Regulatory File Cy.

Commonwealth Edison Company
ONE FIRST NATIONAL PLAZA ★ CHICAGO, ILLINOIS
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December 4, 1969

Dr. Peter A. Morris, Director
Division of Reactor Licensing
U.S. Atomic Energy Commission
Washington, D.C. 20545

Subject: Additional information relative to the applications for construction permits and operating licenses for Dresden Units 2 and 3 filed under AEC Dkts 50-237 and 50-249, respectively

Dear Dr. Morris:

The purpose of this letter is to inform you of the actions which Commonwealth and General Electric are taking relative to hot functional testing which has been the subject of many conversations between ourselves and your staff.

On both the Oyster Creek and Nine Mile Point Plants, a hot functional test using the recirculation pumps as the heat source was conducted. It is our position that such a test should not be conducted on Dresden but should be replaced by a hot functional test using the reactor as the heat source. This position is based primarily on the fact that the Oyster Creek and Nine Mile Point type test has the potential for damaging the plant and permits very little testing to be accomplished. A more detailed statement of our position is included in Appendix A to this letter.

Appendix B of this letter is a general description of the hot functional testing that we will do. This description includes the integrating of various systems' operations, the criteria to be met prior to increasing power level and the power limits applied to the various portions of the testing. It should be noted that most of the testing will be done in the range of one to five percent power with only a short interval at ten percent power.

In summary, Commonwealth considers that the hot functional test described in Appendix B is a much more meaningful test than the hot functional test conducted on the Oyster Creek or Nine Mile Point Plants, and therefore we propose to proceed with hot functional testing in that manner.

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In addition to three signed originals, 19 copies of this information are also submitted.

Very truly yours,

Peter S. Van Nort
Nuclear Licensing
Administrator

SUBSCRIBED AND SWORN to before me this 4th day of December, 1969.

Patricia A. Nelson
Notary Public

RATIONALE FOR HOT FUNCTIONAL TESTS

The conduct of a "hot functional test" in which the primary system is heated to rated temperature and pressure by use of pump power with no core in the vessel is not recommended for the following reasons:

a. The pumps must be operated with very little back pressure and no sub-cooling. The pumps were not designed for operation under these conditions.

b. Lack of the core weight in the vessel changes the vibrational characteristics of the lower pressure vessel components and increases the probability of flow-induced damage.

c. Because of the marginal capability of the pump system for producing the heat necessary to heat up to rated it is necessary to turn off the cooling water to the control rod drives. This results in abnormal temperature conditions on the drives but more importantly, lack of the normal flow of water into the vessel through the drives results in conversion of the drive to a "crud trap".

The test program as it is now planned accomplishes the purpose of the "hot functional test" without the disadvantages listed above.

a. The system is operated at all times in a normal mode.

b. Drives and pumps are operated with cooling water supplies in service at all times.

c. All tests that could be conducted as a part of the "hot functional test" are completed at low power levels and while the irradiation of the fuel is still very low. All tests except S 33 - Auxiliary Power Loss-Diesel Start will be conducted at power levels below 5%. This test requires about 10% power in order to have the turbine in operation for the power loss.

Integrated Hot Functional Testing Program

1. Purpose

This document summarizes the testing to be performed during the initial plant heatup/pressurization and low power operational phases. The program comprises specific startup tests (including hot portions of preoperational tests) and some operational testing of equipment which is not specified elsewhere. The incorporation of all of these tests into this document ensures that the startup will be made in a controlled, orderly fashion, and that the integrated performance of the combined systems necessary to accomplish nuclear power operation will be assessed before proceeding to operation at higher power levels.

Having completed the stepwise increase, the plant will be held at rated temperature and pressure for integrated system performance evaluation until the performance is adequate for advancement to higher test power levels. The program is expected to take 3 to 5 days.

2. Description

Subsequent to satisfactory completion of the applicable portions of the Startup Tests which include fuel loading, the reactor vessel head will be installed and an operational hydrostatic test of the reactor and primary system at 1000 psig will be made. Startup and operating procedures will be followed to allow primary system heating, initially with the recirculation

pumps and then by nuclear heat, for the IRM calibration as outlined in Startup Test Procedure 9. When calibration is completed, power will be increased to establish a heating rate of 10-50°F/hr. During heatup the recirculation, cleanup, and feedwater systems will be operating normally while reactor vessel temperatures and system expansions will be monitored as prescribed in Startup Test Procedures 11 and 12 respectively. At 250°F (15 psig) a visual and radiation survey of the drywell and steam piping will be made to detect any excessive leaks or radiation. Any such defects will be resolved before continuing with the startup program.

Heatup and pressurization will continue until rated values are attained with tests made at intermediate points to determine system performance. The program will be halted at any stage should the analyses of these test results indicate an unsatisfactory condition. During the heatup and pressurization phase special water quality surveillance will be adhered to as indicated below:

Cleanup System

The cleanup system will be operating at all times except for the brief startup period at intermediate pressures, with a filter and the demineralizer in service. Operation with one recirculation pump (half-system-capacity) is acceptable through half power. The reactor operating time with cleanup system out of service between 100 and 900 psi will be minimized. The reactor pressure vessel bottom drain will be open to the cleanup system.

Core Flow

Reactor core flow will be maintained at maximum feasible value with the recirculation pumps during all modes of operation except transient or flow control testing. This is intended to keep the crud in suspension and make it available for removal by the cleanup system and to minimize the opportunity for it to drop out in the reactor vessel.

Condensate Demineralizers

The number of condensate demineralizer beds will be maintained adequate for existing flow conditions. Crud samples will be obtained at the discharge of each individual bed in order to develop criteria for backwashing and regenerating the beds that are more directly related to crud levels. Previous criteria were related to bed pressure drop which may not be a sensitive indicator of crud removal capability. If cooldown is required for equipment repair during the test interval, the shutdown cooling system and head spray will be evaluated.

3. Integrated Tests

The attached Table 1 outlines the various tests which form the integrated hot functional testing program. There are basically three types of tests which are identified as follows:

a. Startup Test Procedures which are denoted by "S".

b. Preoperational Test Procedures denoted by "P". These will be combined into one startup test for administration.

c. Specific plant operations which are made to demonstrate satisfactory functioning of equipment and which are denoted by "O".

The table presents the tests in chronological order as heatup and pressurization proceed. The specific plant manipulations necessary to establish the test conditions will be performed using plant operating procedures.

4. Criteria

Where startup test procedures (S) are used the criteria are clearly defined within the test. In the case of preoperational tests (P) the criteria essentially consist of design and performance specifications for system components. For the functional tests (O), satisfaction of criteria is demonstrated by successful and adequate operation of the particular plant item.

5. Test Supervision

Throughout the test program described, additional shift personnel will be present for test supervision. Whenever a startup test procedure is being followed at least one shift test engineer from the Test Design and Analysis Unit will be present to provide technical direction for the test.

These are in addition to the licensed Startup Engineers, one of whom will be present at all times to provide technical direction for the operation of the plant during the test program.

Integrated Hot Functional Test Program

Plant Condition			Test Description	Test No.
% Power	Pressure PSIG	Temperature °F		
0	1000	120	Operational Leak Test (Hydro)	0
"	0	120-140	IRM Calibration (Recirc. Pump Heatup)	S 9
1-5	0	120-140	IRM Calibration (Recirc. Plus Nuclear Heat)	S 9
"	0-1000	80-540	Reactor Vessel Temperatures	S 11
"	25	250	Drywell/Steam Piping Survey (Leaks & Radiation)	0 & S 5
"	"	"	System Expansion	S 12
"	50	280	Start Turbine Seal Steam	0
"	"	"	Start Cleanup Recirculation Pumps	P-AI0
"	"	"	Stop Auxiliary Cleanup Pump	P-AI0
"	150	360	Primary System Leakage Inspection	0
"	"	"	HPCI Operation (Discharge to Cond. St. Tank)	S 15
"	"	"	Test Response of Pressure Regulators	0
"	"	"	Start Steam Jet Air Ejector	0
"	"	"	Start Reactor Feed Pump	0
"	"	"	System Expansion	S 12
"	300	420	Control Rod Drive System (Selected Scram)	S 2
"	350	440	HPCI Operation (Discharge to Cond. St. Tank)	S 15
"	"	"	System Expansion	S 12
"	"	"	Manually Open Each Steam Relief Valve	O&P A3
"	600	480	Control Rod Drive System (Selected Scram)	S 2
"	650	500	HPCI Operation (Discharge to Cond. St. Tank)	S 15

Integrated Hot Functional Test Program

Plant Condition			Test Description	Test No.
% Power	Pressure PSIG	Temperature °F		
1-5	1000	540	HPCI Operation (Discharge to Cond. St. Tank)	S 15
"	1000	540	Chemical & Radiochemical Measurements	S 1
"	1000	540	Control Rod Drive System	S 2
"	"	"	Radiation Measurements	S 5
"	"	"	Vibration Measurements	S 6
"	"	"	System Expansion	S 12
"	"	"	APRM Calibration	S 26(6.1
"	"	"	Test Response of Pressure Regulations	0
"	"	"	Recirculation Pump Starts/Stops (single Pump)	0
"	"	"	Standby Liquid Control	0
"	"	"	HPCI Operation (Discharge to Vessel)	S 15
"	"	"	Drywell Ventilation Cooling	P C13
"	"	"	Reactor Building Cooling Water Heat Load	P C8
"	"	"	Demineralizer Performance	P C5
10*	"	"	Auxiliary Power Loss-Diesel Start	S 33

*The plant will be operated at this power level only long enough to establish the initial conditions for the test.