UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION
WASHINGTON, D.C. 20555-0001

October 10, 1995

NRC INFORMATION NOTICE 95-48: RESULTS OF SHIFT STAFFING STUDY

Addressees

All holders of operating licenses or construction permits for nuclear power reactors.

Purpose

The U.S. Nuclear Regulatory Commission (NRC) is issuing this information notice to inform addressees of the results of the NRC's study conducted as part of an NRC Office of Nuclear Regulatory Research (RES) project to address the adequacy of minimum shift staffing levels at nuclear power plants (NPPs). It is expected that recipients will review the information for applicability to their facilities and consider actions, as appropriate, to avoid similar problems. However, suggestions contained in this information notice are not NRC requirements; therefore, no specific action or written response is required.

Description of Circumstances

On November 26, 1991, the NRC issued IN 91-77, "Shift Staffing at Nuclear Power Plants," (Reference 1) to alert licensees to the problems that could result from inadequate controls to ensure that shift staffing is sufficient to accomplish all functions required by an event. However, after IN 91-77 was issued, event follow-up inspections indicated that problems involving shift staffing and task allocation continued to occur.

As a result, the NRC continued with further research in this area. This research included an NRC RES project to address the adequacy of minimum shift staffing levels through a shift staffing study encompassing all licensee staff initially needed during an event.

The first component of the shift staffing study (Reference 2) included an evaluation of the experience and events for which staffing was a contributing factor and the identification of the primary issues related to NPP shift staffing levels. Particular attention was given to shift staffing concerns expressed in recent inspection reports. The corresponding events typically occurred at power during the backshift. In addition, observation of emergency preparedness exercises showed that the potential for work overload appeared to be higher among senior reactor operators and shift supervisors than among reactor operators. Dominant factors identified in the study were task allocation and location (including fire brigade support), procedure design, human-system interface, training, and communications.

The second component of the shift staffing study (Reference 3) consisted of detailed, on-site data collection and assessment of the adequacy of current NPP staffing practices for performing activities necessary for responding to and mitigating events. This effort was accomplished by a team survey of the staffing practices at seven NPPs. The two-person research teams, having both operational and human factors expertise, gathered information on site from seven voluntary participants representing the four vendor types, the four NRC regions, single and multi-unit sites, and a variety of plant ages. The teams used four methods of collecting data: (1) plant documentation review, (2) table-top talk-throughs of two accident scenarios (a fire leading to a reactor trip with complications and either a control room fire leading to evacuation and remote shutdown or a station blackout), (3) outside control room walk-throughs of specific tasks related to the scenarios, and (4) interviews with site personnel from different groups and levels. Findings of the second component of the study were the following:

- The licensees surveyed did not use a systematic process for establishing site-specific shift staffing levels.
- The licensees surveyed frequently assigned additional plant-specific tasks that were not specified by regulation to be performed by licensed and non-licensed personnel during an event.
- Five of the licensees surveyed used licensed personnel to staff the fire brigade.
- The administrative procedures of the licensees surveyed varied significantly in both the licensed and non-licensed personnel shift staffing levels and the types of positions staffed. In addition, the number of non-licensed operators normally used during the backshift varied greatly.
- The radiation protection and chemistry technicians of all the licensees surveyed had a high workload during the scenarios.
- During scenario talk-throughs, similar-vendor licensees made significantly different decisions, resulting in very different control room activities and in-plant tasks.
- The licensees surveyed were actively engaged in efforts to reduce operating and maintenance costs, which could result in a reduction in staff.

Discussion

As stated in IN 91-77, "The number of staff on each shift is expected to be sufficient to accomplish all necessary actions to ensure a safe shutdown of the reactor following an event. Those actions include implementing emergency operating procedures, performing required notifications, establishing and maintaining communications with the NRC and plant management, and any additional duties assigned by the licensee's administrative controls.... Section 50.54(m) of Title 10 of the *Code of Federal Regulations*

addresses only minimum staffing levels for licensed personnel and does not address personnel availability for performing all of the necessary actions specified in the licensee's administrative controls and required by an event."

The licensees surveyed generally staffed to levels greater than those required by either the regulations or their plant-specific technical specifications for both licensed and non-licensed personnel. Nevertheless, the results of the research project described in this IN provide several insights into areas which could impact the ability to accomplish safety functions following an event.

This information notice requires no specific action or written response. If you have any questions about the information in this notice, please contact one of the technical contacts listed below or the appropriate Office of Nuclear Reactor Regulation (NRR) project manager.

for Dennis M. Crutchfield, Director
Division of Reactor Program Management
Office of Nuclear Reactor Regulation

References

1. NRC Information Notice 91-77, "Shift Staffing at Nuclear Power Plants," November 26, 1991.

2. D. Shurberg et al., "Identification of Issues Associated with Nuclear Power Plant Shift Staffing Levels," Task 1 Letter Report, Brookhaven National Laboratory, July 20, 1994. (Accession No. 951003074)

2. S. Haber et al., "Nuclear Power Plant Shift Staffing Levels: Site Data Collection Report," Letter Report, Brookhaven National Laboratory, February 1995. (Accession No. 9510030160)

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Information Notice No.	Subject	Date of Issuance	Issued to
95-47	Unexpected Opening of a Safety/Relief Valve and Complications Involving Suppression Pool Cooling Strainer Blockage	10/04/95	All holders of OLs or CPs for nuclear power reactors.
95-46	Unplanned, Undetected Release of Radioactivity from the Exhaust Ventilation System of a Boiling Water Reactor	10/06/95	All holders of OLs or CPs for nuclear power reactors.
95-12, Supp. 1	Potentially Nonconforming Fasteners Supplied by A&G Engineering II, Inc.	10/05/95	All holders of OLs or CPs for nuclear power reactors.
95-45	American Power Service Falsification of American Society for Nondestructive Testing (ASNT) Certificates	10/04/95	All holders of OLs or CPs for nuclear power reactors.
95-44	Ensuring Compatible Use of Drive Cables Incorporating Industrial Nuclear Company Ball-Type Male Connectors	09/25/95	All Radiography Licensees.
95-43	Failure of the Bolt-Locking Device on the Reactor Coolant Pump Turning Vane	09/28/95	All holders of OLs or CPs for nuclear power reactors designed by Westinghouse Electric Corporation (W).
95-42	Commission Decision on the Resolution of Generic Issue 23, "Reactor Coolant Pump Seal Failure"	09/22/95	All holders of OLs or CPs for nuclear power reactors.
95-41	Degradation of Ventilation System Charcoal Resulting from Chemical Cleaning of Steam Generators	09/22/95	All holders of OLs or CPs for nuclear power reactors.

OL = Operating License
CP = Construction Permit

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Dennis M. Crutchfield, Director
Division of Reactor Program Management
Office of Nuclear Reactor Regulation

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RK with recommendation to specify by indicating the NUREG accession numbers for the TAP study reports.

(Accession #'s not available yet per discussion between N.K. Hunemuller & J.A. Arildsen 10/2/95)

10/2/95 Taken with SHConnor (CCEGR staff indicated that he had no objections to issuance of the information notice.

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