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RECORD #40

TITLE: Effluent Radiation Monitor Calibrations

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UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D. C. 20555

NOV 13 1985

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MEMORANDUM FOR: Carl J. Paperiello, Chief  
Emergency Preparedness and Radiological  
Protection Branch  
DRSS, RIII

FROM: Robert L. Baer, Chief  
Engineering and Generic Communications Branch  
Division of Emergency Preparedness and  
Engineering Response  
Office of Inspection and Enforcement

SUBJECT: EFFLUENT RADIATION MONITOR CALIBRATIONS

This memorandum responds to your June 3, 1985 memorandum requesting our review and evaluation of the adequacy of one-point calibrations for scintillation and GM detector effluent radiation monitors. We have discussed this issue with METB, NRR and they concur with our reading of the technical specification requirements.

After a review of the existing Regulatory Guides (1.21 and 4.15) and ANSI industry standards (ANSI N13.10) which establish relevant guidance, we do not believe these documents suggest multi-point calibrations are necessary beyond the initial preoperational acceptance testing for these effluent monitoring systems (sometimes referred to as "primary calibration", as used in ANSI N13.10-1974, section 5.4.10). Section 5.4.10 further states that the primary "...calibration shall be related to a secondary source or method which will be used for periodic in-plant recalibrations." We read this as suggesting that routine re-calibrations can be less rigorous than the one-time, initial primary calibration. These periodic re-calibrations then should be viewed as ensuring the detection system has remained stable over time. Therefore, "single point" calibrations using secondary sources (e.g., solid,) should be considered adequate to meet the requirements of standard technical specifications where detectors are inherently linear.

Assuming a licensee calibrates at a single point, we believe the licensee should consider selecting that point at or near an alarm or action level. Routinely calibrating near an alarm point, coupled with the ongoing comparison of real-time monitor readings against laboratory analysis of periodic grab samples containing "normal" levels of radioactive effluents, seems to provide an adequate assurance of proper monitoring operability. However, calibration near an alarm point or action level is neither a requirement nor a position in the relevant guides or standard.

Contact: Jim Wigginton  
(301)492-4967

Region V provided input pertinent to this discussion which focused on detector saturation problems (memorandum from Wenslawski to Baer and Paperiello with copies sent to all Regions, June 12, 1985). The memorandum documents performance testing by a Region V licensee to determine the potential for saturation problems with the plants' effluent monitors. In general, the licensee found G. M. tubes were most seriously affected, NaI/PM tubes less affected and plastic scintillator/PM tubes least affected.

Given the overall upgrade in effluent monitoring as a result of the NUREG-0737 requirements, we believe each licensee should already be able to demonstrate adequate effluent monitoring capability at high ranges needed during accidents to provide meaningful information relative to a monitored "accident-type" release stream. The evidence demonstrating monitor operability at high ranges need not be verified by each licensee as primary calibrations since previous guidance provided by NRR for calibration of NUREG-0737 monitors suggests other acceptable alternatives (memorandum from Eisenhut to Regional Directors, August 16, 1982).

In summary, we find "single-point", routine calibrations adequate for scintillation monitors, given the monitors inherent stability and a thorough initial primary calibration. The use of single point, routine calibrations for GM tubes is acceptable, given that the radiation monitor initiates a fail-safe trip function (isolates, or re-directs the effluent to another monitored pathway) below the radiation level where the initial primary calibration began to show appreciable saturation losses. To ensure control room operators understand GM effluent monitor system limitations, emergency implementing procedures should clearly define these system limitations. For example, in the event of a steam generator tube failure, the procedures should highlight (e.g., caution notes) probable invalid readings from a SJAE GM monitor (down scale response as the detector saturates, in response to a worsening primary-secondary leakage).

If you have any further questions, please contact me or Jim Wigginton.

Robert L. Baer, Chief  
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Office of Inspection and Enforcement

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\*See previous concurrences

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