

IMC 0609
Appendix C

OCCUPATIONAL RADIATION SAFETY
SIGNIFICANCE DETERMINATION PROCESS

I. APPLICABILITY

The significance determination process (SDP) in this Appendix is designed to provide a means by which NRC inspectors and management can assess the significance of inspection findings related to worker health and safety from exposure to radiation from licensed or unlicensed radioactive materials during routine operations of civilian nuclear reactors.

Background and basis information related to this SDP can be found in Inspection Manual Chapter 0308, "Reactor Oversight Process (ROP) Basis Document," Appendix C, Section 6, "Occupational Radiation Safety SDP."

II. ENTRY CONDITIONS

Each issue entering the SDP process must first be screened using IMC 0612, Appendix B, "Issue Screening."

III. DEFINITIONS

Within this SDP, the following definitions apply:

- A. ALARA. Maintaining radiation dose as low as reasonably achievable.
- B. Compromised ability to assess dose. Deficient program requirements (i.e., inadequate procedures that resulted in program failures), or failures to implement adequate program requirements, that resulted in chronic failure to account for exposures that exceed, or could have exceeded;
 - 1. an acute intake of radionuclides greater than 0.02 annual level of intake (ALI), per individual, or
 - 2. 100 mrem whole body from external exposure, per individual.

A compromised ability to assess dose can result from:

- 1. the licensee's failure to use a National Voluntary Laboratory Accreditation Program (NVLAP) certified dosimeter processor when required by 10 CFR Part 20, or

2. failure of the electronic dosimeters (EDs) to respond to, or record, radiation dose, or
 3. the improper calibration of instruments or monitors which are used as a basis for establishing protective controls, or
 4. the improper analysis of bioassay data that results in missed intakes of radioisotopes, or,
 5. the failure to recognize a radiologic hazard in the work place (i.e., the potential for exposure to alpha emitting, radionuclides resulting in the failure to appropriately assess intakes of these nuclides).
- C. Substantial potential for overexposure. As defined in the current Enforcement Manual (NUREG/BR-0195, subsection 8.4.1).
- D. Unplanned, unintended occupational collective dose. The total sum of the occupational radiation doses (collective dose) received by individuals for a work activity in excess of that collective dose planned or intended (i.e., that dose the licensee determined was ALARA) for that work activity.
1. Planned, or intended, collective dose can be the result of a realistic dose estimates (or projection) established during ALARA planning or the dose expected by the licensee (i.e., historically achievable) for the reasonable exposure control measures specified in ALARA procedures/planning. These do not include “stretch goals” set by a licensee to challenge their organization to strive for excellence in ALARA performance.
 2. Collective dose associated with reasonably unexpected changes in the scope of work, material conditions, or radiological conditions, during a work activity (and for which measures are implemented to track, and if necessary, to reduce these doses) should also be considered intended dose.
- E. Work activity. One or more closely related tasks that the licensee has (or reasonably should have) grouped together as a unit of work for the purpose of ALARA planning and work controls. In determining a reasonable grouping of radiological work, factors such as historical precedence, industry norms, and special circumstances should be considered.

IV. SIGNIFICANCE DETERMINATION PROCESS FOR OCCUPATIONAL RADIATION SAFETY

- Step 1. Identify whether the inspection finding is related to ALARA (e.g., does the finding concern unintended collective dose resulting from a deficiency in the ALARA planning or work control, or exposure control).
- a. If the inspection finding is related to ALARA, then go to Step 2.
 - b. If the inspection finding is not related to ALARA, then go to Step 5.

- Step 2. Consider the licensee's overall ALARA performance. The three-year rolling average collective dose is a high level indication of the radiological challenges the program faces. This SDP decision is intended to direct NRC inspection resources to those programs with the largest challenges.
- a. If the licensee's current 3-year rolling average collective dose is MORE than 135 person-rem/unit for a PWR or more than 240 person-rem/unit for a BWR, then go to Step 3.
 - b. If the licensee's current 3-year rolling average collective dose is LESS than 135 person-rem/unit for a PWR or LESS than 240 person-rem/unit for a BWR, then the significance of the inspection finding is GREEN.
- Step 3. Consider the magnitude of the actual collective dose associated with a work activity. The criterion in this step represents a level of actual dose at which it is reasonably expected that there will be licensee management review and oversight to confirm the adequacy of ALARA measures.
- a. If the actual dose is GREATER than 25 person-rem, then the significance of the finding is WHITE.
 - b. If the actual does is LESS than 25 person-rem, then go to step 4.
- Step 4. Consider overall ALARA program performance and the aggregate impact of the licensee's collective dose.
- a. If the licensee has MORE than 4 occurrences, then the significance of the inspection finding is WHITE.
 - b. If the licensee has LESS than 4 occurrences, then the significance of the inspection finding is GREEN.
- Step 5. Identify if the inspection finding involved an overexposure.
- a. If the finding involves an overexposure, then go to Step 6.
 - b. If the finding DOES NOT involve an overexposure, then go to Step 9.
- Step 6. Identify if the exposure was a shallow dose equivalent (SDE).
- a. If the overexposure was an SDE exposure, then go to Step 7.
 - b. If the overexposure WAS NOT an SDE exposure, then go to Step 8.
- Step 7. Consider the quantity of the SDE.
- a. If the SDE was MORE than 5 times the limit, then the significance of the inspection finding is YELLOW.

- b. If the SDE was LESS than 5 times the limit, then the significance of the inspection finding is WHITE.

Step 8. Consider the dose when the overexposure is NOT SDE exposure.

- a. If the dose was MORE than 5 times the limit, then the significance of the inspection finding is RED.
- b. If the dose was LESS than 5 times the limit, then the significance of the inspection finding is YELLOW.

Step 9. Consider the occurrence constituted a substantial potential for overexposure.

- a. If there was a substantial potential for overexposure, then go to Step 10.
- b. If there was no substantial potential for overexposure, then go to Step 12.

Step 10. Was the substantial potential associated with a SDE/DRP exposure.

- a. If the exposure WAS the result of a shallow dose equivalent from a discrete radioactive particle, then the significance of the inspection finding is GREEN.

Step 11 Consider the risk of the whole body exposure substantial potential exposure in a Very High Radiation Area.

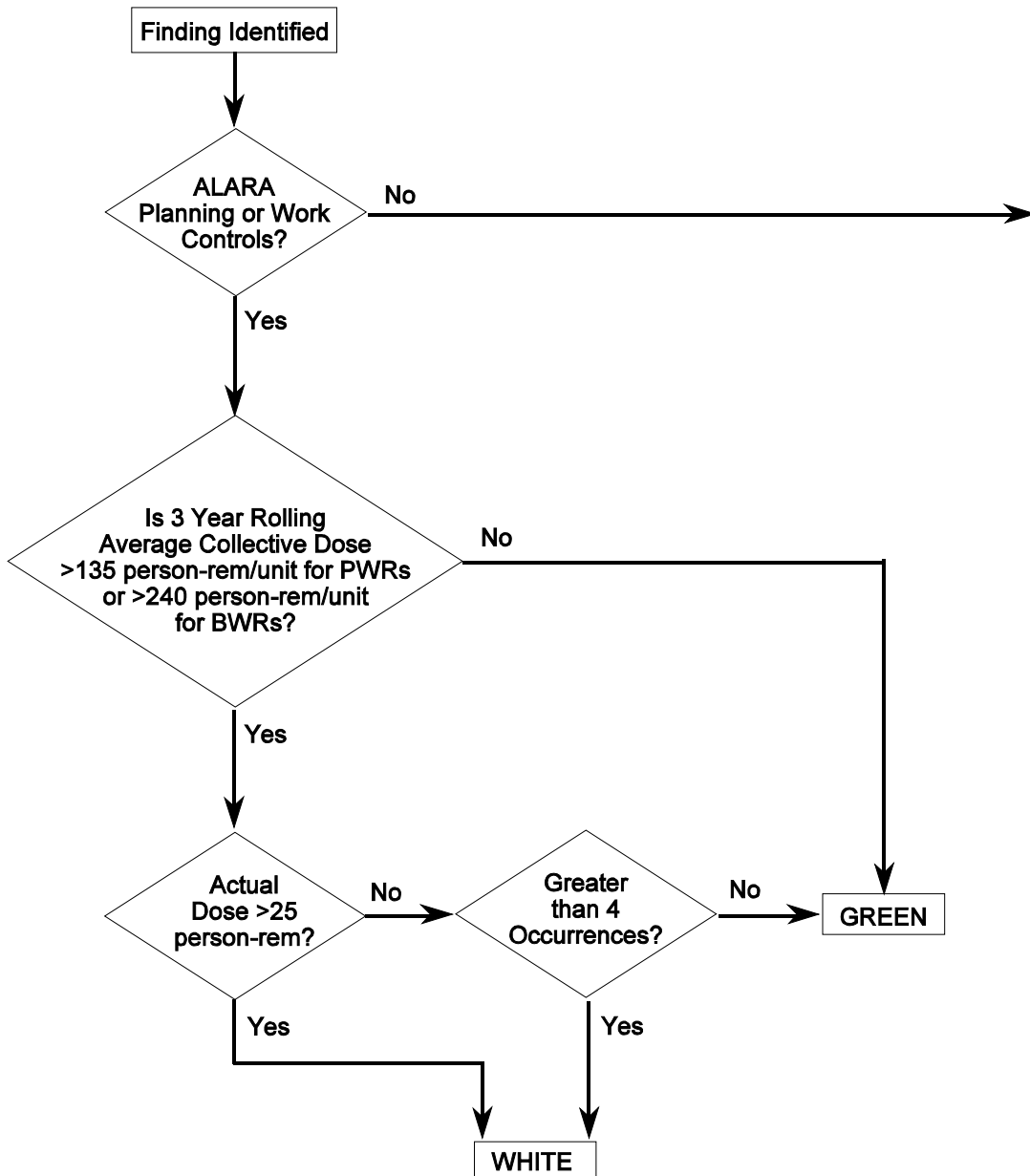
- a. If the exposure WAS a whole body exposure in a very high radiation area, then the significance of the inspection finding is YELLOW.
- b. and it WAS NOT a whole body exposure in a very high radiation area, then the significance of the inspection finding is WHITE.

Step 12 Does the finding involve a situation where the licensee's ability to assess dose was compromised?

- a. If the licensee's ability to assess dose WAS compromised, then the significance of the inspection finding is WHITE.
- b. If the licensee's ability to assess dose WAS NOT compromised, then the significance of the inspection finding is GREEN.

Note: An individual or isolated failure to survey, or monitor, does not constitute a compromised ability to assess dose. However, each should be considered as a failure of a radiation safety barrier and should have been evaluated for its potential for an overexposure in steps 5 and 9 above.

Occupational Radiation Safety SDP



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