

Hotline

The Princeton University Plasma Physics Laboratory is a United States Department of Energy Facility

Tritium is Recycled at PPPL

Tritium Purification System Will Reduce Tritium Shipments

New technology that recycles tritium at PPPL is expected to substantially decrease tritium shipments between New Jersey and South Carolina.

The Laboratory recently installed the Tritium Purification System (TPS) — a closed-loop system for purifying and reusing tritium — at the Tokamak Fusion Test Reactor site. The TFTR is the first magnetic fusion device in the world to perform experiments with a 50/50 ratio of deuterium and tritium — the fuel mix to be used in commercial fusion power plants of the 21st century.

The TPS, which underwent an Operations Readiness Assessment in March, is expected to be fully operational this month.

Outstanding Job

Said PPPL Director Ronald C. Davidson, "The joint U.S.-Canadian engineering team that developed and installed this new system for tritium recycling is to be congratulated for an outstanding job."

Pure tritium is shipped from the Department of Energy's (DOE's) Savannah River Site in Aiken, South Carolina. The tritium is injected into the tokamak where a small fraction is converted into helium, a neutron, and energy. Prior to installing TPS, the tritium not burned in the tokamak was converted into oxide and shipped back

to Savannah River, where it was reprocessed and returned to elemental tritium.

"Since 1993, when tritium came on site, we have shipped used tritium back to DOE's Savannah River Site. With the TPS, we essentially cut out a large number of the tritium shipments in and out because we are able to reuse the tritium that is al-

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From left are PPPL's Rich Scillia, Paul LaMarche, Steve Raftopoulos, and Jim Langford with Jim Anderson of the Los Alamos National Laboratory. Anderson was the Chairperson of the Operational Readiness Assessment while the other four, led by LaMarche, were involved in getting the TPS up and running.

Four PPPL Women Receive PUWO Awards

Recognized for making a positive contribution to the Princeton University Community — especially in regard to women — four PPPL women received Princeton University Women's Organization (PUWO) Awards on Tuesday, April 11.

Laboratory employees Bobbie Forcier, Suzanne Homer, Phyllis Schwarz, and Lynne Yager were among 67 Princeton University stu-

dents, staff, and faculty members honored during the Second Annual PUWO Awards Ceremony at Princeton's Bowen Hall. Each recipient had been nominated by a colleague.

Laboratory Director Ronald C. Davidson said, "I am extremely proud of the positive contributions that these four individuals have made to the Laboratory and the Princeton University community. Their receipt of

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TPS

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ready here again and again," said Paul LaMarche, Head of the TFTR Tritium Systems Division. About 40 grams of tritium have been shipped to and from the Laboratory since tritium first arrived on-site.

Added Larry Dudek, "TPS is attractive in that it eliminates the need for a lot of waste containers. Essentially, we take the waste gas from TFTR and separate out the unused tritium, and send it back as a fuel. TFTR will be the first tokamak that recycles its own tritium." Dudek, who is in charge of the installation of TPS, is the Division Head for Fabrication and Assembly at PPPL.

Minimizing tritium shipments to and from the Laboratory increases

safety by reducing the amount of tritium on the roads and by keeping tritium in its least hazardous, elemental form. The TPS will also trim the time necessary to keep track of the tritium inventory.

Closed-Loop System

"When you've got a closed-loop system where you're not bringing any tritium on- or off-site, you're dealing with more fixed quantities. That tends to decrease the amount of time necessary to do an inventory," said LaMarche. He explained that keeping close tabs on the amount of tritium is necessary to insure that the Laboratory remains within its 5-gram inventory limit.

The TPS removes tritium from the plasma exhaust gases that are collected on the neutral-beam cryogenic pumping panels. The gases contain hydrogen isotopes and traces of other gases such as carbon dioxide and hydrocarbons that may be mixed with nitrogen and argon.

The hydrogen isotopes (hydrogen, deuterium, and tritium) are separated from the other gases in the pre-treatment section of the TPS. This is accomplished by

passing the exhaust gases through a palladium diffuser that separates hydrogen isotopes from other gases. The hydrogen isotopes are then fed into the hydrogen isotope separation section of the TPS. There the isotopes are re-separated using a cryogenic distillation process. The tritium recovered by the TPS can then be reused in combination with deuterium as fuel in the TFTR.

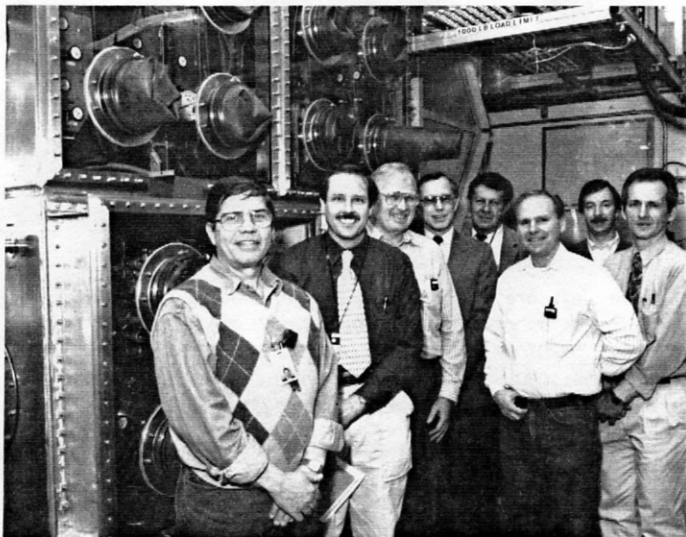
"TPS is attractive in that it eliminates the need for a lot of waste containers ...TFTR will be the first tokamak that recycles its own tritium."

—Larry Dudek

The TPS was designed by the Canadian Fusion Fuels Technology Project and built in Toronto, Canada. Dudek said TPS will be used for the life of TFTR. He added that future prospects for this type of system are bright.

Considered for Future

Said Dudek, "This technology is also being considered for future tokamaks such as the International Thermonuclear Experimental Reactor (ITER). If it works well for TFTR, the ITER will probably use something like this." ●



The group who worked on the design and installation of the TPS are, from left, George Labik, Steve Gordon, Bob Parsells, George Coward, Rich Borusovic, Steve Kemp, Gerald Satkofsky, and Larry Dudek.

HOTLINE

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PUWO

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these awards is highly deserved recognition."

The citation for **Forcier**, who is in charge of employment and benefits at PPPL, stated, "Bobbie is always on the scene on issues concerning women at Princeton. An active member of last year's 'Take Our Daughters to Work Day' Committee and a longtime member of PUWO, her energy and enthusiasm on behalf of women and girls at Princeton have influenced those who have worked with her."

Homer, who is a staff assistant for the TFTR Project, Operations Center, was cited for her contributions to the Director's Advisory Committee on Women (DACW). Her citation said, "Suzanne's positive attitude, genuine concern for those around her, and enthusiasm are truly refreshing and enhance her contributions to the PPPL's Director's Advisory Committee on Women."

Schwarz, who is the Division Secretary for Tokamak Operations, was lauded for her activities with DACW. Her citation stated, "As chair



From left are PPPL Director Ronald C. Davidson with PUWO Award recipients Phyllis Schwarz, Suzanne Homer, and Bobbie Forcier. Not pictured is Lynne Yager.

of PPPL's Director's Advisory Committee on Women, Phyllis works proactively to effect positive change at PPPL."

Yager, an administrator in the Laboratory's Cost and Schedule Control Division, received the PUWO Award for the second time. This year's citation for Yager stated, "Lynne has always volunteered her services toward the causes and concerns of women at Princeton. She was instrumental in extending the 'Take Our Daughters to Work Day' to the Princeton Plasma Physics Labora-

tory and she has helped put PUWO on the map there."

The PUWO Awards Ceremony was established in 1994 to recognize staff members, faculty, and undergraduate and graduate students whose on-the-job actions and attitudes make the University a great place to work and study, especially for women. Each honoree received a certificate and a citation in the program acknowledging their contributions. Last year, three recipients were from PPPL, including Yager, Dori Barnes, and Sue Murphy. ●

Laboratory Receives Corporate Award of Excellence



ment Department at PPPL, said in her nomination, "Comparing the overall stimulating environment at PPPL with others, I must put PPPL at the top of the list!" In the photo, from left, are PPPL Deputy Director Dale Meade, Mary Ann Brown, and PPPL Director Ronald C. Davidson.

In recognition of its continued support and encouragement of office professionals, PPPL has received a Corporate Award of Excellence from the Mercer Chapter of Professional Secretaries International (PSI). The Laboratory was nominated for the award by Mary Ann Brown, a Mercer Chapter member. Brown, who is the Administrative Secretary of the Engineering and Technology Develop-

TRANSITIONS

Births

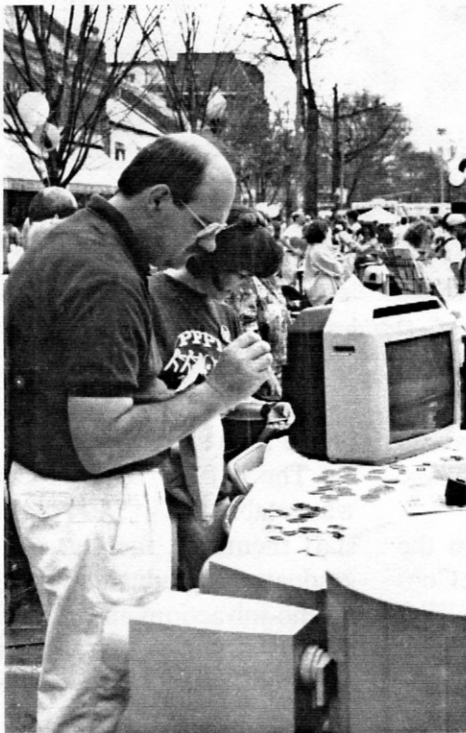
Congratulations to **Colin McFarlane** of the Motor Generator section and his wife, Theresa, on the birth of their son, Daniel Joseph, on January 24.

Retirements

Harold E. Nastelin, a planning and control officer for the TFTR Project, retired on March 31. Nastelin had worked at the Laboratory for 14 years.

PPPL Exhibit Draws Crowd at CommUniversity

Photos by Dietmar Krause, Carol Phillips, and Patti Wieser



The Lab set up a booth at CommUniversity, an annual springtime celebration that joins Princeton University with the community of Princeton. Throughout the day, held this year on April 22, volunteers from PPPL handed out brochures and fusion buttons while answering questions. PPPL's display included written material, poster boards, photos, an exhibit on TFTR's world fusion record, and a model of the tokamak. Above, PPPL physicist Kevin McGuire and Information Officer Carol Phillips get ready to hand out buttons. McGuire and Phillips were among several PPPL volunteers who "worked the crowd."



Engineering and Technology Development Head Mike Williams and Carol Phillips chat with Sandy Schmidt, assistant editor for the "Physics of Plasmas," and her husband, Randy Setlock, who works in Princeton University's Human Resources.



Physicist Don Monticello (at right) describes fusion and the workings of the tokamak to visitors at the booth.



Physicist Mike Zarnstorff answers questions during CommUniversity.



Carol Phillips and Mike Williams hand out literature about PPPL and fusion buttons while answering questions. At left is the model of TFTR.