

Tritium Arrives at the Laboratory

A Long-awaited Milestone Achieved

For most PPPL staff members, Thursday, April 29 was a routine day at the Lab. Yet a very important milestone was achieved as quietly and without fanfare the Laboratory brought tritium on site. This milestone is the result of nearly two years of intensive effort and nineteen years of preparation for deuterium-tritium (D-T) experiments in TFTR.

Emphasizing the importance of this milestone, Richard Hawryluk, Head of the Tokamak Fusion Test Reactor (TFTR) Project, which will use the tritium, said, "Successfully bringing tritium on site and beginning tritium systems testing is an important step in executing the deuterium-tritium (D-T) experiments, which will be started this fall. The D-T experiments will be a landmark in energy research. We expect to produce about 10 megawatts of fusion power in pulses of about one second, and we expect to learn how the energetic alpha particles interact within the D-T plasma."

Continued Hawryluk, "We got the go-ahead after a comprehensive subcontractor Operational Readiness Review (ORR) in early April. They recommended unanimously and without reservation that we were ready to bring tritium on site. Our readiness reflects a tremendous team effort by the Laboratory and by our colleagues at other Department of Energy tritium laboratories who have provided critical tritium expertise."

"PPPL is especially indebted to Jim Anderson of Los Alamos Na-



The truck carrying tritium moves through the gate on to D-site, escorted by security.

tional Laboratory. Jim joined TFTR just this past year as Head of all TFTR Tritium Activities and brings years of experience as Head of the Tritium Systems Test Assembly at Los Alamos. The contributions of Anderson, Dick Carlsen and John Koone were essential to the preparations which led to the successful contractor Operational Readiness Review that resulted in unanimous approval to begin systems tests with tritium," added Hawryluk.

Charlie Gentile, Test Director for the arrival of tritium said, "We had practiced the steps for bringing tritium on site six times, so we were very well prepared. For one practice session, we even brought a similar truck on site. As a result, the performance of those involved was flawless, and the whole process went smoothly."

According to Tritium Engineering Branch Head Bob Sissingh, the

trace amount of tritium now on site—200 Curies or two-hundredths (0.02) gram of tritium in deuterium gas—will be used to test the tritium handling and delivery systems. Additional trace amounts of tritium may be brought on site later this summer for testing purposes before the full amount of five grams is transported here for D-T Operations in the fall.

Said Sissingh, "The trace amount of tritium now on site poses no safety threat, and even the maximum amount of tritium we will have here is very small—50,000 Curies or five grams—weighing about as much as a penny. (At other sites, such as Los Alamos National Laboratory, millions of Curies of tritium are handled safely.) Nevertheless, we have taken every possible safety precaution, both to satisfy Department

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of Energy (DOE) regulations and to ensure everyone's peace of mind."

Since their original installation in 1982, the tritium storage and delivery systems have been modified and upgraded several times, as a result of changes in the D-T operations plan and schedule.

Said Sissingh, "The previous plan was to have tritium on board by 1988, but then, because of budget cuts, we went through a period where it was doubtful that we'd ever have tritium. Now, all the planning and hard work is beginning to pay off. With tritium available for testing, we'll be able to verify that all our systems are ready for D-T operations this fall."

Explains Sissingh, "Because our measurement capabilities for tritium amounts are so much more sensitive than those for deuterium, we will now be able to test our systems for efficiency and possible leaks with much greater accuracy than before."

Tritium Arrives on Site— Photos Tell the Safety Story

1. The truck arrives at PPPL shortly after noon on Thursday, April 29.

2. After paperwork is completed at the gate, the truck stops just inside the C-Site grounds for the first safety check.

The size of the truck belies the tiny amount of tritium inside. (This truck was used not because of its size, but because it is licensed to transport radioactive materials.)

The first safety precaution is the taking of a "smear" or "swipe" of the rear truck doors which is then analyzed by Health Physics staff for radioactivity.

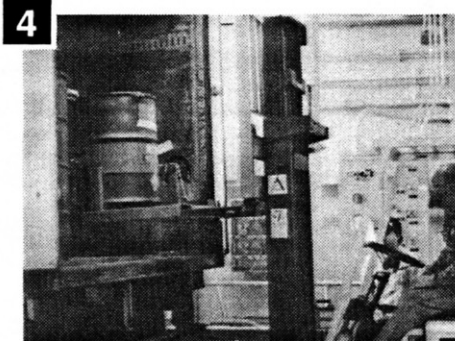
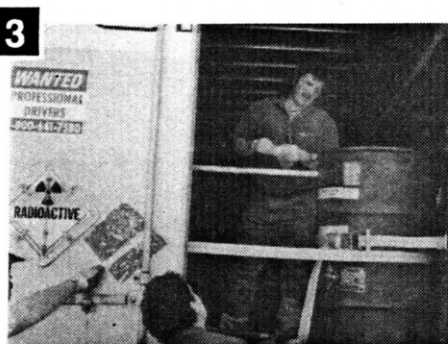
3. Next, the truck door is opened revealing one of the two shipping

containers, each of which contains a stainless steel vessel storing 100 Curies of tritium gas. (One is behind the door in this picture.)

Here, Health Physics Technician Carl Tilson prepares to take swipes of the actual shipping containers. No radioactivity is found.

4. The truck is backed up to the dock of the TFTR mock-up area where forklift operator Dennis Shaltis prepares to unload the tritium shipping containers.

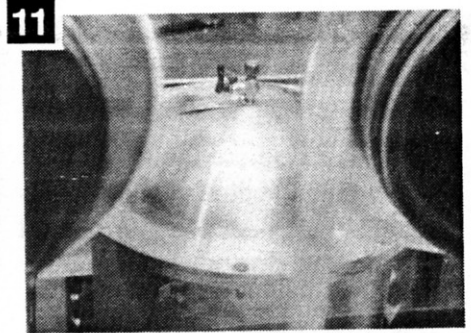
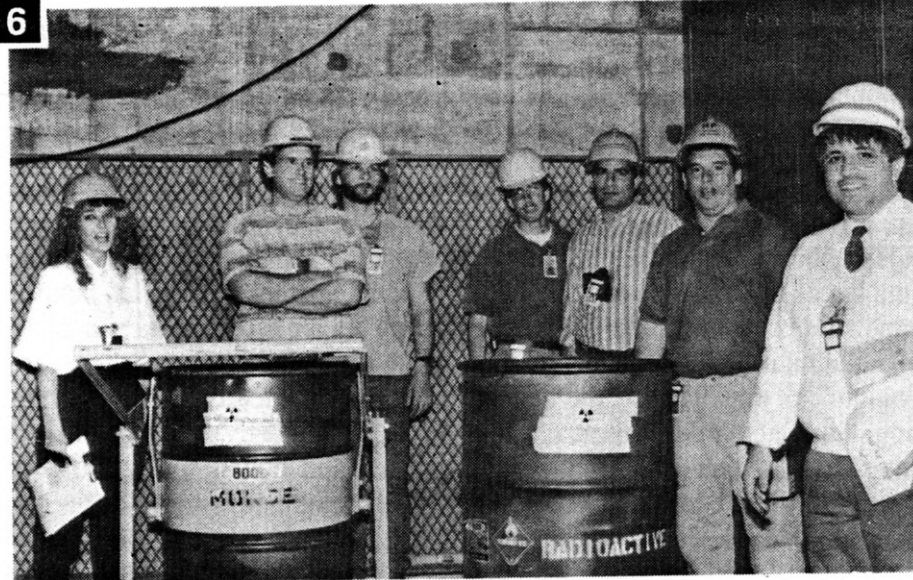
5. Next Cathy Saville of Health Physics, and Jim Anderson, Tritium Systems Division Head, inspect the security seals on the shipping containers.



6. The tritium shipping containers are next moved to the basement by elevator. Riding with the containers are, left to right: Cathy Saville; Tritium Operators Kent Young and Terry Harris; Tritium Shift Supervisor Mike Casey; Health Physicist George Acieone; Health Physics Technician Steve Williams; and Charlie Gentile, Tritium Operations Branch Head.

7. After being moved to the tritium area the containers are then placed on a plastic sheet. Here Bob Sissingh double checks the container labels.

8. Lloyd Ciebiera, Tritium Systems Technician, helps to hoist one of the tritium storage containers to the tritium area mezzanine for storage.



9. Finally, the other container is opened by Carl Tilson and a fifth set of swipes for radioactivity is taken. An "elephant trunk" is available to immediately vacuum up any tritium than might possibly escape.

10. Terry Harris helps lift the inner container (overpack) out of the shipping container. His cotton coveralls are for protection against tritium contamination. Masks are worn because the material insulating the inner container may be dusty.

11. The tritium container is placed in the tritium receiving glove box as shown.

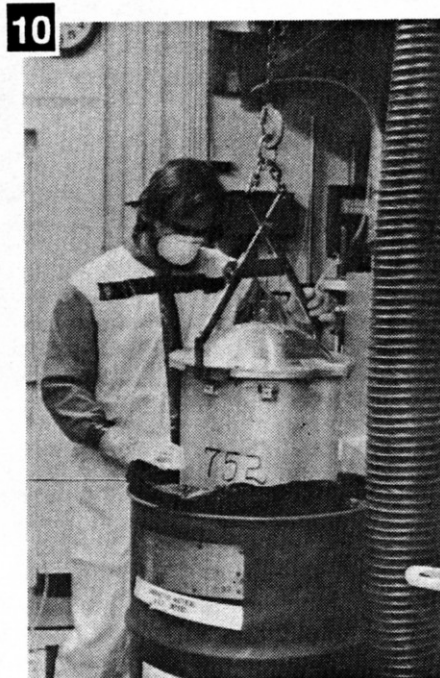
After being analyzed for isotopic content using the Quadrapole Mass Spectrometer (QMS), tritium is placed onto a uranium bed (not shown). There it is stored as uranium tritide until needed. (When heated to 350 degrees centigrade, the tritium once again becomes a gas and is available for use in testing the systems.)

Many Containment Levels in Tritium Storage Area

The tritium storage area includes multiple levels of containment for any possible leak of tritium.

In addition to storage in the uranium bed, the tritium is held within another 6 inch by 8 inch vessel in a vacuum, which acts as insulation and within which any tritium would be detected. The inside of the glove box is kept under slight negative pressure. A clean-up system attached to the glove box recirculates the atmosphere within the glove box and removes tritium.

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Photos: Chuck Cogbill and Bob Cislo

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Also, the tritium storage area is located in an isolated room with its own heating, ventilating and air conditioning (HVAC) system that would shut down immediately should the tritium monitor indicate a high level of tritium. A room clean-up system would be activated before any tritium gas could be released to the environment.

All the work currently being performed with tritium during the tritium systems test will be confined to the tritium area, according to Sissingh.

First Step to D-T Experiments

Emphasizing the importance of this milestone, Hawryluk said, "Successfully bringing tritium on site and beginning tritium systems testing is an actual first step in executing the D-T experiments. Years of hard work in design, fabrication, testing, writing procedures, and training were required to reach this beginning point."

Adds Hawryluk, "The challenge remains as we begin D-T experiments in the fall to discover new physics and technology while doing the experiments safely and without impairing the environment. We're off to an excellent start of a very exciting journey." ♦

CLASSIFIED

For Sale

Apple external floppy disk drive 800K (model MO131); like new; \$75.00. Contact Sara Flohr at 2882.

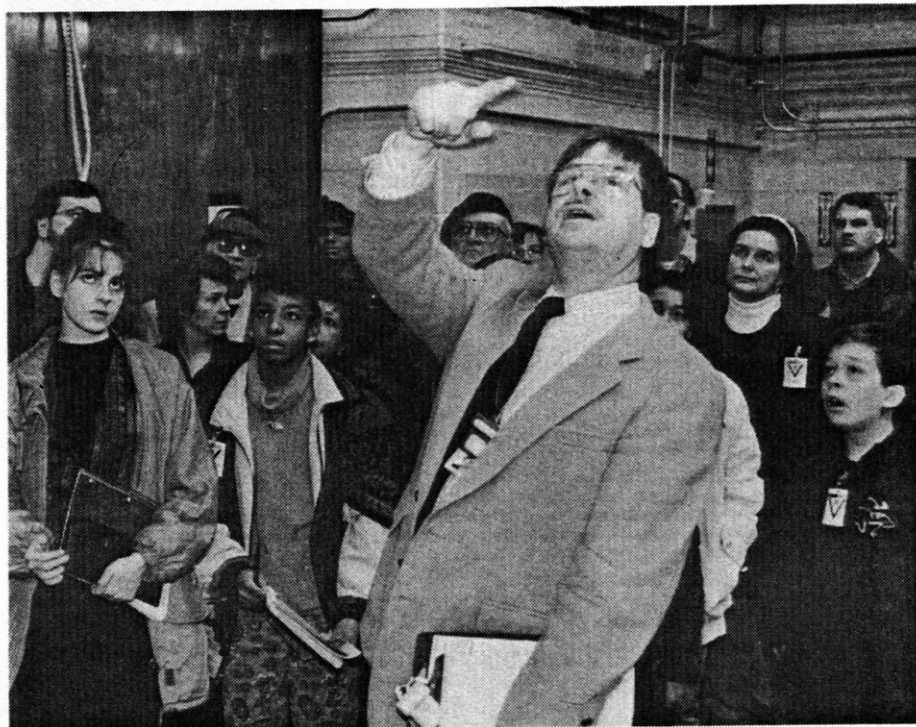
Science on Saturday Explores— From Merlin's Magic to Sports on the Moon to a Ride on the Space Shuttle to Gilligan's Isle

Merlin (alias Dr. Neil Tyson) cast his spell over 400 students, parents, and teachers this past winter, taking them on a magical tour of the universe. During the Laboratory's eighth annual Science on Saturday program, he mesmerized the audience with black holes, quasars, and the expanding universe. (Tyson, of Princeton University's Astrophysics Department, writes under the pen-name of Merlin for a syndicated newspaper column).

Tyson, who has written several popular books on science, was an ideal speaker for the Science on Saturday series. "He uses poetry and comedy to explain science to people in a funny and entertaining way," said Larry Lagin, a PPPL engineer/scientist who has chaired the Science on Saturday series for the last three years.

According to Lagin, "This year's series was very exciting to us all, with crowds of 300 to 400 people coming out to the nine lectures during January to March. We had crowds even for the five lectures held on days when it had snowed. That really says something about how strongly students feel about science and how important it is to their parents and teachers."

"It was interesting too that the audience was so diverse. Although most were high school students, a surprising number of parents, teachers, and siblings attended regularly as well," observed PPPL physicist Dr. Norton Bretz, who also chaired the series this year. "In fact, there was a dedicated contingent of retirees, many with a strong background in science, who came to every lecture and participated vigorously in the question period afterwards."



As a tour guide for Science on Saturday, PPPL Engineer Bob Woolley (center) had the opportunity to inspire many inquiring young minds on the subject of fusion—including that of his daughter Eileen, who regularly attended the series. Thanks to all the PPPL staff members who provided such tours.

Photo: Dietmar Krause

"However, it's not surprising we got such good audience response, because we were very fortunate to have some really great speakers," noted Bretz. "For example, students got to hear Bob Cenker tell them what it was really like to take a ride on the space shuttle. They also heard Professor Peter Brancazio of Brooklyn College explain the physics of sports by describing what different sports, would be like if played on the moon. Imagine waiting over a minute for a base hit to come down after taking a loopy-loop trajectory—a center fielder's nightmare!"

Added Lagin, "The speakers are real heroes for Science on Saturday. They come to PPPL for free and give their time because they really care about students and science in the U. S. Just imagine well-known physicist and chief scientist for NASA's COBE (Cosmic Background Explorer Satellite) experiment, Professor David Wilkinson of Princeton, sitting outside on the floor in the main lobby for hours after his lecture with over fifty parents and students, informally talking about careers in science. Yet that's what happened."

"Or think of Professor Rob Goldston of PPPL giving two lectures on fusion so that everyone attending could both go on the tour of the laboratory and also hear his talk. It really says something about how deeply these people feel," said Lagin.

"Kids also take away with them an impression that scientists can be very interesting and diverse people when they hear someone like Professor Warren Buck of Hampton University, who was our first speaker," observed Bretz. "Buck described to the audience how he took more than three years off from his job and sailed in the Caribbean, financing his travels by selling his original watercolor paintings. During that time, the

Professor even got stranded on a deserted island for six weeks—without Gilligan!"

Thanks for Transportation and Other Help

"In speaking with a summer student from Trenton High last year, we were told that he couldn't come to the series because he had no transportation," said Lagin. "This year, Norton and I were very happy to see the Science Education Program providing a bus to bring a group of students to the series; thanks to Sharon Sherman of Science Education for arranging the bus. Attending the talks really meant something to these kids. Perhaps some day they'll even be working here!"

"We'd also would like to thank some other people who made this program a success," added Lagin. "There was Pat Buggs of Information Services who was in charge of refreshments and who really helped out with the crowds. PPPL Security also did a terrific job in handling the crowds. Chris Ritter of Science Education had the thankless task of sending out over 600 mailings and also assisted on Saturday mornings. And of course, thanks to the American Vacuum Society who provided funds for refreshments."

Lagin and Bretz are just beginning to put together next year's series. Anyone with suggestions for good speakers and/or topics is invited to contact them. According to Lagan and Bretz, "The series could be even bigger and better. We have become very limited by the size of our auditorium and cafeteria. This past year, we began discussions with a public broadcasting station to broadcast the series and will be pursuing it further for future series."

Look for a bigger and better program next year—and some more magic on Saturdays! ♦

TRANSITIONS

Promotions

Jo Barbour has been promoted to Science Education Program Administrator in Science Education.

Linda Harmon has been promoted to Data Processing Assistant in Facilities Engineering.

Margaret King has been promoted to Data Processor in Facilities Engineering.

Scott Larson has been promoted to Head of Environmental Resources/Waste Management in Resource Management.

Andrew McInerney has been promoted to Senior Computer Operator in the Computer Division.

Karen Ossman has been promoted to Senior Computer Operator in the Computer Division.

New Hires

We welcome these recently hired PPPL employees in the following areas:

Environment, Safety, & Health
Steven Elwood, Jr. Health Physicist
Mac Hays, Safety Engineer

Catherine Iervolino, REML Technician

Raymond Juzefyk, REML Technician

Emergency Services Unit

Joseph Cartier, ESU Officer

Christopher Kolodziej, ESU Officer

Human Resources

Gregory Smith, Staff Assistant

Payroll

Penny Keister, Accounting Assistant

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What's Happening at PPPL?

Photo: Dietmar Krause



"When Scholars Leave Their Bowers for Gold" was the title of the fourth Robert A. Ellis Jr. Memorial Lecture given by Dr. William Happer (right) Director of the US DOE Office of Energy Research. Joining Happer at a reception before the lecture are: (left to right) Lisa King, Robert Ellis, III, Walter Ellis, and Victoria Ellis, widow of Dr. Ellis. One of the pioneers of magnetic fusion, Ellis' career at PPPL spanned more than 30 years.

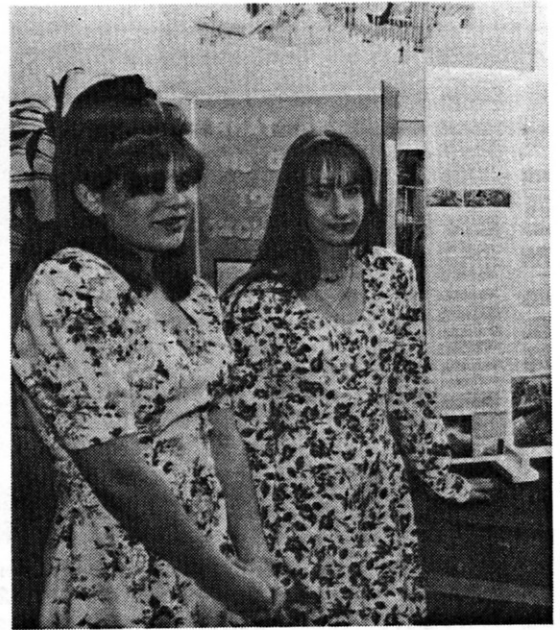


Photo: Dietmar Krause

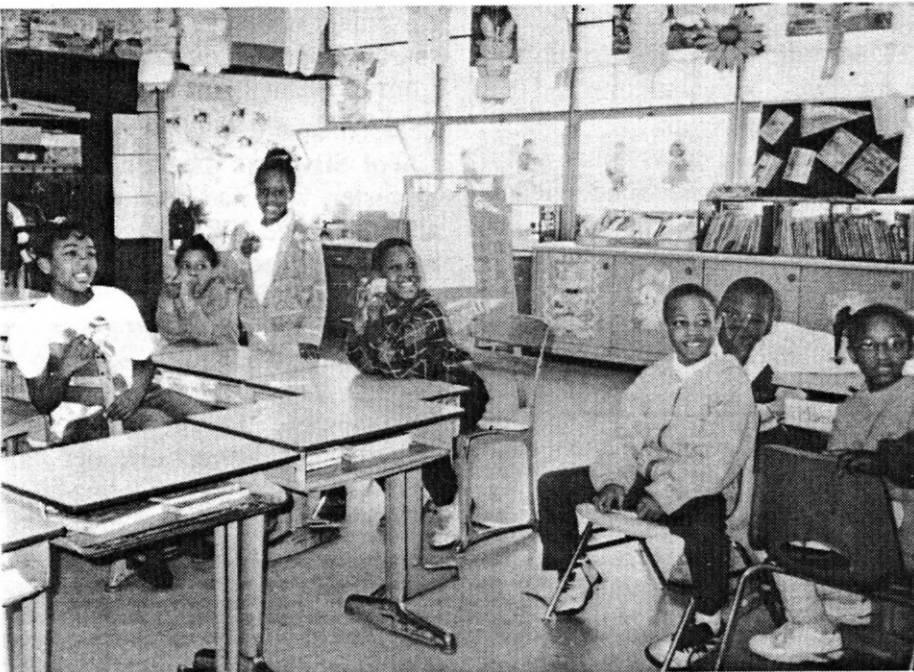
PPPL Deputy Director Dale Meade (left) provides a tour of TFTR for Mary Louise Wagner, Fred Tathwell, Judy Pensabene, Alex Flint, and Paul Barnett. Wagner, Pensabene, and Barnett are members of the Senate Committee on Energy and Natural Resources, which is chaired by Senator Bennett Johnston (D-LA). Flint is from the Office of the Senator Pete Domenici (R-NM), and Tathwell is from the DOE Office of Congressional Operations. The visitors came in April to learn about PPPL's research program in preparation for the Committee's hearing on fusion which took place May 5.



Shown organizing their science team are some of the 34 enthusiastic Cadwalader Elementary School teachers who voluntarily attended a Hands-On Science Education workshop presented by Sharon Sherman with assistance from Chris Ritter on April 17, the day after the science blitz. (see below.)



Holy Family School students Stephanie Klesitz (left) and Nicole Franchino—daughter of Joseph Franchino of the FED—displayed their Science Fair Project, titled "Fusion: Past, Present, and Future," in the LOB lobby on May 7. PPPL hosted students who were the Lab's science fair Corporate Award winners and special guests for lunch, a tour of the Lab, and an opportunity to display their projects here.



Physicist Manny Manickham, Theory Division, (right), works with Cadwalader School students in Trenton during a classroom "blitz." During such Science Education blitzes, 7 to 10 PPPL volunteers visit as many as 18 K-6 classrooms in one morning to do hands-on science projects with students. Contact organizer Tim Bennett at 2574 to volunteer!



Births

All the best to **Art Kolupanowich** of Neutral Beams and his wife **Toni-Jo** on the birth of their son **Travis** March 31.

Congratulations to **John Luckie** of Materiel Control and his wife **Kathleen** on the birth of their son **John** April 16.

Best Wishes to **Jim Scott** of ERWM and wife **Robin** on the birth of their son **Matthew** on May 5.

Retirements

Edna Kalmus, Staff Assistant in Facilities Engineering, retired May 1 after ten years at PPPL.

Edwin Tolnas, Lead Engineer in the Engineering Department, retired March 1, after 25 years at the Lab.

In Memory

Carl Oberman died on April 12. Oberman, who was a Principal Research Physicist when he retired from PPPL in 1990, had been with the Lab since 1955.

Carol Silvester died on May 19. Silvester, who had been employed at PPPL since 1980, was a Quality Assurance Technical Specialist in the QA Division.

HOTLINE

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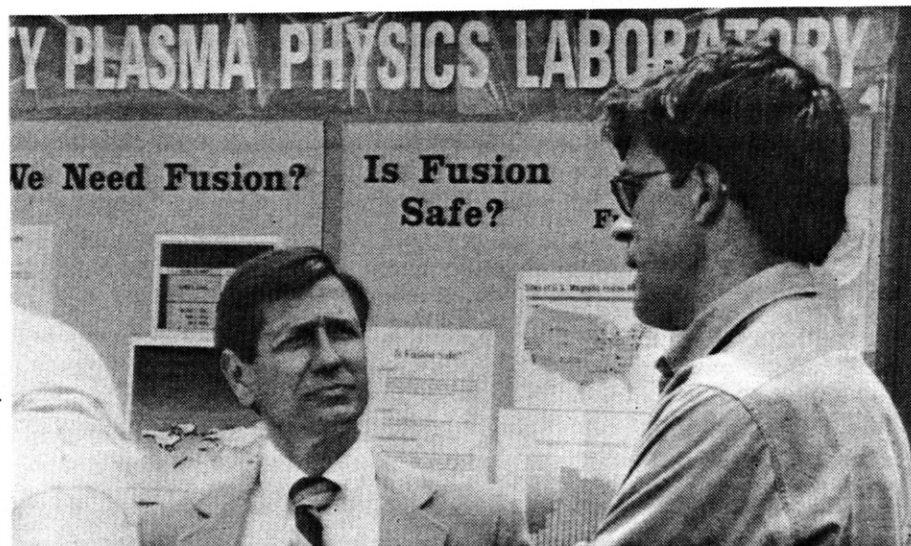


Photo: Carol Phillips

Theoretical Physicist Don Monticello (left) listens carefully to a question about fusion during Communiversality Day held April 24. Tony DeMeo, George Martin, Carol Phillips, John Schmidt, and Jim Sinnis also participated at the PPPL booth. Held in Princeton yearly, Communiversality Day is a festival of the arts that brings together the University and the Community.

PPPL Open House Is June 12

Volunteers Needed

Invite your friends and family to visit PPPL and tour TFTR between 10 am and 4 pm on Saturday, June 12. Hurry, hurry! It will be the last time TFTR is open for tours before deuterium-tritium operations begin.

Volunteers are needed to help with refreshments, displays, tours, and souvenirs. Says organizer Sally Connell, "Our volunteers have had a great time in the past, and we look forward to having our old friends back as well as new volunteers. We'd like to restrict the time volunteers work to two hours, so the more the merrier!"

If you can help, please call Sally at 2689 and indicate the time of day most convenient for you. ♦

Spirit of Philadelphia to Cruise the Delaware

All PPPL Staff Are Invited!

Come one come all to a gala excursion sponsored by the Recreation Committee on Sunday, July 11. The bus will leave B-Site at 11:30 am. Departing from Penns Landing, you and your friends will enjoy a two-hour cruise, complete with a delicious luncheon buffet and live entertainment! Arrival back at PPPL will be 4:30.

Cost is \$35.00 per person. **Deadline for purchasing tickets is June 10.** Please call Jim Conover at extension 2110 for tickets. For more information, call Rae Federico at extension 2014. ♦