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## INSPECTION PROCEDURE 93002

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### MANAGING FATIGUE

PROGRAM APPLICABILITY: 2515

#### 93002-01 INSPECTION OBJECTIVES

01.01 To provide the ability to evaluate an individual issue of concern related to any aspect of Subpart I, “Managing Fatigue,” of Title 10 of the *Code of Federal Regulations* (10 CFR) Part 26, “Fitness for Duty Programs,” when it has been determined that fatigue was a root or contributing cause to an event or other operational issue at a plant.

This inspection procedure (IP) is not part of the routine baseline inspection process. This is a “special” or “infrequently performed inspection” as defined in U.S. Nuclear Regulatory Commission (NRC) Inspection Manual Chapter (IMC) 2515, “Light-Water Reactor Inspection Program—Operations Phase,” dated September 24, 2009. This procedure should be used to supplement special or event followup inspections when fatigue may have contributed to the need for the inspection.

#### 93002-02 INSPECTION REQUIREMENTS

Develop an inspection plan that is designed to inspect all aspects of the rule, which may be related to the issue of concern. This may be done by reviewing each area listed in this section to determine if the issue of concern falls within that area. Once the areas have been selected, then the corresponding guidance in Section 03 may be reviewed to further define the scope of the inspection. The inspector only needs to perform sections related to the issue of concern and only the portions of those sections deemed necessary. The inspector should include an estimate of the time needed to conduct the inspection. Those aspects of the rule that apply only to security personnel (specified in 10 CFR 26.4(a)(5)) will normally be inspected by security inspectors per IP 71130.08, “Fitness for Duty Program.” However, those aspects are also included in this procedure. If the fatigue-related issue involves security personnel, then resident inspectors, security inspectors, and their managers will determine who will inspect the issue.

02.01 Applicability. Verify that the licensee has a process in place to determine which individuals are subject to each section of Subpart I, as specified in 10 CFR 26.201, “Applicability.” The inspection should focus on determining which sections of Subpart I the individual is required to meet. Once the determination has been made for the applicable sections of Subpart I, continue the inspection in the area related to the issue of concern.

02.02 General Provisions. Verify that the licensee has the policies, procedures, and processes in place for individuals subject to this section, as specified in 10 CFR 26.203, “General Provisions.” Individuals identified in 10 CFR 26.4(a) through (c) are subject to these provisions. The inspection should focus on the following areas associated with the issue of concern:

- a. Policy. Verify that the licensee has a fitness for duty (FFD) policy in place that addresses the required aspects of Subpart I.

- b. Procedures. Verify that the licensee has procedures in place that describe licensee and individual responsibilities for Subpart I.
- c. Training and Examinations. Verify that the licensee has incorporated the appropriate knowledge and abilities (KAs) into its FFD training program. Additionally, verify that the annual tests have at least one question for each KA.
- d. Recordkeeping. Verify that the licensee is retaining the appropriate records to support compliance with the Subpart I requirements. Verify that the records are retained for the appropriate amount of time.
- e. Reporting. Verify that the licensee includes the required information pertaining to Subpart I in its annual FFD program performance report.
- f. Audits. Verify that audits are performed as specified in 10 CFR 26.41, "Audits and Corrective Action." These audits must be performed nominally every 24 months (between 18 and 30 months).

02.03 Work Hours. Verify that the licensee is managing work hours for individuals subject to this section as specified in 10 CFR 26.205, "Work Hours." The inspection should focus on determining if the individual meets all of the following requirements:

- a. Individuals Subject to Work Hour Controls. Individuals who are granted unescorted access to nuclear power reactor protected areas and who perform duties identified in 10 CFR 26.4(a)(1) through (a)(5) are subject to these requirements. These duties are as follows:
  - 1. operating or directing (on site) the operation of systems and components that a risk-informed evaluation process has shown to be significant to public health and safety
  - 2. performing health physics or chemistry duties required as a member of the onsite emergency response organization minimum shift complement
  - 3. performing the duties of a fire brigade member who is responsible for understanding the effects of fire and fire suppressants on safe-shutdown capability
  - 4. performing maintenance or directing (on site) the maintenance of structures, systems, and components (SSCs) that a risk-informed evaluation process has shown to be significant to public health and safety
  - 5. performing security duties as an armed security force officer, alarm station operator, response team leader, or watchperson (hereinafter referred to as security personnel)
- b. Work Hour Calculations. Verify, on an individual basis, that work hours are being calculated and documented consistent with the requirements of 10 CFR 26.205(b). The inspection should focus on transitions from noncovered work to covered work because all noncovered work would then need to be included in the calculation of work hours.
- c. Work Hour Scheduling. Verify that the licensee is scheduling work hours of individuals who are subject to this section consistent with the objective of preventing impairment from fatigue due to the duration, frequency, or sequencing of successive shifts.

- d. Work Hour Controls. Verify that the individual has not exceeded the maximum limits for total hours worked, minimum limits for rest breaks, and the minimum limits for days off. As a reminder, the minimum limits for days off may change due to the status of a unit (i.e., outage or nonoutage), security system outage (i.e., planned or unplanned), or increased threat condition.
- e. Reviews. Verify that the appropriate reviews of the control of work hours have been performed. Verify that any problems identified were entered into the licensee's corrective action program.

02.04 Waivers and Exceptions. Verify that the licensee is managing the use of waivers and exceptions for individuals subject to this part as specified in 10 CFR 26.207, "Waivers and Exceptions." Individuals who perform duties identified in 10 CFR 26.4(a)(1) through (a)(5) are subject to these requirements. The inspection should focus on determining if it was reasonable that the licensee could conclude that the waiver was necessary to mitigate or prevent a condition adverse to safety or that the waiver was necessary to maintain site security. Additionally, the inspection should determine that the requirements were met for any exception allowed by 10 CFR 26.207.

- a. Waivers. Verify that, to the extent practicable, waivers were used only to address circumstances that could not have been reasonably controlled.
- b. Force-on-Force Tactical Exercises. Verify that the licensee only excludes shifts worked when calculating the minimum days off and does not exclude the time from the calculation of work hours.
- c. Common Defense and Security. Verify that the NRC has provided the licensee, in writing, the allowance to not meet the requirements of 10 CFR 26.205 for security personnel during the time specified by the NRC. The notification should state that it is for the common defense and security of the licensee.
- d. Plant Emergencies. Verify that the licensee only exempts the work hour scheduling and work hour controls during declared emergencies.

02.05 Self-Declarations. Verify that the licensee is implementing the requirements for self-declarations for individuals subject to this part as specified in 10 CFR 26.209, "Self-Declarations." Individuals who perform duties identified in 10 CFR 26.4(a)(1) through (a)(5) are subject to these requirements. Verify that the self-declaration was made while the individual was performing covered work, as specified above, or during the time the individual was being assessed for work under a waiver. The inspection should focus on the actions taken by the licensee as a result of the self-declaration.

02.06 Fatigue Assessments. Verify that the licensee is implementing the requirements associated with fatigue assessments for individuals subject to this part as specified in 10 CFR 26.211, "Fatigue Assessments." Individuals identified in 10 CFR 26.4(a) through (c) are subject to these provisions. The inspection should focus on the content of the assessment and the determination for any controls and conditions that were put in place to allow the individual to continue performing work for the licensee, if applicable.

## 93002-03 INSPECTION GUIDANCE

### General Guidance.

Subpart I relates to managing fatigue. The rule requires certain work hour controls for certain individuals. These work hour controls cannot ensure, by themselves, that an

individual is not fatigued or fit for duty. Although it is the individual's responsibility to report to work fit for duty, there are other factors that can affect an individual's FFD that are in addition to work hours.

Issues will be documented as required by IMC 0612, "Power Reactor Inspection Reports" in the integrated inspection report for the time period when the inspection occurred. Additionally, there may be instances in which licensees are meeting the specific requirements of the rule but not the intent of the rule, and these instances may be documented as "observations" in Section 4OA5, "Other," of the integrated inspection report. For example, the inspector may consider documenting as an observation a situation in which a licensee restricts access for an individual who previously had unescorted access and then provides an escort so that the individual is not subject to Subpart I. This action is not specifically prohibited by the rule but would be of interest to the NRC. Any issue that is being considered for documentation as an "observation" should be reviewed by the Fatigue Panel prior to documentation. Ensure these entries have the word "fatigue" in the description so that a word search can identify all inspection report entries dealing with managing fatigue.

When a step refers to a "sample" for an inspector to verify, then this means three to five items, if possible, for that step. In some cases, there may not be any items to review, such as waivers, self-declarations, or fatigue assessments for cause or postevent. Once all the information pertaining to the issue of concern is gathered, then evaluate the significance and enforcement aspects of the issue in accordance with IMC 0612 or with the security significance determination process if inspected by security inspectors.

#### Specific Guidance.

03.01 The requirements in 10 CFR 26.201 specify which licensees and entities are subject to Subpart I. The individuals who must be subject to the requirements of Subpart I are specified in 10 CFR 26.4, "FFD Program Applicability to Categories of Individuals." As of October 1, 2009, all operating reactors fall into this category and are subject to Subpart I. Additionally, contractors and vendors (C/Vs) that implement an FFD program or program element (e.g., tracking C/V employees' work hours) that a licensee relies upon to meet Subpart I requirements must meet the requirements of Subpart I.

- a. Verify that the licensee has not been granted specific exemptions from the requirements of Subpart I as allowed by 10 CFR 26.9, "Specific Exemptions."
- b. Verify that the licensee's procedures provide guidance to determine which individuals are subject to each section of Subpart I.
- c. Determine if any C/Vs are being relied upon to have an FFD program that meets the requirements of Subpart I. Verify that the C/V FFD program meets the requirements of 10 CFR Part 26 for the applicable sections for which the licensee is taking credit.
- d. Review the licensee procedure(s) or program that specifies which individuals are subject to each section of Subpart I. Determine which sections of Subpart I are applicable to the individual(s) associated with the issue of concern.

- e. Determine if the individual is subject to the work hour control requirements in 10 CFR 26.205 by referring to 10 CFR 26.4(a)(1) through (a)(5). Work hour controls do NOT apply to the following individuals and activities:
1. maintenance activities on SSCs that are off site (i.e., outside the owner-controlled area)
  2. quality control and quality assurance activities
  3. predictive maintenance activities that do not result in a change of condition or state of an SSC that a risk-informed evaluation process has shown to be significant to public health and safety (e.g., nondestructive examination, thermography, vibration analysis, and data collection and analysis)
  4. individuals who are not granted unescorted access (i.e., the individual is escorted) regardless of the function they perform
  5. emergency response personnel who do not perform health physics or chemistry duties that are required of a member of the onsite emergency response organization minimum shift complement
  6. fire brigade members NOT responsible for understanding safe-shutdown capability
- f. Determine if the individual is directing work or activities that are subject to work hour controls. "Directing" means the exercise of control over a 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. The following tasks are examples generally considered NOT directing:
1. engineering tasks
  2. supervision, in the plant, of the maintenance on a noncovered SSC
  3. supervision at the second level of supervision and higher
  4. performance of work control center documentation activities
  5. development of a work procedure
  6. preparation of a work or modification package
  7. review by senior management of work plans
  8. training of personnel during which time the trainee is not operating or performing maintenance activities

9. provision of recommendations from vendors and engineers on test performance, component and system operation, or other similar technical input
  10. review and approval of documents
  11. any work that does not involve operations or maintenance on risk significant SSCs
  12. provision of recommendations only, by technical staff to control room staff
- g. Verify that the licensee has correctly determined the applicable sections of Subpart I for each individual who is subject to the issue of concern.

03.02 Applicable licensees and entities are required to implement the general provisions specified in 10 CFR 26.203 with some portions, such as policies, rolled into the FFD program. Additional procedures may be put in place to address the specific requirements of Subpart I.

- a. Policy. The Subpart I aspects of the policy statement in the FFD program must address factors that could affect FFD, such as fatigue, and provide a description of any program that is available to individuals who are seeking assistance in dealing with fatigue that could adversely affect an individual's ability to safely and competently perform his or her duties.
  1. Verify that the policy statement includes the above aspects and provides for the management of fatigue. In addition to work hour controls, fatigue management can include understanding circadian factors, shift work rotation, medical conditions such as sleep apnea, and personal challenges to restorative rest.
  2. Verify that the policy statement is readily available to all individuals who are subject to the policy. This can be done by posting the policy in multiple work areas, providing individuals with brochures, or allowing individuals to print the policy from a computer.
  3. Verify that the policy statement provides affected individuals with information on what is expected of them and what consequences may result from a lack of adherence to the policy.
- b. Procedures. The FFD program, along with Subpart I, requires procedures to implement the program. Verify that the following requirements for procedure content are in place:
  1. Verify that there is a process to be followed when any individual subject to 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.

2. Verify that procedures describe the rights and responsibilities related to self-declaration.
  3. Verify that procedures describe the requirements for establishing controls and conditions permitted or required to perform work after that individual declares that he or she is not fit due to fatigue.
  4. Verify that procedures describe the process to be followed if the individual disagrees with the results of a fatigue assessment.
  5. Verify that procedures describe the process for implementing the work hour controls for covered work.
  6. Verify that procedures describe the process to be followed in conducting fatigue assessments.
  7. Verify that procedures describe any disciplinary action that the licensee may impose on an individual following a fatigue assessment and the conditions and considerations for taking those disciplinary actions.
- c. Training and Examinations. Subpart I adds the following KAs to the content of the training program required for the FFD program. All individuals subject to Subpart I must pass an annual FFD exam with a score of 80 percent or higher or take remedial training and testing.
1. Verify that the following KAs are contained in the FFD program content:
    - (a) 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
    - (b) ability to identify symptoms of worker fatigue and contributors to decreased alertness in the workplace
  2. Verify that all individuals associated with the issue of concern or a random sample of individuals has passed the initial or refresher FFD exam. The refresher exam must be completed on a nominal 12-month frequency or more frequently if the need is indicated. Indications of the need for more frequent training include, but are not limited to, an individual's failure to properly implement FFD program procedures and the frequency, nature, or severity of problems discovered through audits or the administration of the program.
  3. Verify that the annual FFD exam contains at least one question relating to each of the KAs specified in item 1 above.

- d. Recordkeeping. The licensee is required to keep the following records for 3 years or until all legal proceedings are complete, whichever is later. There may be additional records that the licensee keeps that may be helpful to an inspector when determining

the facts surrounding an issue of concern. Document all records that are reviewed during an inspection.

1. Verify that the licensee is maintaining records of work hours for individuals who are subject to the work hour controls in 10 CFR 26.205 by reviewing a sample of work hour records.
  2. Verify that the licensee is maintaining records of shift schedules and shift cycles for individuals who are subject to the work hour controls in 10 CFR 26.205 by reviewing a sample of shift schedules and shift cycles.
  3. Verify that the licensee is maintaining documentation of waivers, including the basis for the waivers, by reviewing a sample of waivers. The basis must include the circumstances that necessitated the waiver, a statement of the scope of work and the time period for which the waiver is approved, and the bases for the determinations that (1) the waiver was necessary to mitigate or prevent a condition adverse to safety or to maintain site security and (2) there was a reasonable assurance that the individual would be able to safely and competently perform his or her duties during the additional work period for which the waiver was granted.
  4. Verify that the licensee is maintaining documentation of work hour reviews that are required by 10 CFR 26.205(e)(3) and (e)(4). See Section 03.03.e for details on what needs to be documented.
  5. Verify that the licensee is maintaining documentation of fatigue assessments that are required by 10 CFR 26.211(g). Fatigue assessments conducted in the previous calendar year shall be documented in an annual summary for each power plant site. An online database for FFD reports, which is maintained by the Office of Nuclear Security and Incident Response, is available to inspectors and licensees. See Section 03.06.g for details on the content of the summary.
- e. Reporting. The licensee is required to submit an annual FFD program report. This report may be submitted electronically by the licensee and will be maintained in an NRC database. This option is voluntary by the licensee. Verify that the annual report contains the following information:
1. The report shall contain a summary of all instances during the previous calendar year when the licensee waived the work hour controls for covered individuals. This summary must include only those waivers under which work was performed. The summary must include each of the work hour controls

that were waived during the period. If the licensee submits a summary that includes all approved waivers, including those in which work was not performed, then ensure that the summary clearly identifies the waivers in which work was performed.

2. For each category of individuals subject to work hour controls, the report shall contain the number of instances when each of the following work hour controls was waived for individuals not working on outage activities:
  - (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
  - (d) a 10-hour break between successive work hour periods or an 8-hour break between successive work hour periods when a break of less than 10 hours is necessary to accommodate a crew's scheduled transition between work schedules or shifts
  - (e) a 34-hour break in any 9-day period
  - (f) at least 1 day off per week averaged over the shift cycle for individuals working an 8-hour shift schedule
  - (g) at least 2 days off per week averaged over the shift cycle for individuals working a 10-hour shift schedule
  - (h) at least 2.5 days off per week averaged over the shift cycle for individuals working a 12-hour shift and performing duties specified in 10 CFR 26.4(a)(1) through (a)(3) (i.e., operations, health physics, chemistry, and fire brigade)
  - (i) at least 2 days off per week averaged over the shift cycle for individuals working a 12-hour shift and performing duties specified in 10 CFR 26.4(a)(4) (i.e., maintenance)
  - (j) at least 3 days off per week averaged over the shift cycle for individuals working a 12-hour shift and performing duties specified in 10 CFR 26.4(a)(5) (i.e., security personnel)
3. For each category of individuals subject to work hour controls, the report shall contain the number of instances when each of the following work hour controls was waived for individuals working on outage activities:
  - (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

- (d) a 10-hour break between successive work hour periods or an 8-hour break between successive work hour periods when a break of less than 10 hours is necessary to accommodate a crew's scheduled transition between work schedules or shifts
  - (e) a 34-hour break in any 9-day period
  - (f) during the first 60 days of an outage, at least 3 days off in each successive (i.e., nonrolling) 15-day period for individuals specified in 10 CFR 26.4(a)(1) through (a)(3) (i.e., operations, health physics, chemistry, and fire brigade)
  - (g) during the first 60 days of a unit outage, at least 1 day off in any 7-day period for individuals specified in 10 CFR 26.4(a)(4) (i.e., maintenance)
  - (h) during the first 60 days of a unit outage or a planned security system outage, at least 4 days off in each successive (nonrolling) 15-day period for individuals specified in 10 CFR 26.4(a)(5) (i.e., security personnel)
- 4. The report shall contain a summary that shows the distribution of waiver use among the individuals within each category of individuals identified in 10 CFR 26.4(a).
  - 5. The report shall contain a summary of corrective actions, if any, resulting from the analyses of these data, including fatigue assessments.
- f. Audits. Licensees are required to audit the management of worker fatigue in accordance with 10 CFR 26.41. Verify that the following requirements are met for audits associated with managing fatigue:
- 1. Verify that the audit is conducted as needed, but no less frequently than nominally every 24 months. Licensees and other entities are responsible for determining the appropriate frequency, scope, and depth of additional auditing activities within the nominal 24-month period based on the review of FFD program performance, including, but not limited to, the frequency, nature, and severity of discovered problems, personnel or procedural changes, and previous audit findings. The term "nominal" is defined in 10 CFR 26.5, "Definitions," to mean plus or minus 25 percent.
  - 2. Verify that the audit focuses on the effectiveness of managing fatigue and that it is conducted by individuals who are qualified in the subject of fatigue management.
  - 3. Verify that the individuals performing the audit are independent from the FFD program's management and from personnel who are directly responsible for implementing the FFD program.

4. Verify that the results of the audit, along with recommendations, are documented and reported to senior corporate and site management.
5. Verify that each audit report identifies conditions that are adverse to the proper performance of managing fatigue, the cause of the condition(s), and recommended corrective actions, if applicable.
6. Verify that the audit findings are reviewed and corrective actions taken, including reauditing of the deficient areas where indicated, to preclude, within reason, repetition of the condition, if applicable.
7. Verify that any resolution of audit findings and corrective actions are documented. Audits of C/V programs may be shared between licensees if desired.

03.03 The requirements specified in 10 CFR 26.205 are associated with individuals subject to this part and address normal working hours and work hours associated with unit outages. Additionally, the work hours associated with security system outages or increased threat conditions for security personnel are covered below but are normally inspected by security inspectors. The information below provides guidance on what to inspect to determine if the requirements are being met.

- a. Individuals Subject to Work Hour Controls. The work hour control requirements in 10 CFR 26.205 apply to any individual who performs duties identified in 10 CFR 26.4(a)(1) through (a)(5). See Section 03.01.d and Section 03.01.e for guidance on which activities are typically not subject to work hour controls, although licensees may determine that some of these activities are subject to work hour controls. Review the licensee procedures that specify which individuals or activities are subject to the work hour controls in 10 CFR 26.205 and verify that the licensee has determined the appropriate classification of individuals and activities.
- b. Calculating Work Hours. The licensee must record the work hours for individuals subject to the work hour controls in 10 CFR 26.205. Work hours are calculated as the amount of time an individual performs any duties for the licensee, including, but not limited to, the following:
  1. 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)
  2. shift holdovers to cover for late arrivals of incoming shift members
  3. early arrivals of individuals for licensee-required meetings, training, or preshift briefings for special evolutions (these activities are not considered shift turnover activities)
  4. holdovers for interviews needed for event investigations

5. turnovers between individuals within a shift period due to rotations or relief within a shift
- c. Exceptions. The following exceptions are permitted by the rule in calculating work hours:
1. Licensees may exclude shift turnover from the calculation of work hours. This includes only those activities that are necessary to safely transfer information and responsibilities between two or more individuals between shifts.
  2. Licensees may exclude 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).
  3. Licensees may exclude from the calculation of an individual's work hours the time the individual works unscheduled work hours for the purpose of participation in the actual conduct of an unannounced emergency preparedness exercise or drill.
  4. 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 that the total (cumulative) duration of the work does not exceed a nominal 30 minutes during any single break period.
  5. The regulations at 10 CFR 26.207 have further guidance for exceptions to calculating work hours.
- d. Verification. Verify the following with regard to work hour calculations:
1. Verify that the licensee is calculating work hours in accordance with the above requirements.
  2. Verify that the licensee is not excluding work hours worked during turnovers between individuals within a shift period due to rotations or relief within a shift.
  3. Verify that turnovers only include those activities that are necessary to safely transfer information or duties (e.g., security personnel may include the time required to arm and disarm). A prejob briefing is not considered part of shift turnover because this is not a transfer of information or duties between individual stations; therefore, it should be included in the calculation of work hours.
  4. Verify that the licensee is only omitting one shift turnover period (at the beginning or end of a shift) between each shift worked when calculating the break time between shifts.

5. Verify that, for an individual who begins or resumes performing for the licensee any covered work during the calculation period, the licensee includes in the calculation of the individual's work hours all work hours worked for the licensee, including hours worked performing duties that are not covered work, and that these hours are factored into the work hour controls.
  6. If a licensee provides an area for restorative sleep, then verify that these accommodations are suitable and reasonable. The accommodations should include a sleep surface (e.g., bed or recliner) in a darkened, quiet room. A reasonable opportunity for restorative sleep is generally not less than 30 minutes.
  7. If a licensee excludes after-hours study time from the calculation of work hours, then verify that licensee policies or procedures or both establish that the study time is not required and is used at the discretion of the individual.
- e. Work Hour Scheduling. Staffing levels should be sufficient so that schedules for the covered individuals can be maintained based on vacation, training, or other demands, such as sick leave, without relying on waivers. It is expected and allowed that normal variation in vacation and training demands may occasionally require the use of additional work hours. Management is responsible for understanding the total vacation, training, and workload demands and for maintaining sufficient staff to do the work.

Verify that the licensee develops and adheres to schedules that prevent impairment from fatigue resulting from elements of routine schedules that can significantly affect worker fatigue, such as shift length, the number of consecutive shifts, the duration of breaks between blocks of shifts, and the direction of shift rotation.

- f. Work Hour Controls. Licensees shall control the work hours of individuals subject to the work hour controls in 10 CFR 26.205. The inspector should review documentation that is required to be kept per Section 03.02.d. Perform the following actions for a selected sample of individuals:
1. Verify that the covered individual(s) did not exceed the following work hours, except under the provisions of a waiver:
    - (a) 16 hours in any 24-hour period
    - (b) 26 hours in any 48-hour period
    - (c) 72 hours in any 7-day period

Licensees may calculate the 7-day period as a rolling 168-hour period.

2. Verify that the covered individual(s) has, at a minimum, the following rest

breaks, except under the provisions of a waiver:

- (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-day period

Licensees may calculate the 9-day period as a rolling 216-hour period.

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.

3. Verify that the covered individual(s) has, at a minimum, the following number of days off, except under the provisions of a waiver:

- (a) Individuals who are working 8-hour shift schedules shall have at least 1 day off per week averaged over the shift cycle.
- (b) Individuals who are working 10-hour shift schedules shall have at least 2 days off per week averaged over the shift cycle.
- (c) Individuals who are working 12-hour shift schedules while performing the duties specified in 10 CFR 26.4(a)(1) through (a)(3) (i.e., operations, health physics, chemistry, and fire brigade) shall have at least 2.5 days off per week, averaged over a shift cycle.
- (d) Individuals who are working 12-hour shift schedules while performing the duties specified in 10 CFR 26.4(a)(4) (i.e., maintenance) shall have at least 2 days off per week, averaged over the shift cycle.
- (e) Individuals who are working 12-hour shift schedules while performing the duties specified in 10 CFR 26.4(a)(5) (i.e., security personnel) shall have at least 3 days off per week, averaged over the shift cycle.

A day off is defined as a calendar day during which an individual does not start a work shift. If a work period starts at 2300 hours on day 1 and continues until 0700 hours on day 2, and if there are no other work periods starting on day 2, then day 2 is considered to be a day off for the purposes of calculating the minimum days off. More than one work period may start on any work day as long as there is the appropriate 10-hour break. Additionally, for the purposes of calculating the average number of days off per shift cycle, the duration of a shift cycle may not exceed 6 weeks or be shorter than 1 week.

4. During the first 60 days of a unit outage:

- (a) Verify that the individual(s) specified in 10 CFR 26.4(a)(1) through (a)(3) (i.e., operations, health physics, chemistry, and fire brigade), while working on outage activities, has at least 3 days off in each successive (i.e., nonrolling) 15-day period, except under the provisions of a waiver. The 15-day period is not a requirement for the length of a shift schedule; it is a fixed calculation period.

Refer to Section C.11 of Regulatory Guide 5.73, "Fatigue Management for Nuclear Power Plant Personnel," issued March 2009, for guidance on workers not eligible to work outage hours. Section C.11 also provides guidance on providing relief to the operators who are not on outage hours.

- (b) Verify that the individual(s) specified in 10 CFR 26.4(a)(4) (i.e., maintenance), while working on outage activities, has at least 1 day off in any 7-day period, except under the provisions of a waiver. The 7-day period is not a requirement for the length of a schedule; it is a fixed calculation period.
- (c) Verify that the individual(s) specified in 10 CFR 26.4(a)(5) (i.e., security personnel) has at least 4 days off in each successive (i.e., nonrolling) 15-day period, except under the provisions of a waiver, unplanned security system outage, or increased threat condition. The 15-day period is not a requirement for the length of a shift schedule; it is a fixed calculation period. Additionally, security personnel may remain on work hours associated with operating units even though a unit may be in an outage.

During the first 60 days of an unplanned security system outage or increased threat condition, the individuals specified in 10 CFR 26.4(a)(5) (i.e., security personnel) need not meet any requirements for minimum days off.

- 5. During the first 60 days of a planned security system outage, verify that the individual(s) specified in 10 CFR 26.4(a)(5) (i.e., security personnel) has at least 4 days off in each successive (i.e., nonrolling) 15-day period, except under the provisions of a waiver, unplanned security system outage, or increased threat condition.

During the first 60 days of an unplanned security system outage or increased threat condition, the individuals specified in 10 CFR 26.4(a)(5) (i.e., security personnel) need not meet any requirements for minimum days off.

- 6. Verify that, if an outage extends beyond 60 days, any covered individual who works outage hours after the first 60 days of the unit outage, security system outage, or increased threat condition did not work more than 48 hours for a nonoverlapping 7-day period for each 7-day increment that the individual works on outage hours past the first 60 days. This allowance is not subject to a waiver.

- g. Reviews. This section requires licensees to periodically conduct a self-assessment of their performance with respect to controlling the work hours of those individuals who perform the job duties specified in 10 CFR 26.4(a) and are subject to the provisions of 10 CFR 26.205.
1. Verify that the licensee conducts a review of the effectiveness of its control of work hours of individuals who are subject to this section (i.e., covered workers) once per calendar year.
  2. Verify that the review includes an evaluation of the control of work hours during any plant or security system outage or increased threat condition that occurred since the licensee completed the most recent review. Parts of this verification may be performed by security inspectors.
  3. Verify that the review was completed within 30 days of the end of the review period. This review period shall be defined by the licensee in its program documents and must be completed once per calendar year. For example, if the licensee determines the review period is from October 1, 2009, to September 30, 2010, then the review must be complete by October 30, 2010. This would meet the 2010 requirement for conducting a review once per calendar year.
  4. Verify that the review addressed the actual work hours and performance of covered individuals during the entire review period for consistency with the work hour scheduling requirement objective of preventing impairment from fatigue due to the duration, frequency, and sequencing of hours worked.
  5. Verify that the review was based on information in, but not limited to, the corrective action program. The review should address the following:
    - (a) individuals whose actual hours worked during the review period exceeded an average of 54 hours per week in any shift cycle while their work hours were subject to the nonoutage day-off requirements
    - (b) individuals who were granted more than one waiver during the review period
    - (c) individuals who were assessed for fatigue in accordance with 10 CFR 26.211 during the review period (this does not include the face-to-face supervisory assessment required for a waiver)
  6. Verify that the review addressed the individuals' hours worked and the waivers under which work was performed to evaluate staffing adequacy for all jobs subject to the work hour controls.
  7. Verify that the licensee documented in the review the methods used to conduct the review and the results of the review.
  8. Verify that the licensee records, trends, and corrects, under its corrective action program, any problems identified in maintaining control of work hours

consistent with the specific requirements and performance objectives of this part.

03.04 The granting of waivers is expected to be limited to circumstances in which compliance with the work hour requirements could have immediate adverse consequences for the protection of public health and safety or the common defense and security. The NRC expects a licensee to grant waivers only to address circumstances that it cannot reasonably control. For example, the NRC considers it appropriate to grant a waiver from the work hour requirements if it is necessary to prevent a condition adverse to safety or if compliance with the work hour requirements would cause a forced reactor shutdown, power reduction, or other similar action, as a result of exceeding a time limit for a technical specification limiting condition for operation. Additionally, a waiver would be appropriate if it is necessary to prevent a condition adverse to safety, if compliance with the work hour requirement will cause the licensee to violate other NRC requirements such as the minimum onsite staffing requirements in 10 CFR 50.54(m), or if a delay in the recovery of failed plant equipment that is necessary for maintaining plant safety will occur. Furthermore, holdovers for the postmanning of security personnel to protect security would be appropriate for a waiver.

Exceptions to certain portions of work hour controls, such as during plant emergencies, the actual conduct of NRC-evaluated force-on-force tactical exercises, or common defense and security as identified by the NRC in writing, are deemed necessary by the NRC because these conditions are not under the full direct control of the licensee.

- a. Waivers. Licensees may grant a waiver of the work hour controls in 10 CFR 26.205(d)(1) through (d)(5)(i) only. The waiver only applies to individuals subject to the work hour controls as specified in 10 CFR 26.4(a)(1).
  1. Review a sample of waivers under which work was performed and verify the following:
    - (a) An operations shift manager determined that the waiver was necessary to mitigate or prevent a condition adverse to safety, or a security shift manager determined that the waiver was necessary to maintain site security, or a senior-level site manager with requisite signature authority made either determination.
    - (b) A supervisor performed a face-to-face assessment of each individual for whom a waiver was being considered and determined that there was reasonable assurance that the individual was able to safely and competently perform his or her duties during the additional work period for which the waiver was granted.
  2. For the waivers sampled, verify that they were granted to address circumstances that could not have been reasonably controlled.

For example, the use of a waiver is prohibited in lieu of, but not limited to, adequate staffing, proper work planning, the maintenance of an outage on schedule, attendance at an "all staff" meeting, or the benchmarking of trips to

another site, but it would be permitted for circumstances that the licensee could not have reasonably controlled, which may include, but are not limited to, equipment failures related to a condition adverse to safety or a sudden increase in the personnel attrition rate.

3. For the waivers sampled, verify that the bases for them were documented and included the following information:
  - (a) a description of the circumstances that necessitated the waiver
  - (b) a statement of the scope of the work and the time period for which the waiver was approved
  - (c) the bases for the determination that the waiver was necessary and the bases for the assessment that the individual was able to safely and competently perform the work during the period for which the waiver was granted
4. Review a sample of waiver assessments and verify that the supervisor performing the assessment was trained as required by 10 CFR 26.29 and 10 CFR 203(c) and that the supervisor was qualified to direct the work that was performed by the individual.

If there was no supervisor on site who was qualified to direct the work, verify that the assessment was performed by a supervisor who was qualified to provide oversight of the work that was performed by the individual and who is also trained in performing the assessment as required by 10 CFR 26.29 and 10 CFR 203(c).
5. Verify that any waiver assessments that were reviewed addressed, at a minimum, the following:
  - (a) the potential for acute and cumulative fatigue considering the individual's work history for at least the past 14 days
  - (b) the potential for circadian degradations (i.e., approximately a 24-hour cycle) in alertness and performance considering the time of day for which the waiver was granted
  - (c) the potential for fatigue-related degradations in alertness and performance to affect risk-significant functions
  - (d) whether any controls and conditions were established under which the individual was permitted to perform work
6. Verify that the waiver assessments that were reviewed were conducted face to face and that they were conducted not more than 4 hours before the individual began performing any work under the waiver.

- b. Force-on-Force Tactical Exercises. This exception is only applicable to the minimum days off requirement for security personnel during normal operations, not during outage activities. Additionally, the exception can only be used during the actual conduct of NRC-evaluated force-on-force tactical exercises.

Review a sample of security individuals' records during the time that a force-on-force exercise was performed that was not evaluated by the NRC and verify that the licensee did not exclude these shifts in the calculation of minimum days off.

- c. Common Defense and Security. This exception is only applicable when the NRC informs the licensee in writing that the requirements for work hour controls, or any subset thereof, are waived for security personnel to ensure the common defense and security. The duration of the waiver is specified by the NRC.

If the NRC has notified the licensee in writing that any portion of the work hour controls have been waived for security personnel, then verify that the licensee only takes exception for the portions allowed by the NRC and that the exceptions are only used during the specified time in the exception document.

- d. Plant Emergencies. Licensees need not meet the requirements in 10 CFR 26.205(c) and (d) for work hour scheduling and work hour controls during declared emergencies.

For any declared emergencies, as defined by the licensee's emergency plan, verify that the work hour scheduling and work hour control requirements were not exempted outside the time from when the emergency was declared until the emergency was exited. A licensee cannot exempt these requirements in preparation of an emergency declaration (i.e., an impending hurricane or drought conditions) or following the exit from a declared emergency to make further repairs or to clean up unless the NRC has granted its request for exemption from these requirements or unless enforcement discretion is granted.

03.05 This section applies to covered workers who are working under waiver conditions or are being considered for work under waiver conditions. This requirement is critical to maintaining public health and safety and the common defense and security because there is a significantly increased potential for fatigue-related errors when individuals work more than the maximum work hours or obtain less rest than the minimum rest requirements specified in the work hour controls.

- a. The requirements that the licensee must meet when an individual makes a self-declaration that he or she is not capable of performing his or her duties because of fatigue are specified in 10 CFR 26.209.

Determine the following, if possible, after a self-declaration:

1. The licensee immediately stopped the individual from performing any covered work, except if the individual was required to continue performing

those duties under other requirements of chapter 10 of the Code of Federal Regulations, such as the minimum control room staffing requirements in 10 CFR 50.54(m).

2. If the individual was required to continue performing duties, then verify that the licensee performed the following actions:
  - (a) took immediate action to relieve the individual
  - (b) permitted or required the individual to take a break of at least 10 hours before he or she returned to performing covered work
3. If the individual was not required to continue performing covered work, then verify that the licensee performed one of the following actions:
  - (a) reassigned the individual to noncovered work but only if the results of the fatigue assessment indicated that the individual was fit to safely and competently perform those other duties
  - (b) permitted or required the individual to take a break of at least 10 hours before he or she returned to performing covered work

03.06 The objective of the fatigue assessments required by this section is for licensees to address instances of worker fatigue appropriately, including those that are not prevented by the work hour controls, regardless of the number of hours that the subject individual has worked or rested. Fatigue assessments are important for effective fatigue management because they provide the basis for any short-term corrective actions that may be necessary to ensure that individuals are able to safely and competently perform their duties and any long-term corrective actions that may be necessary to address individual or programmatic issues contributing to recurring instances of fatigue. For the steps listed below, one sample of fatigue assessments may apply to several steps. The inspector may select another sample to complete a step that verifies different information or use the same sample for several steps.

- a. Verify that a fatigue assessment was performed and documented, as applicable, under any of the following conditions with the sample containing an assessment from as many areas as possible. Verify that the fatigue assessment in each area meets the conditions specified below.
  1. For Cause. This assessment is 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. This does not apply if the condition is observed during an individual's break period.

If the observed condition was impaired alertness with no other behaviors or physical conditions creating a reasonable suspicion of possible substance abuse, then the licensee only needed to perform a fatigue assessment.

If the licensee had reason to believe that the observed condition was not due

to fatigue (such as the smell of alcohol), then the licensee did not need to perform the fatigue assessment.

2. Self-Declaration. This 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.

This assessment need not be performed if the licensee permits or requires the individual to take a rest break of at least 10 hours before the individual returns to duty.

3. Postevent. This assessment must be conducted in response to events requiring postevent drug and alcohol testing as specified in 10 CFR 26.31(c).

The events that require postevent drug and alcohol testing are a significant illness or personal injury to the individual to be tested or another individual, a radiation exposure or release of radioactivity in excess of regulatory limits, and actual or potential substantial degradations of the level of safety of the plant.

Medical treatment may not be delayed in order to perform the assessment.

4. Followup. This assessment must be conducted if a fatigue assessment was conducted for cause or in response to a self-declaration and if 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.

The licensee shall determine the need to implement controls and conditions before permitting the individual to resume performing any duties.

- b. Review a sample of fatigue assessments and verify that they were conducted by supervisors or FFD program personnel who are trained under 10 CFR 26.29 and 10 CFR 203(c).
  1. Verify that the fatigue assessments being reviewed were performed face to face with the individual whose alertness may have been impaired.
  2. Verify that any fatigue assessments that were performed for cause were not performed by the individual who observed the condition of impaired alertness.
  3. Verify that any fatigue assessments that were performed for postevent reasons were conducted by an individual who did not take any of the following actions:

- (a) performed or directed (on site) the work activities during which the event occurred.
  - (b) 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.
  - (c) evaluated or approved a waiver of any work hour 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.
- c. Review a sample of fatigue assessments and verify that the following, at a minimum, are addressed, which provides the information necessary for management decisions and actions in response to the circumstance that initiated the assessment. If the licensee's procedure requires additional requirements, then verify that these are also met.
  - 1. acute fatigue
  - 2. cumulative fatigue
  - 3. circadian variations in alertness and performance
- d. Review a sample of fatigue assessments and verify that the assessments did not conclude that the individual(s) did not or would not have a degraded ability to safely and competently perform his or her duties based solely on not exceeding any of the following work hour limits:
  - 1. limits specified in 10 CFR 26.205(d)(1)
  - 2. minimum breaks specified in 10 CFR 26.205(d)(2)
  - 3. minimum days off specified in 10 CFR 26.205(d)(3) through (d)(5)
- e. Review a sample of fatigue assessments that allowed workers to return to performing duties for the licensee and verify that any controls or conditions that were put in place to prevent errors were reasonable and were implemented, including a need for a break.
- f. Review a sample of fatigue assessments and verify that the documentation includes a description of the circumstances that necessitated the need for the assessment.
- g. Review the annual summary for the nuclear plant site that describes the instances of fatigue assessments that were conducted during the previous calendar year for any individual identified in 10 CFR 26.4(a) through (c) and verify that the summary contains the following information:

1. the conditions under which each fatigue assessment was conducted (i.e., self-declaration, for cause, postevent, and followup)
2. 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
3. the category of duties the individual was performing, if the individual was performing the covered duties at the time of the self-declaration or condition resulting in the fatigue assessment
4. management actions, if any, resulting from each fatigue assessment

#### 93002-04 RESOURCES ESTIMATE

This procedure is expected to be used on an “as-needed” basis and may be initiated from another procedure. When the inspector develops the plan for inspecting the issue of concern, then an estimate of the expected hours to complete the inspection should be documented. Each issue of concern is expected to require 4 to 6 hours of inspection. The inspection plan should document the expected hours to complete the inspection of all fatigue-related issues. If this procedure is used to support another procedure, then hours should be charged to the initiating procedure (i.e., IP 71111.20, “Refueling and Other Outage Activities”; or reactive inspections). It is expected that only a portion of this procedure will be completed to address the inspection of the issue of concern.

The intent is not to redirect baseline inspection efforts but to complete the portions of this IP concurrently when possible. This IP is not part of the baseline inspection program, but it is intended to be used to provide additional guidance for the inspector if an issue of concern is identified.

This IP should be performed by resident inspectors if possible, but it may be performed by any qualified inspector. Consideration should be given to completing the online training that is available regarding Subpart I prior to performing this procedure.

#### 93002-05 COMPLETION STATUS

Complete the portions of this procedure as described in the inspection plan developed for each issue of concern. Document the areas inspected in Section 4OA5 of the integrated inspection report that is open at the time of the inspection. If the issue results in a finding OR if this procedure was performed as part of another procedure, such as IP 93812, “Special Inspection” then the issue of concern shall be documented in the associated inspection report. Additionally, any observations that the NRC believes that may be of interest to it may be documented in Section 4OA5 of the integrated inspection report that is open at the time of the observation. Ensure the observation has been reviewed by the Fatigue Panel prior to documentation as long as the panel is in place.

Any questions regarding the use or intent of this procedure may be directed to the NRC Headquarters, Division of Inspection and Regional Support, Reactor Inspection Branch.

#### 93002-06 REFERENCES

IMC 0612, "Power Reactor Inspection Reports"

IMC 0612, "Sample Reactor Inspection Report," Exhibit 3

IMC 2515, "Light-Water Reactor Inspection Program—Operations Phase"

IP 71111.20, "Refueling and Other Outage Activities"

IP 93812, "Special Inspection"

Nuclear Energy Institute 06-11, "Managing Personnel Fatigue at Nuclear Power Reactor Sites," Revision 1, October 31, 2008, Agencywide Documents Access and Management System (ADAMS) Accession No. ML090360158

U.S. Code of Federal Regulations, "Fitness for Duty Programs," Part 26

U.S. Nuclear Regulatory Commission, "Fatigue Management for Nuclear Power Plant Personnel," Regulatory Guide 5.73, March 2009, ADAMS Accession No. ML083450028

U.S. Nuclear Regulatory Commission, "Fitness for Duty Programs," *Federal Register*, Vol. 73, No. 62, March 31, 2008, pp. 16966–17235

END

Attachment 1 – Revision History for IP 93002

Commitment Tracking Number	Issue Date	Description of Change	Training Needed	Training Completion Date	Comment Resolution Accession Number
NA	11/09/09 CN 09-026	<p>Researched commitments for 4 years and found none.</p> <p>The purpose of this procedure is to provide guidance for performing a detailed inspection for any issue of concern relating to managing fatigue in accordance with 10 CFR 26, Subpart I. The procedure may be referenced on an "as needed" basis and required Regional Administrator permission to perform the inspection procedure as required by IMC 2515, App. C. The procedure was issued to provide inspection guidance related to the new 10 CFR 26, Subpart I requirements.</p>	Yes	06/17/09	ML092860257