HOTLINE
PRINCETON PLASMA PHYSICS LABORATORY
Vol. 3, No. 4 December 3, 1981

ISS For TFTR Arrives

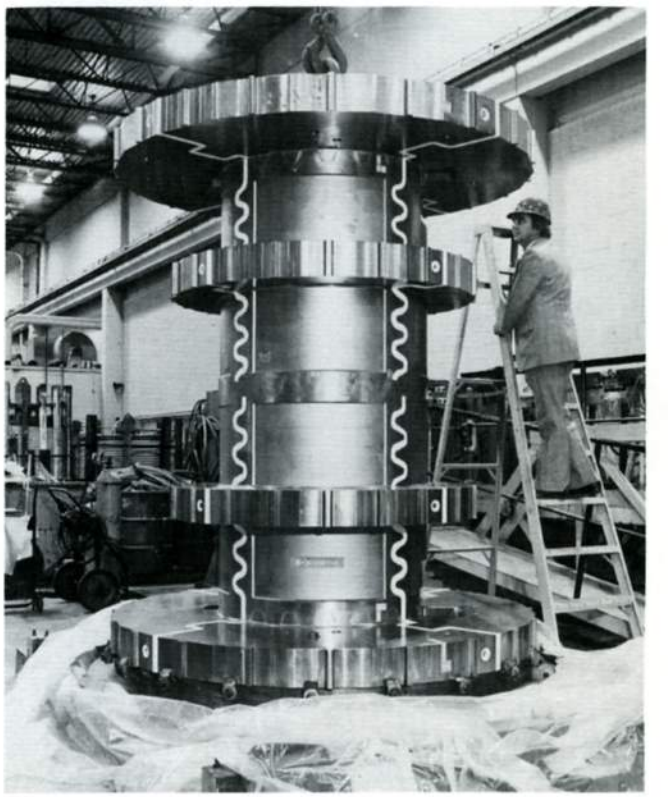
The largest diffusion bonded assembly ever built—the inner support structure for TFTR—was delivered to the Brown Boveri Corporation's New Brunswick facility October 29. The unit was fabricated at Rockwell International's North American Aircraft Operations (NAAO), culminating a three year effort by that company.

When TFTR is operating, the magnetic fields generated by the TF coils will produce both a centering and overturning force on the coils. The inner support structure is designed to resist these forces.

The ISS will take up to 75 percent of the centering force and 10 percent of the overturning force exerted by the TF coils during machine operation. In addition, it will support three stacks of PF coils. The remaining PF coils will be supported by an umbrella structure above the TFTR or by the machine substructure itself.

Rockwell International constructed the ISS at its Los Angeles facility. The unit is made of titanium alloy 6Al-4V, selected for its mechanical properties. It consists of four subassemblies; each subassembly is separated into quadrants by a fiberglass dielectric to reduce eddy currents.

The ISS represents the first time that Rockwell's diffusion bonding technology has been applied to a non-aerospace product. Titanium plates, cut and shaped to the approximate envelope of the desired finished product, were stacked in intimate contact and surrounded by stainless steel mold blocks within a vacuum retort. The "stack" was heated to about 1,700° F, while the pressure was increased in steps to a maximum of 3,000 psi. The temperatures and pressure conditions cause molecular diffusion across the interface between plates, forming one homogeneous piece of titanium with the properties of a single piece.

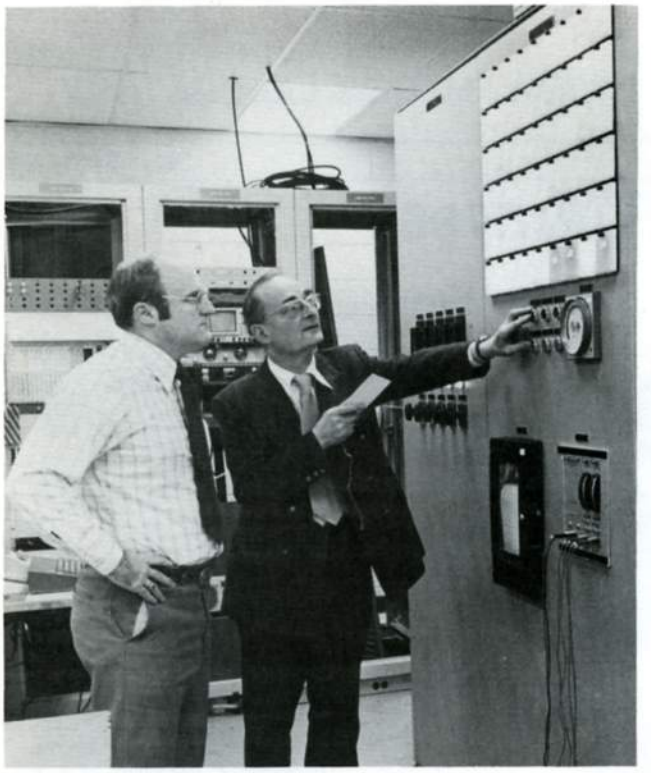


The ISS weighs 28,000 pounds, measures 8½ feet tall with a maximum diameter of 7¼ feet, and has 6½ inch thick rings. The ring and cylinder sections are the most difficult parts ever diffusion bonded.

After assembly, Rockwell machined "keys" on the four ISS rings, which will mate with the nose of each TF coil case. Despite the massive size of the unit, machining tolerances of less than ±.005 inch were maintained in many areas.

The ISS will be separated into four subassemblies at Brown Boveri's facility, then reassembled as six PF coils are precisely positioned around the cylinder. The ISS/PF coil assembly will then be shipped to PPL for installation in the TFTR machine by early next year.

MG Tests Continue



Dr. Ernst de Haas, lead engineer for the TFTR MG sets, points out results of the recent MG test to David O'Neill, AC Power Section head of the Energy Branch, FOM.

The first motor generator set for TFTR passed another important test November 19. During the test, the 600-ton rotor was brought up to 100 revolutions per minute (rpm), then allowed to coast down to 20 rpm over a two hour period. At that point, it was mechanically braked to a halt.

Dr. Ernst de Haas, lead engineer for the MG sets on the TFTR project, explained that the main purpose of the test was to check the balance of the flywheel. It was found to be .014 inch out of balance, well within the .018 inch tolerance at which the bearings were set. "Everything went beautifully" during the test, Dr. de Haas added.

Following the test, holes were drilled in the spider assembly atop the MG unit, allowing for placement of weights to further balance the massive flywheel. Weights are inserted into the structure "just as they are when you balance a wheel on your car," Dr. de Haas explained. The MG set will continue being spun and balanced at increasing speeds throughout the month.

Engineers from General Electric arrived at PPL Nov. 30 to begin electrical testing of the unit. Electrical testing is expected to continue through February.

Dr. de Haas pointed out that the Nov. 19 test began at 6 a.m. and was completed by 8 a.m., avoiding peak demand time utility charges which could have added approximately $9,000 to PPL's November electric bill. The prudent scheduling of the test prevented the increased charges.

The two MG sets for TFTR are nine times as big as the older motor generator sets at PPL. Each 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.

The pieces for each set were supplied to PPL by General Electric, and were assembled by the Belding Corporation.

Detector Recall

Some of the 185,000 photoelectric smoke detectors manufactured by the Chloride Pyrotechnic Division of Chloride, Inc. are being recalled due to possible defects.

Some of the battery operated detectors the Hingham, Mass. firm made between March 1, 1979 and March 15, 1981 may contain a potentially defective microchip. The fault would prevent the alarm from sounding in the presence of smoke.

The commercial and residential detectors were sold under the brand names of Chloride Pyrotector, Archer, Masterguard, Vanguard, Vantage I and Protect-er Systems. Detector owners can test their detector by inserting a fresh, factory specified 9-volt battery and pressing the test button. If the horn sounds, the detector does not contain the faulty microchip.

If the horn does not sound when tested, owners should call Roberta Calla of Chloride Pyrotector at 1-800-343-5647 for instructions on where to send the product for repair or free replacement.

Holiday Closing

In a November 17 memo to all PPL employees, laboratory Director Dr. Harold Furth announced the closing of the laboratory between December 24 and January 4.

The closing is expected to contribute to improving the laboratory's financial situation by producing savings in two principal areas:

> Energy Conservation: The cost savings for heat and significant contribution to our Energy Conservation program.
>
> Productivity: In past years, about 50 percent of the staff chose to take vacation during the period between Christmas and New Year's, so that those who came to work were hampered in their ability to accomplish many of their assigned tasks.

All staff members will be charged three vacation days for December 28, 29 and 30. Staff members who have not accrued sufficient vacation days or who have made other plans for the use of their accrued vacation will be permitted to draw against credited vacation time for the next vacation cycle. Those who foresee some problem are urged to talk to their supervisors or to contact the Personnel Office as soon as possible.

The Exempt Staff will receive their December paychecks on Monday, December 21. The Biweekly Staffs will receive their regular paycheck on Friday, December 18. On Wednesday, December 23, the Biweekly Staffs will receive a salary advance (standard hours less estimated deductions) on their payroll checks of December 30. On January 4, 1982, the Biweekly Staffs will receive their regular (December 30) paycheck adjusted for overtime and for the salary advance.

Service Awards

A service awards presentation will be held December 17 at 9 a.m. in the Gottlieb auditorium. Employees with five, 10, 15 and 20 years of service to PPL will receive awards from their department heads.

The Personnel Office will contact eligible employees with invitations to the ceremony.

T.O.U.R.S.

(Thanks to Our Underlying Reason for Success)

One of the laboratory's greatest resources for public relations is our tour and speaker program. By opening our doors to the public, we are able to explain our fusion research program to thousands of people yearly.

In 1974 (the first year that formal records were kept) about 50 groups were shown through the laboratory. Each year the number of groups visiting the lab has risen. During 1981, 165 groups were escorted through the lab, totalling nearly 3,000 people—almost double the number from the previous year!

By traveling to professional organizations, colleges and high schools, our speakers have "spread the word" about fusion to another 2,000 people this year.

HOTLINE salutes the dedicated individuals who make this possible. Without the cooperation of the guides and speakers, who volunteer their time and their expertise, the benefits and successes of this program could not be reaped. It is their attitude of sharing (both of ideas and of themselves) that has helped make PPL one of the "hot spots" for tourism in New Jersey.

ERC Notes

The ERC met on Wednesday, November 11. Following sub-committee reports, Dr. Furth and Mr. Rossi spoke to the committee regarding the general budget "picture" for the laboratory. They also discussed the possibility of a total laboratory shutdown over the Christmas holiday. Dr. Furth explained to the committee that the lab needs to economize wherever possible, and the shutdown will be a relatively painless way to save money.

Under old business, the employees' credit union and some of its policies were discussed.

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.

Patent Booklet

Inventors can discover their role in the PPL patent procedure by reading "You and the Patenting Process", now available from the Technical Information Office.

The booklet, produced by the DOE, covers general patent information. Specifics relating to DOE contractors are also included.

To obtain a copy of the booklet, contact the Technical Information Office at ext. 2659.

Fire Safety

Employees are reminded that coffee pots, portable electric heaters and other electrical appliances should not be plugged in and left unattended for extended periods of time. A potential for fire can occur if the water in a coffee pot is allowed to evaporate and the pot starts to overheat. Heaters left on overnight can also pose a fire hazard.

Each person with a coffee pot or electric heater must take personal responsibility to make certain it is not left on while unattended. For those to whom this represents a problem, one possible solution is a timer, which will automatically shut off the coffee pot or heater after a certain time.

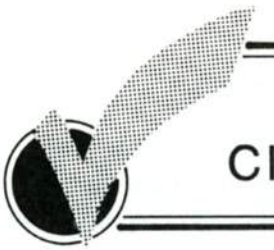
Coffee pots and heaters left on overnight will be subject to confiscation by security.

Lost Glasses

LOST—Eyeglasses with plastic lenses, and "FMS" engraved on the metal frames. Lost at the Accounting Department party at the Gun Club October 23. If found, call Flo Short at ext. 3522.

Holiday Dinner Dance

PPL's annual Holiday Dinner Dance will be held December 11 at Cedar Gardens in Hamilton Square. Tickets, which are $15 for dinner and dancing and $8 for the dance alone, are on sale at the C-Site reception desk through December 9.



Security Checkpoints

Employees in the PPL community can contribute greatly to their own protection by following these tips for preventing thefts:

- Personal property (such as purses, brief cases, etc.) should not be left unattended.
- Lock your office door or your desk when you leave, even if it's only for a few minutes.
- Make a list of all serial or model numbers of your office equipment and personal property and keep it handy.
- Watch for suspicious individuals who have no business in your area; report them to Security immediately.
- Familiarize yourself with the numbers to call to report incidents, such as suspicious persons, illness, fire, and so on.
- When reporting a theft, be able to give identifying information to investigators. Include the make and model, license numbers, color and identifying characteristics of your vehicle; the model and serial numbers, brand names, and identifying characteristics of your property; the sex, color, height and weight, clothing, other personal characteristics (such as a beard, mustache etc.), and the method and direction of travel of any suspicious persons.

Call 3333 in case of an emergency, or call 2536 to report any other type of violation. By following these simple measures, you can aid the Security Office in safeguarding laboratory and personal property.