DmB

March 18, 1983

MEMORANDUM FOR: D. G. Eisenhut, Director, Division of Licensing, NRR

FROM: C. E. Norelius, Director, Division of Project and Resident Programs

SUBJECT: SAFETY EVALUATION OF NUREG-0737, ITEM II.B.2.2
DESIGN REVIEW OF PLANT SHIELDING-ACCESS TO VITAL AREAS
DONALD C. COOK NUCLEAR PLANT, UNITS 1 AND 2
TAC NOS. 47931 and 47932

Per your request we have completed the review of the subject TMI Action Item. The Safety Evaluation and referenced portions of the Inspection Reports documenting this review are attached.

Forty-five staff hours were used in this evaluation.

Any questions on this subject should be directed to K. R. Ridgway (FTS 384-2544).

C. E. Norelius, Director
Division of Project and
Resident Programs

Enclosures:
1. SE
2. Inspection Reports (in part)
   50-315/82-24 and
   50-316/82-24

cc w/encls:
G. Lainas, AD/OR
E. Tourigney, LORPM
D. Wigginton, ORPM
S. Varga, ORB-1

cc w/o encls:
J. Thoma, NRR

RIII	RIII	RIII	RIII	RIII	RIII
Hueter/jp	Greger	Ridgway	Tambling	Streeter	Norelius
3/16/83	3/17	3/17	3/17	3/17	3/17

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SAFETY EVALUATION OF NUREG-0737, ITEM II.B.2.2 - DESIGN REVIEW OF PLANT SHIELDING-ACCESS TO VITAL AREAS

American Electric Power Service Corporation
Indiana and Michigan Electric Company
Donald C. Cook Nuclear Plant, Units 1 and 2
DOCKET NOS. 50-315; 50-316

INTRODUCTION

Following the accident at TMI-2, the NRC staff developed Action Plan NUREG-0660, and "Clarification of TMI Action Plan Requirements" NUREG-0737, to provide for improved safety at nuclear power plants.

NUREG-0737, Item II.B.2 directed all licensees to perform a design review of plant shielding and to provide for adequate access to vital areas. The licensee has not requested technical deviations from the criteria of Item II.B.2.

The following evaluation contains the results of the post implementation review regarding II.B.2.2 entitled Plant Shielding Modifications for Vital Area Access.

EVALUATION

The inspector examined the conclusions resulting from the licensee's shielding review, as contained in the Design Review of Plant Shielding dated December 10, 1980, for the Donald C. Cook Nuclear Power Station.

The review concluded that, based on plant modifications being made to meet other TMI action items, no additional shielding is required for necessary access to vital areas. The inspector verified by actual observation that selected modifications, used as the bases for the conclusion, were complete. In addition, the inspector verified by selective review and walkdown of procedures that post-accident procedural controls for ensuring adequate access to vital areas were implemented. The inspector did not observe any potential sources of radiation that were not included in the licensee's evaluation.

These verifications were performed on December 20-22, 1982, and the results were reported in Inspection Report No. 50-315/82-24, 50-316/82-24.

CONCLUSION

The licensee has completed the modifications resulting from the plant shielding review for post-accident access to vital areas as outlined in NUREG-0737, Item II.B.2. Additional verification of the adequacy of two modifications will be made in conjuction with NUREG-0737 Items II.B.1 and II.B.3.

The following NRC personnel have contributed to this Safety Evaluation.

L. J. Hueter

U.S. NUCLEAR REGULATORY COMMISSION

REGION III

Reports No. 50-315/82-24(DRMS); 50-316/82-24(DRMS)

Docket Nos. 50-315; 50-316 License Nos. DPR-58; DPR-74

Licensee: American Electric Power Service Corporation
Indiana and Michigan Electric Company
2 Broadway
New York, NY 10004

Facility Name: D. C. Cook Nuclear Plant, Units 1 and 2

Inspection At: D. C. Cook Site, Bridgman, MI

Inspection Conducted: December 20-22, 1982

Inspector: L. J. Hueter 1-27-83

Approved By: L. R. Greger, Chief 1/27/83
Facilities Radiation
Protection Section

Inspection Summary

Inspection on December 20-22, 1982 (Reports No. 50-315/82-24(DRMS); 50-316/82-24(DRMS))
Areas Inspected: Routine, announced inspection of selected aspects of NUREG-0737 Item II.B.2.2 regarding shielding for access to vital areas, the status of other post-TMI action items, and licensee actions in response to previous inspection findings. The inspection involved 28 inspector-hours onsite by one NRC inspector.
Results: No items of noncompliance or deviations were identified.

DETAILS

1. Persons Contacted

*T. Beilman, Senior QA Auditor
W. Ketchum, Senior Radiation Protection Engineer
*T. Kriesel, Environmental Coordinator
W. Lentz, Chemical Supervisor
G. Peak, Performance Engineer, Operations
*W. Smith, Plant Manager
*B. Svensson, Assistant Plant Manager, Operations

*N. DuBry, NRC Resident Inspector
*E. Swanson, NRC Senior Resident Inspector

*Denotes those present at the exit meeting.

2. General

This inspection, which began about 8:00 a.m. on December 20, 1982, included tours of the hot laboratory, counting room, alternate counting facility for post-accident conditions, turbine building, and various levels of the auxiliary building. Attention was primarily directed toward review and inspection of selected aspects of NUREG-0737 Item II.B.2.2 regarding shielding for access to vital areas. Housekeeping in general appeared satisfactory in areas toured.

3. NUREG-0737 Item II.B.2.2, Plant Shielding For Access to Vital Areas

The Design Review of Plant Shielding for the D. C. Cook plant, dated December 10, 1980, was prepared by the Nuclear Safety and Licensing Section of American Electric Power. This document and its conclusion were reviewed by the inspector. The review concluded that, based on plant modifications being made to meet other TMI action items, no additional shielding is required for necessary access to vital areas. The modifications required pertain to NUREG-0737 Items II.B.1 and II.B.3. Modification of the reactor heads (II.B.1) of both units to allow venting the vessels directly to containment under accident conditions and to permit isolation of the letdown system to preclude unnecessary transfer of highly contaminated liquid and gas to certain systems in the auxiliary building is complete, but the system has not been declared operational pending NRR approval of the modification and finalization by the licensee of procedures for use of the system. Operability of this modification will be reviewed in conjunction with NUREG-0737 Item II.B.1. Construction of a new sampling system (II.B.3) to be used in place of the normal sampling system for sampling liquid from the primary system and gas from containment during post-accident conditions has been installed and the licensee now considers it fulfills requirements of NUREG-0737 Item II.B.3.

For review of a plant procedure involving shielding considerations, the inspector selected procedure 12 THP 6020.PAS.011 (Post-Accident Sampling for Hydrogen and Dilute Liquid and Total Gas Grab Samples) and traced the planned paths for collecting and analyzing a liquid sample from the primary system under post-accident conditions. During the walk-down, the inspector discussed potential post-accident sources of radiation with the licensee representative, made observations concerning stay times for personnel involved in the implementation of this procedure, and reviewed calculated doses to personnel.

The post-accident sampling facility is a heavily shielded facility located, along with its control panels, in the auxiliary building in a room adjacent to the normal sample room. The post-accident sample room has a separate outside air supply and is maintained at a positive pressure with respect to the rest of the auxiliary building. The planned path for obtaining a post-accident sample is to use the normal access and egress to the auxiliary building. This pathway takes one through hallways that are adjacent to piping, pumps, and heat exchangers which may contain primary system water. The shielding study indicates that under worst case accident conditions the hallway should still be accessible. To ensure that airborne concentrations are not limiting, the licensee minimized water leaks in six systems (CVCS, boron injection, safety injection, RHR, containment spray, and post-accident sampling) and established procedure OHP 4030 STP 038 (Leak Rate Test of Liquid Systems) for routine surveillance each refueling outage. The inspector reviewed the results of leak rate tests conducted for all six systems during the Unit 1 refueling during the summer of 1982, and for the four systems which had been completed as of the inspection date during the current Unit 2 refueling outage. The tests showed a combined leakage of less than one milliliter per minute. (A similar surveillance test has been established for the waste gas system.)

The post-accident sampling procedure provides for the individual collecting the sample to be accompanied by a radiation protection technician to evaluate radiation fields. As a backup, an alternate pathway for collecting the sample is provided which involves use of a door near the east end of the auxiliary building for access and egress. This pathway is on the opposite side of the sample room and thereby avoids the hallway with potential high radiation areas. Although the normal counting facility is expected to be usable, an alternate counting facility has also been established in the old guardhouse. However, no evaluation was made of the shielding provided by the old guardhouse and the one inch of lead shielding around the detector to demonstrate that radiation levels would be reduced sufficiently to permit counting the sample. It appears that use of this alternate counting facility is questionable based on radiation levels external to the nearest containment. This matter was discussed at the exit meeting.

By constructing the sample panel walls with eight inches of lead (instead of four inches in the NUS design) and adding a high density concrete block wall which serves as a partial labyrinth, the licensee estimates the dose received in the sample room would be less than 100 millirems whole body.

while collecting the primary coolant sample. Further, the licensee estimates that under worst case accident conditions, the total dose received by one individual while taking, transporting, and analyzing the sample would be 1.1 rems whole body and 55 rems to the hands assuming the primary pathway (normal access and egress to auxiliary building) is used.

During the walk down of this pathway, the inspector identified no sources of radiation which had not been considered by the licensee.

The alternate pathway should provide a significant reduction in dose to the whole body under worst case accident conditions, and the just completed manufacture of a new transport pig, which doubles the lead shielding and provides a longer handle, should reduce both extremity and whole body doses.

To expedite sampling, the licensee is now installing in-line air in the sample room to enable individuals to switch from self-contained breathing bottles to in-line air while in the sample room.

It appears the licensee can implement procedure 12 THP 6020.PAS.011 to obtain and analyze post-accident reactor coolant samples without radiation exposures to any individual exceeding the criteria of GDC 19 (5 rems whole body, 75 rems extremity).

4. Status of Other NUREG-0737 Items

a. Post-Accident Sampling, Item II.B.3

The NUS designed post-accident sampling system (briefly described in Section 3) is installed and operable in both Units No. 1 and No. 2. As stated in licensee letter dated December 14, 1982, from Hunter to Denton, the licensee considers that the system, as installed, fulfills the requirements of NUREG-0737 Item II.B.3. This item will be reviewed in further detail during a future inspection.

b. Noble Gas Effluent Monitoring, Item II.F.1, Attachment 1

The type and general location of noble gas effluent monitors are briefly described in Inspection Report Nos. 50-315/81-26; 50-316/81-29. The licensee's current commitment date for completion of this item for Units No. 1 and No. 2 is May 31, 1983 (letter from Hunter to Denton dated December 14, 1982). The delay is partially due to failure of electronic interface boxes for the main steam safety valve/power operated relief valve monitors due to high ambient temperatures (even though the interface boxes were purchased with high operating temperature specifications). Another source of delay is moisture problems affecting the steam jet air ejector and gland steam condenser vent monitors even after installation of moisture separators and heat tracing.