

March 7, 2002

Tech Spec Section 6.7.A.1

US Nuclear Regulatory Commission  
Attn: Document Control Desk  
Washington, DC 20555

**MONTICELLO NUCLEAR GENERATING PLANT**  
Docket No. 50-263 License No. DPR-22

**Startup Report for Cycle 21**

Section 6.7.A.1 of the Monticello Technical Specifications requires that a Startup Report be submitted within 90 days following resumption of commercial operation with a fuel installed that has a different design or has been manufactured by a different supplier. Cycle 21 is the first cycle to utilize Global Nuclear Fuel's (formerly General Electric Company) GE14 fuel design. In compliance with Technical Specification Section 6.7.A.1, a Startup Report for Cycle 21 is provided as attachment A.

This submittal contains no new NRC commitments nor does it modify any existing commitments.

Please contact Paul Hartmann at 763-271-5172 if you require further information related to this submittal.



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**Attachment**

c: Regional Administrator-III, NRC  
NRR Project Manager, NRC  
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## ATTACHMENT A

### STARTUP REPORT FOR CYCLE 21

Monticello Cycle 21 started up with a fuel design (GE14) in-core that has not been previously operated in the Monticello core. The Cycle 21 reactor core includes 104 GE14 fuel bundles, in addition to 380 bundles that have been previously used at Monticello.

The features of the GE14 fuel bundle design are described in references 1 and 2. A summary of these features is as follows:

The GE14 fuel design has a 10x10 array of fuel pins with two central water rods which occupy eight pin positions, similar to the GE12 fuel design of which 4 lead use assemblies were loaded at beginning of cycle 18. The GE14 fuel has 6 inches of natural uranium at the bottom of the fuel rods, 12 inches of natural uranium at the top of the fuel rods (except the part length rods), axially zoned gadolinia, and 14 part length rods. It also includes 8 spacer grids, a maximum nominal active fuel length of 148 inches, and a debris filter lower tie plate.

During startup of Cycle 21, standard post-refueling outage startup physics testing was performed. This included:

- Shutdown margin testing to confirm that the reactor will be subcritical during cycle 21 with the strongest worth operable rod fully withdrawn;
- One "few-rod critical" centered around withdrawal of the control rod calculated to have the highest worth during the test, and enough diagonally adjacent rods to reach critical and measure the reactor period;
- One "dispersed critical" or "in-sequence critical" where criticality was achieved using the normal startup control rod withdrawal sequence.

The results of each of these tests agreed with the predicted results within expected differences.

The features of the new fuel design were included (where appropriate) in the analysis of the plant transients listed in the Monticello FSAR to evaluate their effect on the transients. This evaluation is documented in reference 2, and the effects of the new fuel type are included in the Core Operating Limits Report for Cycle 21.

Appendix D of the Monticello USAR describes the startup program that was followed for initial startup of the plant. The following tests were essentially repeated for the Cycle 21 startup, with modifications noted in parentheses:

- Section D.5.3.b – Control Rod Drive System tests: Drive operability during fuel loading was ensured by drive operability testing during the preceding operating cycle and during shutdown. Scram timing was performed on all control rod drives (with the exception of drive 26-27) either prior to the initial cycle criticality or at approximately 40% reactor power. Drive 26-27 had been declared inoperable and maintained fully inserted in accordance with the plant Technical Specifications for reasons unrelated to the presence of GE14 fuel. Drive 26-27 has subsequently

been repaired, tested satisfactorily, and returned to service. (Drive line friction testing was not performed, and no dummy fuel was used during testing);

- Section D.5.3.d – Fuel Loading (without poison curtains);
- Section D.5.3.e – Shutdown Margin for the fully loaded core (no physical demonstrations were performed during fuel loading);
- Section D.5.3.f – Control Rod Sequences – In addition to the testing and evaluations described in the USAR for the cycle startup sequence, an additional few-rod test critical was performed which utilized a withdrawal sequence that was subjected to the same safety criteria as the startup sequence;
- Section D.5.5.o – LPRM Calibrations (at 100% power);
- Section D.5.5.q – Core Performance Evaluations (Minimum Critical Power Ratio has replaced Minimum Critical Heat Flux Ratio).

Other testing listed in Appendix D of the Monticello USAR is not affected by the presence of GE14 fuel.

Results of the tests that were performed were all acceptable. No corrective actions were required to obtain satisfactory operation with GE14 fuel in-core.

#### References:

1. "GE14 Compliance With Amendment 22 of NEDE-24011-P-A (GESTAR II)", NEDC-32868P, Rev 1, September, 2000.
2. "Monticello Cycle 21 Final Reload Design Report (Reload Safety Evaluation)", Revision 1, TD.NMC.NAD-MN-001.01, November, 2001.
3. Monticello USAR Appendix D, "Pre-Operational and Startup Tests".