



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

Schierling

MAR 17 1972

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V. A. Moore, Chief  
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SITE VISIT, THREE MILE ISLAND NUCLEAR STATION - UNIT 1; DOCKET NO. 50-289

I visited the Three Mile Island site on March 9, 1972, to review the instrumentation, control and emergency power systems installed at Unit 1. I was accompanied by Messrs H. Schierling and R. Cudlin of DRL and S. Folsom and T. Varella of CO:I. The applicant was represented by the following persons:

R. W. Heward, Jr	GPU
W. T. Gunn	GPU
J. R. Thorpe	GPU
T. E. Hreczuch	GPU
J. H. Wright	GPU
D. H. Reppert	GPU
W. R. Schmauss	GPU
E. Stauffer	GAI
W. F. Sailer	GAI
J. M. Smith	GAI
V. H. Willems	GAI
R. W. Liscom	UE&C
J. E. Hill	B&W

Summary of Outstanding Items

- A. There appear to be no quality assurance procedures governing separation for that portion of the cable installation between the control room console and the cable spreading area in the room below.
- B. The separation of installed redundant ESF signal cables appears to be inadequate.
- C. Several lighting fixtures of questionable seismic integrity are suspended directly over the station batteries.
- D. Proper separation of instruments, cables and impulse lines to be located in containment could not be verified since none of this equipment is yet installed.

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E. Proper separation of the scram breakers and associated cabling could not be verified since they are not yet installed.

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1. Switchyard

We observed no deficiencies. The transmission lines converge on the site over two independent rights-of-way and terminate at the switchyard which is arranged in a breaker-and-a-half configuration. The two startup transformers are connected to the switchyard by two independent lines which, respectively, terminate at the two switchyard buses.

2. Control Room

The redundant reactor trip system cabinets will be located on opposite sides of the control room (two on one side and two on the other). This is compatible with the two-out-of-four logic scheme. Vital equipment and cables within the control console will be separated by thirty inches. In one case (diesel generator controls) a steel fire barrier is also used.

Wiring runs to the reactor trip cabinets will be via floor mounted conduits, one for each channel. Since four two-out-of-four relay matrices (to the scram breakers) are made up at these cabinets, there is some, previously approved, interconnecting cabling between the four cabinets. This is also to be carried in floor-mounted conduit.

Wiring from the control console to the cable spreading area below is via vertical cable runs; i.e., horizontal runs within the console are avoided. Our review indicated, however, that there has been no site QA review of these vertical runs in terms of separation of redundant system cables. By contrast, there appears to be adequate control over the placement of switches, etc., at the console and over the routing of cables into the spreading area.

The applicant was asked to perform an in-depth QA review over this portion of the cabling.

The scram breakers were not installed and, thus, could not be reviewed. Also, the routing of cables from the reactor trip panels

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to the breakers could not be reviewed for the same reason. The cables to the scram breakers should be run in four independent trays or conduits. I understand that Compliance will verify this item as well as the physical independence of the breakers themselves.

### 3. ESF Actuation Cabinets

Our review of the ESF actuation cabinets indicated that the scheme for properly color coding and separating redundant instrument signal wiring is not being implemented. We were informed that the signal wiring was installed; however, there was no evidence of three distinct (color coded) sets of conduit. We agreed to discuss this further at the exit interview.

During the exit interview we were informed that certain of the containment pressure switch logic (two-out-of-three) was made up external to the ESF panels; thus, only two redundant signals (train A and B) would appear at these cabinets. This was consistent with the observed two color scheme (green and red).

However, we were also informed that the logic for the remaining signals was made up in the cabinets; thus, three sets of conduit should have been observed.

The applicant was asked to pursue this matter further and to determine what is actually being installed at these cabinets.

The Compliance representatives were requested to follow this matter, including a review of the logic circuits which are external to the ESF cabinets.

### 4. Containment Area

None of the instruments, cables, or impulse lines have been installed. The Compliance representative were requested to follow and inspect the final installation.

### 5. Diesel Generators

The two diesel generators are located in separate rooms in a concrete structure. The cooling units are self contained. Control and (output) power wiring for the diesel generators are carried in separate underground ducts.

We observed no deficiencies.

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6. 4160 Volt Motor Control Center

The two redundant MCC's were observed to be adequately separated and identified. The installed redundant conduit was observed to be adequately identified (red and green colors) for the two emergency power and ESF trains.

We observed no deficiencies.

7. Battery Rooms

The two redundant sets of batteries and their distribution systems appeared to be adequately mounted, separated and ventilated. We observed, however, that several lighting fixtures of doubtful seismic integrity are suspended directly over the batteries.

Upon my return to Bethesda, I discussed this with Dave Lange who stated that he will follow this item.

8. Control Rod Patching Panels

We observed these panels mostly to determine the potential for patching errors.

I remain convinced that there is considerable potential for making these errors, and that the only adequate defense is a careful cross-check with the hard wired "zone reference indicator" and the computer (also hard-wired) which displays the same information as the zone reference system.

Inasmuch as the zone reference system and the computer comprise two "standards" against which the patched rods could be compared for patching accuracy, I asked if the zone and computer systems would be cross-checked against each other during the pre-op tests. It would seem that such a cross-check would reveal most (through not all categories of) wiring errors.

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This was discussed again at the exit interview and my understanding is that the applicant agreed to the suggestion, and that the Compliance representatives will follow-up on this item.

*D. F. Sullivan*

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