Files

UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C. 20545

PDR

October 22, 1969

Files
THRU: V. Moore, Chief, Instrumentation & Power Technology Branch, DRL

REVIEW OF INSTRUMENTATION SCHEMATICS, MONTICELLO NUCLEAR GENERATING PLANT; DOCKET #50-263

T. Ippolito and I met with the applicant and his representatives on October 16 and 17 for the purpose of reviewing the instrumentation schematics of the following systems:

1. Reactor Trip
2. Reactor Manual Control (including RBM and Refueling Interlocks)
3. Radiation Monitoring
4. Core Spray
5. LPCI/Containment Spray
6. Containment Isolation

In attendance were:

NSP

M. N. Bjeldanes
G. H. Jacobson
G. Yanagita
A. W. McDermid

Bechtel

J. V. Carlson

G.E.

G. L. Davis
J. W. Lingafelter
M. R. Muir
M. K. Hentschel
L. Stanley
H. W. Pielage

CO III

C. Feierabend

DRL

T. A. Ippolito
D. F. Sullivan

The results of our review are as follows:

1. Reactor Trip System

We found no deficiencies. The various instrument channels retain their independence from sensor through the logic subchannels. The channels are divided into four groups (one for each logic subchannel) and only those channels within a given group are combined with each other.

The logic, 1/2 x 2, is coincident and redundant throughout. Operational bypass channels are also divided into four groups and each channel is assigned to one, and only one, subchannel.

It should be pointed out that the flow signals utilized in the APRM Power/Flow channels do not meet the single failure criterion. The design is identical to that at Dresden #2.

2. Reactor Manual Control System

a. RBM

The RBM design is similar to the one at Dresden #2.

As at Dresden, a single contact within each rod selector switch energizes both sets of redundant LPRM channels. A second contact then calls for comparison with the RBM channel output from the reference APRM. Thus, some measure of protection against single failures (in this case, failure to select the LPRM's) is afforded by the comparator circuits.

We also reviewed the relay circuits downstream of the RBM channels which interrupt the rod drives. Essentially, one RBM channel interrupts the selection circuits and the other channel opens the power source to the drive system.

We were unable to uncover any single failure in the electrical system which would disable both channels. However, as at Dresden, the system does not satisfy the requirements of IEEE 279 relating to independence between mutually redundant channels.

b. Refueling Interlock System

The purpose of the refueling interlocks is to prevent fuel from being over the core when more than one rod is withdrawn. The system should meet the single failure criterion when the mode switch is set at "Refuel."

It appears that the system can be compromised by a single failure: If several rods are withdrawn while the mode switch is in the "Startup" position, a single failure in the fuel platform motor interlock will allow fuel to be moved over the core even when the mode switch is subsequently returned to the "Refuel" position.

We will pursue this matter further with G.E. and the applicant.

There were no other deficiencies.

3. Radiation Monitoring

Discussed under "Containment Isolation" (below).

4. Core Spray System

We found no deficiencies. The instrumentation is diverse and comprises two redundant and independent logic chains, one for each loop.

5. LPCI/Containment Spray System

a. LPCI System

The system is essentially the same as the one accepted by us at Dresden #2 and is vulnerable to the same "single failures." The system proper can be disabled by a valve failure. The initiating instrumentation circuits can be disabled by a single failure such that both discharge valves are called upon to open, thus allowing all pumps to discharge through the broken loop.

b. Containment Spray System

We found no deficiencies. There are two independent logic channels energized from separate station batteries. Each channel controls one containment spray loop. We observed no areas where a single failure could preclude spray, when required.

6. <u>Containment Isolation</u>

During the review of the HPCI steam line isolation system we uncovered what may be a design deficiency in several other isolation systems as well. Briefly, several lines, including HPCI, are isolated by redundant motor-operated valves, one a.c. and one d.c. The HPCI isolation system is such that the d-c control power for the d-c valve is from the same station battery as the breaker control power to the other valve's essential a-c bus. Thus, both valves could be disabled by a single failure at the d-c system.

We will discuss this at the next meeting. In the meantime, G.E. will look at all other ac-dc valve designs in this category to see if similar deficiencies exist.

The radiation monitors which effect isolation of the reactor building will be reviewed at the next meeting in conjunction with the SGTS review.

The Main Steam Isolation Valve Circuits, Condenser Mechanical Vacuum Pump Isolation Circuits, and those circuits which isolate the Steam Line Drain were reviewed and found to be satisfactory. The four radiation monitors which initiate MSIV closure also initiate the other two systems.

The drawings for the Drywell Purge and Vent Isolation Systems were not available and will be reviewed at the next meeting.

At the conclusion of the meeting we agreed that we could complete our review of the schematics (including resolution of the outstanding items discussed above) during the course of a one-day meeting. We tentatively selected November 4.

The agenda for the final meeting will be as follows:

1. Standby Gas Treatment System
2. Emergency Power (a.c. and d.c.)
3. Refueling Interlock (Platform Motor Interlock)
4. Auto Blowdown
5. Common Failure Mode of DC-AC Isolation Valves
6. Drywell Purge and Vent Isolation Schematics

D. F. Sullivan
Instrumentation & Power
Technology Branch
Division of Reactor Licensing

RT-785A
DRL:I&PTB:DFS

cc: F. Schroeder
S. Levine
R. Boyd
R. DeYoung
D. Muller
D. Vassallo
J. O'Reilly
T. Ippolito