

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

June 10, 1991

NRC INFORMATION NOTICE NO. 91-36: NUCLEAR PLANT STAFF WORKING HOURS

Addressees:

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

Purpose:

This information notice is intended to alert addressees of potential problems resulting from inadequate controls to prevent excessive plant staff working hours. 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 do not constitute NRC requirements; therefore, no specific action or written response is required.

Description of Circumstances:

On October 4, 1990, Braidwood Station, Unit 1 lost approximately 620 gallons of water from the reactor coolant system (RCS) while the reactor was in cold shutdown. The Braidwood technical staff was conducting two residual heat removal (RHR) system surveillances concurrently. Before fully closing an RHR system vent valve in accordance with one surveillance procedure, the staff opened an RHR system isolation valve as specified in the other surveillance procedure. RCS coolant at 360 psig and 180°F exited the vent valve, ruptured a tygon tube line, and sprayed two engineers and the equipment attendant who were in the vicinity of the vent valve. An NRC augmented inspection team (AIT) conducted an onsite review of this event. The AIT reported that the fatigue from excessive use of overtime by the technical staff was a main contributor to this event.

In an August 1990 NRC Diagnostic Evaluation Team (DET) report, the NRC staff documented high amounts of overtime for personnel at the Zion Station. Individuals in the operations department regularly exceeded the working hour guidelines contained in Generic Letter 82-12, "Nuclear Power Plant Staff Working Hours," and in Zion's administrative procedures. In November 1990, the NRC performed an audit and identified numerous additional deviations from Zion's administrative procedure for approving, tracking, and reporting overtime. These deviations occurred in 1989 and 1990.

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Although the audit team could not connect a specific operating event or human error to fatigue caused by excessive overtime, the amount of overtime worked caused the NRC concern regarding the adequacy of the licensee's staffing. Generic Letter 82-12 states that controls established should ensure that, to the extent practical, personnel are not assigned to shift duties while in a fatigued condition that could significantly reduce their mental alertness or their decisionmaking ability. The licensee should employ enough plant operating personnel to maintain adequate shift coverage without routine heavy use of overtime. The objective is to have operating personnel work a nominal 40-hour week while the unit is operating.

During the 1989 refueling outage at the San Onofre Nuclear Generating Station, Unit 2, the Southern California Edison Company (the licensee) had an outage shift schedule policy which required San Onofre Unit 3 operating personnel to work the same shift schedule as Unit 2. San Onofre Unit 3 was operating in Mode 1 during this time. Similarly, from March through May 1989 at the Alabama Power Company's Joseph M. Farley Nuclear Plant, the licensee established an outage shift schedule for both Unit 1 and Unit 2 even though only one of the two units was in an outage. In these cases, plant personnel for an operating unit were placed on a site outage schedule, a practice that is inconsistent with the intent of the TMI Action Plan, NUREG-0737, Item I.A.1.3, and Generic Letter 82-12 (letter from S. A. Varga, NRC, to W. G. Hairston III, Alabama Power Company, dated May 24, 1991, "Operator Work Schedules at the Joseph M. Farley Nuclear Plant, Units 1 and 2").

On November 5, 1990, at the Sequoyah Nuclear Plant, an NRC inspection team reviewed the records of hours worked for the Operations section for the week of October 8, 1990. The inspection team found 23 instances of inadequate documentation for exceeding overtime limits and 5 instances of overtime authorization prepared after the fact.

In January 1991 at the Callaway Plant, Unit 1, NRC inspectors reviewed "time on site" for selected contract personnel for the previous refueling outage. Two of the contract personnel worked on safety-related systems and exceeded overtime limits without receiving individual authorizations. However, the licensee had issued a single authorization to cover all of that contractor's personnel engaged in safety-related work. To be consistent with Generic Letter 83-14, "Definition of 'Key Maintenance Personnel' (Clarification of Generic Letter 82-12)," Callaway has decided to expand the procedural control of staff working hours to include engineers when they are "directing" safety-related work.

#### Discussion of Safety Significance:

The safety of nuclear power plant operations and the assurance of general public health and safety depend on personnel performing their jobs at adequate levels. Research on extended working hours indicates that the performance of individuals will degrade without adequate rest after long periods of work. Fatigue can degrade an operator's ability to rapidly process complex information such as that presented by off normal plant conditions. In addition, fatigue may jeopardize the ability to respond in a timely fashion. Furthermore, performance errors are more likely to occur as a result of lapses in

short-term memory. Because individuals performing safety-related duties may be required to respond quickly to a plant emergency, it is important for plant management to carefully exercise control over overtime practices in order to ensure that plant personnel perform adequately.

Related Generic Communications:

1. NRC Generic Letter 82-12, "Nuclear Power Plant Staff Working Hours," June 15, 1982.
2. NRC Generic Letter 82-16, "NUREG-0737 Technical Specifications," September 20, 1982.
3. NRC Generic Letter 83-02, "NUREG-0737 Technical Specifications," January 10, 1983.
4. NRC Generic Letter 83-14, "Definition of 'Key Maintenance Personnel' (Clarification of Generic Letter 82-12)," March 7, 1983.
5. NUREG-0737, "TMI Action Plan," November 1980.

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 NRR project manager.

  
Charles E. Rossi, Director  
Division of Operational Events Assessment  
Office of Nuclear Reactor Regulation

Technical Contacts: David Desaulniers, NRR  
(301) 492-1043

Jesse Arildsen, NRR  
(301) 492-1026

Attachment: List of Recently Issued NRC Information Notices

LIST OF RECENTLY ISSUED  
NRC INFORMATION NOTICES

Information Notice No.	Subject	Date of Issuance	Issued to
91-35	Labeling Requirements for Transporting Multi-Hazard Radioactive Materials	06/07/91	All U.S. Nuclear Regulatory Commission (NRC) licensees.
91-34	Potential Problems in Identifying Causes of Emergency Diesel Generator Malfunctions	06/03/91	All holders of OLs or CPs for nuclear power reactors.
91-33	Reactor Safety Information for States During Exercises and Emergencies	05/31/91	All holders of OLs or CPs for nuclear power reactors.
91-32	Possible Flaws in Certain Piping Systems Fabricated by Associated Piping and Engineering	05/15/91	All holders of OLs or CPs for nuclear power reactors.
91-31	Nonconforming Magnaflex Magnetic Particle (14AM) Prepared Bath	05/09/91	All holders of OLs or CPs for nuclear power reactors.
91-30	Inadequate Calibration of Thermoluminescent Dosimeters Utilized to Monitor Extremity Dose at Uranium Processing and Fabrication Facilities	04/23/91	All fuel cycle licensees and other licensees routinely handling unshielded uranium materials.
86-21, Supp. 2	Recognition of American Society of Mechanical Engineers Accreditation Program for N Stamp Holders	04/16/91	All holders of OLs or CPs for nuclear power reactors and all recipients of NUREG-0040, "Licensee Contractor and Vendor Inspection Status Report" (White Book).

OL = Operating License  
CP = Construction Permit

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NUCLEAR REGULATORY COMMISSION  
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Original Signed by  
Charles E. Rossi

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*OGCB:DOEA:NRR CVHodge 05/22/91	*LHFB:DLPQ:NRR DDesaulniers 05/23/91	*LHFB:DLPQ:NRR JArildsen 05/23/91	*LHFB:DLPQ:NRR WSwenson 05/24/91	*C/LHFB:DLPQ:NRR JWermiel 05/24/91

required to respond quickly to a plant emergency, plant management is ~~expected~~ <sup>encouraged</sup> to carefully exercise its control over ~~such~~ overtime practices in order to ensure that plant personnel perform adequately.

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Document Name: *CVH* NOTICE - ARILDSSEN, HODGE

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CERossi	CHBerlinger	TechEd	JRoe	C/Thoms
05/ /91	05/28/91	05/21/91	05/21/91	05/24/91
OGCB:DOEA:NRR	LHFB:DLPQ:NRR	LHFB:DLPQ:NRR	LHFB:DLPQ:NRR	C/LHFB/DLPQ:NRR
CVHodge <i>ok</i>	DDesaulniers <i>ok</i>	JArildsen <i>ok</i>	<i>Shenk</i>	JWedmiel
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Document Name: INFO NOTICE - ARILDSSEN, HODGE

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CERossi	CHBerlinger	TechEd JM <sup>ain</sup> g <sup>m</sup>	JRoe	CThomas
05/ /91	05/ /91	05/21/91	05/ /91	05/ /91
OGCB:DOEA:NRR	LHFB:DLPQ:NRR	LHFB:DLPQ:NRR	LHFB:DLPQ:NRR	C/LHFB:DLPQ:NRR
CVHodge	DDesaulniers	JArildsen	WSwenson	JWermiel
05/ /91	05/ /91	05/ /91	05/ /91	05/ /91