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RECORD #328

TITLE: HEALTH PHYSICS POSITION: PROPER OPERATION AND USE OF ALARM
DOSIMETERS AT NUCLEAR POWER PLANTS

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SUBJECT: HEALTH PHYSICS POSITION: PROPER OPERATION AND USE OF ALARM
DOSIMETERS AT NUCLEAR POWER PLANTS

The enclosed subject health physics position is issued in response to numerous inspection report findings and regional requests for guidance on the proper use and operation of alarm dosimeters. This position has had the benefit of NMSS, RES and regional comment.

If you have any questions on this position, please contact Dan Carter at (301) 504-1848 or Jim Wigginton at (301) 504-1059.

Original Signed By:

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Enclosure: As stated

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**Health Physics Position
Proper Operation and Use of Alarm Dosimeters
at Nuclear Power Plants**

Background Information

This position is being provided in response to numerous inspection report findings and regional requests for guidance. The following examples of improper use/operation of alarm dosimeters (ADs) are illustrative of the types of recent problems that have occurred at nuclear power plants:

- 1) ADs are not operated in the proper mode of operation for their intended use [e.g., ADs were used in the accumulated dose mode (integrating mode) when the licensee procedure/RWP required them to be used in the dose rate mode of operation.]
- 2) Personnel do not exit, but continue working in high radiation areas, even though their AD is alarming in the integrating mode.
- 3) Health Physics personnel issue ADs to individuals without properly informing these users as to which mode of operation the AD is operating in or what the alarm setpoints are.
- 4) Contract HP technicians do not always receive training on the type of AD in use at their particular facility (even though different facilities may use different ADs.)
- 5) To prevent them from becoming contaminated, ADs are routinely placed in plastic bags and frequently placed inside the pockets of PCs. These actions decrease the ability of the wearer to hear the AD alarms, especially when worn in high noise areas that require the worker to use hearing protection.

The following requirements and guidance are referenced from the following publications:

- ◆ 10 CFR Part 20 "Standards For Protection Against Radiation"
- ◆ 10 CFR Part 19 "Notices, Instructions and Reports to Workers"
- ◆ Regulatory Guide 8.28 "Audible-Alarm Dosimeters"
- ◆ ANSI N13.27-1981 "Performance Requirements for Pocket Sized Alarm Dosimeters and Alarm Ratemeters"

Calibration of Alarming Dosimeters

Regulatory Guide 8.28 "Audible-Alarm Dosimeters" states that audible-alarm dosimeters are not generally substituted for conventional survey meters.

While this point is technically correct and consistent with good HP practice, Technical Specification (TS) 6.12.1 allows an audible-alarm dosimeter to be used instead of a survey meter or HPT accompaniment after the dose rates in the area have been measured with a survey meter and the workers in the area have been informed of the measured dose rates.

10 CFR 20.1501(b) states that "the licensee shall ensure that instruments and equipment used for quantitative radiation measurements (e.g., dose rate and effluent monitoring) are calibrated periodically for the radiation measured." Using a ADs cumulative alarm setpoint to initiate worker actions (i.e., exit an area when the alarm sounds) in HRAs, meets the intent of the above regulation. Based on the above requirements: ADs should be part of a routine instrument calibration program if they are used to satisfy the requirements under 10 CFR 20.1501(b) or if used under 10 CFR 20.1601(c) "alternative methods" as specified in Technical Specification 6.12.1 as a condition for entry into high radiation areas.

Training in the Proper Use of Alarm Dosimeters

10 CFR 19.12 "Instructions to Workers" states "all individuals working in or frequenting any portion of a restricted area shall be kept informed of the storage, transfer, or use of radioactive materials or of radiation in such portions of the restricted area; ...shall be instructed in the purposes and functions of protective devices employed, ...and instructed in the appropriate response to warnings made in the event of any unusual occurrence or malfunction that may involve exposure to radiation or radioactive material." (emphasis added)

To meet the above highlighted Part 19 requirements, a licensee needs to train personnel in the proper operation of ADs. This training should typically include, as a minimum, the following areas:

- Different modes of operation; integrated dose and dose-rate
- The different types of alarms including the different sounds of each alarm
- Actions to be taken upon receiving an alarm (i.e., leave the area and contact health physics, or move to a lower dose rate area)
- Guidance for proper use: (as adapted in RG 8.28)
 - 1) An AD should not to be routinely used as a survey meter (removed from the body and used to check dose rates in the area.)
 - 2) Care should be taken to avoid dropping of ADs and, if dropped, the ADs proper operation should be verified.
 - 3) ADs should not normally be used in high noise areas or when a user has a pronounced hearing loss or when the AD would be muffled by heavy clothing (e.g., PCs). When ADs are used in high noise areas, workers should be instructed to visually check their ADs

frequently (similar to reading a pocket ion chamber) or be equipped with a means of warning the individual of an AD alarm while in the high noise area (e.g., remote ear-piece or visual flashing light.)

- 4) Source and battery checks should be performed daily when the ADs are in use, and prior to the first use when they have been inactive.