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NORTHEAST NUCLEAR ENERGY COMPANY

A NORTHEAST UTILITIES COMPANY

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July 1, 1976

Mr. James P. O'Reilly
Director, Region I
Office of Inspection and Enforcement
U. S. Nuclear Regulatory Commission
631 Park Avenue
King of Prussia, Pennsylvania 19406

Reference: Facility Operating License No. DPR-65
Docket No. 50-336

Pursuant to Millstone Unit 2 Appendix A, Technical Specification 6.9.1, Northeast Nuclear Energy Company is required to submit a Startup Report addressing plant startup and power escalation testing outlined in Regulatory Guide 1.16, Revision 4, Section C.1.a, within (1) 90 days following completion of the startup test program, (2) 90 days following resumption or commencement of commercial power operation, or (3) 9 months following initial criticality whichever is earliest.

To fulfill the requirement for submitting a report within 9 months following initial criticality, Northeast Nuclear Energy Company hereby submits a Startup Test Report Summary as Attachment A. The nature and timing of this interim report was discussed and agreed upon in a telephone conference between Mr. D. Jaffe, Millstone 2 NRC Project Manager, and Mr. B. Kenyon, Millstone 2 Superintendent. The final Startup Test Report will be submitted on or before August 26, 1976, which is 90 days following the May 28, 1976 completion date of the startup test program.

Very truly yours,

Northeast Nuclear Energy Company

D. C. Switzer

D. C. Switzer
President

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ATTACHMENT A

NORTHEAST NUCLEAR ENERGY COMPANY
MILLSTONE UNIT 2
STARTUP TEST REPORT - PRELIMINARY SUMMARY

1. Initial Fuel Load

Fuel loading was preceded by a response checkout of all neutron detectors that were utilized during the core loading. Two temporary incore detectors were used as well as the four permanently installed wide range channels. Operability of the detectors was verified using a neutron source assembly installed in the dummy fuel assembly. Background countrate was also determined at this time. Fuel loading commenced on 8/2/75 and the final fuel assembly was installed on 8/10/75. During the evolution, minor delays were experienced due to equipment malfunctions and due to a few instances of fuel assemblies hanging up during insertion. One fuel assembly was removed from the core and examined for damage, but no significant signs of damage were observed on this or any other assembly.

2. Post Core Hot Functional Tests

Post Core Hot Functional testing commenced on 8/25/75 and was completed on 10/15/75. The primary purpose of this testing was to determine the thermal/hydraulic operating characteristics of the Reactor Coolant System with the core in place and to verify proper operation of the Control Element Drive Mechanisms. Additional testing was performed on selected secondary systems to obtain baseline information and verify proper operation.

The Post Core Hot Functional Tests were conducted prior to bringing the reactor critical at selected pressures and temperatures ranging from ambient to zero-power, no-load conditions (532°F, 2250 psia). Specific tests included control element drive mechanism performance, Reactor Coolant System flow determination and coastdown characteristics, Pressurizer Control and Instrumentation testing, Reactor Coolant System Leak Rate determination, Reactor Coolant System heat loss and heatup rate measurements, Boration/Dilution testing, and secondary plant checkout.

Test results met acceptance criteria with the exception of the Reactor Coolant System four-pump flow coastdown test. The normalized flow response after simultaneous tripping of the four pumps did not agree with prediction over the entire coastdown range. Subsequent analysis by the NSSS Vendor (Combustion Engineering) determined that this was due to the total core flow (and therefore system resistance) being higher than that used in the accident analysis. However, because of the flow being well in excess (approximately 25%) of design, the flow coastdown response was judged adequate. Difficulty was also encountered with the Reactor Coolant System Heat Loss Test. Two different methods were employed to calculate the fixed heat loss from the primary system. Results of the two tests had significant deviation and in addition were higher than expected (design) conditions. The test was therefore re-performed during a halt in Low Power Physics Testing after additional insulation had been added to the primary system. Results at this time were consistent between the two methods and also comparable in magnitude to similar design plants.

A number of significant problems occurred during Post Core Hot Functionals that considerably lengthened the testing. These major problems included Control Element Assembly position indication and drive mechanism problems, two non-isolable leaks on Reactor Coolant Pump instrumentation lines, and two failures of Reactor Coolant Pump guide bearings. Each instance required a plant cooldown before repairs could be affected.

3. Initial Criticality

The approach to initial criticality commenced on 10/16/75 at 0545 with the commencement of rod withdrawal. Minor problems were encountered with the control element drive system that required adjustment of operating voltages. A slow Reactor Coolant System dilution at approximately one ppm/minute commenced @ 2030. The reactor was declared critical at 1337 on 10/17/76. The measured boron concentration at the time of criticality was in excellent agreement with the predicted value.

4. Low Power Physics Testing

Low Power Physics testing commenced on 10/18/75 and was completed on 10/29/75. All test results agreed favorably with predictions and were within acceptance criteria. Numerous minor delays were experienced with the Control Element Drive System requiring additional grooming of the system.

5. Power Ascension Testing

The power ascension phase of testing commenced on 10/29/75 and the final test in this evolution was completed on 5/8/76. Testing was conducted at four major test plateaus (20%, 50%, 80% and 100%) to determine as-built plant operating characteristics (transient and steady-state) and to provide reasonable verification of the FSAR transient and accident analysis.

Tests conducted during power ascension included secondary plant startup, Core Power Distributions, Reactor Protection System Calibrations, Chemistry and Radiochemistry tests, Power and Isothermal Temperature Coefficient Measurements, Pseudo Dropped and Ejected CEA Tests, and a number of trip tests. The trip tests included shutdown from Outside the Control Room, Partial and Total Loss of RCS Flow, Total Loss of Offsite Power, and Generator Trip from 100% Power. Two tests were deferred. Part loop operation of the Reactor Coolant System was not performed due to a Technical Specification restriction allowing only four reactor coolant pump operation. In addition, automatic testing of the Reactor Regulating System was deferred, The primary reason was based on fuel considerations with the concern that rapid and constant rod motion could adversely affect fuel integrity. Administrative requirements presently prevent use of the control element drive system in the automatic mode of operation (this feature is wired out).

Preliminary review of all power ascension tests were acceptable with three exceptions. The Power Coefficient Measurements initially did not meet acceptance criteria at 50 and 80% power. Revised predictive values were obtained from the NSSS vendor that reflected the as-built characteristics of the Millstone 2 fuel. Power Coefficient values obtained at all four test plateaus were in good agreement with the revised predictions. Two other tests, the pseudo ejected and pseudo dropped CEA tests, were analyzed off-site by the NSSS vendor. The dropped CEA test was acceptable at the power level (50%) where it was performed. However, until the vendor extrapolation analysis to the 100% power condition had been performed and reviewed, administrative requirements specified that the reactor be tripped in the event a rod was dropped at a power level greater than 50%. The NSSS vendor extrapolation analysis was satisfactorily completed and the administrative requirement to trip removed on 6/18/76.

During the Power Ascension program, a few major problems occurred that significantly delayed the testing and/or had a significant impact on plant operations. These included higher than predicted containment radiation levels due to neutron streaming from the reactor cavity annulus, significant and numerous condenser tube failures, turbine control and valve problems, and turbine bypass (to condenser) valve instability problems.

6. Warranty Run

The 250 hour warranty run commenced on 5/16/76 and was completed on 5/28/76. Performance of the NSSS as specified in the NSSS contract was verified.