

## ITER Engineering Design Agreement Signed

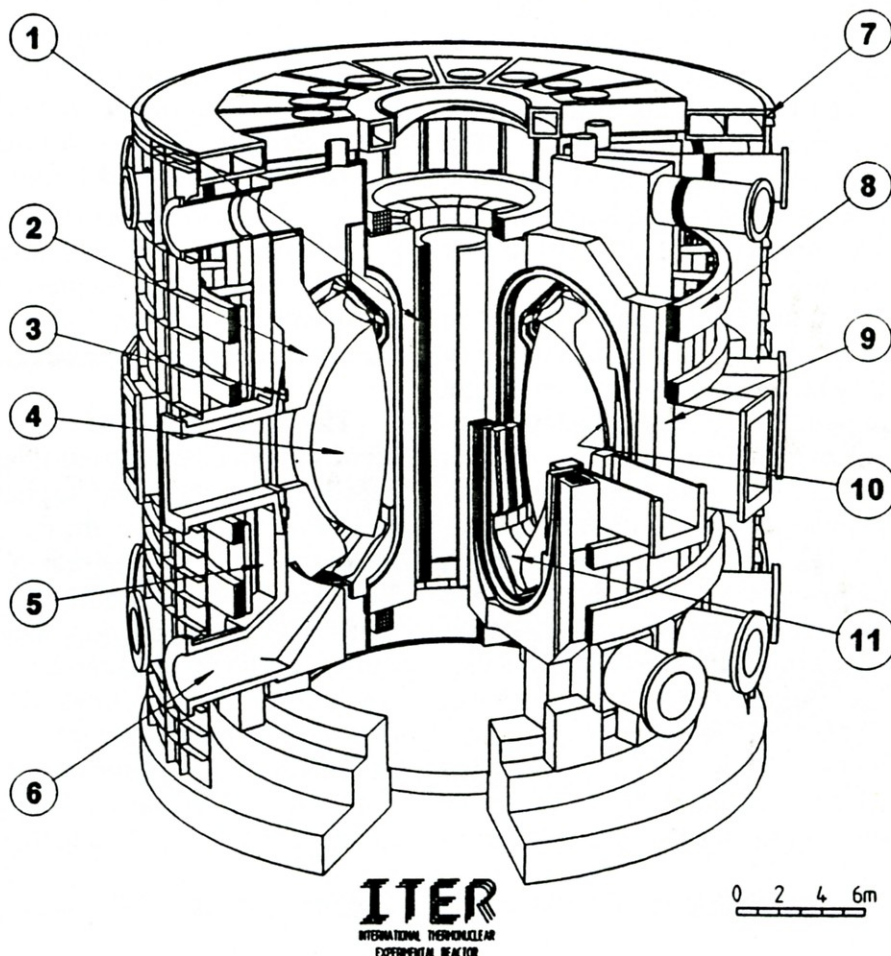
On July 21, in Washington D.C., the formal agreement for engineering design of the International Thermonuclear Experimental Reactor—ITER—(see sidebar) was signed by the four partners—the United States, Russia, Japan, and the European Community (EC).

Secretary of Energy James D. Watkins, who signed the agreement for the U.S., said, "Today's agreement is truly a milestone in the development of a safe, environmentally sound energy source for the next century. The international nature of this team means that the best scientists and engineers will be co-operating to produce a world-class design."

Signers for the other three partners—Russia, Japan, and the European Community—were, respectively: Professor Viktor Mikhailov, Minister of the Russian Federation for Atomic Energy, Minister Hiroshi Hirabayashi, Deputy Chief of Mission in the Embassy of Japan in Washington, and Ambassador Andreas van Agt, Head of the Delegation of the Commission of the European Communities to the U.S.

Dr. Hans Blix, the Director General of the International Atomic Energy Agency (IAEA), under whose auspices ITER work is being conducted, participated in the signing ceremony.

The six year Engineering Design Activity (EDA) will produce a detailed final engineering design that will be used to construct ITER. Negotiations leading to the EDA agreement were begun in mid-1989,



1- CENTRAL SOLENOID  
2- SHIELD/BLANKET  
3- ACTIVE COIL  
4- PLASMA

5- VACUUM VESSEL-SHIELD  
6- PLASMA EXHAUST  
7- CRYOSTAT  
8- POLOIDAL FIELD COILS

9- TOROIDAL FIELD COILS  
10- FIRST WALL  
11- DIVERTOR PLATES

*International Thermonuclear Experimental Reactor*

shortly before the Conceptual Design Activity was completed in December, 1990.

Says Doug Post, who is the Physics Task Manager for the U.S. ITER Home Team, "We expect the engineering design process to begin this

autumn and to be complete by 1997 or 1998, with actual construction to take seven years at a site to be determined. The U.S. is now in the process of organizing to participate in engineering design activities."

Continued on Page 2

## EDA Agreement

Continued from Page 1

### Design Staff

The Engineering Design Activity will be headed by Paul Henri Rebut, former director of the Joint European Torus (JET). A joint central team will produce a design and will coordinate and integrate the design and the research and development (R&D) work that will be done by institutions located on the four parties' home territories. The joint central team will be located in three co-centers of equal importance and composed of staff from all four parties.

At the San Diego Co-center, to be headed by Valery Chuyanov of Russia, the focus will be on design integration. At the Naka, Japan Co-center, to be headed by Michel Hugué from the European Community, the focus will be on out-of-vessel components. At the Garching, Germany Co-center, to be headed by Ron Parker (Massachusetts Institute of Technology), internal vessel components will be designed. The U.S. ITER Home Team, headed by Dr. Alexander Glass (Lawrence Livermore National Laboratory), will support the Joint Central Team.

## ITER

### *International Thermonuclear Experimental Reactor*

*The ITER project is an international collaboration among the European Community (EC), Japan, Russia, and the United States. When built, ITER will be the major fusion experiment worldwide. The primary goals of ITER are to achieve ignited burning plasma conditions and to advance the technology required for a commercial fusion power reactor.*

*ITER will be a tokamak with a major radius of about 7 meters (three times as large as TFTR) with a construction cost of approximately \$5.8 billion. It will serve as a bridge from the present generation of large tokamak experiments—such as TFTR and JET—to a Tokamak Demonstration Power Plant (DEMO).*

*ITER will address physics issues for DEMO such as long-pulse ignited burn and engineering issues including operation with superconducting magnets and long-pulse operation with high heat fluxes and neutron fluxes.*

The ITER project will be overseen by a council composed of members of each party. It will be chaired by E. P. Velikhov from the Russian Federation and co-chaired by M. Yoshikawa from Japan. The formal seat for Council meetings will be Moscow. The ITER Council will be advised by two committees, a Technical Advisory Committee to be chaired by P. H. Rutherford, and a Management Advisory Committee to be chaired by M. Yoshikawa.

PPPL is expected to provide personnel to the Joint Central Team, with selection pending. In addition to Post, other PPPL staff members to be involved in engineering design include **Dale Meade** who will serve on the U.S. ITER Steering Committee. **Don Grove**, who is retired from PPPL, will serve as Principal Engineer for the U.S. Home Team. It is expected that a number of PPPL staff will join the central team as it is formed.

## Post Receives Technical Accomplishment Award

### *ITER Conceptual Design Work Cited*

Douglass E. Post was recently presented the 1992 Outstanding Technical Accomplishment Award by the Fusion Energy Division (FED) of the American Nuclear Society (ANS).

Post was given the award in recognition of his exemplary accomplishments in leading the International Thermonuclear Experi-

mental Reactor (ITER) Physics Team during the three years (1988-1990) of conceptual design. The FED Awards were presented in June at the Tenth Topical Meeting on the Technology of Fusion Energy, held in Boston, MA.

Said PPPL Director Ron Davidson, "Doug has worked on ITER since its inception, and he

has done a superb job in helping bring the project to this point. Because of the dedication shown by him and the rest of the U.S. team, we are now in an excellent position to move ahead with the engineering design."

Post served as leader for both the U.S. ITER Physics Group and

Continued on Page 3





Photo: Denise Applewhite

**Dr. Douglass E. Post**

## Post

Continued from Page 2

the International ITER Physics Group. According to Professor Don Steiner, Chairman FED Awards Committee of the ANS, "Doug was required not only to coordinate a broad program of physics studies in support of ITER, but also to present and defend the physics basis for ITER in world fusion councils. He accomplished this difficult task with mastery of the relevant physics and with enormous personal dedication."

### Award Reflects Work of U.S. Team

Said Post, "I view this as an award for the entire United States ITER team, who did a very good job in bringing the best elements

of the U.S. fusion program to the ITER design."

According to Post, each of the four participants in the ITER project—the U.S., Russia, Japan, and the European Community—sent a team of approximately 15 scientists and engineers. These four teams made up the international team of 60 members—comprised of 15 physicists and 45 engineers. This international team was centered at the Max-Planck-Institut für Plasmaphysik at Garching (near Munich, Germany).

During the three year conceptual design process, Post, along with many other international team members, spent half their time or more at the Institut. Each of the teams there was supported by 40 to 60 more scientists and engineers at home. (In the U.S., an additional 120 physicists from the U.S. fusion program participated in the design at some level.)

### American Participants

The U.S. participation in the ITER conceptual design was led by John Gilleland of LLNL\*. American colleagues in the Physics Group made numerous contributions. **Sam Cohen (PPPL)** led the power and particle control physics group. **Bill Nevins (LLNL)** led the heating and current drive physics group. **Nermin Uckan (ORNL\*)** developed the physics guidelines and pulled together the final physics report. **John Wesley**

(GA\*) coordinated the U.S. contribution to the poloidal-field design. **John Hogan (ORNL)** and **Don Pearlstein (LLNL)** worked on MHD stability issues.

The senior members of the American Engineering Conceptual Design Team included **Dale Smith (ANL\*)** and **Charles Baker (ORNL)**, who lead the blanket design group, and **John Miller (LLNL)**, who led the magnet group.

**Charles Flanagan (ORNL)**, was a member of the systems engineering group and coordinated much of the project. **Dave Lousteau** and **Brad Nelson (ORNL)** were responsible for the U.S. contributions in mechanical engineering; **Walt Lindquist (LLNL)** handled the engineering of the heating and current drive systems, **Steve Piet (INEL\*)** addressed safety and engineering issues, and **John Perkins (LLNL)** and **John Galambos (ORNL)** conducted systems analyses to assess design options.

Other PPPL contributors to ITER design included **Ken Young** for diagnostics, **Stan Kaye** for confinement scalings, and **Paul Rutherford**, who was a member of the Technical Advisory Committee which reviewed and reported on the work of the design team to the ITER Council.

### \*Laboratory Abbreviations

LLNL:	Lawrence Livermore National Laboratory
ORNL:	Oak Ridge National Laboratory
GA:	General Atomics
ANL:	Argonne National Laboratory
INEL:	Idaho National Engineering Laboratory

# What's Happening at PPPL?

## Goldston Appointed Full Professor

Dr. Robert J. Goldston has been appointed to the position of Full Professor of Astrophysical Sciences at Princeton University, effective July 1. Goldston first came to PPPL in 1972 as a graduate student after completing a B.A. in Physics at Harvard University. In 1977, he completed his doctoral dissertation under the guidance of Harold Furth and Harold Eubank.

Upon receiving his Ph.D., Goldston became a member of the PPPL research staff and actively participated in neutral beam heating experiments on the Princeton Large Torus and the Poloidal Divertor Experiment. He was promoted to Research Physicist in 1981 and then served as Head of the TFTR Physics Program Division from 1983 to 1989.

In 1990, Goldston moved to the position of Head of CIT/BPX Project Physics, and most recently he has served as Head of the Laboratory's Research Council. He is currently involved in the design effort for the Steady State Advanced Tokamak.

Since 1986, Goldston has taught an introductory undergraduate course on plasma physics in collaboration with Paul Rutherford. The course is jointly listed by the Physics and Mechanical and Aerospace Engineering Departments. Goldston has published extensively in both experimental and theoretical plasma physics.

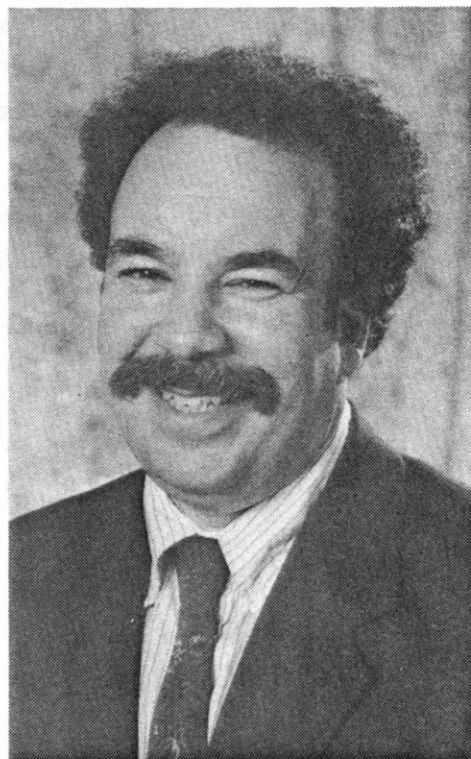


Photo: Denise Applewhite

**Dr. Robert J. Goldston**



*Joe Stencel and Cathy Saville, of the Environment, Safety & Health Division, recently accepted the Governor's Safety Award from Raymond L. Bramucci, New Jersey Commissioner of Labor. The award—the highest presented by the State—was in recognition of TFTR's safety record of four years and 2.5 million person hours without a lost time accident. The award, which exemplifies the commitment of TFTR and PPPL to high ES&H standards, was given during an Occupational and Health Safety Awards Dinner in Middlesex County.*





As part of PPPL's Trenton Partnership, 13 seventh and eighth graders from the Franklin Elementary School science magnet class visited Secretary of Energy James D. Watkins (rear, third from right) in his Washington D.C. office on June 5. (Their teacher, John Hilkevich, and Robert Redding, of the PPPL Science Education Program, are standing to Watkins' left.) The students visited Watkins in return for his May 1991 visit to their classroom in Trenton. Watkins gifted the school with Technopoly board games and a Futures video on science careers.

*presented*

## TRANSITIONS

### New Hires

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

#### Computer Division

Danielle Bonfrancesco, Technical Assistant

Paul Hagar Technical Writer

#### Emergency Services Unit

Harry Cranmer, ESU Officer

Joseph Palazzone, ESU Officer

#### Environment, Safety & Health

Steve Duritt, Electrical Safety Engineer

### Facilities Engineering

Joseph Pasquarello, Fire Protection Engineer

#### Research

Marco Caorlin, Research Physicist

#### TFTR

Vince Mastrocola, Process Control and Instrumentation Engineer

Patricia Terlitz, Secretary

#### Training and Certification

Anthony Contino, Training Specialist

### Retirement

Joseph H. Davenport, an Engineer in the Mechanical Engineering Division, retired from PPPL on July 1, after 34 years of service.

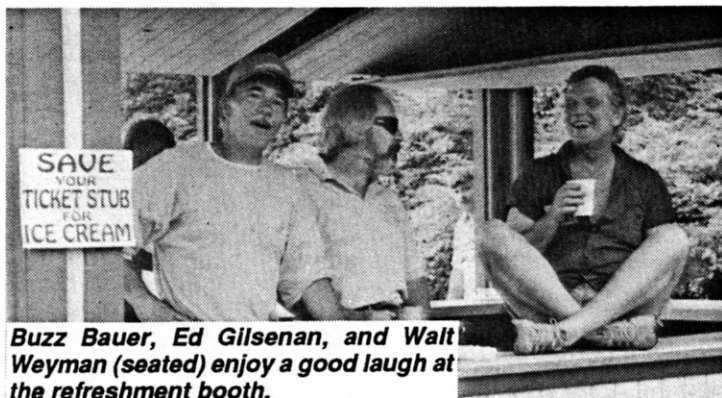
### Birth

Congratulations to Rafi Nazikian of TFTR Diagnostics and his wife Fumiko on the birth of their son Tomoki on June 17.

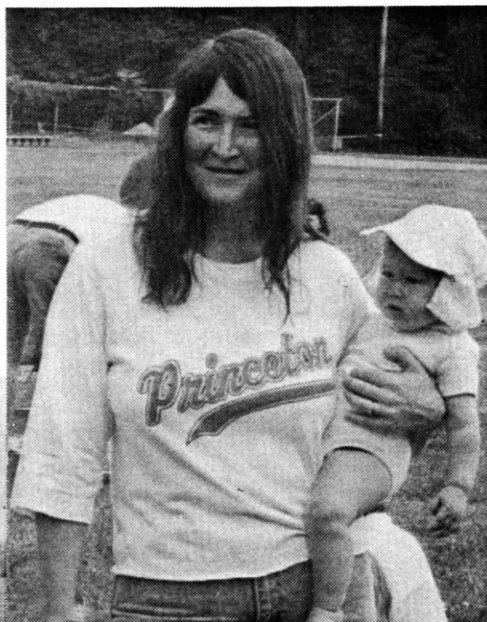
### In Memory

Thomas B. Reilly died on June 13. Joining PPPL in 1973, he was most recently a Tech Associate in the Engineering Drafting Division.

# Fun, Food, Frolic—PPPL's Recipe for a Great Picnic



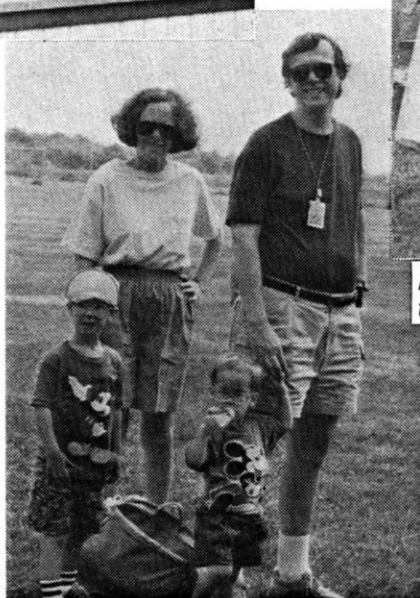
**Buzz Bauer, Ed Gilsenan, and Walt Weyman (seated) enjoy a good laugh at the refreshment booth.**



**Ken Silber's wife Linda, and their daughter Emily.**



**Sally Connell cradles six-week old grandson Daniel, probably the youngest (and sleepest) picnic participant.**



**Rich Hawryluk, his wife Mary Catherine, and their sons David (left) and Kevin, came to enjoy a full day of picnic fun.**



**Picnic Coordinator Rae Federico surveys the happy results of her planning with her son Greg.**

## A Special Thanks

A very warm thank you to all the behind-the-scenes picnic workers. Your spirit, energy, and cooperation made this year's picnic a great success. Special thanks for the hard work of the Recreation Committee—Jo Barbour, Angelo Candelori, Jim Conover, Ed Gilsenan, Ceil O'Brien, Ray Pressburger, Chris Ritter, Rosemary Shangle-Johnson, and Sallie Young.

Thanks too for the creativity of Greg Czechowicz in designing posters, table notices and tickets. A vote of appreciation to Teri Daynorowicz for printing tickets, and to Arlene White and Procurement for handling purchasing details. Also, thanks to Security and to the Emergency Services Unit staff for assuring that the day went smoothly.

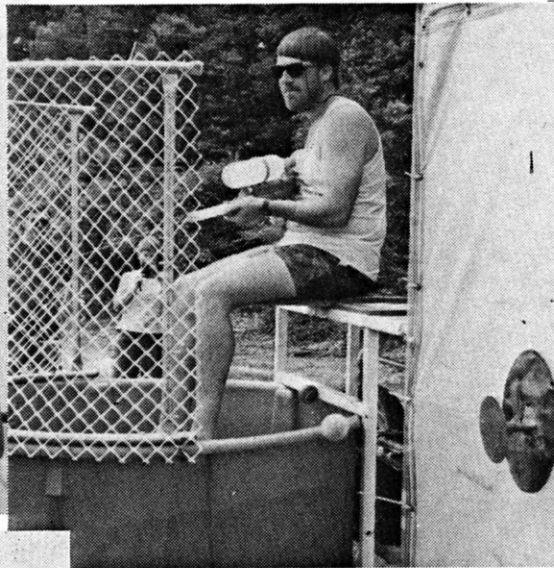
And last but not least, many thanks to those good sports who allowed themselves to be kept cool in the dunking booth—Rich Cargill, Rich Hawryluk, Dale Meade, Valerie Simpson, and Mike Williams.

Rae Federico, Picnic Coordinator





**Dale Meade (left) protests a dunking booth spill, while Mike Williams fights back with his mega-water gun.**



**Ed Tolnas keeps cool with an umbrella and an ice cream bar.**



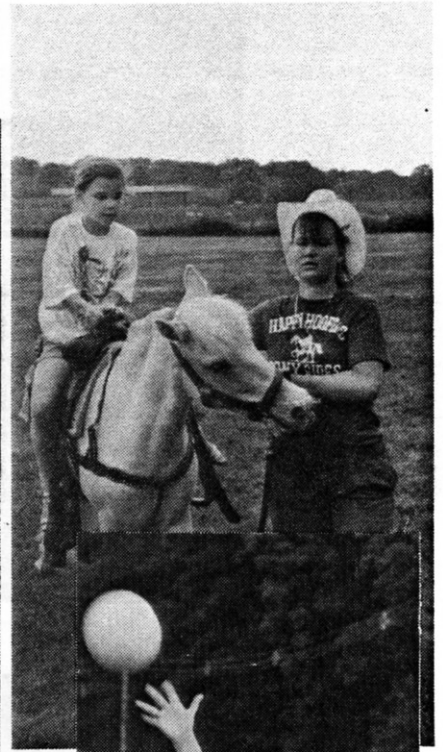
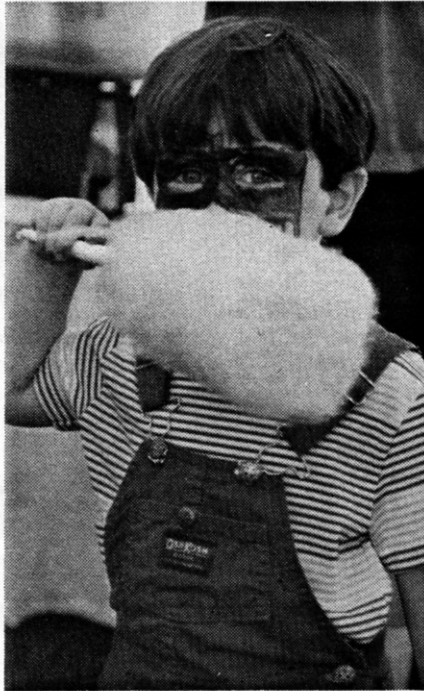
**Pete Del Gandio holds his foster child Robert, who is showing off his newly painted mug.**



**Cheryl Such helps her son Kevin with an art project (foreground), while Bobbie Forcier's granddaughter Ellen, awaits face painting, held by Bobbie's daughter Noreen Solly.**



***Beverly Faulkner (above) eagerly awaits the taste of her cotton candy, while a young man with an artistically painted face bites into his. (center photo)***



***At home or at a picnic, the sandbox is a favorite for Dolores Lawson's son Christopher.***



***An action-packed afternoon—from clowns and balloons to pony rides, bouncing and ball games, kids of all ages kicked up their heels!***

