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Managing Fatigue at Power Reactor Sites

March 2007

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Nuclear Energy Institute

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EXECUTIVE SUMMARY

This document provides guidance for managing fatigue in accordance with 10 CFR 26, Subpart I, *Managing Fatigue*. The goals of this guide are to provide the tools needed to meet regulatory requirements while:

- Maintaining reasonable assurance of industrial and nuclear safety.
- Recognizing that a wide variety of work situations exist across the industry.
- Supporting management flexibility and decision making when unplanned work is required.
- Avoiding unnecessary administrative burden in documenting hours worked.
- Providing the records needed to allow the required performance evaluations to be performed efficiently.
- Clarifying the rights and responsibilities of licensees and workers.

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MANAGING FATIGUE AT POWER REACTOR SITES

1 INTRODUCTION

Reference: 10 CFR Part 26, Subpart I

This guide provides an approach to meeting 10 CFR Part 26, Subpart I requirements related to managing fatigue at power reactor sites. Implementation of the drug and alcohol portion of the fitness for duty program are addressed in NEI 03-01, *Nuclear Power Plant Access Authorization Program* and NEI 03-04, "Guideline for Plant Access Training."

Licensees have a number of programs in place to promote worker alertness and reduce the potential for human performance errors. In 1982 the Regulatory Commission issued Generic Letter 82-12, *Nuclear Power Plant Staff Working Hours*, providing guidelines for managing the hours worked for individuals performing safety related work. The current rule was driven, in part, by the variation in approaches used across the industry to meet these guidelines. To meet the requirements in Subpart I a detailed process for managing and documenting hours worked is required.

This guide addresses a number of challenges on the level of detail needed in the program.

This guide addresses the content of training and the comprehensive examination that is required by Part 26 for the following new knowledge and abilities (KAs):

- Knowledge of the contributors to worker fatigue, circadian variations in alertness and performance, indications and risk factors for common sleep disorders, shift work strategies for obtaining adequate rest, and the effective use of fatigue countermeasures
- Ability to identify symptoms of worker fatigue and contributors to decreased alertness in the workplace.

The training for other KAs associated with FFD is addressed in NEI 03-01 and NEI 03-04.

An individual's ability to safely and competently perform his or her duties is not solely based on the individual's work hours or that the individual has had adequate rest breaks. Fatigue can be caused by numerous things including such things as long hours of work, inadequate rest between work periods, sleep disorders, sedentary lifestyles, work problems or dissatisfaction, home finances and relationships, inadequate nutrition, emotional stress, physical stress, prescription drugs, and mental or physical illness. Fatigue may lead to decreased alertness. When an individual is alert, he or she may be more focused and better able to pay attention. Fatigue and decreased alertness can substantively degrade an individual's ability to safely and competently perform his or her duties. Fatigue management is part of the licensee's overall fitness for duty (FFD) program.

2 PURPOSE AND APPLICABILITY

Reference: 10 CFR Part 26.201

2.1 PURPOSE

The purpose of this guide is to provide the tools needed by licensees to have an effective program for meeting the requirements of 10 CFR Part 26 Subpart I related to managing fatigue. The goal is to provide management processes, record keeping processes and monitoring tools that ensures compliance while providing guidance for flexibility for day to day operations.

2.2 APPLICABILITY

This guide applies to licensees who are authorized to operate a nuclear power reactor (under Sec. 50.57) and holders of a combined license after the Commission has made the finding under Sec. 52.103.

Managing fatigue applies to the following individuals, with exception of work hour controls:

- All individuals who are granted unescorted access to nuclear power reactor protected areas.
- All persons who are required by a licensee to physically report to the licensee's Technical Support Center or Emergency Operations Facility by licensee emergency plans and procedures, except work hour controls.

Work hour controls apply only to a subset of the above individuals, designated as “covered individuals” in this document.

Managing fatigue does not apply to the following individuals because they are not subject to the rule:

- Contractor/vendors, whether granted unescorted access to nuclear power reactor protected areas or not, conducting work off site.
- Emergency response personnel who are not in the protected area and are not required by a licensee to physically report to the licensee's Technical Support Center or Emergency Operations Facility by licensee emergency plans and procedures. This includes emergency response personnel who are granted unescorted access to nuclear power reactor protected areas.

3 DEFINITIONS

Reference: 10 CFR Part 26.5

The following definitions are used in this guide.

A day-off means a calendar day in which an individual does not start a work shift.

Acute fatigue means fatigue from causes (e.g., restricted sleep, sustained wakefulness, task demands) occurring within the past 24 hours.

Alertness means the ability to remain awake and sustain attention.

Backward shift rotation means rotation of the start of the shift from days to night to swings.

Break is defined as an interval of time that falls between successive work periods, during which the individual does not perform any duties for the licensee other than one period of shift turnover at either the beginning or end of a shift but not both.

Call-in means returning to the site when not normally scheduled for work.

Circadian variation in alertness and performance means the increases and decreases in alertness and cognitive/motor functioning caused by human physiological processes (e.g., body temperature, release of hormones) that vary on an approximately 24-hour cycle.

Contractor/vendor (C/V) means any company, or any individual not employed by a licensee who is providing work or services to a licensee, either by contract, purchase order, oral agreement, or other arrangement.

Covered individual means an individual subject to work hour controls. Any individual granted unescorted access to a nuclear power plant protected areas who performs covered work.

Covered work means the following:

- Operating or on-site directing of the operation of systems and components that a risk-informed evaluation process has shown to be significant to public health and safety;
- Performing maintenance or on-site directing of the maintenance of structures, systems, and components (SSCs) that a risk-informed evaluation process has shown to be significant to public health and safety;
- Performing Health Physics or Chemistry duties required as a member of the on-site emergency response organization minimum shift complement;
- Performing the duties of a Fire Brigade member who is responsible for understanding the effects of fire and fire suppressants on safe shutdown capability; and

- Performing security duties as an armed security force officer, alarm station operator, response team leader, or watchperson, hereinafter referred to as security personnel.

Cumulative fatigue means the increase in fatigue over consecutive sleep-wake periods resulting from inadequate rest.

Directing means the exercise of control over an operations or maintenance covered work activity by an individual who is directly involved in the execution of the work activity, and either makes technical decisions for that activity without subsequent technical review, or is ultimately responsible for the correct performance of that work activity.

Eight (8) -hour shift schedule means a schedule that averages not more than 9 hours per workday over the entire shift cycle.

Fatigue means the degradation in an individual's cognitive and motor functioning resulting from inadequate rest.

Incidental duties means those work activities occasionally performed off-site that required communicating verbally with on-site personnel.

Increased threat condition means an increase in protective measure level, relative to the lowest protective measure level applicable to the site during the previous 60 days, as promulgated by an NRC advisory.

Onsite means within that portion of the owner controlled area of the nuclear power plant that contain(s) risk significant SSCs.

Nap or Restorative Sleep means a brief opportunity and accommodations for restorative, uninterrupted sleep of at least one half hour in a designated area.

Nominal means the limited flexibility that is permitted in meeting a scheduled due date for completing a recurrent activity that is required under 10 CFR 26, such as the nominal 12-month frequency required for FFD refresher training and the nominal 12-month frequency required for certain audits. Completing a recurrent activity at a nominal frequency means that the activity may be completed within a period that is 25 percent longer or shorter than the period required in 10 CFR 26. The next scheduled due date would be no later than the current scheduled due date plus the required frequency for completing the activity.

Protected area means an area encompassed by physical barriers and to which access is controlled.

Risk informed evaluation process means an evaluation based on a probabilistic risk analyses approach such as the Maintenance Rule (50.65(a)(4)) or other process.

Security personnel means armed security force officer, alarm station operator, response team leader, or watchperson.

Shift cycle means a series of consecutive work shifts and days off that is planned by the licensee to repeat regularly, thereby constituting a continuous shift schedule. A shift cycle cannot exceed 6 weeks for the purposes of calculating days off.

Shift turnover means only those activities that are necessary to safely transfer information and responsibilities between two or more individuals between shifts. Shift turnover activities may include, but are not limited to, discussions of the status of plant equipment, and the status of ongoing activities, such as extended tests of safety systems and components.

Tactical exercise means a force-on-force simulation used to evaluate and demonstrate the capability to defend target sets against selected attributes and characteristics of an adversary. A force-on-force tactical exercise includes all key program elements of a stations protective strategy.

Ten (10)-hour shift schedule means a schedule that averages more than 9 hours, but not more than 11 hours, per workday over the entire shift cycle.

Twelve (12)-hour shift schedule means a schedule that averages more than 11 hours, but not more than 12 hours, per workday over the entire shift cycle.

Unit outage means that the reactor unit is disconnected from the electrical grid.

Work hours mean the amount of time an individual performs duties for the licensee. This includes all work hours, with the following exceptions:

- One period of shift turnover time, either at the end or beginning of the shift, but not both shall be excluded;
- Within-shift break and rest periods in which there is reasonable opportunity and accommodations for restorative sleep may be excluded;
- Unscheduled work hours for the purpose of participating in an unannounced emergency preparedness exercises and drills may be excluded;
- Incidental duties performed off-site provided the total duration of the work does not exceed a nominal 30 minutes during any single break period may be excluded.
- For security personnel, during the actual conduct of force-on-force tactical exercises if security personnel work on their day off, this work day may be counted in the calculation of minimum days off.
- For security personnel, during periods defined in writing by the NRC when security personnel are required to work to ensure the common defense and security.
- Personal time in which an individual is onsite but is off duty (i.e., before or after his/her normally scheduled work period in which work activities are performed for the licensee)

may be excluded. The individual may be reading the paper, in the onsite fitness center, eating breakfast, etc.

Work hour controls mean the regulatory requirements in 10 CFR 26.205.

4 IMPLEMENTATION

The guidance in this document shall be implemented as follows:

Eighteen months from the publication of the final rule in the *Federal Register*.

5 POLICY AND PROCEDURES

Reference: 10 CFR Part 26.203 General Provisions

5.1 POLICY

The licensee program shall establish a policy for the management of fatigue for all individuals who are subject to the licensee's FFD program and incorporate the guidance into the site or corporate written FFD policy.

The policy should be an integrated FFD policy and should include the following in association with managing fatigue:

- Provides reasonable measures for the early detection of persons who are not fit to perform their duties in a safe and reliable manner.
- Establishes an Employee Assistance Program which is available to employees desiring assistance in dealing with managing fatigue that could adversely affect their ability to safely and competently perform their duties.
- Provides reasonable measures to address fitness for duty associated with as mental stress, fatigue and illness.
- Provides the proper Fitness For Duty training.

Appendix C provides an example integrated FFD policy that includes the FFD requirements.

5.2 PROCEDURES

The licensee program shall develop, implement, and maintain procedures that:

Describe the process to be followed when any individual covered by the FFD program makes a self-declaration that he or she is not fit to safely and competently perform his or her duties for any part of a working tour as a result of fatigue. The procedure shall:

- a) Describe the individual's and licensee's rights and responsibilities related to self-declaration.
- b) Describe requirements for establishing controls and conditions under which an individual may be permitted or required to perform work after that individual declares that he or she is not fit due to fatigue.

- c) Describe the process to be followed if the individual disagrees with the results of a fatigue assessment that is required.
- d) Describe the process for implementing the controls required for covered individuals.
- e) Describe the process to be followed in conducting fatigue assessments.
- f) Describe the sanctions that the licensee may impose on an individual following a fatigue assessment, and the conditions and considerations for taking those sanctions.

The procedure should include the following responsibilities:

[1] The Operations Shift Manager or a site senior level manager with requisite signature authority is responsible for:

- Determining that a work hour waiver is necessary to mitigate or prevent a condition adverse to safety.
- Evaluating staffing levels to ensure individual work hours are managed with the objective of preventing impairment from fatigue due to the duration, frequency, or sequencing of work schedules.

[2] The Security Shift Manager or a site senior level manager with requisite signature authority is responsible for:

- Determining that a waiver is necessary to maintain site security.
- Evaluating staffing levels to ensure individual work hours are managed with the objective of preventing impairment from fatigue due to the duration, frequency, or sequencing of work schedules.

[3] The General Manager, Plant Operations (GM) is responsible for:

- Ensuring a review is performed at least twice per year, such that the entire year is reviewed, to monitor overtime hours worked and ensure that excessive hours have not been assigned.
- Evaluating staffing levels to ensure individual work hours are managed with the objective of preventing impairment from fatigue due to the duration, frequency, or sequencing of work schedules.
- Evaluating the performance of individuals to ensure individual work schedules prevent impairment from fatigue. This includes evaluating the duration, frequency and sequencing of the overtime hours that are worked by each individual.

[4] The Manager or Supervisor of the individual who will be issued a waiver to exceed the work hour limits established in this procedure or who is being assessed for fatigue is responsible for:

- Evaluating the employee's fitness by performing a face-to-face fatigue assessment.
- Evaluating the employee's performance and continued fitness for duty while working extended work hours.

If evaluating for the issuance of a waiver and the individual's Supervisor or Manager is not on-site, this responsibility may be performed by any manager or supervisor who is qualified to direct the work to be performed by the individual.

[5] Each Department Head is responsible for:

- Providing guidelines for overtime selection process (comment from NRC meeting need to include guidelines later in guide) as required by the union contract and the fitness for duty requirements outlined in this guide and in the licensee's, *Fitness for Duty Program*.
- Communicating the requirements of this procedure to appropriate personnel within his/her department.
- Maintaining a record of the shift schedules and shift cycles used for at least the past 3 years for those individuals who are subject to work hour controls. Records may be required longer than 3 years, if legal proceedings are ongoing..
- Evaluating staffing levels are adequate to ensure individual work hours are managed with the objective of preventing impairment from fatigue due to the duration, frequency, or sequencing of work schedules.

[6] Each Requesting Supervisor is responsible for ensuring authorization for issuance of a waiver to exceed working hours limits is obtained prior to allowing an individual to exceed these limits.

[7] Each Employee (licensee or Contract) is responsible for (this is inclusive of the above listed positions):

- Evaluating his/her personal fitness to work based on impairment from fatigue.
- Managing his/her work hours consistent with the objective of preventing impairment from fatigue.
- Making a self-declaration of fatigue and discussing his/her concerns with supervision or management in cases when he/she feels his/her performance may be impaired.
- Verifying his/her working hours are correctly documented regardless of whether he/she is paid for the hours worked. (From 10 CFR 26.203(d)(1))

- Monitoring and reporting concerns related to individuals' fitness to work based on impairment from fatigue (i.e., behavioral observation program).
- Being available at work for a face-to face fatigue assessment when required.
- Being aware of the total hours worked in the previous 14 days and notifying management if working hours limits will be exceeded if asked to work additional hours.

Appendix D provides an example procedure.

6 INDIVIDUALS SUBJECT TO FATIGUE MANAGEMENT AND WORK HOUR CONTROLS

Reference: 10 CFR Part 26.4

6.1 INDIVIDUALS SUBJECT TO FATIGUE MANAGEMENT

Fatigue management requirements, with exception of work hour controls, apply to the following individuals,: All persons who are granted unescorted access to nuclear power reactor protected areas and all persons who are required to physically report to the Technical Support Center or Emergency Operations Facility, in accordance with the site Emergency Plan and procedures.

Each individual may make a self declaration that he/she is not fit to safely and competently perform his/her duties because of fatigue.

Each individual is subject to the fatigue assessment process for the following conditions:

- For-Cause;
- Self-Declaration;
- Post-Event; and
- Follow-up

6.2 WORK HOUR CONTROLS FOR COVERED INDIVIDUALS

Work hour controls apply to only covered individuals. Any individual who performs duties within any of the following job categories is a covered individual subject to work hour controls:

- Operating or on-site directing of the operation of systems and components that a risk-informed evaluation process has shown to be significant to public health and safety
- Performing maintenance or on-site directing of the maintenance of structures, systems, and components (SSCs) that a risk-informed evaluation process has shown to be significant to public health and safety
- Performing Health Physics or Chemistry duties required as a member of the on-site emergency response organization minimum shift complement
- Performing the duties of a Fire Brigade member who is responsible for understanding the effects of fire and fire suppressants on safe shutdown capability. The Fire Brigade leader is considered the person responsible for understanding the effects of fire and fire suppressants on safe shutdown capability. The remaining Fire Brigade members are not considered as the person(s) responsible for understanding the effects of fire and fire suppressants on safe shutdown capability.
- Performing security duties as an armed security force officer, alarm station operator, response team leader, or watchperson, hereinafter referred to as security personnel

Fatigue Management / work hour controls do not apply to the following individuals:

- Contractor/vendors conducting work off site.
- Contractor/vendors who are granted unescorted access to nuclear power reactor protected areas while conducting work off site.
- Emergency response personnel who are not in the protected area and are not required by a licensee to physically report to the licensee's Technical Support Center or Emergency Operations Facility by licensee emergency plans and procedures.

The licensee program shall clearly define when an individual is subject to work hour controls. The Maintenance Rule, Requirements for monitoring the effectiveness of maintenance at nuclear power plants, § 50.65 (a) (4), can be considered a risk-informed evaluation process to identify SSC's that are significant to public health and safety. The licensee has the option of using risk-informed evaluation processes other than those used for compliance with the Maintenance Rule.

Example: 10 CFR 26.4, "FFD program applicability to categories of individuals," paragraph (a) states that "All persons who are granted unescorted access to nuclear power reactor protected areas by the licensees in 26.3(a) and perform the following duties shall be subject to an FFD program that meets all of the requirements of this part..." Paragraphs (a)(1) through (a)(5) go on to list the work under the scope of the work hours limitations.

If an unbadged contractor is brought into the plant to do emergent critical specialty work on a risk-significant component, (such as a Furmanite contractor who is sealing a risk-significant valve), is that contractor subject to the work hour limitations or may he/she work without time limitations? Note that the contractor would be escorted.

Answer: Personnel under escort (i.e., unbadged individuals) are not subject to work hour limitations.

6.3 DIRECTING

Directing means the exercise of control over an operations or maintenance covered work activity by an individual who is directly involved in the execution of the work activity, and either makes technical decisions for that activity without subsequent technical review, or is ultimately responsible for the correct performance of that work activity.

The licensee program shall clearly define when an individual is directing and subject to work hour controls. Considerations should include all of the following when determining if an individual is directing an operation or maintenance activity:

- Is the individual onsite?
- Is the work at the location of risk significant SSCs?
- Is the individual the first line supervisor/foreman/leader?
- Is the individual actively and directly involved in the execution of the work activity?
- Is the individual making technical decisions for that activity without subsequent technical review?
- Is the individual ultimately responsible for the correct performance of that work activity? (For the purpose of this guide, ultimately refers to first level of leadership accountability for the performance of the task.)
- Is the individual assisting a trainee in completing on the job training?

The following tasks are examples generally considered NOT directing:

- Tasks conducted by engineers
- Supervision in the plant of the maintenance on a non-covered SSC
- Supervision at the second level supervision
- Conducting Work Control Center documentation activities
- Writing a work procedure
- Preparing a work or modification package
- Review by senior management of work plans
- Training of personnel during which time the trainee is not operating or performing maintenance activities
- Providing only advice from vendors and engineers on test performance, component and system operation, or other similar technical inputs
- Review and approval of documents
- Providing only advice from STAs to control room staff (note if STA/SE is in the plant, outside the control room, he / she may be considered directing)

Examples:

A diesel generator (DG) System Engineer, who normally works 8 hour days, has worked 66 hours (12 hours on Monday through Friday (0700 – 1900) and 6 hours on

Saturday (1500-2100)) to prepare for an NRC inspection. On Sunday morning at 0400, while running the # 1 DG a problem develops that requires the System Engineer to return to site to provide technical assistance.

The System Engineer is not directing, he is advising and therefore not conducting covered work.

Prior to refueling operations, a Reactor Engineer had worked six 12 hour days reviewing a criticality analysis that was being prepared to be included in a proposed Technical Specification submittal. On day seven, refueling starts and the Reactor Engineer is required to be present during fuel movement. He works 14 hours that day, one hour of which was turnover. Has he violated a work hour limit?

The Reactor Engineer is not directing, he is advising and therefore not conducting covered work. A licensed SRO is required for fuel movement. The licensed SRO would be directing.

7 WORK HOUR SCHEDULING

Reference: 10 CFR Part 26.205(c)

This section covers the normal long range schedule used for covered individuals. It does not address the process for scheduled or unscheduled overtime needed to support work activity.

7.1 WORK HOURS SCHEDULING

Licenses shall schedule the work hours of covered individuals consistent with the objective of preventing impairment from fatigue due to the duration, frequency, or sequencing of successive shifts. Licenses should have a procedure on establishing schedules.

When establishing schedules the following should be considered:

- Scheduled work hours are within work hour limits defined in 10 CFR 26.
- Duration of scheduled work period (not to exceed 12 hours)
- Duration of break period (normally about 12 hours or more)
- Consistent start/stop times for work periods
- Consistent rotation (e.g., if working a 5-week shift rotation, the scheduled work days and days off are repeated every five weeks)
- Stable 24-hour shift rotation (e.g., 3 X 8's, 2 X 12's, 2 X 10's with four hours un-staffed)
- The impact of backward shift rotation
- Rotating schedules provide suitable transition between shifts (days/nights, days/swings/nights), 8-hour shift rotations rotate forward or provide more than 24 hours between work periods to adjust circadian rhythm; 12-hour shift rotations provide 34 hours off during day/night transitions.
- Long range predictability is a key aspect of fatigue mitigation.
- Circadian factors - start times fixed (i.e., 6 or 7 a.m.) vs. rotating shifts
- Training requirements
- Vacation scheduling

Staffing levels should be sufficient so that on average (over non-outage periods) for the covered individuals can be maintained based on vacation and emergent training demand without relying on excessive work hours. It is expected and allowed that normal variation in the vacation demand and training demand may occasionally require additional work hours to be used. Management is responsible for understanding the total vacation, training, and work loads, and for maintaining sufficient staff to get the work done.

Appendix B provides a series of shift schedules that meet the criteria of this section.

7.2 DEVIATIONS FROM NORMAL SCHEDULES

To be provided.

8 MANAGING HOURS WORKED

Reference: 10 CFR Part 26.205(b)

This section addresses what the expectations are relative to the work hour limits and what records are needed to document compliance. Management and covered individuals should be equally responsible for properly managing work hours.

8.1 CALCULATING HOURS WORKED

The concepts for this section are:

- Licensees shall establish the accounting practices to be used in monitoring hours worked. In many cases this will parallel the established system for compensation. However the accounting practices may be different from record keeping for payroll purposes. Work periods should be rounded consistently.
- Work hour records should show the number of hours worked each calendar day. Work period start and stop times should be recorded and documented in a consistent manner.

The licensee shall calculate the work hours of covered individuals subject to this section as the amount of time the individuals perform duties for the licensee. The calculated work hours must include all time performing duties for the licensee, including all within-shift break times and rest periods during which there are no reasonable opportunities or accommodations appropriate for restorative sleep.

Work hour limits and the associated calculation and tracking of work hours apply to the individuals who perform covered work.

Work hours are calculated as the amount of time an individual performs any duties for the licensee including but not limited to the following:

- All within-shift break times and rest periods during which there is no reasonable opportunity or accommodations appropriate for restorative sleep (e.g., a nap);
- Shift holdovers to cover for late arrivals of incoming shift members;
- Early arrivals of individuals for meetings, training, or pre-shift briefings for special evolutions; and
- Holdovers for interviews needed for event investigations.

For the purposes of calculating the average number of days off, the duration of the shift cycle may not exceed 6 weeks.

To ensure an individual's work hour limits are not exceeded, the following guidance should be used:

- (a) The periods of "24-hours," "48-hours," and "7-days" are considered rolling time periods. Rolling means -the period is not re-zeroed, or the "clock reset" following a day off or after obtaining authorization to exceed the limits. The "24-hours," "48-hours," and "7-days" periods do NOT restart after a day off, the periods continue to roll.
- (b) Hours worked should be evaluated to determine if any limit will be exceeded based on the work schedule by picking a future time (T) on the work schedule and asking, "how many hours will have been worked during the T-24 hours, T-48 hours, or T-168 hours (T-7days)" (i.e., a backwards look the number of hours that have or will have been worked based on a time in the future.)
- (c) If a work hour limit will be exceeded, it shall be identified BEFORE the hours are worked.
- (d) The period is NOT re-zeroed, or the "clock reset" following a day off or after obtaining authorization to exceed the limits.
- (d) For example, if an individual who normally works a 12-hour shift schedule is requested to work additional hours from 0700 to 1900 on Friday, the following should be considered prior to working the additional hours.
 - All hours worked during the 24-hour period prior to the stop time on Friday as reflected in the request to work additional hours to determine if more than 16 hours in any 24-hour period will be exceeded.
 - All hours worked during the 48-hour period prior to the stop time on Friday as reflected in the request to work additional hours to determine if more than 26 hours in any 48-hour period will be exceeded.
 - All hours worked during the 7-day period prior to the stop time on Friday (i.e., T-168 hours) as reflected in the request to work additional hours to determine if more than 72 hours in any 7-day period will be exceeded.
 - Break periods between the last day of work before Friday and 0700 on Friday to determine if a 10-hour break has been taken.
 - Break periods during the last 9 days prior to the stop time on Friday to determine if a break of at least 34 consecutive hours has been taken.
 - For non-outage periods all days off during the shift cycle (note the shift cycle may not exceed 6 weeks) to determine if the average number of days off have been met (e.g., an average of 2.5 days per week or for security personnel an average of 3.0 days off per week).

- For outage periods, all days off during the 15-day non-rolling period, to determine if the average number of days off have been met (i.e., 3 days off or if security personnel 4 days off).
- (e) For those individuals who normally work an 8-hour shift rotation and are requested to work a 12-hour day, the above guidance applies, however, the day off requirements for non-outage periods are based on the 8-hour shift schedule not the 12-hour shift schedule.

Within-Shift Breaks and Rest Periods

- (a) Only that portion of a break or rest period during which there is a reasonable opportunity and accommodation for restorative sleep may be excluded.
- (b) Time spent at lunch, although non-productive work may not be excluded from the work hour calculations.
- (c) Any other break time allowed during the scheduled work day that does not allow opportunity or accommodations for restorative sleep is included in the work hour calculation.

Paid Time NOT Included in the Work Hour Calculations

- (a) Holidays Worked – Hours worked on holidays that are recorded to gain holiday pay do not count in the calculation of actual hours worked. For example, 21 hours of pay may be applicable if an individual works on a holiday (8 hours holiday pay, 12 hours work, 1 hour shift turnover time at the beginning of shift). The calculation of work hours includes only the 12 hours of work.
- (b) Vacation time – this is time away from work and is not included in the work hour calculation.
- (c) Sick leave – this is time away from work and is not included in the work hour calculation.
- (d) Personal leave – this is time away from work and is not included in the work hour calculation.
- (e) Declared Plant Emergencies as defined in the licensee's emergency plan.
- (f) Unannounced emergency preparedness exercises and drills - Licensees may exclude from the calculation of an individual's work hours the time the individual works unscheduled work hours for the purpose of participating in the actual conduct of an unannounced emergency preparedness exercise or drill.
- (g) Incidental duties performed off-site - Licensees may exclude from the calculation of an individual's work hours unscheduled work performed off-site (e.g., technical assistance provided by telephone from an individual's home) provided the total duration of the work, which is requested by the licensee, does not exceed a nominal 30 minutes

during any single break period. For the purposes of compliance with the minimum break requirements and the minimum day off requirements, such duties do not constitute work periods or work shifts.

Beginning or Resuming Duties Subject to Work Hour Controls

- (a) If an individual begins or resumes performing covered work then the following guidance applies:
- All of the individual's work hours including hours worked performing non-covered work are counted.
 - If an individual will be temporarily transitioning onto a different schedule (e.g., 8-hour to 12-hour), then the individual shall meet the requirements of the normal shift schedule (i.e., 8-hours) throughout the short time period (e.g., ≤ 4 weeks) when working the different schedule.
 - If an individual will be transitioning onto a different schedule for a long period of time (e.g. greater than 4 weeks), then the individual shall meet break / day off requirements of his/her current shift schedule prior to transitioning to the new schedule and shall meet the break/day off requirements of the new schedule after transitioning to the difference schedule.

Multiple Unit Sites

At a multiple unit site, if an individual is working for a unit that is in an outage and for a unit that is not in an outage, the individual shall throughout the outage period work under either the non-outage work hour limits or the outage work hour limits, but not both. The licensee shall document the work hour controls applicable to individuals.

For example, if Unit 1 is in an outage and Unit 2 is on-line, a Unit 2 operator who is working part time in the Unit 1 outage and full time in his Unit 2 job function may apply the outage work hour limits for the duration of the Unit 1 outage.

Call-in

- (a) When calculating work hours, only the time the individual is on-site is counted, although he/she may be paid more hours based on the Union contract.
- (b) A call-in is not considered an extension of the normal work schedule.

Example: An individual's normal schedule is from 0700 to 1500 (8 hour day) and the individual is called back to work at 1900 and he/she works until 2100; then

the total time the individual has worked is counted (10 hours). A waiver is required because the individual was called back to work with less than a 10-hour break.

Daylight Saving Time

- (a) When working during the change from daylight savings time back to standard time, the day may be counted as an 8-hour, 10-hour, or 12 hour day (i.e., the additional hour does not have to be included in the work hour calculations.)

Non-Outage and Outage Days

- (a) A non-outage day for a shift is a day when the unit is not in an outage when the shift starts.
- (b) An outage day for a shift is a day when the unit is in an outage when the shift starts.

For example if Crew “A” works from 0700 to 1900 on Friday and the outage starts at 1800 on Friday, Crew “A” is working a non-outage day. When Crew “B” comes in at 1900 on Friday, Crew “B” is working an outage day.

The licensee may exclude the following as discussed below:

- Shift Turnover
- Within-shift break and rest periods
- Unannounced emergency preparedness exercises and drills
- Incidental duties performed off-site.

Shift turnover

Licensees may exclude either oncoming or off going shift turnover, but not both, from the calculation of an individual’s work hours. Shift turnover includes only those activities that are necessary to safely transfer information and responsibilities between two or more individuals between shifts. Shift turnover activities may include, but are not limited to, discussions of the status of plant equipment, and the status of ongoing activities, such as extended tests of safety systems and components. Licensees may not exclude work hours worked during turnovers between individuals within a shift period due to rotations or relief within a shift. Activities that licensees may not exclude from work hours calculations also include, but are not limited to, shift holdovers to cover for late arrivals of incoming shift members; early arrivals of individuals for meetings, training, or pre-shift briefings for special evolutions; and holdovers for interviews needed for event investigations.

Within-shift break and rest periods

Licensees may exclude from the calculation of an individual's work hours only that portion of a break or rest period during which there is a reasonable opportunity and accommodations for restorative sleep (e.g., a nap).

Unannounced emergency preparedness exercises and drills

Licensees may exclude from the calculation of an individual's work hours the time the individual works unscheduled work hours for the purpose of participating in the actual conduct of an unannounced emergency preparedness exercise or drill.

Incidental duties performed off-site

Licensees may exclude from the calculation of an individual's work hours unscheduled work performed off-site (e.g., technical assistance provided by telephone from an individual's home) provided the total duration of the work, which is requested by the licensee, does not exceed a nominal 30 minutes during any single break period. For the purposes of compliance with the minimum break requirements and the minimum day off requirements, such duties do not constitute work periods or work shifts.

Beginning or resuming duties subject to work hour controls

If an individual begins or resumes performing for the licensee any covered work during the calculation period, the licensee shall include in the calculation of the individual's work hours all work hours worked for the license, including hours worked performing duties that are not covered work and control the individual's work hours in accordance with the requirements of this document.

When considering work hour extensions for individuals performing covered work, all hours worked by the individual shall be included. For example, if an individual has performed 15 hours of non-covered work, and the individual is needed to perform additional work that extends beyond 16 hours in a 24 hour period, then a work hour extension would need to be approved prior to the individual exceeding the 16 hour limit.

On the other hand, if the individual has performed 14 hours of covered work, and is needed to perform additional non-covered work, then the programmatic approvals of this document do not apply. However, the additional work hours are included in consideration of any other limits if the individual subsequently performs covered work.

Designated lunches and breaks are included in work hours counted toward work hour limits.

Example: An individual performs risk-significant work for 10 hours (7:00 am - 5:00 pm) and goes home. At 10:00 pm he/she receives a call from work and talks for 1 hour until 11:00 pm. He/she returns to work at 7am the next day.

Answer: None of the hours from 5:00 pm through 10:00 pm must be counted with respect to compliance with the work hours rule. Total hours worked would be 11 hours. He/she

meets the 10-hour break requirement since he/she has reasonable opportunity for restorative sleep.

Example: If an individual is on a day off and talks with someone at work on 3 occasions, with each call lasting 20 minutes, totaling 1 hour, can that day still be considered a day off since that one hour shall be included in the work hour total.

Answer: The total time spent on the phone shall be counted; therefore, the total time spent on the telephone call must be documented as an hour worked. The day is still considered a day off.

Example: What "work-related" activities may be done at home on a day off without violating the "day off" intent? For example, may an individual read procedures, catch up on administrative tasks, or study for a license requalification exam for a number of hours and still count that day as a "day off?"

Answer: Activities initiated by the individual may be performed at home on a day off and not be considered "work," e.g., studying, reading work-related material, reading email. These activities have no time limitations. Contact with the individual initiated by the licensee, limited to a nominal 30 minutes in duration, will not be counted toward the work hour total.

8.2 WORK HOUR CONTROLS DURING NORMAL OPERATIONS

During normal operations, licensees shall control the work hours of covered individuals as follows:

1. Except as permitted by waivers and exceptions, licensees shall ensure that any individual's work hours do not exceed the following limits:
 - a. 16 work hours in any 24-hour period
 - b. 26 work hours in any 48-hour period
 - c. 72 work hours in any 7-day period
2. Licensees shall ensure that individuals have, at a minimum, the rest breaks specified below. A break is defined as an interval of time that falls between successive work periods, during which the individual does not perform any duties for the licensee other than one period of shift turnover at either the beginning or end of a shift but not both. Except as permitted by waivers and exceptions, licensees shall ensure that individuals have, at a minimum,

- a. A 10-hour break between successive work periods, or an 8-hour break between successive work periods when a break of less than 10 hours is necessary to accommodate a crew's scheduled transition between work schedules or shifts.
 - b. A 34-hour break in any 9-calendar day period.
3. Licensees shall ensure that individuals have, at a minimum, the number of days off specified below. For the purposes of breaks, a day off is defined as a calendar day in which an individual does not start a work shift. For the purposes of calculating the average number of days off, the duration of the shift cycle may not exceed 6 weeks.
- a. Covered individuals who are working 8-hour shift schedules shall have at least 1 day off per week, averaged over the shift cycle.
 - b. Covered individuals who are working 10-hour shift schedules shall have at least two days-off per week, averaged over the shift cycle.
 - c. Covered individuals, except security personnel, who are working 12-hour shift schedules shall have at least 2.5 days off per week, averaged over the shift cycle.
 - d. Security personnel who are working 12-hour shift schedules while performing covered work, shall have at least 3 days off per week, averaged over the shift cycle.

Example: Assume that John Doe is a staff engineer in the Operations department who holds an active license. John works a nominal 8-hour day. John's normal work duties are NOT within the scope of the work hours rule. Over the last 6 weeks John has had weekends off except for the 6th week; i.e., during the 6th week (i.e., last week) John worked Monday through Friday, came in on Saturday for 4 hours to catch up on work; and also came in Sunday for 4 hours. John resumed his normal duties on Monday this week. Today, (Tuesday), John is asked to stand an SRO watch. Can he stand the watch since Tuesday is the 9th day in a row that John will be working?

Answer: John needs a waiver to stand the watch.

8.3 WORK HOUR CONTROLS DURING OUTAGES

During an outage, licensees shall control the work hours of covered individuals under Section 8.2, "Work Hour Controls During Operation" **or as follows:**

- 1. Except as permitted by waivers and exceptions, licensees shall ensure that any individual's work hours do not exceed the following limits:
 - a. 16 work hours in any 24-hour period
 - b. 26 work hours in any 48-hour period

- c. 72 work hours in any 7-day period
2. Licensees shall ensure that individuals have, at a minimum, the rest breaks specified below. A break is defined as an interval of time that falls between successive work periods, during which the individual does not perform any duties for the licensee other than one period of shift turnover at either the beginning or end of a shift but not both. Except as permitted by waivers and exceptions, licensees shall ensure that individuals have, at a minimum,
 - a. A 10-hour break between successive work periods, or an 8-hour break between successive work periods when a break of less than 10 hours is necessary to accommodate a crew's scheduled transition between work schedules or shifts.
 - b. A 34-hour break in any 9-calendar day period.
 3. During the first 60 days of a unit outage, licensees need not meet the requirements of minimum days off for covered individuals, except security personnel, while those individuals are working on unit outage activities. During the first 60 days of a unit outage, covered individuals, except security personnel, shall have at least 3 days off in each successive (i.e., non-rolling) 15-day period.
 4. During the first 60 days of a unit outage, security system outage, or increased threat condition, licensees shall control the hours worked by security personnel as follows:
 - a. During the first 60 days of a unit outage or planned security system outage, licensees need not meet the normal operations requirements of minimum days off for security personnel, however security personnel shall have at least 4 days off in each successive (i.e., non-rolling) 15-day period.
 - b. During the first 60 days of an unplanned security system outage or increased threat condition, licensees need not meet any requirements for minimum days off.
 5. The 60-day periods may be extended for each individual in 7-day increments for each non-overlapping 7-day period in which the individual has worked not more than 48 hours during the unit or security system outage or increased threat condition, as applicable.
 6. When an individual works for a single licensee during two or more nuclear unit outages and the interval(s) between successive outages is less than 2 weeks, the requirements in paragraphs 3 and 4 above must be based upon the number of days that have elapsed since the first unit outage in the series began.

Contractor/vendors are responsible for tracking and reporting their hours between outages.

Example: If during the 1st 60 days, a covered worker gets a 7 day block where he works not more than 48 hours, you can extend the 60-day period by 7 days. If the worker gets 2 7-day blocks where he does not work more than 48-hours and the 2 periods do not overlap, you can extend the 60 day period by 14 days.

Example: An individual has not worked for a licensee on a nuclear unit outage with work hour controls for 14 days. The individual starts work on an outage on the 15 day. The worker can be placed under the outage work hour controls only for a period of 45 days. The 60 day period is defined by the start of the outage.

8.4 WAIVERS

Reference: 10 CFR Part 26.207

This guide provides an example, but not mandatory, form for completing Waivers.

The process for granting waivers includes the following distinct steps:

1. Identification by the job supervisor that a waiver is needed:
 - Name of the individual for which a waiver is to be requested.
 - Date and time the request is initiated.
 - Limits for which a waiver is required.
 - Date and time waiver would start.
 - Duration of the waiver requested. For example, how many hours beyond 16?
 - Description of the work to be performed. This should be in adequate detail to support the supervisory (operations or security shift manager) fatigue assessment.
 - Circumstances that caused the job extension.
 - Identify that the waiver is required to address conditions that are adverse to security or safety
2. Review and approval by the operations shift manager or security shift manager.
 - Basis for approval
 - Name, signature, date, and time
3. Supervisory evaluation (Note: shall be completed within 4 hours before start of waiver period.)
 - Work history for past 14 days as reported by the individual for whom the waiver is requested.
 - Statement of check box that the following were considered:
 - Potential for acute fatigue—time since last 10 hour break.
 - Potential for cumulative fatigue—review work history above.
 - Circadian factors-time of day and recent work cycle.
 - Observation and statements of the individual.
 - How fatigue could affect the work quality, if at all.

- Nature of work to be performed.
 - Are controls and conditions on work required? If yes describe.
 - Name, signature, date, and time review completed.
4. Closeout. In many cases waivers are generated as a contingency for a job and not used. The information in this section is to support the periodic reviews that are required.
- Hours actually worked, beyond limits, under this waiver.
 - Did the individual perform satisfactorily?
 - Name, Signature and date of job supervisor or individual for whom waiver was granted.

Example : It would appear that all individuals NOT performing work described under 26.4(a), i.e., risk significant work, are subject to 26.207, "Waivers," however, only individuals conducting activities described in 26.4(a); i.e., risk-significant would have a need for a waiver.

Answer: "Waivers" are only applicable to workers who perform risk-significant work.

Example : The applicability statements suggest that 26.209, "Self-declarations," is applicable to individuals NOT performing work described under 26.4(a); i.e., risk-significant work. This would suggest that an individual performing non-risk-significant work could self-declare fatigue and a fatigue assessment would be required prior to returning that individual to work. What is the rule intent?

Answer: Section 26.209 addresses work being done under a waiver which is only applicable to workers who perform risk-significant work.

The following are examples of controls and conditions on work from a fatigue assessment:

To be developed

8.5 GRANTING WAIVERS

Licensees may grant a waiver of the work hour controls as follows:

In order to grant a waiver, the licensee shall meet the following requirements:

1. An operations shift manager determines that the waiver is necessary to mitigate or prevent a condition adverse to safety, or a security shift manager determines that the waiver is necessary to maintain site security, or a site senior-level manager with requisite signature authority makes either determination.
2. A supervisor assesses the individual face to face and determines that there is reasonable assurance that the individual will be able to safely and competently perform his or her duties during the additional work period for which the waiver will be granted. The supervisor performing the assessment shall be trained in accordance with the requirements of §§ 26.29 and 26.203(c) and shall be qualified to direct the work to be performed by the individual.
3. If there is no supervisor on site who is qualified to direct the work, the assessment may be performed by a supervisor who is qualified/experienced to provide oversight of the work to be performed by the individual. The supervisor can be a second level supervisor or a manager in the chain of command.
4. At a minimum, the assessment must address the potential for acute and cumulative fatigue considering the individual's work history for at least the past 14 days, the potential for circadian degradations in alertness and performance considering the time of day for which the waiver will be granted, the potential for fatigue-related degradations in alertness and performance to affect risk-significant functions, and whether any controls and conditions must be established under which the individual will be permitted to perform work.

To the extent practicable, licensees shall rely upon the granting of waivers only to address circumstances that could not have been reasonably controlled. (Guidance to be added.)

Licensees shall ensure that the timing of the required face-to-face supervisory assessment supports a valid assessment of the potential for worker fatigue during the time the individual will be performing work under the waiver. Licensees may not perform the face-to-face assessment more than four hours before the individual begins performing any work under the waiver. (Guidance to be added.)

Licensees shall document the bases for individual waivers. The documented basis for a waiver must include a description of the circumstances that necessitate the waiver, a statement of the scope of work and time period for which the waiver is approved, and the bases for the required determinations.

Appendix D provides a sample form for completing waivers.

8.6 SANCTIONS

The refusal on the part of an individual to submit to a fatigue assessment after being requested to do so, shall constitute an act of insubordination and shall subject the individual to disciplinary action and possible removal from unescorted access. Facts to be considered in assessing disciplinary action shall include the employee's job assignment and past work record. Personnel subject to the fatigue assessments who refuse to be assessed will be considered fatigued and unable to perform their duties. Time away from work shall be classified as vacation, personal time (if available), or non-paid time.

9 EXCEPTIONS

Reference: 10 CFR Part 26.207

The licensee may use the following exceptions to work hour controls:

Force-on-force tactical exercises

For the purposes of compliance with the minimum day off requirements, licensees may exclude shifts worked by security personnel during the actual conduct of force-on-force tactical exercises when calculating the individual's number of days off.

Common defense and security

Licensees need not meet the work hour requirements when informed in writing by the NRC that these requirements, or any subset thereof, are waived for security personnel in order to assure the common defense and security, for the duration of the period defined by the NRC.

Plant emergencies

Licensees need not meet the requirements of paragraphs work hour scheduling and work hour controls during declared emergencies, as defined in the licensee's emergency plan.

10 FATIGUE ASSESSMENTS

Reference: 10 CFR Part 26.211

10.1 REQUIRED ASSESSMENTS

1. Licensees shall ensure that fatigue assessments are conducted for all individuals in the FFD Program under the following conditions:
 - a. For-cause. In addition to any other test or determination of fitness that may be required, a fatigue assessment must be conducted in response to an observed condition of impaired individual alertness creating a reasonable suspicion that an individual is not fit to safely and competently perform his or her duties, except if the condition is observed during an individual's break period. If the observed condition is impaired alertness with no other behaviors or physical conditions creating a reasonable suspicion of possible substance abuse, then the licensee need only conduct a fatigue assessment. If the licensee has reason to believe that the observed condition is not due to fatigue, the licensee need not conduct a fatigue assessment. (Guidance to be added)
 - b. Self-declaration. A fatigue assessment must be conducted in response to an individual's self-declaration to his or her supervisor that he or she is not fit to safely and competently perform his or her duties for any part of a working tour because of fatigue, except if, following the self-declaration, the licensee permits or requires the individual to take a break of at least 10 hours before the individual returns to duty;
 - c. Post-event. A fatigue assessment must be conducted in response to events requiring post-event drug and alcohol testing. Licensees may not delay necessary medical treatment in order to conduct a fatigue assessment; and
 - d. Follow-up. If a fatigue assessment was conducted for cause or in response to a self-declaration, and the licensee returns the individual to duty following a break of less than 10 hours in duration, the licensee shall reassess the individual for fatigue as well as the need to implement controls and conditions before permitting the individual to resume performing any duties. If no break occurs, only one assessment is required.
2. Either a supervisor or a staff member of the FFD program, who is trained, shall conduct the fatigue assessment face to face with the individual whose alertness may be impaired.
 - a. In the case of a fatigue assessment conducted for cause, the individual who observed the condition of impaired alertness may not conduct the fatigue assessment.

- b. In the case of a post-event fatigue assessment, the individual who conducts the fatigue assessment may not have
 - (i) Performed or directed (on-site) the work activities during which the event occurred;
 - (ii) Performed, within 24 hours before the event occurred, a fatigue assessment of the individuals who were performing or directing (on-site) the work activities during which the event occurred; and
 - (iii) Evaluated or approved a waiver of the limits for any of the individuals who were performing or directing (on-site) the work activities during which the event occurred, if the event occurred while such individuals were performing work under that waiver.
- 2. A fatigue assessment must provide the information necessary for management decisions and actions in response to the circumstance that initiated the assessment.
 - a. At a minimum, the fatigue assessment must address the following factors:
 - (i) Acute fatigue;
 - (ii) Cumulative fatigue; and
 - (iii) Circadian variations in alertness and performance.
 - b. Individuals shall provide complete and accurate information that may be required by the licensee to address the required factors. Licensees shall limit any inquiries to only the personal information from the subject individual that may be necessary to assess the required factors
- 3. The licensee may not conclude that fatigue has not or will not degrade the individual's ability to safely and competently perform his or her duties solely on the basis that the individual's work hours have not exceeded any of the work hour limits or that the individual has had the minimum breaks or minimum days off, as applicable.
- 4. Following a fatigue assessment, the licensee shall determine and implement the controls and conditions, if any, that are necessary to permit the individual to resume performing duties for the licensee, including the need for a break.
- 5. Licensees shall document the results of any fatigue assessments conducted, the circumstances that necessitated the fatigue assessment, and any controls and conditions that were implemented.

10.2 ASSESSMENT PROCESS

A fatigue assessment is evaluating an individual's ability to perform any assigned duties within the scope of the fitness for duty rule. It is not limited to covered individuals.

The process for conducting a fatigue assessment includes the following steps:

1. Identification of condition requiring a fatigue assessment:
 - Name of the individual.
 - Date and time.
 - Type of evaluation: For-Cause, Self-declaration, Post-event, Follow-up
 - Narrative supporting the type of evaluation
 - For Cause—Description of observed behavior
 - Self-declaration—description of current job duties, time in a duty status, and scheduled end of tour.
 - Post-event—describe the event and the individuals involvement.
 - Follow-up—length of rest period, reason for early return, and expected duties
 - Name, date, time, signature of individual completing this section.
2. Supervisory review
 - Work history for past 14 days as reported by the individual.
 - Work history for the past 14 days as documented by the licensee.
 - Statement of check box that the following were considered.
 - Potential for acute fatigue—time since last 10 hour break.
 - Potential for cumulative fatigue—review work history above. Determine if the individual has had the opportunity for two restorative rest periods, 34 hours off in the last 7 days.
 - Circadian factors-time of day and recent work cycle.
 - Observation and statements of the individual.
 - Nature of work to be performed.
 - Results of evaluation
 - Individual is not fatigued—return to full work status.
 - Individual is fatigued—provide a 10 hour break.
 - Individual is returned to duties with the following restrictions (Describe the restrictions. Restrictions can include assignment to non-covered work, a nap before continuing covered work, etc.)
 - Name, date, signature of supervisor.

11 SELF-DECLARATIONS

Reference: 10 CFR Part 26.209

It is the individual's responsibility to make a clear self-declaration of fatigue. Site procedures should clearly identify how a self-declaration is to be made and leave no room for confusion. A casual statement to a supervisor or fellow employee that an individual is tired is not a self-declaration. The process shall leave no confusion that a declaration was made and when it was made. It should also be clear that an assessment is not needed if the supervisor agrees with the individual and provides a rest break of at least 10 hours.

Any individual covered by the FFD program can self declare.

Self-declarations during extended work hours.

If an individual is performing, or being assessed for, work under a waiver of the requirements and declares that, due to fatigue, he or she is unable to safely and competently perform his or her duties, the licensee shall immediately stop the individual from performing any covered work, except if the individual is required to continue performing those duties under other requirements of the regulations, e.g., meet minimum licensed operator staffing. If the subject individual must continue performing the covered work until relieved, the licensee shall immediately take action to relieve the individual. Following the self-declaration or relief from performing covered work, as applicable, the licensee:

- May reassign the individual to duties other than covered work, but only if the results of a fatigue assessment indicate that the individual is fit to safely and competently perform those other duties;
- Shall permit or require the individual to take a break of at least 10 hours before the individual returns to performing any covered work.

12 TRAINING AND EXAMINATION

Reference: 10 CFR Part 26.203(c)

Licenses shall add the following KAs to the content of the training that is required in § 26.29(a) and the comprehensive examination required in § 26.29(b):

- Knowledge of the contributors to worker fatigue, circadian variations in alertness and performance, indications and risk factors for common sleep disorders, shiftwork strategies for obtaining adequate rest, and the effective use of fatigue countermeasures.
- Ability to identify symptoms of worker fatigue and contributors to decreased alertness in the workplace.

This section defines the level of training to meet the requirements of 10 CFR 26 Subpart I.

Upon completion of this training, students should be aware of the trustworthiness and reliability requirements for unescorted access to the protected area, the importance of being fit for duty, understand the potential consequences of substance abuse, and work in compliance with the station access authorization and fitness-for-duty policies.

Workers should be able to:

- Demonstrate knowledge of the basic fatigue management requirements for workers.
- Recognize the personal, public health, and safety hazards associated with fatigue.
- State the company fatigue management policy.
- State individual roles and responsibilities under the company fatigue management policy.
- Demonstrate knowledge of the contributors to worker fatigue, circadian variations in alertness and performance, indications and risk factors for common sleep disorders, shiftwork strategies for obtaining adequate rest, and the effective use of fatigue countermeasures.
- Demonstrate understanding of identifying symptoms of worker fatigue and contributors to decreased alertness in the workplace.
- Demonstrate understanding of fatigue management techniques.
- State the methods used to implement the company fatigue management policy.
- State the consequences of not following the company fatigue management policy.
- State individual and company rights regarding the company fatigue management policy.

In addition to items above, Supervisors should be able to:
To be provided.

An example of a training package is provided in appendix E.

13 REVIEWS

Reference: 10 CFR Part 26.205(e)

Licenseses shall evaluate the effectiveness of their control of work hours of individuals who are subject to this section. At a minimum, licenseses shall conduct the reviews twice per calendar year. The two reviews need not cover periods of equal duration but must collectively cover the entire calendar year. If any plant or security system outages or increased threat conditions occurred since the licensee completed the most recent review, the licensee shall include in the subsequent review an evaluation of the control of work hours during the outages or increased threat conditions. Licenseses shall complete the review within 30 days of the end of the review period.

Licenseses shall:

1. Review the actual work hours and performance of covered individuals for consistency with work hours scheduling requirements. Review of performance means compliance with the work hours scheduling requirements and licensee scheduling policy. At a minimum, this review must address:
 - a. Individuals whose actual hours worked during the review period exceeded an average of 54 hours per week in any shift cycle while the individuals' work hours are subject to the non-outage days off requirements.
 - b. Individuals who were granted more than one waiver during the review period.
 - c. Individuals who were assessed for fatigue during the review period.
2. Review individuals' hours worked and the waivers under which work was performed to evaluate staffing adequacy for all jobs subject to the work hour controls of this section.
3. Document the methods used to conduct these reviews and the results of the reviews.
4. Record, trend, and correct, under the licensee's corrective action program, any problems identified in maintaining control of work hours consistent with the specific requirements and performance objectives of this part.

14 RECORDS

Reference: 10 CFR Part 26.203(d)

Licensees shall retain the following records for at least three years or until the completion of all related legal proceedings, whichever is later:

- Records of work hours for individuals who are subject to the work hour controls
- Records of shift schedules and shift cycles of individuals who are subject to the work hour controls
- The documentation of waivers including the bases for granting the waivers
- The documentation of work hour reviews
- The documentation of fatigue assessments

15 REPORTING

Reference: 10 CFR Part 26.203(e)

Licenses shall include the following information in a standard format in the annual FFD program performance report required under § 26.717:

1. A summary for each nuclear power plant site of all instances during the previous calendar year in which the licensee waived the work hour controls specified in § 26.205(d)(1) through (d)(4) for individuals described in § 26.4(a). The summary shall include only those waivers under which work was performed. If it was necessary to waive more than one work hour control during any single extended work period, the summary of instances shall include each of the work hour controls that were waived during the period. For each category of individuals specified in § 26.4(a), the licensee shall report:
 - a. The number of instances in which each work hour control specified in § 26.205(d)(1)(i) through (d)(1)(iii), (d)(2)(i) and (d)(2)(ii), and (d)(3)(i) through (d)(3)(iv) was waived for individuals not working on outage activities.
 - b. The number of instances in which each work hour control specified in § 26.205(d)(1)(i) through (d)(1)(iii), (d)(2)(i) and (d)(2)(ii), (d)(3)(i) through (d)(3)(iv), and (d)(4)(i) and (d)(4)(ii) was waived for individuals working on outage activities.
 - c. A summary that shows the distribution of waiver use among the individuals within each category of individuals identified in § 26.4(a) (e.g., a table that shows the number of individuals that received only one waiver during the reporting period, the number of individuals that received a total of two waivers during the reporting period, etc.).
2. A summary for each nuclear power plant site of instances of fatigue assessments that were conducted during the previous calendar year for any individual identified in § 26.4(a) through (c). The summary shall include:
 - a. The conditions under which each fatigue assessment was conducted (i.e., self-declaration, for cause, post-event, followup).
 - b. A statement of whether or not the individual was working on outage activities at the time of the self-declaration or condition resulting in the fatigue assessment.
 - c. The category of duties the individual was performing, if the individual was performing the duties described in § 26.4(a)(1) through (a)(5) at the time of the self-declaration or condition resulting in the fatigue assessment.
 - d. The management actions, if any, resulting from each fatigue assessment.

Reports related to fatigue management can be integrated into the overall FFD report and can be submitted electronically. A sample format for the standard report is provided in appendix D.

16 AUDITS

Reference: 10 CFR Part 26.203(f)

Licenses shall audit the management of worker fatigue as required by § 26.41.

Conduct of audits. Audits shall focus on the effectiveness of the FFD program element, Fatigue Management, and shall be conducted by individuals who are qualified in the subject(s) being audited. The individuals performing the audit of the program shall be independent from both the subject FFD program's management and from personnel who are directly responsible for implementing the FFD program.

Audit results. The result of the audits, along with any recommendations, shall be documented and reported to senior corporate and site management. Each audit report shall identify conditions that are adverse to the proper performance of the FFD program, the cause of the condition(s), and, when appropriate, recommended corrective actions. The licensee or other entity shall review the audit findings and take corrective actions, including re-auditing of the deficient areas where indicated, to preclude, within reason, repetition of the condition. The resolution of the audit findings and corrective actions shall be documented.

Timing of Audits. Audits shall be conducted each twenty four months in accordance with the license's audit program.

APPENDIX A

References

1. 10 CFR Part 26, Fitness For duty, dated XXXX
2. EPRI NP-6748, Control-Room Operator Alertness and Performance in Nuclear Power Plants, February 1990
3. NUREG/CR-4248, Recommendations for NRC Policy on Shift Scheduling and Overtime at Nuclear Power Plants, July 1985

APPENDIX B

Example Work Hour Schedules

The following nominal schedules have been reviewed and meet the performance based scheduling criteria of 10 CFR Part 26.

To be provided

APPENDIX C

Example Policy

NUCLEAR POLICY STATEMENT

FITNESS FOR DUTY

A Fitness For Duty Program shall be established to provide a safe work environment and reasonable assurance that station personnel perform their tasks in a reliable and trustworthy manner and are not under the influence of any substance, legal or illegal, or mentally or physically impaired from any cause, which in any way adversely affects their ability to safely and competently perform their duties.

The FFD program shall:

- Provide reasonable measures for the early detection of persons who are not fit to perform their duties in a safe and reliable manner.
- Have a goal of achieving a drug free workplace and a workplace free of effects of such substances.
- Have a goal of preventing employees who might be under the influence of alcohol from performing safety activities by prohibiting the consumption of alcohol within an abstinence period of at least [X] hours preceding any scheduled working tour, and during the period of any working tour.
- Establish an Employee Assistance Program which is available to employees desiring assistance in dealing with drug, alcohol, fatigue management, or other problems that could adversely affect their ability to safely and competently perform their duties.
- Provide reasonable measures to address mental stress, fatigue and illness.
- Establish criteria for use of medication properly prescribed by licensed physicians.
- Provide the proper Fitness For Duty training.
- Provide a means to deter and detect substance abuse.

These program elements shall implement the requirements as delineated in Attachment 1.

The primary responsibility for the development and implementation of the Fitness For Duty Program lies with the _____.

Senior Vice President &
Chief Nuclear Officer

Attachment 1

It is our policy to provide a safe work environment. Operation of a nuclear facility creates an obligation to public safety and duty on our part to uphold the public trust and confidence in the company and its personnel. For these reasons, a Fitness For Duty Program for has been established.

It is the goal of the Fitness For Duty Program to maintain a workplace that is free from intoxicants, drugs and narcotics. The Fitness For Duty Program provides reasonable assurance that nuclear personnel are able to perform their tasks in a reliable and trustworthy manner and are not under the influence of any substance, legal or illegal, or mentally or physically impaired from any cause, which in any way adversely affects their ability to safely and competently perform their duties.

The Fitness For Duty Program also provides reasonable measures for the early detection of persons who are not fit to perform their duties in a safe and reliable manner.

Personnel are reminded that it is everyone's responsibility to report unsafe working conditions or hazardous activities which jeopardize their or their fellow worker's safety, or the safe maintenance, construction, operation or testing of the station. This responsibility includes reporting the on-the-job use, sale, or possession of intoxicants, drugs or narcotics. Such information shall remain strictly confidential and be used only to promote a safe environment for personnel and the public.

The company encourages personnel who may be suffering from mental stress, fatigue or illness to seek professional help, if appropriate, before job performance suffers or the level of job safety is reduced. The company also expects these types of conditions to be reported to one's supervisor if job performance or safety could be affected.

Our employees desiring assistance in dealing with drug, alcohol, or other personal problems may participate in the Employee Assistance Program (EAP). Elective participation in EAP for drug-related problems shall not jeopardize an individual's continued employment provided the employee ceases any and all abuse of drugs or alcohol and the employee's job performance does not suffer. However, participation in EAP is not an alternative to discipline. Enrollment in EAP shall not excuse a violation of the work rules. Contract and vendor employees desiring assistance in dealing with drug, alcohol or other personal problems should also arrange for professional assistance through their employer.

In order to enforce the rules, individuals may be required to take a blood test, urinalysis, breath alcohol test, submit to other recognized investigatory tests or procedures which would assist in evaluating the employee's physical condition or aid in the investigation of a violation of these rules. Any such test or procedure shall be administered by qualified personnel under established methods and subject to confirmation by appropriate laboratory processes.

Our employees desiring assistance in dealing with fatigue management may participate in the EAP. Elective participation in EAP for fatigue management shall not jeopardize an individual's continued employment provided the employee is able to remain alert while on duty and safely and competently perform his or her duties. However, participation in EAP is not an alternative to discipline. Enrollment in EAP shall not excuse a violation of the work rules. Contract and vendor employees desiring assistance in dealing with fatigue management should also arrange for professional assistance through their employer.

In order to enforce fatigue management, individuals may be subject to a fatigue assessment which will be performed by qualified personnel.

Individuals, as well as vehicles, personal belongings, offices, lockers and company property, are subject to search while on company property.

The results of investigatory tests and searches shall be a factor considered by the company in determining compliance with the above rules and in determining what action shall be taken with an individual who violates those rules.

The refusal on the part of an individual to submit immediately to a search of his or her person and/or property or to be tested, after being requested to do so, shall constitute an act of insubordination and shall subject the individual to removal from unescorted access and to immediate discharge. Personnel subject to Fitness For Duty testing that refuse to be tested will be adjudicated the same as a positive test and denied unescorted access.

The refusal on the part of an individual to submit to a fatigue assessment after being requested to do so, shall constitute an act of insubordination and shall subject the individual to disciplinary action and possible removal from unescorted access. Facts to be considered in assessing disciplinary action shall include the employee's job assignment and past work record. Personnel subject to the fatigue assessments who refuse to be assessed will be considered fatigued and unable to perform their duties. Time away from work shall be classified as vacation, personal time (if available), or non-paid time.

If illegal drugs are found on company premises, Security shall be notified. Security shall in turn notify local law enforcement officials.

The above rules apply to the parking lots, except that possession of alcoholic beverages in sealed containers is permitted.

Except as indicated below, any individual who brings, attempts to bring, has in his or her possession, or is under the influence of intoxicants, drugs or narcotics, on company property, shall be subject to immediate discharge. Appropriate notifications will be made to local law enforcement.

Prescription drugs (prescribed by licensed physicians for the individual) or over-the-counter drugs which could affect an individual's job performance should be reported to the supervisor. Any individual taking such medication must inform his or her supervisor of the medication being taken. On request, the prescription shall be verified in writing by the issuing physician.

The company expects individuals to report for work in condition fit to perform their duties. Off-the-job involvement with intoxicants, drugs or narcotics which adversely affect the company, such as affecting either the individual's ability to perform his or her job; the individual's co-workers' confidence in or the ability to work with the individual; or the public trust in the ability of the company to carry out its responsibilities, is against company policy. Such conduct shall be subject to discipline up to and including discharge, depending on the nature of the conduct and the facts involved. Facts to be considered in assessing disciplinary action shall include the employee's job assignment and past work record, the potential adverse effect of the conduct on the company and the obligation of the individuals of a nuclear facility to uphold the public's trust and confidence.

Individuals granted Unescorted Access to the Protected Area, or who physically report to the Emergency Operation Facilities (EOF) in accordance with the site Emergency Plan, or who are associated with the administration of the Fitness For Duty Program at the site are prohibited from use or involvement with illegal drugs on or off the job. In addition, such personnel shall not consume alcohol for a period of five (5) hours prior to reporting for regularly scheduled work and during work.

APPENDIX D
Example Procedure

PROVIDED AS A SEPARATE FILE

APPENDIX E

Fatigue Management Training

To be provided