inel news
First class
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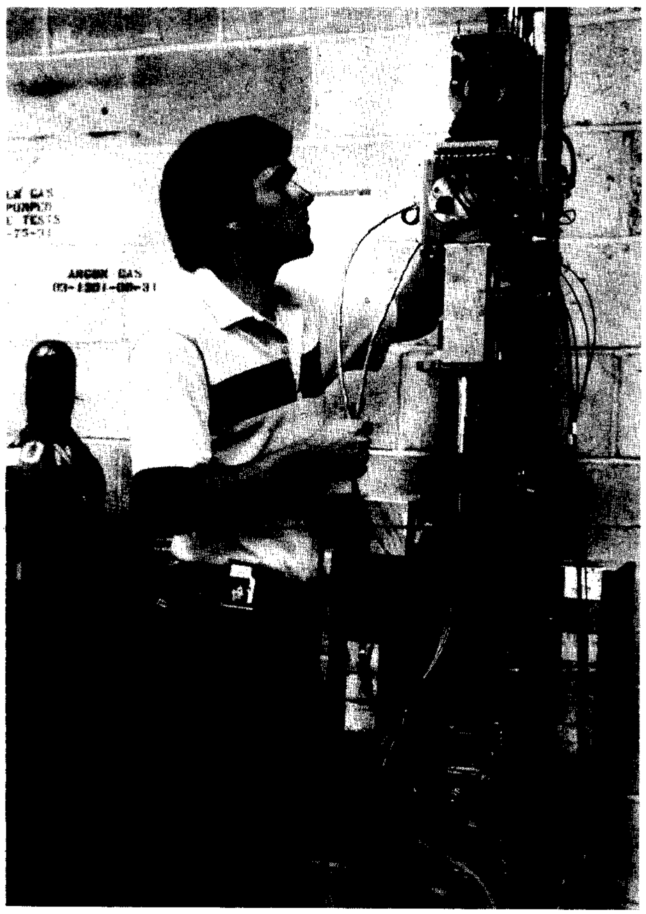

KEITH CROCKER, participant in Argonne National Laboratory's Nuclear Engineering Insititute at ANL-W, designed circuits for an automatic control-rod drive system that will be installed in the EBR-II reactor. He is shown testing the drive motor for the system. (Photo by Denis Jensen, ANL-W.)

Crocker, son of EG&G employee, participates in ANL-W institute

Keith Crocker, son of Jimmy (EG&G Idaho) and Rhona Crocker, completed an 11-week project Aug. 17 as a participant in Argonne National Laboratory's Nuclear Engineering Institute on the Argonne-West site.

Crocker is a 1983 graduate of the University of Idaho, where he received his bachelor of science degree in electrical engineering. He is a candidate for a master of science degree in electrical engineering at Oklahoma State University and is teaching engineering graphics in the Engineering Department. He was one of 12 students from U.S. colleges and universities who participated in the Institute this summer.

The Institute was sponsored by Argonne's Division of Educational Programs. Each student who participated completed a project involving work in at least one of the ANL-W facilities. Among these facilities are five reactors and a large hot-cell complex.

During his summer's work at ANL-W, Crocker was assigned to EBR-II. He worked with the EBR-II Instrumentation and Control Systems Section, where he designed circuits for an automatic control-rod drive system that will be installed in the EBR-II reactor.

Severe Fuel Damage test successful

An experiment paralleling the actual conditions in the Three Mile Island nuclear reactor core was successfully completed Sept. 8 at the INEL.

The test is the second in a series of Severe Fuel Damage experiments to be conducted by EG&G Idaho at the Power Burst Facility. The tests examine nuclear fuel damage and fission product behavior during postulated serious nuclear reactor accidents in which the fuel rods are exposed to extremely high temperatures as occurred at TMI. The experiment is a major part of the Severe Accident Research Program that the Nuclear Regulatory Commission established in response to the Three Mile Island accident.

"The successful completion of this experiment will provide us with very important information on reactor behavior under severe accident conditions," explains Bob Wright, NRC program manager. "This information will substantially reduce uncertainties regarding reactor behavior during such accidents and provide the NRC with a basis for policy decisions."

During the experiment, a bundle of 32 nuclear fuel rods was brought quickly to temperatures of almost 4,000 degrees Fahrenheit, a temperature causing the fuel rod cladding (metal surrounding the fuel) to melt and relocate in the bundle. Then the fuel rods were allowed to cool slowly. This was in contrast to the initial Severe Fuel Damage scoping test in which the fuel rods were brought slowly to that high temperature and then cooled quickly with a "quench" of water.

The faster heat-up was made possible by the addition of only minute amounts of water—"one teaspoonful every six seconds."

Philip MacDonald, manager for EG&G Idaho's Light Water Reactor Fuel Research Branch, said the test met every criteria for success.

"The temperatures rose as high as we planned and then dropped slowly," says MacDonald. We were able to measure the fission products and the hydrogen as they were released. The data looks very encouraging. None of the radioactive fission products were released from the test assembly designed for these measurements."

Researchers stress that the results are preliminary and will take months of analysis. The test information will be used to verify computer codes predicting the behavior of the reactor fuel and fission products during a reactor accident. This information will help provide improved reactor designs and safety features and to evaluate emergency response procedures. By showing the nature of potential radioactive releases that could be expected from these accidents, the test series will provide a better understanding of how to protect the public during possible accidents of this sort.

After the 32 rod-bundle is removed from the PBF reactor, the test assembly will be subjected to analysis techniques such as neutron tomography, an imaging technique similar to medical CAT scanning. This technique is expected to provide pictures, similar to X-rays, of the internal structure and physical condition of the fuel assembly. The assembly will then be disassembled at the INEL hot cell facilities.