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DTE Energy

NRC 05-0017
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U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington D C 20555

Reference: Fermi 2
NRC Docket No. 50-341
NRC Operating License No. NPF-43

Subject: Fermi 2 Cycle 11 Startup Report

In accordance with Technical Requirements Manual Section 5.2.1, Detroit Edison is submitting the enclosed Fermi 2 Cycle 11 Startup Report.

The Technical Requirements Manual states that a summary report of plant startup and power escalation testing shall be submitted "following installation of fuel that has a different design." Fermi 2 loaded 192 GE14 fuel assemblies manufactured by Global Nuclear Fuel-Americas during the Tenth Refueling Outage.

The startup report addresses applicable tests identified in Section 14.1.4.8 of the Updated Final Safety Analysis Report and includes a description of the measured values of the operating conditions or characteristics obtained during the test program and a comparison of these values with design predictions and specifications.

Should you have any questions or require additional information, please contact Mr. Paul R. Kiel, Principal Engineer, at (734) 586-1455.

Sincerely,

William T. O'Connor

Enclosure

cc: E. R. Duncan
N. K. Ray
NRC Resident Office
Regional Administrator, Region III

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Summary

This startup report is being submitted pursuant to Fermi 2 Technical Requirements Manual Section 5.2.1, which requires a report to be submitted whenever Fermi 2 installs a fuel of a different design or has been manufactured by a different fuel supplier. Cycle 11, which is currently in progress, is operating with 192 GE14 fuel assemblies manufactured by Global Nuclear Fuel-Americas. This is the same manufacturer of the GE11 fuel that constitutes the remainder of the fuel in the core.

Although Global Nuclear Fuel-Americas considers GE14 to be an evolutionary fuel design, Fermi 2 is documenting the testing for the first reload of GE14 fuel assemblies. Only applicable tests from Chapter 14 of the Updated Final Safety Analysis Report are described herein. Fermi 2 completed the startup testing for Cycle 11 based on performance of Procedure 57.000.15, "Recirculation System Performance Data Collection and Speed Limiter Setpoint Determination," on December 18, 2004.

Fuel Loading

The purpose of this test is to load fuel safely and efficiently to the full core size. The partially loaded core must be subcritical by at least 0.38 percent $\Delta k/k$ with the analytically determined strongest rod fully withdrawn.

The beginning of cycle shutdown margin calculated by the Fermi 2 fuel vendor was reported at 1.17 percent $\Delta k/k$. Core shuffle was conducted in accordance with approved instructions. Equipment required to be operable to ensure that shutdown margin is maintained was verified by various performances of Procedure 24.000.03, "Mode 5 Shiftly, Daily, and Weekly Surveillances," before and during core alterations. Procedure 24.000.03 was last completed on November 20, 2004. Post core alteration core verification was completed on November 25, 2004 in accordance with Procedure 82.000.04, "Refueling and Post Core Alteration Verification." All fuel bundles were verified to be in their proper locations and properly oriented in the control cells.

Full Core Shutdown Margin

The purpose of this test is to demonstrate that the reactor is subcritical throughout the first fuel cycle with any single control rod fully withdrawn.

This test is performed in the fully loaded core in the Xenon-free condition. The shutdown margin is measured by withdrawing the control rods until criticality is reached. If criticality is not reached with in-sequence control rods in the

configuration corresponding to the required shutdown margin reactivity, the shutdown margin is satisfied. Additional in-sequence control rods are then withdrawn until the reactor is critical. The difference between the measured K_{eff} and the calculated K_{eff} for the in-sequence critical will be applied to the calculated shutdown margin to obtain the true shutdown margin. Technical Specification 3.1.1 requires that shutdown margin of the fully loaded core with the analytically determined strongest rod withdrawn must be at least 0.38 percent $\Delta k/k$ plus an additional margin for exposure. Criticality should occur within 1.0 percent $\Delta k/k$ of the predicted critical.

The shutdown margin measured on December 1, 2004 in accordance with Procedure 54.000.01, "Shutdown Margin Check," was 0.9521 percent. This was above the minimum required shutdown margin of 0.38 percent.

Control Rod Drive System

The purposes of the Control Rod Drive (CRD) system test are to demonstrate that the CRD system operates properly over the full range of primary coolant temperatures and pressures from ambient to operating, and to determine the initial operating characteristics of the entire CRD system. These tests would not be affected by the addition of GE14 fuel.

Core Performance

The core performance evaluation is employed to determine the principal thermal and hydraulic parameters associated with core behavior. The test evaluated core thermal power, core flow rate, and the core performance parameters of maximum linear heat generation rate (MLHGR), minimum critical power ratio (MCPR), and maximum average planar linear heat generation rate (MAPLHGR). The MLHGR during steady-state conditions shall not exceed the allowable heat flux as specified in the core operating limits report (COLR). The steady-state MCPR shall be maintained greater than, or equal to, the value specified in the COLR. The MAPLHGR shall not exceed the limits given in the COLR. Steady-state reactor power shall be limited to full rated maximum values on or below the design flow control line. Core flow will not exceed its rated value.

During power ascension after the Tenth Refueling Outage, core parameters were monitored frequently using the 3D Monicore system. Core performance was documented in Procedure 54.000.07, "Core Performance Parameter Check," and Procedure 24.000.02, "Shiftly, Daily, and Weekly Required Surveillances," on December 3, 2004. Offline comparisons of 3D Monicore output and Panacea output indicate the core is behaving as expected.