

Introduction Nancy Salgado

NRC Staff Attendees:

Pamela Henderson
Timothy Kobetz
Michael Boggi
David Desaulniers
Paul Harris
Timothy Kolb

Kamishan Martin James Trapp, Region I James Shehee, Region II Bruce Palagi, Region III Michael Shannon, Region IV

Regulatory Guide 5.73 Fatigue Management for Nuclear Power Plant Personnel



United States Nuclear Regulatory Commission

Protecting People and the Environment

Kamishan Martin U.S. Nuclear Regulatory Commission



Overview

Rulemaking History
 Effects of Fatigue on Performance
 Development of Guidance
 Key Rule Provisions & Corresponding Guidance

History

- 1982 NRC published GL 82-12, Policy on Worker Fatigue
- I991 NRC issued IN 91-36, Nuclear Plant Staff Working Hours
- 1999 NRC received concerns from Congress and UCS
- 2001 NRC staff reviewed adequacy of policy implementation
- 2002 Commission approved rulemaking
- 2002-2008 public meetings held on draft requirements and implementation development
- 2008 Final Rule Published



History Sample of Worker Fatigue Incidents/Issues

- Sleeping operators
- Inattentive STA
- Inattentive security officers
- Inadequate overtime controls
- Continued self-declaration concerns



Performance Degradation from Fatigue

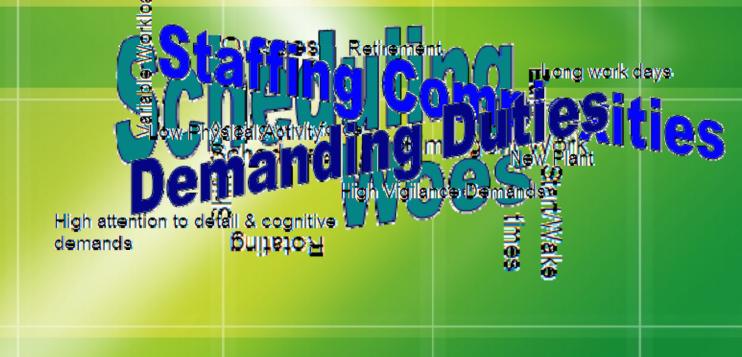
Occurs Before sleep onset
 Effects comparable to blood alcohol concentrations that are prohibited in other parts of Part 26

Impairs attention, communication skills, decision making, teamwork



What to do?

How to minimize fatigue and sustain adequate fitness for duty, with various contributors to fatigue in the nuclear industry





Comply with the Rule!



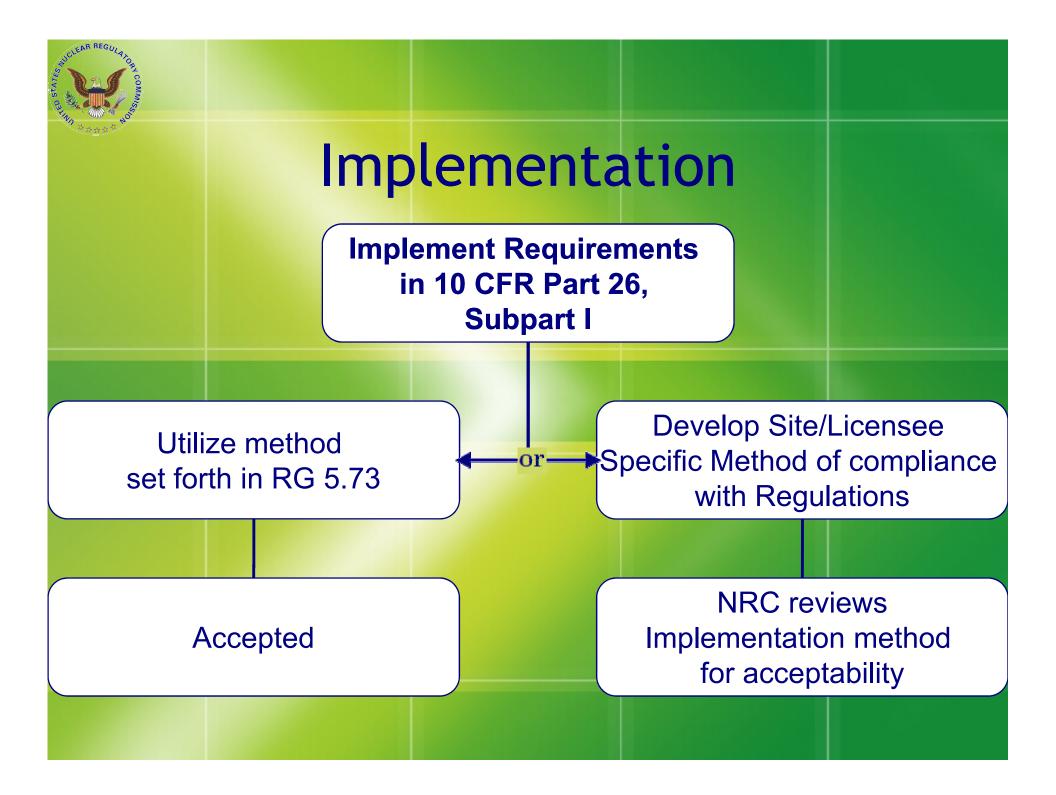
 Major Rule Provisions:
 Work hour controls
 Periodic performance based assessments
 Training
 Self-declarations
 Waivers
 Behavioral observation
 Fatigue assessments
 Annual reporting Addresses Contributors to Fatigue including: Tasks - work hour limits based on duties performed
 Rest - Requires days off & permits napping



Implementation

- NRC staff and stakeholders agreed on need for implementation guidance
- Various public meetings and correspondence during the development of NEI 06-11, Managing Personnel Fatigue at Nuclear Power Reactor
 Sites, Revision 1 and the NRC's regulatory guide
- Draft Final Regulatory Guide (RG 5.73) endorses
 NEI 06-11, with exceptions, additions and clarifications

http://www.nrc.gov/reactors/operating/ops-experience/fitness-for-duty.html





RG 5.73 Fatigue Management for Nuclear Power Plant Personnel

- Substantive Issues General Description
 Work Hour Controls
 - Minimum Day Off (MDO) Requirements
 - Individuals Eligible for Outage Controls
- General clarifications and revisions to NEI-0611 and stated as NRC implementation guidance



Work Hour Controls

- Who?
 - Maintenance, Operations (risk significant)
 - Chemistry, Health Physics (emergency response only)
 - Responsible Fire Brigade (FB) Member(s)
 - Security Force (non-administrative)



Work Hour Controls

- What?
 - Work Hour Scheduling
 - Work Hour Limits
 - O Break Requirements
 - Minimum Day Off (MDO) Requirements
- RG 5.73
 - Gives specific guidance and clarifications in these areas in lieu of endorsing various sections of NEI 06-11 in totality



- Work Hour Scheduling
 - The concept of periodic overtime introduced in NEI 06-11 is not endorsed in RG 5.73
 - Normal variation in vacation and training demands may occasionally require additional work hours to be used



- MDO Requirements
 - Unscheduled hours will be worked while meeting all work hour rules (including MDO)
 - Accumulation of unscheduled work hours over a shift cycle may affect the MDO requirement that applies to individuals or crews
 - MDO requirements are based on average hours worked by individuals over a shift cycle



- MDO Requirements
 - Built in flexibility exists for individuals to work more hours on some days as permitted in 10 CFR 26.205(d)(1)

 Individuals actual hours worked determine which MDO requirement is applicable



Guidance on average hours worked and applicable MDO Requirements for 8 and 10 hour shiftwork

○ ≤9 avg hrs → 8hr MDO Reqs → 1day off

o 9< ≤ 11 avg hrs→10hr MDO Reqs ⇒ 2days off



 Guidance on average hours worked and applicable MDO Requirements based on job function up to 13 average hours
 Performing duties described in 26.4(a)(1)-(3)
 Operations, ERO, FB ____> 2.5 days off

Performing duties described in 26.4(a)(4)
 Maintenance Workers _____ 2 days off

• Performing duties described in 26.4(a)(5) Security Force 3 days off



- MDO requirements for Individuals transitioning shift schedules
 - Calculate the average duration of the shifts (worked and scheduled to work) during a period
 - Section 4 Contraction Section 2 Contraction Section 2 Contraction 2 C
 - Termination of shift cycles can be used for transitions





- MDO requirements during outage 10 CFR 26.205(d)(4)
- Relaxation applicable to individuals "while working on outage activities," as stated in regulations

Eligible Workers for Relaxation during outage

 Individuals composing the minimum shift complement of operators, should not work the longer work hours that outage work hour controls allow



Work Hour Controls

- MDO Requirements During Outages
 - Minimum complement tied to 10 CFR 50.54(m) requirements
 - Retaining only one RO and one SRO on nonoutage MDO was not adequate to meet the intent of the rule
 - Staff position includes provisions for relief, transition and ability to participate in outage activities

BURNN * * * * *	AN COMMULE				OUR CO uidance -			
Minimum Number of Individuals Per Shift Working Nonoutage Schedules for Onsite Staffing of Operating Nuclear Power Units during Outages ¹								
Number of operating nuclear power units ²	Position	Two-unit site		Three-unit site				
		-	0	Two control rooms				
		One Control Room	Two Control Rooms	Single Control Room Unit in Outage	Single Control Room Unit and One Unit Served by Dual Control Room in Outage		Control Room in	Three Control Rooms
One	Senior Operator	2(2)	2(2)		2(2)		2(2)	2(2)
	Operator	2(3)	2(3)		2(3)		2(4)	2(4)
Two	Senior Operator			2(2)		3(3)		3(3)
	Operator			3(4)		4(5)		4(5)
					d by 10 CFR 50.54(m) to be operating when it is co	nnected to the grid.		



Work Hour Controls Specific Guidance - Outages MDO Requirements During Outages Examples in NEI 06-11 describing individuals affected by outage work hour limitations were revised and presented in RG 5.73



- Example 1—A maintenance or operations worker at a multiunit site who has responsibilities for outage activities, except if the operations worker is a member of the minimum shift complement for an operating unit, as described in this section. The maintenance worker and the operations worker who is not a member of the minimum shift complement for an operating unit, as described in this section, are eligible for outage workhour limitations.
- Example 4—An operator at a multiunit site with responsibilities for activities on the operating unit, outage unit, and common systems, who is not a member of the minimum shift complement for an operating unit, as described in this section. This operator is eligible for outage work-hour limitations.



Example 9—An operator at a multiunit site who is performing activities on the outage unit and is following outage work-hour requirements who is assigned to activities on an operating unit, except if the operator is a member of the minimum shift complement for an operating unit, as described in this section. The operator who is on outage work-hour limitations should not provide relief to the operator at the controls or the senior operator in the control room for an operating unit, unless another operator who has been on nonoutage work hours is not immediately available and the operator has had 2 days off in the preceding 7-day period. If the operator may provide short-term relief (up to 2 hours) to the operator at the controls or the senior operator in the control room for an operating unit or long-term relief (more than 2 hours) under a waiver of the MDO requirement that is applicable to the shift schedule (i.e., 8-, 10-, or 12-hour shifts) for personnel assigned to the operating unit.



RG 5.73 in Summary

- General endorsement of various portions of NEI 06-11 as a method of implementation
- Examples
 - Before implementing the guidance in any example in NEI 06-11, ensure example is applicable to and consistent with the requirements of the rule
- Sections excepted
 - MDO guidance in NEI 06-11 via periodic overtime concept
 - Outage Work Hour Controls
- Other Regulatory Positions
 - NEI 03-04, Predictive Maintenance, Emergency Response Personnel, Waivers, Reviews

