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February 11, 1985

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Subject: Byron Generating Station Units 1 and 2
Braidwood Generating Station Units 1 and 2
Intial Test Program
NRC Docket Nos. 50-454/455 and 50-456/457

Reference (a): February 1, 1985 letter from B. J. Youngblood to D. L. Farrar.

Dear Mr. Denton:

This letter provides advance copies of the responses to several NRC questions regarding the initial test program at Byron and Braidwood stations. These responses will be incorporated into the FSAR at the earliest opportunity.

Enclosed are the responses to FSAR questions 423.44 through 423.48. These matters have already been discussed with the NRC Staff. Our testing program will proceed on the basis of our understanding that these responses are acceptable to the NRC Staff. Please address further questions regarding this matter to this office.

One signed original and fifteen copies of this letter and the enclosures are provided for NRC review.

Very truly yours,

T. R. Tramm

T. R. Tramm
Nuclear Licensing Administrator

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cc: Resident Inspector Byron

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423.44

a) Provide the following additional test abstracts or expanded justification for their omission in discussion of conformance with Regulatory Guide 1.68, Revision 2, Appendix A:

1.j(22) Post-accident Monitoring System
FSAR Subsection 7.5.3.3.9

1.1(1) Liquid Radwaste Handling System
FSAR Subsection 11.2

1.1(3) Solid Radwaste Handling System
FSAR Subsection 11.4

5.c.c Gaseous and Liquid Radwaste Systems
FSAR Subsections 11.3 and 11.2

b) Natural Circulation Tests - Modify the statement of conformance to NUREG-0694, Item I.G.1, as contained in FSAR Appendix E.18 to ensure that each licensed operator receives the training as specified in Item 423.30, Part 4.t.

c) Provide expanded justification for not performing a Feedwater Heater Bypass test as required by Regulatory Guide 1.68, Revision 2, Appendix A, Part 5.k.k.

d) MSIV Closure Test - FSAR Appendix A states that this test will not be conducted since "the closure of all MSIV's will result in a turbine trip" and that the "turbine trip test will be performed at 100% power and is a more severe transient." The turbine trip is not a more severe test than the closure of all MSIV's test. Therefore, conduct this test at 100% power (or a lower power level if acceptable justification is provided) in accordance with Regulatory Guide 1.68 or provide acceptable, appropriate technical justification for an exception to the Regulatory Guide.

Response:

a) Post-accident monitoring instrumentation is tested in various Preoperational Tests. Therefore, no abstracts for tests of individual instrumentation are provided.

Sec. 1.1.(1), 1.1(3), and 5.c.c These systems are non-safety related, with the exception of the gaseous radwaste system. Non-safety related systems are tested by System Demonstration Tests, which are not within the scope of the formal Preoperational Test Program.

Parts of the Preoperational Test for the Radioactive Waste Gas System are performed during the Startup Test for reactor coolant system degassing to verify operability of the gaseous radwaste system. Table 14.2-24 will be revised to reflect this testing.

b) The modified statement of conformance in FSAR Appendix E.18 is contained in Amendment 46.

c) As described in FSAR Section 15.1.1.2, the bypass of feedwater heaters is a less severe case of feedwater temperature reduction than a 10% step load increase. The 10% load increase is tested as described in Table 14.2-88. Therefore a feedwater heater bypass test as described by Section 5.k.k will not be performed. FSAR page A1.68-2 is being revised to reflect this amended justification.

d) Refer to FSAR Table 14.2-91, "Turbine Trip from 20% Power". This new table is contained in Amendment 46 and was transmitted in a letter dated November 29, 1984 from T.R. Tramm to Harold R. Denton. This table will be revised to perform the test at 25% power. FSAR page A1.68-2 will be revised to provide justification for performing this test at the 25% power level.

423.45

The response to Item 423.33, Part 12, is not acceptable. Modify the response to this item, FSAR Table 14.2-25, Diesel-Generator, (Appendix A) and the statement of conformance to Regulatory Guide 1.108 (Periodic Testing of Diesel Generator Units Use as Onsite Electric Power Systems at Nuclear Power Plants) as stated in FSAR Appendix A to include all testing as defined in Regulatory Guide 1.108, including positions C.2.a.2, 5, 7, 8 and 9.

Response:

All testing required by Section C.2.a has been performed within the scope of the preoperational test program or plant surveillance procedures. FSAR Table 14.2-25 will be revised accordingly.

423.46

The response to Item 423.42, Sub-item 6, is not acceptable. Modify FSAR Table 14.2-72, Water Chemistry, to include testing at approximately 30%, 50%, 75% and 100% reactor power in accordance with Regulatory Guide 1.68, Appendix 2, Part 5.a.a.

Response:

A revised FSAR Table 14.2-72 is contained in Amendment 46 and was transmitted in a letter dated November 29, 1984 from T.R. Tramm to Harold R. Denton.

423.47

Modify FSAR Table 14.2-50, Primary Safety and Relief Valves, FSAR Table 14.2-51, Steam Generator Safety and Relief Valves, or other FSAR Chapter 14 test abstracts as appropriate to demonstrate that the capacity of the pressurizer power operated relief valves is consistent with the accident analysis assumptions for both the minimum and maximum conditions. When taking credit for bench tests instead of performing installed capacity checks, technical justification should be provided. Where valves are not tested in-situ with the process fluid, testing should be conducted to verify that discharge piping is clear and will not choke or produce back-pressure affecting set-reset pressures of the valves.

Response:

Based on the manufacturer's flow coefficient, testing by the Electric Power Research Institute using an identical design, and in-situ testing to verify stroke length and timing adequacy, it has been verified that the pressurizer power operated relief valves will deliver the minimum flow capacity for all overpressure transient conditions. Using the same methodology, it has been verified that the flow capacity will not exceed the maximum flow assumed in the accident analysis.

To verify the discharge flow path is clear, the valves are actuated during hot functional testing at operating temperature and pressure. Calculations have verified that the maximum back pressure developed in the discharge piping will not inhibit the flow capacity or set-reset pressures.

423.48

Modify FSAR Table 14.2-85 (Turbine Trip) to initiate the turbine trip by opening of the generator main breaker, or add a test abstract which demonstrates that the dynamic response of the plant is in accordance with design for the case of full load rejection (Regulatory Guide 1.68, Appendix A, Part 5.n.n.).

Response:

FSAR Table 14.2-85 will be revised to reflect conformance with Regulatory Guide 1.68, Appendix A, Part 5.n.n.

TABLE 14.2-24

RADIOACTIVE WASTE GAS

(Preoperational Test)

Plant Condition or Prerequisite

Prior to core load and for plant degassing capabilities during startup testing.

Test Objective

To verify system operation. Some sections of the test will be reperformed during the Startup Test for reactor coolant system degassing.

Test Summary

Tests will be performed to demonstrate gas transfer from vent header to gas decay tanks and to verify valve operation, and interlocks. Alarms and pressure setpoints will be checked.

Acceptance Criteria

The radioactive waste gas system and its components operates in accordance with Table 11.3-1 for compressor suction pressure, discharge pressure, and normal operating temperature, and Section 11.3.2.4 for switchover pressure on the gas decay tanks and backup waste gas compressor auto-start pressure.

TABLE 14.2-25

DIESEL-GENERATOR

(Preoperational Test)

Plant Condition or Prerequisite

Prior to core load.

Test Objective

To demonstrate that each diesel generator can start and assume its rated load and to verify operation of alarms, indications, controls, and safety features.

Test Summary

Each diesel will be started and loaded a number of times under normal and simulated accident conditions to prove conformance to Regulatory Guide 1.108, Revision 1, Regulatory Positions C.2.a, parts (1), (3), (4), (6), (9) and C.2.b during this test. Conformance to Regulatory Position C.2.a, parts (2), (5), (7), and (8) will be demonstrated in other Preoperational Tests or in plant surveillances. Data collected during this test to prove conformance includes voltage, frequency, and current.

Acceptance Criteria

Each diesel generator will be tested to prove conformance to Regulatory Guide 1.108, Revision 1, Regulatory Positions C.2.a, parts (1), (3), (4), (6), (9) and C.2.b.

TABLE 14.2-85

Full-Power Plant Trip

(Startup Test)

Plant Condition or Prerequisites

Plant at normal steady state full power condition with the electrical loads aligned for normal full power operation.

Test Objective

To verify the ability of the primary and secondary plant and the plant automatic control systems to sustain a trip from 100% power and to bring the plant to a stable condition following the transient.

Test Summary

The plant will be brought to normal steady-state full power conditions with the electrical loads aligned for normal full power operation. The plant will be tripped by manual trip or by initiation of an automatic trip of the generator main breakers.

The parameters to be monitored will include nuclear flux; reactor coolant loop temperature; pressurizer pressure and level; steam generator level, steam flow, and feed flow; turbine trip operation; reactor trip breaker operation; and controlling group rod position indication. The parameters will be selected to determine the response of the plant control systems.

Acceptance Criteria

The acceptance criteria that must be met to successfully complete the turbine test are:

a. the pressurizer safety valves shall not lift;
b. the steam generator safety valves shall not lift;
c. Safety Injection shall not be initiated; and,
d. no unacceptable water hammer in the steam generators and/or feedwater system shall occur.

TABLE 14.2-91

TURBINE TRIP FROM 25% POWER

(Startup Test)

Plant Condition or Prerequisites

Plant at 25% ± 3% of normal steady-state full power condition with the auxiliary electrical loads supplied from the unit auxiliary transformer.

Test Objective

To verify the ability of the primary and secondary plant and the plant automatic control systems to sustain a trip from 25% power without the turbine bypass to condenser system available, and to bring the plant to a stable condition following the transient.

Test Summary

The plant will be brought to normal 25% steady-state power conditions with the auxiliary loads supplied from the unit auxiliary transformer. The plant will be tripped by manually tripping the turbine from the turbine control station.

The parameters to be monitored will include nuclear flux; reactor coolant loop temperature; pressurizer pressure and level; steam generator level, steam flow, and feed flow; turbine trip operation; reactor trip breaker operation; and controlling group rod position indication. The parameters will be selected to determine the response of the plant control systems.

Acceptance Criteria

The acceptance criteria that must be met to successfully complete the turbine test are:

a. The pressurizer safety valves shall not lift;

b. The pressurizer power-operated relief valves shall not lift;

c. The steam generator power-operated valves shall operate as designed to remove energy;

d. Safety injection shall not be initiated; and,

e. No unacceptable water hammer in the steam generators and/or feedwater system shall occur.

The Applicant does not intend to perform this testing because current facility design does not include special ATWS equipment.

Appendix A.5.k.k states "Demonstrate that the dynamic response of the plant is in accordance with design for the loss of or bypassing of the feedwater heater(s) from a credible single failure or operator error that would result in the most severe case of feedwater temperature reduction (50%, 90%)."

As described in FSAR Section 15.1.1.2, the bypass of feedwater heaters is a less severe case of feedwater temperature reduction than a 10% step load increase. The 10% load increase is tested as described in Table 14.2-88. Therefore a feedwater heater bypass test as described by Appendix A5.k.k will not be performed.

Appendix A.5.mm states "Demonstrate that the dynamic response of the plant is in accordance with design for the case of automatic closure of all main steam line isolation valves. For PWRs, justification for conducting the test at a lower power level, while still demonstrating proper plant response to this transient, may be submitted for NRC staff review (100%)".

The Applicant does not intend to perform this test at 100% power because the closure of all main steam isolation valves will result in a turbine trip per Byron FSAR Subsection 15.2.4. The generator/turbine trip test will be performed at 100% power and is a more severe transient. The applicant will, further, perform a turbine trip at about 25% power with the turbine bypass valves closed and disabled. This will further verify plant dynamic response. The combination of these two trip tests will verify the transient response of the plant and the capability of the secondary side decay heat removal systems to cope with these transients. The disabling of the turbine bypass system will restrict that capability to the steam generator PORV's and auxiliary feedwater systems (i.e., the safety related systems) and will demonstrate their dynamic capability. The performance of the MSIV test would be redundant and would provide no additional information regarding plant response or capability. In effect, performance of this test would only result in unnecessary cycling of this equipment.

A test program has been established to ensure that all structures, systems, and components will satisfactorily perform their safety-related functions. This test program provides additional assurance that the plant has been properly designed and constructed and is ready to operate in a manner that will not endanger the health and safety of the public, that the procedures for operating the plant safely have been evaluated and have been demonstrated, ant that the plant and procedures are fully prepared to operate the facility in a safe manner.