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U. S. Nuclear Regulatory Commission
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Subject: Arkansas Nuclear One - Unit 2
Docket No. 50-368
License No. NPF-6
Power Uprate Startup Testing Report Supplement

References: Entergy Operations Inc. Letter No. 2CAN080203, dated August 5, 2002, "Power Uprate Startup Testing Report"

Entergy Operations Inc. Letter No. 2CAN110201, dated November 4, 2002, "Power Uprate Startup Testing Report Supplement"

Dear Sir or Madam:

On August 5, 2002, Entergy Operations, Inc. (Entergy) submitted a Startup Testing Report to the NRC summarizing the relevant testing conducted at Arkansas Nuclear One Unit 2 (ANO-2) following a 7.5% power uprate. At the time the report was submitted, there were four relevant tests yet to be completed. These tests were: Secondary Plant Performance, Steam Generator Moisture Carryover, Steam Generator Performance, and Maximum Dependable Capability.

Additionally, Entergy stated that data collected during a transient that occurred during startup from Refueling Outage 2R15 would be evaluated to determine if it was sufficient to meet the objectives of the planned Unit Load Transient Test.

On November 4, 2002, a supplemental report was submitted as required by ANO-2 Technical Specification 6.9.1.3 documenting that the testing had been completed but test results were not yet finalized.

As required by ANO-2 Technical Specification 6.9.1.3, this submittal provides the current status of the relevant testing conducted post-power uprate and the results of the startup transient data evaluation. This submittal contains no new commitments.

Sincerely,

Sherrie R. Cotton

Sherrie R. Cotton
Director, Nuclear Safety Assurance

SRC/rhs
attachment

IE26

cc:

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ARKANSAS NUCLEAR ONE UNIT 2
POWER UPRATE STARTUP TESTING REPORT
SUPPLEMENT

Steam Generator Performance Testing

The objective of this test was to collect data and perform calculations to permit comparison of replacement steam generators and related parameters against contract specifications and design criteria.

The test was performed by securing steam generator blowdown and establishing initial conditions at 100% power and normal full power Reactor Coolant System (RCS) temperatures. With conditions maintained stable, specified data was collected from the Plant Data Server for approximately six hours. The data were averaged and analyzed to permit calculation of actual steam generator and related parameters for comparison to established acceptance criteria.

Data analysis verified that the following acceptance criteria were met: Steam generator dome pressure, steam generator outlet nozzle pressure, steam line pressure, steam generator moisture carryover, average RCS temperature at the operating point, and the steam generator tube fouling factor and heat transfer coefficient.

Steam generator secondary side differential pressures did not meet the acceptance criterion of 35.6 psid as the "A" and "B" generator's differential pressures were measured/calculated to be 63.62 and 55.26 psid, respectively. However, these pressures were evaluated as acceptable with no actions deemed necessary.

Moisture Carryover Test

The purpose of this test was to collect data to determine the amount of moisture being carried over into the main steam lines from the steam generators.

The test was conducted by isolating steam generator blowdown and condensate makeup, injecting Lithium into the feedwater system and subsequently comparing the concentration of lithium in the steam generators to that in the steam system.

The results of the carryover tests showed that performance of the steam generator moisture separation system was well within the design limit of 0.10%. Maximum carryover was 0.0394% for the "A" steam generator and 0.0557% for the "B" generator.

Maximum Dependable Capability

The objective of this test was to determine the new Maximum Dependable Capability (MDC) rating for the unit. Data were collected from the plant data server during power operation and normalized for 100% summertime operation.

Entergy is currently in the process of standardizing the MDC testing process for all of its operating units. Since the standardized process may impact the calculated value of MDC, the test results were not finalized.

Entergy does not anticipate submitting an additional supplemental report regarding this test since the revised MDC will be included in subsequent Monthly Operating Reports submitted to the NRC.

Secondary Plant Performance

The objective of this test was to provide instructions for post-modification testing of the high and low pressure turbines, Moisture Separator Reheater (MSR) low load and high load valves, and the MSR excess steam valves. This test also monitored key secondary plant parameters during power ascension from 90% power to the uprated 100% power for comparison to acceptance criteria developed from design documents. Data were collected at 90%, 92.5%, 95%, 97.5%, and 100% power.

The secondary plant performance test was not finalized and approved by the Test Working Group because the vendor supplied performance test report was not received until late November, 2002.

However, since the preliminary test results were favorable, Entergy does not anticipate submitting an additional supplemental report regarding this test unless the finalized results are unacceptable.

Unit Load Transient Test

The objective of the Unit Load Transient Test was to verify the acceptable integrated response of plant systems to plant transients by initiating a step load decrease of $\geq 25\%$ from approximately 75% power. The transient test data would also provide validation of the Westinghouse-Combustion Engineering Long Term Cooling Analysis changes made relative to steam generator replacement and power uprate.

During startup from 2R15, a main turbine control valve failed shut and then suddenly re-opened. The plant transient initiated by this event was similar to the one intended by the unit load transient test.

As stated in our letter dated August 5, 2002, Entergy was evaluating the data collected during the plant transient to determine if it was sufficient to meet the objectives of the Unit Load Transient Test.

The objectives of the Unit Load Transient Test were:

- Control system actions occur as expected (i.e., react in the proper direction at the appropriate time)
- No unnecessary plant trips, including Reactor Protection System actuations occur

- No unnecessary Engineered Safety Features Actuation System actuations occur
- No lifting of pressurizer or main steam safety valves
- Minimize entry into Technical Specifications Limiting Condition for Operation action statements
- RCS inventory maintained (avoid draining or overfilling the pressurizer)
- Avoid excessive overcooling of the primary or secondary
- Avoid excessive component cycling or modulation (e.g., no excessive Steam Dump Bypass Control System valve oscillations)
- Operator is not overburdened due to ineffective or overly aggressive control system operation

The evaluation was completed and established that the transient-initiated control system responses were sufficient to verify the objectives of the unit load transient test. The control system responses were adequate and met all the acceptance criteria of the transient test. In addition, the data validated the Long Term Cooling code as a "best estimate" modeling tool.