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December 15, 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 application for construction permit and operating license for Dresden Unit 2 filed under AEC Dkt 50-237

Regulatory File Cy

Dear Dr. Morris:

Based on conversations with your staff, we have decided to modify the testing that we will do of control rod drive scram times and the way in which we operate the plant relative to chemistry control during the initial phases of the start-up test program. These modifications were made in view of the increasing scram times which have been experienced at the Oyster Creek and Nine Mile Point plants.

The purpose of this letter is to inform you of the modifications we have made in our testing and chemistry control programs. These modifications have been discussed with members of your staff and members of the Division of Compliance.

Attachment A is a statement of our total program relative to control rod drive surveillance during the start-up test program. This attachment presents a general summary of the surveillance program and includes two tables which detail the chemistry analyses which will be performed during start-up and the testing that will be performed on the control rod drives.

In view of your high degree of interest in this matter, we will inform the Region III office of the Division of Compliance of significant events concerning the performance of our control rod drives during the plant start-up test program. In particular

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the Region III office will be informed of any measured scram times for 90% insertion of a drive that does not fall within the range of 1.9 to 3.6 seconds and if the average scram time for all operable control rods for 90% insertion is not within the range of 2.4 to 3.1 seconds.

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

Very truly yours,

Peter S. Van Nort

Peter S. Van Nort
Nuclear Licensing Administrator

SUBSCRIBED and SWORN to
before me this 15th day
of December, 1969.

Patricia A. Nelson
Notary Public

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ATTACHMENT A

CONTROL ROD DRIVE (CRD)
SURVEILLANCE DURING START-UP TEST PROGRAM

During the Jersey Central and Niagra Mohawk reactor start-ups, a problem of gradually increasing control rod scram times in the pressurized condition was experienced due to crud build-up on the inner screens.

At the above reactors, the inner screen was either removed or was replaced with a larger screen. At the present time, there are no plans to replace the inner screens on the Dresden 2 control rod drives prior to fuel loading. These screens are the same as originally used at Jersey Central and Niagra Mohawk.

A program will be in effect during the Dresden 2 start-up to ensure adequate monitoring of crud introduction and control rod drive performance. Should screen plugging and attendant lengthened scram times occur, it will be detected at an early stage and corrective measures can be taken to alleviate the problem. The program is as follows:

Plant Operation

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

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 clean-up system and to minimize the opportunity for it to drop in the reactor vessel.

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.

Crud Monitoring

During initial fuel loading the reactor vessel will be full of clean demineralized water and visual observation can be used to detect "dirty water." During initial fuel loading there should be no source of crud introduction into the reactor vessel.

The major source of possible crud introduction is through the feedwater system, especially when feedwater heaters are put into service or a sudden thermal transient is experienced. A sampling program as outlined in Table A will be put into effect to detect any crud introduction when the reactor begins steaming. Should the sampling program detect an abnormal amount of crud in the primary system, an evaluation will be made as to the amount of additional control rod drive testing that will be necessary to determine if the scram times have been affected.

Control Rod Drive Monitoring

Table B outlines the preoperational tests that have been performed and the tests that will be performed on the control rod drives during the start-up program to assure proper operation.

Four control rod drives will be removed and the inner screens replaced with screens having a nominal 10-mil opening, prior to initial pressurization of the reactor. These drives will be included in the scram time surveillance program. In addition, the screens removed from these drives will be examined for crud deposition. If examination indicates the possibility of plugging, cold pressurized scram tests on all drives will be conducted prior to nuclear heat-up and hot pressurized scram tests or other appropriate action will be taken. The hot pressurized scram tests will be performed as soon as rated conditions are reached.

TABLE A

WATER CHEMISTRY CRUD MONITORING SAMPLING SCHEDULE FOR START-UP OPERATIONS

1. Reactor Water (normal schedule)

conductivity			daily
pH			daily
chloride			daily
silica			daily
boron			weekly
turbidity or filterable solids			daily
activity - gross filtrate	@ 2 hrs	cpm/ml	daily
gross iodines	@ 2 hrs	cpm/ml	daily
gross crud	@ 2 hrs	cpm/mg	daily
gross filtrate	@ 7 days		daily
gross crud	@ 7 days		daily

2. Off-gas

gross activity @ 2 hrs μc/sec	daily

3. Other Analyses on Regular Lab Schedule: Frequency as required

make up system
rad waste
closed cooling water
condensate storage
etc.

4. Start-up Period

Condensate - Feedwater Tests

	Millipore Filters	Chemical Analysis for Metals
condensate	1 shift	1/day crud Fe, filtrate
polisher effluent on combined CDE stream	1 shift (continuous millipore)	1/day crud Fe, filtrate Fe
Feedwater	1 shift	1/day crud Fe, filtrate Fe
reactor water		1/day crud Fe Cu Ni Cr filtrate Fe Cu Ni Cr

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Notes:

a) The samples for chemical analysis of metals should be taken at approximately the same time to provide meaningful comparisons.

b) Depending on the analytical results, the frequency and/or specific metals analysis schedule could be changed to eliminate results not required or to emphasize certain types of data.

The laboratory schedule includes all the normal analyses required for routine power operations as well as any special analyses required by the start-up conditions of the plant. Items 1 and 2 are routine that are done daily. Item 3 is only indicative of all of the other analyses that must be done routinely on a schedule frequency that varies depending upon the individual system being tested. The millipore filters in Item 4 are an unusual set of tests related to the start-up. The metals analyses of the feedwater and reactor water should be done daily as part of the regular routine during this period. Thus, the metals analyses of the condensate and condensate polisher effluent are the only extra analyses being requested to support the start-up program.

Additional samples may be required to monitor rapidly changing water conditions which may accompany plant transients. Prior to planned reactor scrams or transients, water chemistry personnel are to determine what samples, if any, are to be taken before and after the transient. Also, following unplanned transients, such as a rapid change in condenser vacuum, water chemistry personnel are to determine what samples will be taken.

TABLE B

Preoperational Tests

Each rod out and in at least 8 times.

Each rod individually scrammed at least 2 times.

Fastest and slowest rods scrammed at least 20 times.

All rods simultaneously scrammed at least 4 times.

Functional Test Prior to Fuel Loading

Each rod out and in once.

Four rods scrammed from SRM high flux.

Functional Test Prior to Power Testing (cold depressurized)

Each rod out and in for friction tests.

Each rod scram tested once.

Four rods scrammed with minimum accumulator pressure.

Functional Test Prior to Power Testing (cold pressurized)

A minimum of 20 rods will be scram tested once.

Tests at Low Power, Rated Temperature and Pressure

Each rod scrammed at full pressure.

Four rods scrammed at intermediate reactor pressure.

Four rods scrammed at zero accumulator pressure.

Full system scram from loss of normal power.

Data During Power Operation

During power operation a minimum of 20 control rod drives will be continuously monitored such that should a scram occur for any reason, planned or unplanned, the scram times on these drives will be recorded. Selected drives will represent total core and will be in withdrawn pattern. At least 8 control rods will be scram-timed at each test power level (10%, 25%, 50%, 75%, and 100%) prior to

performing tests which will result in a planned scram, such as isolation scrams, power-loss scrams, turbine and generator trips at 50% power and above.

Should the crud monitoring program detect an abnormal amount of crud in the reactor vessel, an evaluation will be made as to the amount of additional scrams necessary to assure early detection of lengthening scram times.