
- Use all cleaners as directed on the label only. Never mix cleaners.
- Oily rags should be placed in a tight-fitting tin can. Store the can in a cool place where the rags won't ignite.
- Be careful with what you put in a clothes dryer. Some rubber articles can burn. Check the label to be sure.
- Use self-polishing or non-skid waxes on floors to prevent falls.
- Don't carry so much that you can't see where you're going.
- Stairs should never be used for temporary storage.
- Make sure you know how to lift heavy objects. Bend your knees!
- Never use boxes, chairs or other makeshift ladders. Be sure ladders are placed firmly.
- Test your smoke detectors to make sure the batteries are still good.
- Apply decals to large glass panes that could be mistaken for open doors.

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

Security Checkpoints

In order to maintain the safe environment of the Forrestal Campus for employees and guests, specific rules and motor vehicle regulations have been established. Speed limit signs have been posted, stop signs have been placed in areas where the protection of pedestrians and motorists is required, and handicapped parking space signs have been allocated according to the New Jersey motor vehicle statutes.

In complying with New Jersey motor vehicle law, the Security Department has endeavored to protect the well-being of the laboratory staff. One of the Security Department's growing concerns for individuals driving through the facility is the moving violation of tailgating.

Tailgating is a serious safety hazard to all motorists. Accidents occur within seconds; keeping a safe distance from other moving vehicles could prevent serious injury to yourself, as well as to the other drivers sharing the road with you.

According to Section 39:4-89 of the state motor vehicle law ("Distance between Vehicles"), "The driver of a vehicle shall not follow another vehicle more closely than is reasonable and prudent, having due regard to the speed of the preceding vehicle and the traffic upon, and condition of, the highway."

Let's all show reasonable and prudent regard for our fellow employees by keeping a safe distance from each other while driving.

OSHA Violations

The following safety reminders are drawn from a list of common OSHA (Occupational Safety and Health Administration) violations:

- Protective eye and face equipment shall be required where there is a reasonable probability of injury that can be prevented by such equipment.
- Respirators shall be stored in a convenient, clean, and sanitary location.
- Where the eyes or body of any person may be exposed to injurious corrosive materials, suitable facilities for quick drenching or flushing of the eyes and body shall be provided within the work area for immediate emergency use.

Photography Exhibit

An exhibit of photographs taken by New Jersey freelance photographer Clem Fiori are on display in the Dorothy Brown Room at the Princeton University League headquarters, 171 Broadmead, weekdays from 9 a.m. to 1 p.m.

The exhibit, which includes abstract close-ups of natural materials as well as photos of rural New Jersey landscapes, will run through June 7.

Dr. Fisch Wins Guggenheim Fellowship

PPL research physicist Nathaniel J. Fisch has been selected to receive a one-year Guggenheim Fellowship from the John Simon Guggenheim Memorial Foundation.

Approximately 3,500 applications for Guggenheim Fellowships were received this year. The 270 candidates who were awarded fellowships were chosen by a seven-member panel of experts in a variety of fields. Selections were based on an applicant's past work, as well as potential future achievement.

Each applicant was required to outline a proposed area of research to be investigated during the Fellowship term. In Dr. Fisch's case, he will be determining whether solutions derived in plasma physics might be applicable to other physics problems.

Dr. Fisch received his bachelor's, master's, and doctoral degrees from MIT, where he also did his postdoctoral work. He became a member of PPL's Theory Division in September 1978 and is currently investigating transport in driven systems.

FOR SALE -- Public address system, eight channel stereo board with two cabinets. Asking $500. Call Eric in Graphic Services, ext. 3370.

Library Joins Computer Age

A new computer terminal coupled with a "smart modem" has made the PPL library's computerized literature searches much easier to complete. But despite the increasing automation of their operation, maintaining the "user friendly" atmosphere remains a top priority for the library staff, which includes PPL head librarian Jane Holmquist, assistant librarian Rhoda Stasiak, special collection assistants Sharon Brown and Joan Eisenberg, and typist Michi Nakayama.

DOE/RECON and NASA/RECON are two of several database systems the library can access to answer reference questions or perform literature searches. These computerized searches are an increasingly popular library service. A total of 460 searches were performed in 1984, compared to 308 searches in 1983 -- a 50% increase. The capability is especially useful to the physicist or engineer writing a review article, the graduate student starting his thesis research, or to the individual who simply needs to complete a reference citation.

In addition to saving time, head librarian Jane Holmquist feels that the process of formulating the search request helps the user focus more precisely on the specific information required.

DOE's ENERGY DATA BASE, the file the librarians use most, is compiled by the Technical Information Center in Oak Ridge, TN. It includes energy-related journal articles, technical reports, patents, books and conference papers. These can be retrieved using subject terms, title words, report numbers, journal titles, and personal names, singly or in various combinations.

The DIALOG database system covers a much broader subject spectrum than does DOE/RECON. The DIALOG files searched most frequently include INSPEC (the online equivalent of Physics Abstracts, Electrical and Electronics Abstracts, and Computer and Control Abstracts); NTIS (the National Technical Information Service's database); SCISEARCH (the online equivalent of Science Citation Index, which is useful for discovering who has cited a particular journal article); and BIOGRAPHY MASTER INDEX.

The RLIN (Research Libraries Information Network) database is the online cataloguing tool of over 30 major research libraries throughout the country, including Stanford, Yale, and the New York Public Library. Princeton University has used RLIN to catalogue its collection of monographs and serials since 1980.

PPL's library has reciprocal borrowing agreements with the other research libraries using RLIN. It takes approximately one month to obtain a book by interlibrary loan.

That time can be shortened to two days if the book is located in a branch of the University library.

"Using RLIN is like looking through a card catalogue of all the member libraries' combined holdings," Jane explained. The process not only saves time, but provides a much more comprehensive and sophisticated search than could be accomplished previously.

The costs for searches on the DIALOG databases generally range from $15 to $25, and are charged back to the requestor's cost center. The library absorbs the costs for searches on DOE/RECON, NASA/RECON, and RLIN. For more information on the searching process, or to arrange to have a search done, call Jane at ext. 3567 or Rhoda at ext. 3566.

Computerization hasn't supplanted the library's traditional use of "hard copies," however. Last year, lab employees borrowed over 4500 books, journals and reports from the library's collection of approximately 10,000 bound volumes, 18,000 technical reports, and 29,000 microfiche holdings. An additional 1500 journals and books were obtained for their use on intralibrary loans from the Princeton University Library system.

The library's timely cataloguing and indexing of pertinent journal articles and reports complements the computerized databases nicely. Along with the library's Monthly Bulletin and Acquisitions List, the cataloguing service helps PPL researchers keep current with the latest plasma physics/-nuclear fusion literature. The time-consuming cataloguing of individual journal articles

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and laboratory reports constitutes a resource not routinely available from most libraries. The PPL system is so efficient it can often provide journal references six to eight months ahead of the DOE/RECON database.

The library's collection of books, journals and reports has developed over the years in support of the laboratory's research program. Jane emphasized that she welcomes suggestions for new acquisitions from library users in order to maintain a collection relevant to the laboratory's mission.

Stress Testing

Last summer a 46-year-old man felt excruciating pain across his chest while playing a weekend game of golf. In certain circumstances, the events that followed could have led to coronary bypass surgery. But this man was lucky -- he didn't have the surgery.

That weekend golfer was given a stress test in an effort to check the condition of his heart. The test revealed some changes in the man's heart while he exercised, but none specific enough to determine whether the man was suffering from coronary artery disease. That's not so rare; forty percent of all regular stress tests are inconclusive or inaccurate.

In the golfer's case, however, a second stress test was ordered -- this time with radioactive tracer thallium-201 injected into his bloodstream so his heart could be "photographed."

Thallium-201 was developed in the early 1970's at the Department of Energy's Brookhaven National Laboratory in New York. Prior to that time, there was no radioactive isotope available that was both readily producible and medically useful for imaging the heart.

Within five minutes after injection, thallium-201 disappears from the blood and is deposited in the muscles, which include heart tissue. A radiation reading camera tracks the isotope and measures its accumulation in tissue. During a scan, thallium-201 will not accumulate in sections of the heart that are receiving insufficient blood supply. Rather, it accumulates at the sites of blockages preventing blood from reaching the heart, allowing them to be pinpointed.

The thallium tests also tell if a patient with heart disease is a good candidate for coronary artery bypass surgery. If the scan shows that the heart muscle can accumulate thallium from its blood supply, bypass surgery may be helpful. In the golfer's case, thallium-201 ruled out heart disease as the source of his pain.

Thallium-201 is used 370,000 times a year for heart imaging. Because the demand for the isotope is so great, the technology for its manufacture has been transferred to industry. Thallium-201 now has a $30-million market, which is growing by about 10 percent per year.

The clinical work with thallium-201 is one more example of how the Department of Energy supports basic and applied research that benefits all Americans.

United Way

AT WORK

Planning a Safe, Fun-Filled Vacation --

If your vacation plans include travel, take along a few tips from the United Way-Princeton Area Communities:

- Be sure to make advance reservations for motels and hotels wherever you plan to stay -- including places where you'll stop along the way.
- If driving, have your car serviced before you travel. The money you might have to spend to make sure your car is running properly before you leave will pay dividends by avoiding the unnecessary delays and aggravation a breakdown on the road can cause.
- If flying or taking the train, don't get left behind. Arrive early at the airport or station, with tickets in hand. Don't wait to pick them up just before you depart; delays at the station may derail your vacation before it begins.
- Children require special care when traveling. Make sure you take frequent exercise breaks during your trip. Bring toys and a supply of childrens' medicines. And remember that a young child travels safest in a specially designed infant's or child's travel seat.
- It's best to leave pets with a friend or at a kennel. If you must travel with your

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pet, be sure to call ahead to find out if your hotel allows pets. While on the road, keep your pet on a leash or in a travel kennel. Never leave a pet inside a parked, enclosed car -- heat stroke is a killer. And be sure to interrupt your driving with planned stops to water and walk your pet.

- Traveling overseas? Get your passport in the off-season (spring, autumn, or winter). Do not wait until summer, when the large volume of requests may delay the processing of your application from six to eight weeks.
- International travelers should be aware that some countries, such as Spain and Austria, do not recognize United States driver's licenses. Other countries require special medical insurance for travelers. Your travel agent or local auto club can alert you to the special requirements of the country you're visiting, and provide information on obtaining international driver's licenses.
- Remember to bring emergency provisions (medications, copies of prescriptions, an extra pair of eyeglasses, extra traveler's checks, etc.). Pack them in your carry-on baggage when you fly so they're easily accessible.
- Be sure someone back home knows how to reach you in case of an emergency.

If you are stranded out of town, you can contact the information and referral service of the local United Way where you are for information and help.

Home Fire Hazards

As the saying goes, "There's no place like home." But that easy familiarity can breed a wealth of hazards if we allow our fire prevention guard to drop when we leave the office. You can keep your "castle" from turning to cinders by observing these simple home fire rules:

- Take the time to prepare a home escape plan, which should include at least two exits from any room in case of fire. Then establish a regular schedule for practicing Exit Drills In The Home, or EDITH.
- Be sure smoke detectors are installed on each level of your home, with one outside each sleeping area. You should be able to hear the detector signal even when the bedroom door is closed. Once the detectors are installed, don't forget to test them frequently; replace low or dead batteries immediately.
- Smokers are responsible for more fatal home fires than any other cause. If you smoke, use large, deep ashtrays, and dump ashes into a metal can when cleaning up.
- Approximately 70,000 fires in the United States are caused each year by children playing with matches. Keep matches from the reach of curious little ones.
- Make sure all flammable liquids (such as kerosene, or the gasoline for your lawn mower) are stored in safety containers far from sources of heat or flame.
- Never operate electrical switches with wet hands, and don't use electrical appliances while in the bathtub, while standing in water, or at any other wet location.
- The kitchen can be the most dangerous room in the house when it comes to burns. Toddlers should be in a playpen (rather than underfoot) while older family members are cooking. Turn pot handles inward so that inquisitive kids won't be tempted to grab them. Smother a pan fire with a lid· never use water or flour.

Grad School Roundup

Princeton University's Department of Astrophysical Sciences has attracted a "prize" group of students for the fall 1985 semester in the Plasma Physics section. Of the eight students who accepted admission offers, six have received a variety of fellowships.

Two incoming Plasma Physics Department students, John Cuthbertson and Mark Bannister, were among six students across the country who won the Oak Ridge Associated Universities' (ORAU) Magnetic Fusion Science Fellowships. Sponsored by the DOE, these three-year awards are available to college seniors and first-year graduate students. Each Fellowship provides full tuition, a $12,000 per year stipend, and

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a practicum at a major fusion laboratory during the summer following the first academic year. Incoming student David Ward of Arizona State received Honorable Mention from the ORAU in the fellowship competition.

ORAU also sponsors a similar set of Fusion Technology Fellowships. One of this year's winners is incoming student Donald Roberts from the University of California at Irvine.

Other entering students bringing fellowships to Princeton with them are Arif Babul, Alain Brizard, and John Bowman. Each has received a fellowship from Canada's National Science and Engineering Research Council.

Chang Hee Nam, a second-year student, is one of 20 students named as recipients of a Josephine de Karman Fellowship. First-year departmental graduate student Edward Powell is also a new award winner, receiving a three-year fellowship from the National Science Foundation.

Changes have also been occurring in curriculum. Beginning next spring, the Department of Physics will offer a new plasma physics undergraduate course. The course, which will be cross-listed with the Department of Mechanical and Aerospace Engineering, will be taught by lecturers Robert Goldston and Paul Rutherford.

On the graduate level, an expanded Program in Plasma Science and Fusion Technology will be offered this fall. The program, headed by Robert Mills, spans the five departments in Princeton's School of Engineering and Applied Science (SEAS). It offers PPL-funded opportunities for doctoral and master's degree research by SEAS students, as well as cooperative projects with SEAS faculty.

Guinea Pigs

FREE TO GOOD HOME -- Healthy adult female Abyssinian guinea pig. Comes with all accessories and three months' supply of food and litter. Call Meg Gilbert in Personnel, ext. 2036.

Volunteers: People People

The following volunteer opportunities were submitted to the HOTLINE by the Princeton Area Council of Community Services, a member agency of the United Way-Princeton Area Communities. For further information on any volunteer position, contact each agency directly.

- The Catholic Welfare Bureau of the Diocese of Trenton is searching for painters, maintenance assistants, groundskeepers, and general contracting assistants. Call 609-394-5181 to offer your aid.

- The Delaware-Raritan Girl Scout Council is seeking men and women over age 18 to serve as Girl Scout troop leaders. Leaders conduct one weekly meeting with 10 to 15 girls, plan activities, and organize occasional weekend outings. Volunteers to serve as day camp counselors (training provided) and program consultants, as well as members of the Council's various committees, are also needed. For more details, call the Council at 800-576-2656 or 201-738-8200.

- The E.R. Johnstone Training and Research Center is a co-ed state residential facility for handicapped adolescents and young adults ages 13 to 30.

- Volunteers who will take students on community shopping trips, act as host families for students, or sponsor an off-campus activity are needed. For information on these and other volunteer positions at the Center, call 609-289-2500.

The next three listings were provided by the United Way of Somerset Valley. To learn more about any listing, contact each agency directly.

- The Adult Day Center of Somerset County is looking for volunteers to work with a disabled older adult on a one-to-one basis. Individuals willing to serve as speakers or entertainers would also be welcomed. To lend a hand, call 201-356-1302.

- The Raritan Valley Chapter of the American Red Cross is seeking volunteer help with the Chapter's blood, handicapped riding, and swimming programs. Assistance is also needed for the motor service, social services, and the first aid and CPR courses. If you can help, call the Red Cross at 201-725-2217.

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- The Jerry Davis Early Childhood Center for Handicapped Children needs volunteers willing to work on water adjustment and swimming with individual children in a pool. Assistance in the classroom activities of handicapped preschool children is also being sought. To share a little of yourself with these youngsters, call 201-658-4359.

The following volunteer posts were supplied by the Voluntary Action Center of Middlesex County. For more details about any listing, contact the VAC at 201-249-8910.

- A national charitable organization needs telephone volunteers in the afternoons, evenings, and on weekends. Volunteers may place calls from their home or office. To make the connection, call the VAC.

- A group monitoring the enforcement of fair housing statutes needs fair housing testers. Testers attempt to secure housing, and report back on the treatment they receive. To begin house-hunting, call the VAC.

- Many charitable organizations need drivers to transport elderly or disabled clients to shopping or for medical treatment. Start your wheels spinning by calling the VAC.

The next volunteer opportunities were supplied by the Voluntary Action Center (VAC) of Morris County. Additional information on any listing is available by calling the VAC at 201-538-7200.

- Since there are no classes and few staff around, weekends can be a very lonely time for handicapped, wheelchair-bound youngsters in a residential treatment center. Your short visit one Saturday or Sunday per month can make a big difference to these children. To become a youngster's "special someone," contact the VAC.

- A volunteer administrator is being sought to advise a small child care organization on the process of incorporating community help. Prepare a needs assessment, plan of action, staff orientation plan, and training schedule. Implementation of your plans will be the responsibility of the group, and hours can be tailored to your needs. If you think you'd fill the bill, contact the VAC.

Students seking experience and/or possible college credit this summer are encouraged to register their interests with the VAC. At present, there is a need for a computer operator, environmental and legislative researchers, and a public administration planner. Hours are during the day in a central office location. For more details, call the VAC.

Safety Training

The following Health and Safety training courses are scheduled for July:

Course	Responsible Instructor	Date Scheduled
● Chemical Handling	K. Semel Ext. 2531	To be announced
● Fire Extinguisher Training	S. Larson Ext. 3166	July 9 and 23 2-3:30 p.m.
● Basic First Aid	S. Larson Ext. 3166	July 15, 17, and 19 1-3 p.m.
● Self-Contained Breathing Apparatus	S. Larson Ext. 3166	July 17 9:30-11:30 a.m.
● Cardiopulmonary Resusitation (CPR)	S. Larson Ext. 3166	July 22, 24, and 26 9 a.m.-noon OR 1-4 p.m.

Employees must obtain permission from their immediate supervisor to attend these classes. Supervisors must call the responsible instructor to enroll their employees.

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