



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

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DEC 7 1977

MEMORANDUM FOR: Reactor Safeguards Licensing Branch, DOR
FROM: Robert A. Clark, Chief, Reactor Safeguards
Licensing Branch, DOR
SUBJECT: PERFORMANCE OF X-RAY DEVICES - REVIEW GUIDELINES #4

All licensees are required to search packages entering the protected area. This search may be conducted by X-ray devices. Enclosed is a standardized procedure that is acceptable to assure the X-ray devices are operating properly.

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cc: J. R. Miller
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Performance of X-Ray Devices

Equipment Performance Standard:

- (1) An X-ray monitor must be able to image and an operator must be able to see an insulated 24 gauge solid copper wire.

Operator Performance Standard:

- (1) Operators of an X-ray monitor must be trained to recognize unauthorized articles, including weapons, explosives and incendiary devices in X-ray images.

X-ray Imaging Testing:

- (1) At least quarterly, each X-ray system shall be tested to assure that the monitor will image and an operator can see insulated 24 gauge solid copper wire.
- (2) A wire test kit is used consisting of samples of 20, 22, 24 and 26 gauge solid copper wire.
- (3) The wire test samples are placed in X-ray systems in the same way packages are introduced. If the 26 gauge wire can be seen, the X-ray exceeds performance standards. If the 24 gauge wire can be seen clearly, the X-ray is acceptable. If 22 gauge wire can be seen clearly but not 24 gauge, the X-ray monitor must be repaired or replaced within 48 hours. If 20 gauge wire can be seen but not 22 or 24 gauge, the X-ray monitor must be repaired

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or replaced within 24 hours. If 20 gauge wire cannot be seen, the X-ray cannot be used for the screening of packages. Items must be physically inspected.

X-ray Operator Testing:

- (1) An evaluation of operator performance is conducted at least quarterly at each X-ray system. The procedures set forth below are followed using as the test object guns designed for calibration of detector testing. (COLT .25 automatic, Tite .25 automatic, General Precision Model 20.22LR, CPM.22 cal.)
- (2) The test object is positioned in a package so that a clear undisguised lateral (profile) image would logically be projected on the monitor during X-ray inspection of the package.
- (3) The person conducting the test presents the package for inspection just as any person would - without prior notification or identification.
- (4) If the operator detects the object, he or she is appropriately credited.
- (5) If the test object is visible on the monitor and is not detected by the operator, arrangements are made for corrective action such as training, supervision, disciplinary action, etc.
- (6) If a clear image of the test object is not visible on the X-ray monitor, the wire test is conducted to make certain the X-ray is operating satisfactorily. If it is, the operator test is repeated. If not, appropriate corrective action is taken.