DOE RECAP

The large-break loss-of-coolant accident, simulated in October, was once conceived as the worst to happen in a commercial reactor without the core melting. The experiment successfully subjected the facility to the harshest conditions it has ever been put through, and core recovery occurred less than 60 seconds after the test began.

Until recently, experiments in LOFT were funded by the NRC. The consortium of international participants expanded the LOFT program objectives from NRC's focus on U.S. safety issues to include experimental research into operating procedures and the design of commercial reactors and their safety systems. Beyond this latest small-break experiment, and the one which will soon follow, the consortium's management board has selected a series of experiments including large pipe breaks and accidents leading to reactor core damage. The current LOFT Program, including follow-up analysis, is planned to continue into 1986.

The Severe Fuel Damage experiment conducted in the Power Burst Facility in September was the first nuclear simulation of the TMI Unit 2 accident. The test was the second in a series, established by the NRC, examining nuclear fuel damage and fission product behavior during postulated serious nuclear reactor accidents. Specifically, these are accidents exposing the fuel rods to extremely high temperatures as at TMI.

Information from the September experiment (during which the peak temperatures reached approximately 4000 degrees Fahrenheit), will substantially reduce uncertainties regarding reactor behavior during such accidents and provide the NRC with a basis for policy decisions.

In 1983 the Semiscale facility was modified to get the plant ready for the Steam Generator Tube Rupture tests. Four of a series of nine experiments have been completed this year, making a contribution to the resolution of nuclear reactor safety issues and to the reactor research data base.

The Advanced Test Reactor's utilization and operation continued at near record levels this year. The reactor continued to support a variety of DOE programs involving advanced reactor fuel concepts, materials irradiation, basic nuclear physics research, environmental monitoring and isotope production.

The first batch of cobalt 60 to be irradiated in ATR was shipped early in 1983. Cobalt 60 is widely used in cancer radiation therapy. ATR personnel are also developing a new system to be installed in the reactor at the first of this year allowing greater temperature control in the reactor's irradiation test spaces. Irradiation tests for candidate fusion reactor materials will then be conducted.

During 1983 activities in the TMI program advanced. Most notable was the waste shipped off the island ahead of schedule. In July the last of 50 EPICOR-II liners, used in cleaning up contaminated water in the TMI auxiliary building, was loaded and transported to INEL for research and development purposes. Work also continued on developing and testing a High Integrity Container to be used to dispose each liner in a commercial disposal facility.

At TMI, INEL personnel used ultrasonic equipment to gather roughly 500,000 data points about the damaged TMI core cavity. The information was used to create a three-dimensional topographic map showing the overall shape of damaged fuel assemblies and other core features. A Plexiglas model developed from the map will be used to document the extent of the core damage and assist planners preparing to defuel the core.

The INEL effort at TMI also included a core sampling project. An EG&G Idaho engineer team entered the TMI containment building, and working above the reactor, took samples of core material from different depths in the center of the core. The samples, sent to off-site hot cells for analysis, are expected to give scientists basic technical data on the nature of core damage during a reactor accident. The information will also aid the defueling effort.

A new facility recovering uranium from graphite-based fuels began operating at the INEL's CPP this past year. The Rover facility processes fuels produced in the 1960s for a cancelled Federal nuclear rocket reactor propulsion program. The Rover fuel rods contain a larger percentage of Uranium-235 than most other spent nuclear fuels, therefore the recovery's monetary value is significant. Process work will continue into 1984.

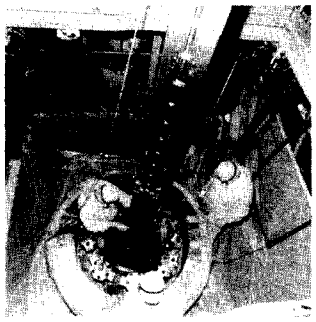
Basic breeder reactor research continued at a brisk pace in 1983 at ANL-W. There, breeder research is becoming more of an international program, as reflected in financial support from Japan and the United Kingdom.

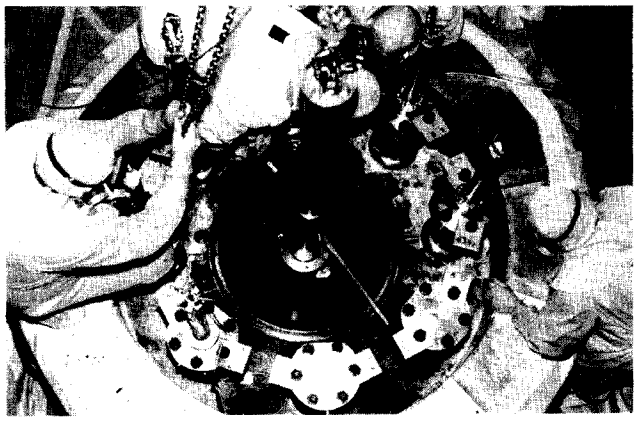
EBR-II entered its 20th operating year with transient overpower tests on future breeder prototype fuels. These tests are forerunners of tests to be done in 1984, learning about the reliability of these reactor fuels in mild accident conditions. Japan, with a Clinch-River-size breeder now under construction, is a participant in the EBR-II program.

During the year, the EBR-II Project resumed manufacturing new reactor fuel assuring an ample supply for future operations. A study was also undertaken to assure spare parts would be available for at least 10 more years of reactor operation.

The Transient Reactor Test Facility, celebrating 25 years in February, was kept busy throughout the year on high-power experiments involving fuel specimens meeting in accident simulations. Some of these specimens came from U.S. sponsors and some from the U.K.'s

More on 1983 continued on page 3





A NEW A3 center fuel module has been installed at LOFT for use in an upcoming test for the OECD LOFT Project. A specially-trained and certified fuel handling crew is pictured lowering the module into the LOFT reactor.

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