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# **Occupational Radiation Safety SDP**



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### Appendix C

Occupational Radiation Safety Significance Determination Process

#### 1. Guidance

The objective of this cornerstone is to ensure worker health and safety from exposure to radiation from licensed or un-licensed radioactive materials during routine operations of civilian nuclear reactors. The health and safety of workers is assured by maintaining their doses within the limits in 10 CFR 20 and as low as is reasonably achievable (ALARA).

Licensee performance in the cornerstone is assessed by considering the PI indication in combination with inspection findings. A baseline inspection is maintained to verify the accuracy and completeness of the PI data (i.e., work control in radiologically significant areas), supplement the PI data in areas where the PI alone is not sufficient to measure performance (i.e., problem identification and resolution), and complement the PIs with inspection findings of performance for areas not covered by the PI (i.e., ALARA planning and controls, radiation monitoring instrumentation, and personnel dosimetry).

The Significance Determination Process (SDP) is the mechanism in which the significance of individual events (follow-up of an operational occurrence, substantiated allegation, or other inspection finding) can be normalized and combined with the PI results to arrive at an overall cornerstone performance assessment. Logic flow charts are provided to outline the process. A finding that gets through the process (flow chart) without tripping a decision "gate" ends up as a GREEN finding. This does not mean that the performance on this individual finding is good or even acceptable. It still may be a non-conformance or a violation. It does mean that the safety significance of the event is not large enough to warrant further NRC intervention. Licensees are still required to come into compliance with the regulation and their commitments. However, the licensees are given the latitude to self correct these non-conformances.

#### **ALARA Findings**

Section 1101.(b) of 10 CFR Part 20 states that licensees shall use, to the extent practical, procedures and engineering controls based upon sound radiation protection principles to achieve occupational doses that are as low as is reasonably achievable (ALARA).

Section 1101 of 10 CFR Part 20 requires that each licensee develop, document, and implement a radiation protection program that includes provisions for keeping occupational radiation doses ALARA. As contained in the Statements of Consideration in the May 21, 1991 Federal Register concerning the revision to 10 CFR Part 20, the Commission continues to emphasize the importance of the ALARA concept to an adequate radiation protection program. A licensee's compliance with this requirement will be judged on whether the licensee has incorporated measures to track and, if necessary, to reduce exposures and not whether exposures and doses represent an absolute minimum or whether the licensee has used all possible methods to reduce exposures. An ALARA issue must successfully satisfy three screening criteria before it can be categorized as an ALARA finding. These screening criteria are contained in Supplement 2 of IMC 0609. Once it has satisfied these three criteria, the designated ALARA finding is entered into the Occupational Radiation Safety SDP and is analyzed using the ALARA portion of this SDP. The ensuing logic of the ALARA portion of the Occupational Radiation Safety SDP will sort the ALARA finding into either the GREEN, WHITE, or YELLOW significance band.

The first decision gate evaluates the magnitude of the actual measured job dose associated with the ALARA finding. If the actual collective job dose associated with the finding was not greater than 25 person-rem, and if there were two or fewer such occurrences in the last rolling 18-month period, then the ALARA finding is GREEN. If there have been three or more such occurrences in the last rolling 18-month period, then the finding 18-month period, then the finding is WHITE.

If the actual collective job dose is greater than 25 person-rem, then the finding is either WHITE or YELLOW depending on the magnitude of the plant's three-year rolling average collective dose. If the plant's current three-year rolling average collective dose is less than or equal to 340 person-rem(for PWRs) or 600 person-rem (for BWRs), then the finding will be WHITE. However, if the plant's current three year rolling average collective dose exceeds 340 person-rem (for PWRs) or 600 person-rem (for BWRs), then the ALARA finding will be designated as a YELLOW finding.

#### **Exposure Control Findings**

With the exception of shallow dose equivalent limits and doses from discrete radioactive particles (DRP), the failure to control radiation exposures to an individual resulting in a dose in excess of the 10 CFR 20 dose limits is at least a YELLOW finding. An exposure attributable to a DRP which exceeds the Enforcement Discretion of 75 Ci-hrs (as discussed in subsection 8:4:2 of the current Enforcement Manual (NUREG/BR-0195)) will be considered a WHITE finding. Occurrences that result in dose(s) in excess of five (5) times the 10 CFR 20 dose limits are designated as RED findings.

A failure to control radiation exposures to an individual resulting in a shallow dose equivalent in excess of the applicable limit in 10 CFR 20 is at least a WHITE finding. Occurrences that result in dose(s) in excess of five (5) times the shallow dose equivalent limit are designated as YELLOW findings.

Breakdowns in the Radiation Protection Program, or unintended exposures, that do not exceed a dose limit can still be considered significant if they constitute a "Substantial Potential for Overexposure". A substantial potential, consistent with the current Enforcement Manual (NUREG/BR-0195, subsection 8.4.1), is an occurrence in which a minor alteration of the circumstances would have resulted in a violation of Part 20 limits and it was only fortuitous that the altered circumstances did not occur. In the SDP the finding involving a substantial potential for overexposure can result in a WHITE or YELLOW finding depending on the dose rates (risk of a serious outcome) associated with the failure. In a Very High Radiation Area of 500 rads/hr, it can take as little as 3 minutes for a worker to receive 25 rem. Note, however, that the Enforcement Process (and possible civil penalty) will not engage unless the event involved an "actual consequence" (in this case an actual overexposure). The Assessment Process, rather than the Enforcement Process, will determine further licensee and NRC action for events that do not result in "actual consequences."

The last decision gate in the Exposure Control Findings portion of the Occupational Radiation Safety SDP is intended to sort out significant issues and findings related to plant equipment and facilities. The Assessment Program is a risk informed process, and radiation dose is the measure of health risk associated with licensee activities. Therefore, this gate focuses on those issues that could or do compromise the licensee's ability to assess dose. Since this gate culls out WHITE findings, it is intended that only significant, programmatic, failures of radiation monitoring and personnel dosimetry trip this gate. Examples of findings intended to be addressed by this gate include; 1) the licensee's failure to use a NVLAP certified dosimeter processor, 2) a generic and uncorrected failure of the electronic dosimeters (EDs) to respond to, or record, radiation dose, and 3) improper calibration of instruments or monitors (thereby significantly biasing their response) which are used as a basis for establishing protective controls. An individual failure to survey or monitor should be considered a failure of a radiation safety barrier and should be evaluated for its potential for unintended dose or substantial potential for overexposure, as discussed above.

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