

## Summary Discussion of Staff's Resolution of Substantive Comments on Fatigue Management and FFD Programs for Construction Provisions in The Proposed Rule

### Subpart I, Fatigue Management, Individual Break Requirements, and Collective Work Hour Limits:

Several stakeholders commented that the proposed requirement for individuals to have at least one 24-hour break in any 7-day period would limit their ability to effectively schedule 8-hour shifts. In response to these comments, the staff revised this provision to require a minimum of one 34-hour break in any 9-day rolling period. The final rule requirement provides the flexibility to effectively schedule 8-hour shifts while ensuring that individuals on 8- and 10-hour shifts have periodic days off to prevent and mitigate fatigue.

Industry stakeholders commented that the requirement for a minimum 48-hour break in any rolling 14-day period could adversely affect a licensee's ability to restore inoperable equipment in a timely manner. Other stakeholders were concerned that the 48-hour break requirements would disrupt the sleep patterns of workers on night shifts, thereby increasing the likelihood of fatigue-related errors at work. Stakeholders commenting on the collective work hour limits asserted that they were redundant with other proposed requirements and therefore unnecessary. Other stakeholders were concerned that the collective work hour limits did not address worker fatigue on an individual basis and that the calculation of work hours with regard to these limits could be manipulated. In response to these comments, the staff replaced the 48-hour break and collective work hour limit requirements with provisions that ensure each worker receives a minimum number of days off per week, on average, while the plant is operating and receives a minimum number of days off in each consecutive 15-day period of a unit outage. The final rule also requires security personnel to have a minimum number of days off in each 15-day period during planned security system outages. As a result, the final rule is less complex and more flexible, yet ensures periodic days off and limits average weekly work hours to levels comparable to those that would have been required by the collective work hour limits.

Although the staff believes that these changes have addressed most stakeholder concerns regarding the proposed work hour limits, industry and union stakeholders have asserted that the final rule requirement for minimum days off during unit outages is unnecessarily restrictive and will cause supplemental outage workers to seek employment in other industries where they can work without restriction on the amount of overtime that they work. Although the staff cannot predict with certainty the effect of the work hour limits on the future job seeking behavior of supplemental workers, the staff expects the effect to be limited because (1) the limits reduce the average work week by less than 5 hours while continuing to allow an average of more than 25 hours of overtime per week, and (2) the limits will not apply to all supplemental workers, only those maintaining systems, structures, and components that a risk-informed evaluation process has shown to be significant to public health and safety. As a result, the staff believes that licensees have the flexibility to manage the effect of the work hour limits on supplemental workers. The staff also notes that in establishing the work hour limits the staff considered that the requirements would not only apply to supplemental workers but also licensee employees, many of whom were concerned about impairment from fatigue rather than loss of wages.

Industry stakeholders have also asserted that one 34-hour break in any 7-day period is adequate to provide full recovery from fatigue during unit outages, citing the basis for the Federal Motor Carrier Safety Administration's (FMCSA) requirement for a minimum 34-hour

break for commercial motor vehicle (CMV) operators. The staff reviewed the FMCSA regulations, associated statements of consideration, and the findings of an expert panel commissioned by the FMCSA. The staff concluded that, for a limited range of circumstances, the studies cited by FMCSA support a 34-hour break as a minimum rest period for recovery from cumulative fatigue. However, the staff does not agree that the basis cited by the FMCSA supports a requirement that would routinely allow 72 hours of work before a 34-hour break (i.e., a day off) is required. The staff notes that:

- (1) The FMCSA regulations include requirements that prohibit driving after 60 hours of duty in 7 days. By contrast, the industry proposal would allow 72 hours of work in a 7-day period, excluding turnover.
- (2) The statements of consideration for the FMCSA regulations establish that long work weeks with minimum break periods are the exception for CMV operators. By contrast, application of the industry proposed requirement to the control of work hours during unit outages would allow licensed operators<sup>1</sup> and other plant personnel to work regularly occurring periods of multiple consecutive 72-hour work weeks with minimum break periods.
- (3) The FMCSA's expert panel considered the 34-hour break "absolutely minimal" for recovery with a fundamental assumption being that the 34 hours will provide the opportunity for two consecutive nights of sleep between midnight and 6 a.m. Given common outage scheduling practices and day-shift start times, no workers on night-shifts and few workers on day-shifts would meet this assumption. Consequently, full recovery from six consecutive 12-hour shifts would not be likely for the majority of workers .

In summary, given the number of hours worked prior to a break and the outage schedule constraints on the sleep-wake schedule for most workers, the 34-hour break would not be sufficient for full recovery from fatigue. In addition, by allowing multiple consecutive 72-hour work weeks, the staff does not consider the NEI proposal to provide 34-hour breaks on a sufficient frequency to prevent the onset of cumulative fatigue during the course of a multi-week outage. Considering the limitations of the technical basis cited by the industry and its applicability to outage scheduling practices, comments of other stakeholders, and the technical basis cited by the staff with respect to the causes and prevention of cumulative fatigue, the staff concluded that the industry proposal would not effectively prevent cumulative fatigue for multiple consecutive weeks of extended work hours. The staff considers the minimum day off requirements of the final rule to provide adequate flexibility to accommodate emergent work and a range of scheduling practices, while supporting reasonable assurance of worker FFD.

#### Subpart I, Fatigue Management, Reporting Requirements:

Several industry stakeholders objected to the proposed requirement to report waivers from the work hour limits and information concerning fatigue assessments as part of their annual FFD program performance report. They asserted that the NRC should delete the reporting requirements from the rule because the reports would not provide new or unique information,

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<sup>1</sup>At multi-unit sites with common control rooms, all licensed operators would be subject to the final rule's limits applicable to unit outages, including operators responsible for operating units.

are unnecessary to protect public health and safety, are unnecessary to facilitate NRC oversight of implementation of the revised rule, and are unduly burdensome, and because the NRC has not met its obligation under the Paperwork Reduction Act. The staff revised the reporting requirements in the final rule to ensure that annual reports provide meaningful information for NRC oversight of the rule implementation. However, the staff does not agree with comments suggesting that the NRC delete the annual reporting requirement and maintains that the reports will be important for effective and efficient oversight and consistent implementation of the rule.

The annual reports will provide unique information that is important to NRC oversight of licensee fitness for duty programs and which is not otherwise reported to the NRC. By summarizing licensee use of waivers from the work hour limits the annual reports will indicate how often a licensee relies on individuals who are at increased potential for impairment from fatigue to mitigate or prevent a condition adverse to safety or security, specifically when these functions are associated with risk significant systems, structures, or components, or functions that are essential for effective response to a fire, plant emergency, or implementation of the site security plan. The staff believes that frequent reliance on personnel with a high potential for impairment to resolve these conditions indicates a lack of effective management of worker fatigue and plant risk.

The annual reports will also include information pertaining to licensee fatigue assessments that will indicate how often: (1) individuals are relieved of duty because of observed impairment from fatigue, (2) fatigue is identified as a causal factor in significant plant events and injuries, and (3) individuals are required to remain on duty after declaring that they are not fit for duty because of fatigue. When this information is considered in conjunction with the licensee's use of work hour limit waivers, it will provide an indication of the extent to which these conditions may be the result of the licensee's work scheduling practices.

The annual reporting requirement addresses a lesson learned from the NRC's current policy on worker fatigue. In SECY-01-0113, *Fatigue of Workers at Nuclear Power Plants*, the NRC documented large differences among licensees in the use of waivers and noted that a number of licensees made extensive use of waivers from their plant technical specification work hour limits. The NRC intended waivers to be used only in "very unusual circumstances." The annual report will enable the NRC to more effectively monitor industry use of waivers to ensure a more consistent implementation of the rule and ensure that licensees use the discretion to authorize waivers in a manner consistent with the objectives of managing worker fatigue, and not as a means to compensate for a lack of adequate staffing.

In addition, the staff expects the annual reports to enable the NRC to: (1) efficiently focus inspection resources on sites, job functions, or specific elements of fatigue management, (2) identify opportunities to amend the rule to improve its effectiveness, and (3) make oversight of the rule more transparent to stakeholders who have asserted that information regarding worker fatigue is often withheld from the public to either protect an alleged's identity, or in the case of security personnel, plant security.

Furthermore, the requirement for annual reporting of information pertaining to management of worker fatigue is consistent with the requirements for reporting information pertaining to drug and alcohol testing, consistent with the Part 26 performance objective for licensees to implement a comprehensive FFD program, and consistent with management of worker fatigue being no less important to worker FFD than the effective detection and deterrence of drug and

alcohol abuse.

### FFD Programs for Construction, Clarification of Requirements

In comments on the proposed rule during the public comment period, industry stakeholders noted that the proposed rule did not clearly describe the types of FFD programs the NRC expected during nuclear power plant construction. Commenters stated that because the proposed rule required FFD programs for construction to comply with a few specific sections of the rule, it would have imposed virtually all of the rule's requirements on FFD programs for construction because it would be difficult to ensure compliance with the referenced sections of the rule without applying the entire rule.

In response, the staff developed a new Subpart K, "FFD Programs for Construction," and revised other sections of the rule to clarify the scope of requirements for construction, which were addressed in less detail in § 26.2(c) of the former rule and § 26.3(e) of the proposed rule. The final rule retains the intent of the former and proposed requirements to provide reasonable assurance that individuals involved in the construction of a new nuclear power plant who perform specified duties at the site are fit for duty, trustworthy, and reliable, commensurate with the risk to public health and safety and the common defense and security.

To streamline administration of the FFD program for construction and add flexibility, the final rule requires two different levels of FFD requirements for workers in different job roles. Because of their important oversight responsibilities, the first category of workers includes quality assurance/quality control personnel, personnel who certify that inspections, tests, and analyses have met acceptance criteria (ITAACs), individuals who serve as security officers under NRC requirements, and any persons who are designated by the licensee/permit holder to perform fitness monitoring. These individuals must be subject to a full FFD program that meets the same requirements as FFD programs for operating plants (including random testing at the 50 percent annual rate, behavioral observation training, and a suitable inquiry/employment history check).

In contrast, the FFD program in Subpart K applies only to persons who will construct, at the location where the nuclear power plant will be constructed and operated, safety- and security-related structures, systems, and components (SSCs) that are required to be described in the COL/CP applicant's or permit holder's site safety analysis report, preliminary or final safety analysis report, or physical security or safeguards contingency plans (under Part 73). These workers' tasks include fabricating, erecting, integrating, and testing safety- and security-related SSCs and installing their foundations, including the placement of concrete. At a minimum, these individuals must be subject to an FFD program that meets the requirements of Subpart K, which emphasizes performance objectives and does not incorporate all of the requirements of Part 26, unless the licensee or other entity chooses to subject them to an FFD program that meets the Part 26 requirements for operating plants, except Subpart I. If an entity elects to implement an FFD program under Subpart K, it has the flexibility either to subject these individuals to random testing for drugs and alcohol or to detect and deter substance abuse by implementing a fitness monitoring program.

If an applicant for or holder of a COL or CP chooses to implement an FFD program for construction under Subpart K, the entity must submit to the NRC for review and approval an FFD program plan, including a written FFD policy that will be given to all individuals covered by the program and FFD procedures. The program must include pre-assignment, for-cause, and

post-accident drug and alcohol testing. Subpart K requires an FFD program for construction to include sanctions for FFD policy violations, a system of files and procedures to protect personal information, and procedures for reviewing determinations that an individual has violated the FFD policy. The entity subject to Subpart K must conduct periodic audits, maintain records, provide reports to the NRC, and develop and apply procedures for suitability and fitness evaluations to determine whether to assign individuals to construct safety- and security-related SSCs.

In addition to the flexibility to impose either random testing for drugs and alcohol or a fitness monitoring program to detect and deter substance abuse by workers who construct safety- and security-related SSCs, Subpart K, among other flexibilities, permits applicants for and holders of COLs and CPs to—

- (1) Collect specimens other than urine for drug testing and/or rely on collection sites at local hospitals or clinics that conduct testing under U.S. DOT procedures, rather than those specified in Subpart E, “Collecting Specimens for Testing,” of Part 26;
- (2) Rely on healthcare professionals other than a substance abuse expert to evaluate an individual’s fitness;
- (3) Designate the persons who will perform fitness monitoring, if the entity elects this option, and adjust the number of fitness monitors performing monitoring and the frequency of monitoring to accommodate the stage of construction and local conditions; and
- (4) Establish the random testing rate and limit the selection of individuals for testing to only those who are present and constructing safety- or security-related SSCs on a given day, if the entity elects this option.

The staff believes that the requirements for FFD programs for construction in the final rule (1) provide reasonable assurance that individuals who are responsible for constructing and assuring the quality of safety- and security-related SSCs are fit for duty, trustworthy, and reliable, commensurate with the risk to public health and safety and the common defense and security, (2) permit applicants for and holders of COLs and CPs the flexibility to implement FFD programs that are appropriate for local circumstances, and (3) ensure that the privacy and other rights (including due process) of individuals who are subject to the requirements will be protected.

#### Subpart K, FFD Programs for Construction, Need for FFD Programs during Construction:

During the public comment period, some industry commenters indicated that, because there are no immediate radiological risks to public health and safety or the common defense and security during the construction of new plants, the NRC should not require FFD programs for construction that are more rigorous than the industrial safety programs implemented during construction of other large, commercial facilities. During subsequent public meetings between the staff and stakeholders (as described in the “Background” section of this SECY paper), industry stakeholders further asserted that NRC requirements for FFD programs during construction are unnecessary because (1) the NRC-mandated quality assurance processes will detect any errors in construction and are adequate to protect public health and safety and the common defense and security, and (2) the industry will voluntarily implement FFD programs during construction for industrial safety and business reasons.

The staff addressed these comments during the public meeting held on November 7, 2006 to present the technical bases for Subpart K of the draft final rule and to describe the fitness

monitoring option that Subpart K permits in lieu of random testing of certain construction workers. The staff indicated that the NRC is imposing regulatory requirements for FFD programs during construction for four primary reasons: (1) the quality of work could be adversely affected by construction workers who are impaired by substance abuse where studies indicate that members of this group have the highest rates of substance abuse problems among occupational groups in the U.S. (e.g., Substance Abuse and Mental Health Services Administration of the U.S. Department of Health and Human Services' National Household Survey on Drug Abuse (NHSDA) covering the years 2000-2001), (2) individuals who have become addicted to illegal drugs are susceptible to coercion and will interact with others involved in the drug trade, (3) past experience has demonstrated that errors during construction can adversely affect subsequent plant operations (NUREG/CR-6819, Vols. 1-4, "Common-Cause Failure Event Insights," (May 2003) and NUREG-1837, "Regulatory Effectiveness Assessment of Generic Issue 43 and Generic Letter 88-14," (October, 2005)), and (4) quality assurance by design uses a sampling process. The staff stated that, despite having a high degree of confidence in the effectiveness of quality assurance and ITAAC programs to detect construction errors, it is prudent to require an FFD program during construction to provide reasonable assurance that impaired construction workers do not introduce faults in safety- or security-related SSCs that may cause the SSCs to fail to perform their intended functions when the plant is operational. In addition, the staff expressed concern that some construction personnel who have substance abuse problems will have access to sensitive information that could be useful to an adversary, as well as physical access to safety- and security-related SSCs that may provide opportunities for malicious acts.

The staff acknowledged, in part, that the full defense-in-depth approach of the FFD program for operating plants is not appropriate for all construction workers because many construction activities do not have the potential to impact subsequent plant operations, and, before fuel arrives on site, do not impose immediate radiological risks. Therefore, the rule's requirements for construction require a full FFD program for only a limited number of personnel who have critical responsibilities for verifying that safety- and security-related SSCs have been constructed properly. For workers who will construct the safety- and security-related SSCs, the FFD program requirements in Subpart K are less stringent. For example, Subpart K does not require a suitable inquiry/employment history check for these workers. In addition, the staff acknowledged the many complex logistical challenges associated with implementing FFD requirements during construction. Therefore, the Subpart K program provides applicants for and holders of COLs and CPs greater flexibility in implementing FFD programs for construction than the rule permits for FFD programs at operating plants.

Stakeholder responses to the staff's presentation varied. Industry stakeholders continued to assert that Part 26 requirements during construction are not warranted until shortly before fuel arrives on site. Industry stakeholders also commented that the fitness monitoring program, which is permitted under Subpart K in lieu of random drug and alcohol testing of workers who are constructing safety- and security-related SSCs, is an unfamiliar concept and asked several implementation questions. The staff indicated that it will work with stakeholders to develop a guidance document that would provide examples of acceptable means to implement an FFD program under Subpart K.

A representative from a public interest group stated that the Subpart K requirements are necessary for FFD during construction. However, this representative questioned the staff's concerns about construction workers having unfettered access to sensitive information as partial justification for the FFD requirements before fuel receipt. This individual stated that

safety considerations alone, independent of any potential security concerns, warrant regulations for FFD programs for construction before fuel receipt.

In response to the industry's comments, the staff gathered information about FFD programs in other industries. The results of the staff's benchmarking activities have indicated that, in response to the higher incidence of substance problems among construction workers, pre-employment, for-cause, and post-accident drug and alcohol testing are increasingly common at large, commercial construction projects and some labor union coalitions have implemented testing and treatment-referral programs for their members. In addition, the staff also identified several private-sector entities in the petrochemical and steel manufacturing industries that require drug and alcohol testing, including random testing, for construction workers on large projects, as well as employment history and other background checks. Where safety and/or security during construction are critical, large construction projects initiated by some Federal agencies (e.g., the Department of Energy) require drug and alcohol testing, including random testing, extensive background checks, and continuous behavioral observation by dedicated observers for the most sensitive construction tasks. The staff concluded that (1) implementing FFD requirements for new nuclear power plant construction activities is consistent with the practices of other industries, and (2) taking a graded approach to FFD requirements, by imposing requirements that are commensurate with the potential risks that the results of certain construction activities may pose when a plant begins operations, is consistent with the approach implemented by other government agencies.

Based on the staff's assessment of the potential risks to public health and safety and the common defense and security that the results of construction activities may pose when a plant begins operations, the staff concluded that—

- (1) Relying on voluntary FFD programs would not assure that all workers who construct safety- and security-related SSCs or provide oversight of those construction activities are subject to a program;
- (2) Relying on voluntary FFD programs that include only pre-employment, for-cause, and post-accident testing would not provide the on-going detection and deterrence of substance abuse that is achieved by either random testing or a fitness monitoring program;
- (3) The extensive programs required for operating plants are not warranted for all nuclear power plant construction activities, but consistent implementation of an FFD program that provides on-going detection and deterrence of substance abuse is warranted; and
- (4) Public confidence in new plant construction will be enhanced by a program to provide reasonable assurance that individuals who construct safety- and security-related SSCs are fit for duty.