



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, DC 20555 - 0001

March 24, 2003

MEMORANDUM TO: David C. Trimble, Chief
Operator Licensing and Human Performance Section
Equipment and Human Performance Branch
Office of Nuclear Reactor Regulation
/RA/

FROM: David R. Desaulniers, Human Factors Analyst
Operator Licensing and Human Performance Section
Equipment and Human Performance Branch
Office of Nuclear Reactor Regulation

SUBJECT: PUBLIC MEETING TO DISCUSS DEVELOPMENT OF A PROPOSED RULE
CONCERNING WORKER FATIGUE AT NUCLEAR POWER PLANTS

DATE AND TIME: April 3, 2003
8:30 A.M. - 4:00 P.M.

LOCATION: U.S. Nuclear Regulatory Commission
One White Flint North
Room O-7B4
11555 Rockville Pike
Rockville, Maryland

PURPOSE: The purpose of this meeting is to provide a public forum for stakeholders to participate in discussions concerning the development of a proposed rulemaking concerning worker fatigue at nuclear power plants. An agenda of specific topics for discussion at this meeting is provided as Attachment 1. Attachment 2 is a series of five white papers concerning the proposed rulemaking that have been submitted by the industry task force for this rulemaking.

CATEGORY: This is a Category 3 Meeting. The public is invited to participate in this meeting by providing comments and asking questions throughout the meeting.

PARTICIPANTS:

<u>NRC</u>	<u>STAKEHOLDERS</u>
D. Trimble	J. Davis (NEI)
D. Desaulniers	R. Evans (NEI)
J. Persensky	D. Lochbaum (UCS)
A. Roecklein	S. Turrin (PROS)
M. Rothschild	B. Quigley

Interested members of the public can participate in this meeting via a toll-free teleconference. For details, please call the NRC meeting contact.

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REFERENCE DOCUMENTS: Information concerning this rulemaking can be found at
http://ruleforum.llnl.gov/cgi-bin/rulemake?source=BQ_PETITION

Attachments: As stated

MEMORANDUM TO: David C. Trimble, Chief
Operator Licensing and Human Performance Section
Equipment and Human Performance Branch

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R. Barrett	IPE/IPEEE issues	RidsNrrDssaSpsb
J. Schiffgens	IPE/IPEEE issues	
G. Holahan	Materials issues	RidsNrrDssa (i.e., stress cracking, erosion/corrosion)

cc: Licensee & Plant Mailing List

MEETING WITH STAKEHOLDERS TO DISCUSS DEVELOPMENT OF A
PROPOSED RULE CONCERNING WORKER FATIGUE
AT NUCLEAR POWER PLANTS

April 3, 2003

AGENDA

Morning Session

- 8:30-8:40 Introductions and Opening Remarks
- 8:40-9:00 Status of Security Worker Fatigue Orders
- 9:00-9:30 Written Policy and Procedures
- 9:30-10:15 Work Scheduling Controls
- 10:15-10:30 Break
- 10:30-11:30 Work Scheduling Controls
- 11:30-12:00 Training
- 12:00-1:00 Lunch

Afternoon Session

- 1:00-2:00 Fatigue Assessment
- 2:00-2:45 Audits and Corrective Action
- 2:45-3:00 Break
- 3:00-3:30 Recordkeeping
- 3:30-4:00 Meeting Summary and Future Schedule

Note: This is a Category 3 Meeting. The public is invited to participate in this meeting by providing comments and asking questions throughout the meeting.

White Paper Number One
Defining Directing Work
March 18, 2003

Purpose: The draft rule requires that the work hour scheduling controls applies to personnel directing the operation or maintenance of structures, systems and components that a risk-informed evaluation process has shown to be significant to public health and safety. It is important that there be a clear and consistent understanding of what ***directing*** operation or maintenance means.

Issue: In the draft work scheduling control excerpts listed below, the term directing is used to provide succinct guidance to the industry. There is the potential however for misinterpretation since a well-defined operational definition of directing is not provided.

26.30 Work Scheduling Controls

(a) Work scheduling controls shall be implemented at nuclear power reactors authorized to operate. These controls shall apply to the following categories of job functions:

- (1) operation or ***directing*** the operation of structures, systems and components that a risk-informed evaluation process has shown to be significant to public health and safety;
- (2) maintenance or ***directing*** the maintenance of structures, systems and components that a risk-informed evaluation process has shown to be significant to public health and safety]

Proposed Text for Definitions Section: ***Directing*** operation or maintenance means a first-line supervisor, foreman, or team leader that is working in the power plant providing direct supervision of an ongoing operational evolution or maintenance task.

White Paper Number Two
Covered Security Personnel

March 18, 2003

Purpose: The section is provided to list those categories of plant security personnel who are to be covered by the work scheduling controls associated with the work-hours portion of the worker fatigue rule.

Issue: The cited section includes watchpersons and, as such, is overly inclusive. Security watchpersons' duties and responsibilities are at a level where they should not be included within the scope of the work-hours portion of the worker fatigue rulemaking. Security watchperson duties are generally associated with vehicle/personnel access control and searches. The role of the security watchperson is much less critical than the armed member of the security force, central alarm station operator, secondary alarm station operator, or security shift supervisor. As such, the position of watchperson is much less susceptible to fatigue related errors of consequence. In all cases, the security watch stations manned by these personnel at key vehicle or personnel entrance points, are monitored and protected by other security personnel that fall within the scope of the work hour requirements.

Security watchpersons do not have the same link to fatigue-related issues (i.e., maintaining alertness in static posts and/or armed response decision making), as alarm station monitors or armed responders. As such, both their required vigilance levels and cognitive demands are less than those for personnel who have to maintain exceptional levels of visual and auditory vigilance; watching and listening for the unexpected (e.g., plant operators and security armed responders).

A risk-informed perspective would focus the most significant controls (i.e., work hour limitations) on the most risk-significant tasks. Other tasks, while of less risk significance, are still important and would be covered by the more general fitness for duty requirements of Part 26.

Proposed Text: '26.30 Work Scheduling Controls

- (a) Work scheduling controls shall be implemented at nuclear power reactors authorized to operate. These controls shall apply to the following categories of job functions:
- (1) operation or directing the operation of structures, systems and components that a risk-informed evaluation process has shown to be significant to public health and safety;
 - (2) maintenance or directing the maintenance of structures, systems and components that a risk-informed evaluation process has shown to be significant to public health and safety

- (3) performing the duties of a Health Physics or Chemistry technician required as part of the minimum shift complement for the on-site emergency response organization;
- (4) performing the duties of a Fire Brigade member responsible for understanding the effects of fire and fire suppressants on safe shutdown capability as required by 10 CFR XX.XX; or
- (5) performing security duties as an armed member of the security force, central alarm station operator, secondary alarm station operator, or security shift supervisor, ~~or watchperson.~~

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White Paper Number Three
Granting Work-Hour Deviations
March 18, 2003

Purpose: This draft section specifies the level of plant management that can determine and grant work-hours deviations for operations, maintenance and security personnel.

Issue: (1) The industry agrees that a senior-level plant manager should both determine whether a deviation is necessary and grant the deviation after pre-specified conditions have been met, focusing on both the work to be performed and the person(s) being granted the deviation. The industry does think, however, that by specifying only operations and security shift supervisors the pool of potential senior-level decision makers is limited. Suggested alternative language would generically specify senior-level plant decision-making personnel, with the requirement that approved senior-level titles be specified in individual plant procedures.

(2) Anchoring the decision process to the prevention of conditions adverse to safety limits the normal decision making process. Although infrequent, non-safety or security related situations do arise in a plant that would be adequately compelling to justify granting individuals work-hour deviations. As a consequence, rigidly adhering to safety and/or security precursors as the only drivers for the thoughtful process of granting deviations significantly reduces licensee management prerogatives. If the process for granting follows an auditable path with required decision points reviewed by responsible plant management, the precursors to the decision should remain at the plant level.

Proposed Text: (3) Licensees may authorize individual workers to deviate from the requirements of §26.30(b)(1) and (2) provided:

(i) the licensee could not have reasonably foreseen or controlled the circumstances necessitating the deviation,

(ii) the operations shift manager, or a senior-level designee determines that the deviation is necessary to mitigate or prevent conditions adverse to safety, or the security shift manager determines that the deviation is necessary to maintain the security of the facility whether to grant work-hours deviations, taking into account the plant/security conditions and the physical condition of eh personnel being granted the deviation, and

(iii) a supervisor trained in the causes, symptoms, and effects of fatigue, performs an assessment in accordance with §26.32 and determines that the individual's fitness for duty will not be adversely affected by the additional work period to be authorized under the deviation and evaluates the need for compensatory measures.

White Paper Number Four
Work-Hour Deviation Documentation
March 18, 2003

Purpose: This draft section is designed to ensure individual work-hour deviations follow the prescriptive requirements in subpart (b) (3) by documenting the bases for granting the individual deviations from the requirements of 26.30 (b) (1) and (2).

Issue: (1) Although infrequent, non-safety or security related situations do arise in a plant that would be adequately compelling to justify granting individuals work-hour deviations. As a consequence, rigidly adhering to safety and/or security precursors as the only drivers for the thoughtful process of granting deviations significantly reduces licensee management prerogatives. If the process for granting follows an auditable path with required decision points reviewed by responsible plant management, the precursors to the decision should remain at the plant level.

(2) The attached form (Appendix A) provides guidance for plant staff to perform individual and task analyses, implement fatigue management strategies, as well as providing specific review and authorization points along a decision continuum. In addition, the completed form provides auditable documentation.

Proposed Text: (4) The basis for individual deviations from the requirements of §26.30(b)(1) and (2) shall be documented. The documented basis shall include:
(i) a description of the conditions or circumstances for which approval is requested ~~safety or security condition necessitating the work schedule extension;~~
(ii) the basis for the determination that the individual's fitness for duty will not be adversely affected by the additional work period approval of the deviation, including any measures taken to manage the potential for fatigue-related errors, and
(iii) an assessment of the potential for fatigue-related errors to affect the safe performance of the work and the use of any compensatory measures: a completed fitness for duty assessment.

White Paper Number Five
Developing a Manning/Work-Hours Metric
March 18, 2003

Purpose: Generic Letter 82-12 and, until recently, the draft rule contained a requirement to staff for a nominal 42 hour work week. Over the last year, there have been discussions on how to monitor this manning/work-hour requirement and provide a sound regulatory basis for citing of violations. In the most recent draft, a limit of 48 hours was proposed as a target value for average hours worked per week.

Issue: Work-hour average values between 48 and 56 were discussed in a recent public meeting. These values are significantly affected by the metric used for calculation. Before an actual average work-hour limit can be adequately justified, the metric to be employed in calculating the limit must be clearly defined. As the paper progresses to define an acceptable metric, "X" will be used to define the average work-hours limit.

Defining an acceptable metric is the goal of this white paper; however, in the course of definition, attention will be paid to closing the gap between short-term limits of up to 72 hours worked per week, for an individual, and the important recognition that working at or near this limit for an extended period, increases the potential for fatigue-related issues.

A primary goal of an acceptable metric is its specificity in delineating "X," the point at which licensees must take action and, if necessary, regulatory action is indicated. The value "X" must have a clear nexus to actual hours worked and their impact on worker performance as it is affected by fatigue.

At a minimum, an acceptable metric should possess the following features:

- Be closely related to the function it is monitoring
- Be as simple as possible
- Be measured on an effective frequency.
- Provide reasonable visibility for affected work groups.
- Provide adequate flexibility for licensee response before regulatory action is required.

Be closely related to the function it is monitoring. There are several work-hours related measures that can be monitored. In the past, much of the work-hours related data collected came predominately from pay records. These data represented an amalgam of hours paid and overtime listed. When collecting historical data, pay records are often the only reliable source available. These data can provide a basis for relative comparison and developing long-term trends; however, they do not provide a definitive measure of hours actually worked, or short-term changes to the size of a work force. These data are also not adequately compatible for inter-utility comparisons because of the wide divergence in the bases for computing worker pay and overtime.

Using hours actually worked provides a strong link to the work-hour limit parameter being targeted. Hours actually worked is sensitive to changes in the size and work load

of the work force of interest. It is therefore recommended that data collection and decisions be based on hours actually worked.

Be as simple as possible, and be measured on an effective frequency. The proposal provided in the most recent public meeting for a rolling six-week average would be a cumbersome process and may not provide the most direct relationship to goal of the measurement exercise---a true hours worked value. Fluctuations in vacation and sick leave, along with hours paid but not worked (e.g., hourly employees called out are paid for four hours even if they work less.), negatively affect the target measure.

Calculating the proposed rolling average on a rolling six week basis is too frequent and as such presents a burden without concurrent benefit. Quarterly measurement and evaluation is consistent with conventional business monitoring cycles and well established surveillance frequencies. Six week rolling averages are rarely used and constitute undue burden to develop a methodology to perform essentially continuous calculations. Also, periodic measurement of this parameter will more clearly illuminate bulk changes in the parameter than the essentially continuous calculations in a rolling average (in other words, the meaning of the difference between two measurements taken one quarter apart would be more clear than the meaning of the difference between two "rolling averages," say, the rolling average on March 23 and the rolling average March 24). Finally, the parameter measured will change very slowly from day to day and week to week. Quarterly monitoring is sufficient to provide fine-grained data upon which to identify trends that require additional attention.

Provide reasonable visibility for different sections of the workforce. Calculating over-all work hour values for an entire work force would not provide adequate bases for manning decisions within functional work groups. It is suggested the calculations be preformed on functional work groups. Functional work groups means groups of plant personnel who perform similar functions (e.g., health physics technicians and chemistry technicians, and licensed and non-licensed operators are generally considered separate functional groups).

Provide adequate flexibility for licensee response before regulatory action is needed. The metric should be adequately robust to provide succinct indicators that the licensee can use to address staffing issues, well in advance of them escalating to the point where regulatory intervention is indicated. The metric should provide concrete gradations where acceptable is clearly delineated from unacceptable.

Considering all the above listed factors, we recommend the metric be calculated quarterly, based on the number of people in the functional group being measured, and the people who are in the functional group for any portion of the calculation period be prorated based on the percentage of time in that group.

Proposed Text: (1) The average work hours for personnel performing the functions identified in §26.30(a)(1)-(5) shall be controlled as follows: ~~in accordance with the following limit. While the plant is operating, the number of hours actually worked by a [shift] shall not exceed an average of 48 hours per person per week [averaged over a rolling consecutive period not to exceed six weeks. Worker absences and workers who~~

~~were not assigned to the shift for the entire period shall be prorated when calculating the average.]~~

- (i) For groups of workers performing functions associated with an operating unit, the number of hours actually worked should not exceed an average of "X" hours per person per week. The average is calculated quarterly by dividing the total number of hours actually worked (for the included population) by the number of individuals in the population and the number of applicable operating weeks in the quarter. The calculation shall be performed on a functional group basis. Functional groups are groups of plant personnel who perform similar functions (e.g., health physics technicians, chemistry technicians, maintenance personnel, licensed operators and non-licensed operators are typically considered as separate functional groups). Turnover time and hours paid but not actually worked are not to be included in the calculation. In addition, workers who are assigned to a functional group, but are not actually working within the functional group for any portion of the calculation period will have their group-related hours prorated.
- (ii) If the average of "X" hours per person per week is exceeded, the licensee shall enter the issue into the plant corrective action program and take corrective action to restore the average to the less than "X" hours per person per week goal. If the licensee is unable to restore the average to less than the goal within the next quarter, or if the average exceeds "Y" hours per person per week, the licensee shall notify the NRC in writing, specifying the circumstances that have prevented the licensee from restoring the average, and/or are projected to prevent the licensee from restoring the average within the next quarter, and the actions being taken to restore the average to less than "X" hours as soon as reasonably possible.

APPENDIX A to White paper number Four

Work Hour Exemption

(NOTE: A-B and C must be completed)

Date _____

Time _____

Employee: _____

Work hour limits to be exceeded: (e.g., 16/24—26/48) _____

Approved number of hours to be worked: _____

(A) Fitness for Duty Evaluation Completed:

Name _____ **Title** _____

(B) Work-Scope and Task Evaluation Completed:

Reason(s) for continuance _____

Reason(s) for personnel selection _____

**Fatigue management strategies and/or compensatory measures in place
(specify)** _____

Name _____ **Title** _____

(C) Exemption Authorization: (Plant Manager or designee)

Name _____ **Title** _____

