An aerial view of DTE Energy's Fermi nuclear power plant site

Behind the scenes of Fermi-2's 15th refueling outage

The 38-day refueling and maintenance outage included cable and piping upgrades for the plant's emergency diesel generators and transmission switchyard improvements.

THE 15TH REFUELING outage at DTE Energy's Fermi-2 nuclear power plant, an 1150-MWe boiling water reactor located in Newport, Mich., began in late March 2012 and ran for 38 days. During the outage, more than 16 000 planned inspection and equipment maintenance activities were carried out. Major jobs included the replacement of about one-third of the reactor fuel and the upgrading of the cables that connect the emergency diesel generators (EDG) to the plant and of the piping that supplies cooling water to the EDGs. These are long-term reliability improvements for the EDGs, a major backup safety system. In addition, new equipment that will improve grid reliability was installed in the transmission switchyard. The plant was reconnected to the grid on May 5.

More than 1500 supplemental workers, including millwrights, boilermakers, iron workers, and carpenters, augmented Fermi-2's normal staff of about 900.

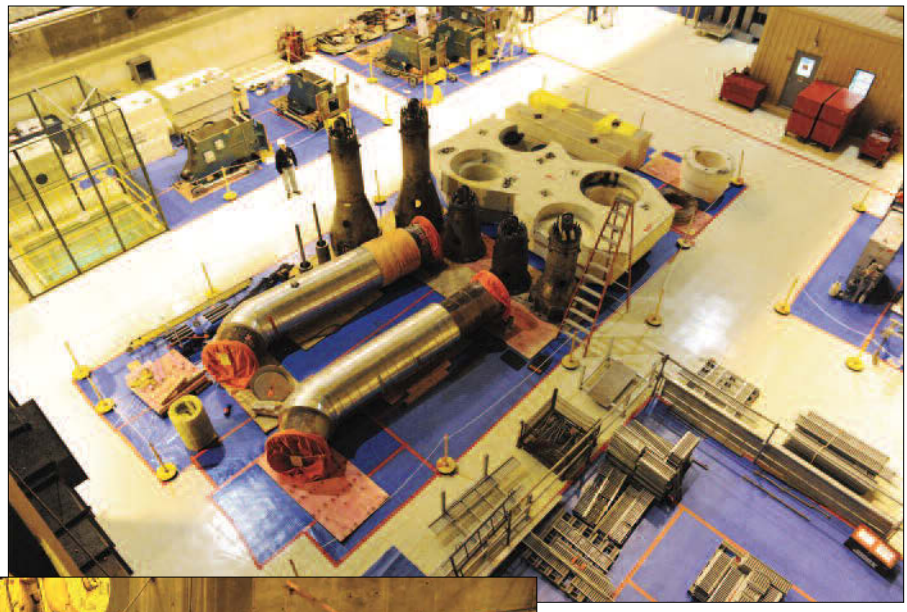
The photos on pages 64 through 69 depict just some of the tasks that were performed during the outage. (Photos: DTE Energy)

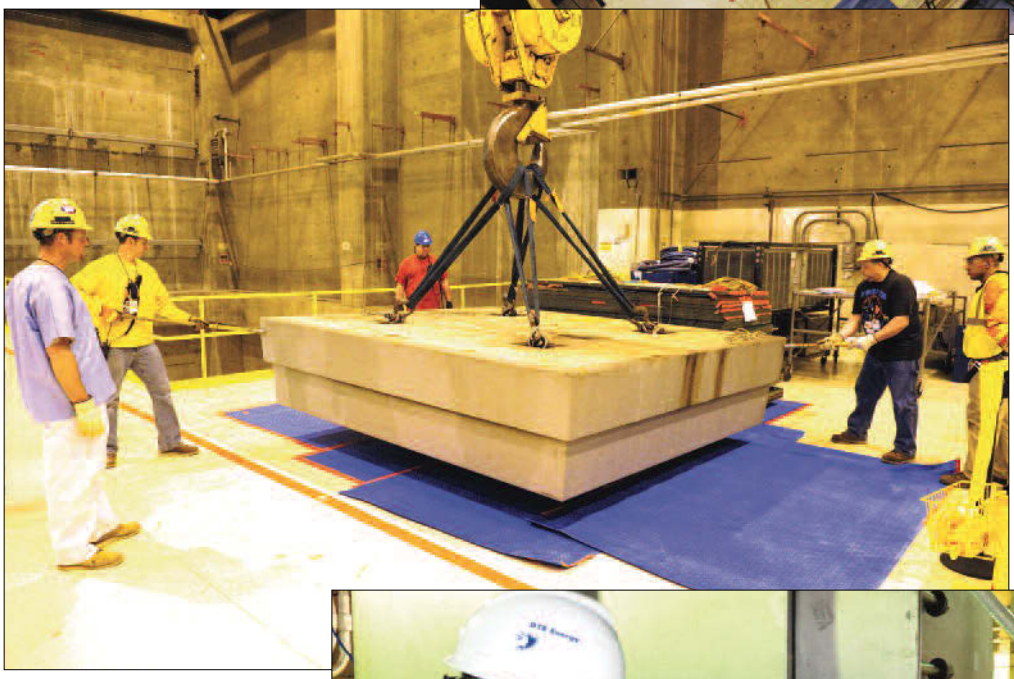
From left, Gabriel Verespec, Sam Hiner, and David Vanek perform preventive maintenance on a field circuit breaker for a motor generator. ▶

◀ A worker secures a bolt during a job to replace all service water piping for Fermi-2's emergency diesel generators (EDG). In all, crews removed and replaced more than 700 feet of piping in about 12 days. Preparation was the key to the success of this huge undertaking.

Also part of the service water piping for the EDGs, a worker cuts a portion of pipe that will be replaced during the outage. ▶

On the third floor of Fermi-2's turbine building, equipment from various valves connected to the low-pressure turbine is staged on the floor.





Also on the third floor of the turbine building, workers move a 20-ton cap to give crews access to a filter for cleaning during the plant's 15th refueling outage.

Mark Alward (left) and Ron Reddick conduct a test of the check valves and other components that are part of Fermi-2's primary containment system. The work done on the valves was part of a job that stretched over two outages and was finished during this refueling outage.

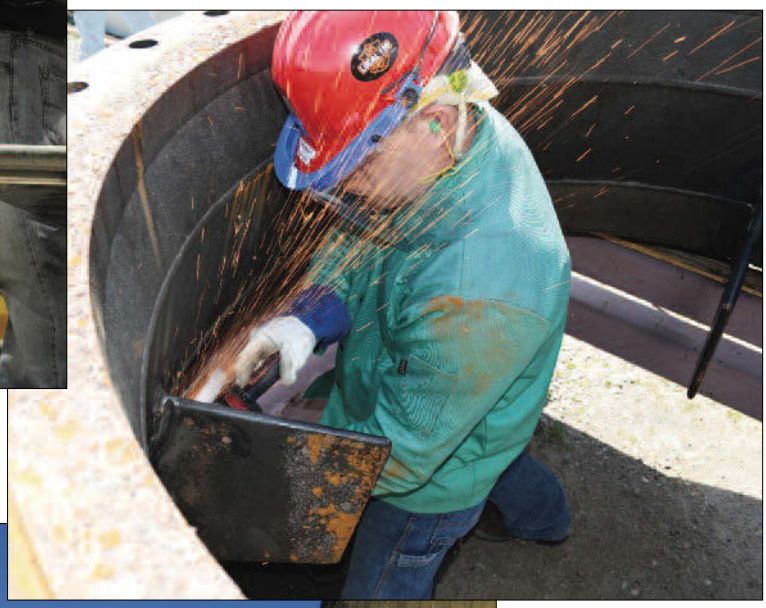
◀ As part of a multiyear project to replace the cables that connect the EDGs to the plant, new trenches were built to run the cables. More than 800 feet of cable was replaced during Fermi-2's 15th refueling outage. For the entire project, more than 30 tons of rebar, 700 feet of 4-inch conduit, and 800 yards of concrete were used to construct the cable duct banks.

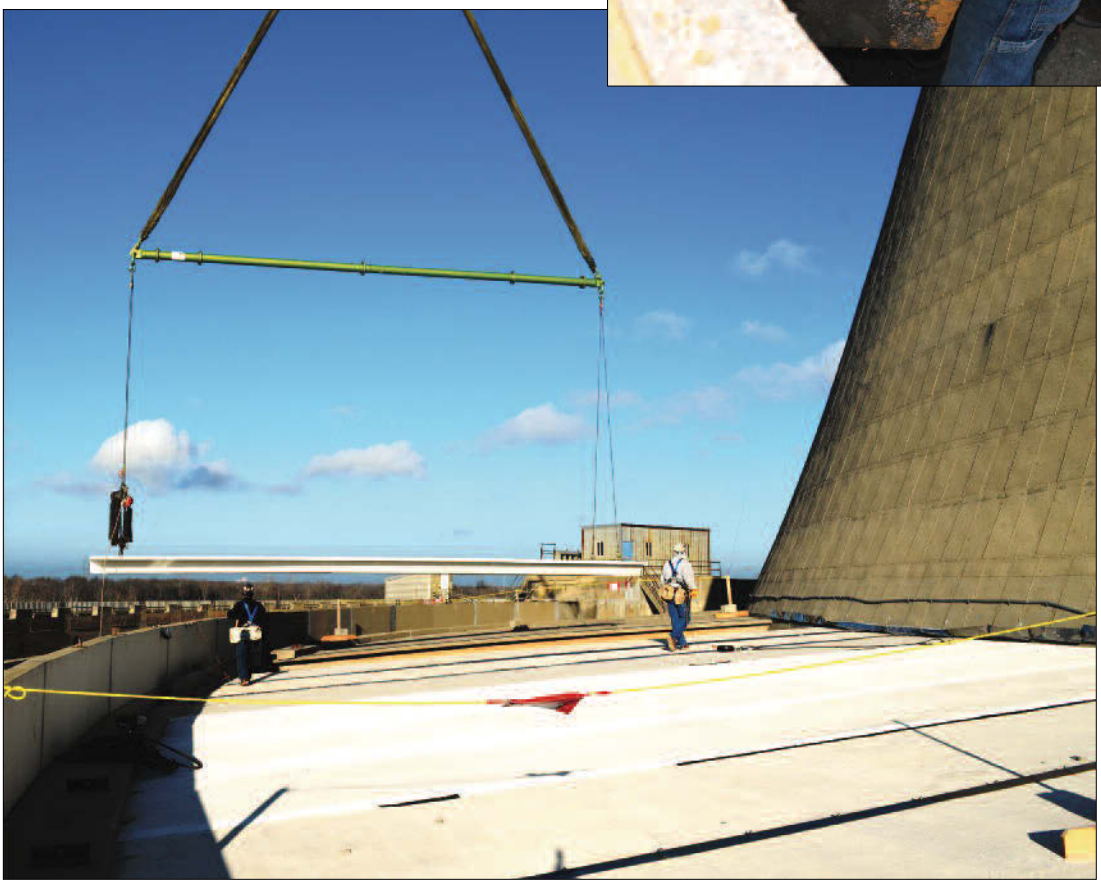
▼ Workers complete the connection of cables that lead from the EDGs to the switchgear room inside Fermi-2.

◀ Inside the residual heat removal building at Fermi-2, Rick Clear (left) and Glenn Paulette check the connections for the cables that provide electricity to the plant from the EDGs. Clear and his team replaced more than 800 feet of cable to complete the project.

◀ On the refueling floor in Fermi-2's reactor building, two engineers inspect new nuclear fuel, looking for any imperfections.

▼ Tommy Wright makes repairs to a separator vane on the suction bell of the No. 2 circulating water pump at the circulating water pump house.





◀ A 160-feet-tall, 240-ton crane was used to replace 10 of the canopy covers on Fermi-2's north cooling tower. Each canopy cover weighs 13 200 lb, is 40 feet long, and measures 8.5 feet wide at one end and 6.5 feet wide at the other end.

◀ Rich McDevitt, a journeyman mechanic at Fermi-2, works on a valve component in the machine shop.

▲ Satbir Singh (left) and Elaine Belenky—both nuclear engineers—work on Fermi-2's flow-accelerated corrosion program. Pipe wall thickness is tested during each outage, and if the pipe walls are found to be thinner than allowable, corrective action is taken.

▼ Fermi-2 workers prepare to change out four oil pumps on one of the plant's main unit transformers.