DEPARTMENT OF TRANSPORTATION
MATERIALS TRANSPORTATION BUREAU
WASHINGTON, D.C. 20590

[14 CFR Part 103]

[Docket No. HM-131; Notice No. 75-10]

TRANSPORTATION OF DANGEROUS ARTICLES AND MAGNETIZED MATERIALS

Proposed Inspection and Monitoring Requirements for Radioactive Materials

The Materials Transportation Bureau is considering amending Part 103 of the Federal Aviation Regulations to require aircraft operators to perform certain inspection and monitoring of radioactive material shipments.

On April 25, 1974, a notice of proposed rule making (Docket No. 13668; Notice No. 74-18; 39 FR 14612) on this same subject was published by the Federal Aviation Administration (FAA). That proposal was finalized, with certain changes, on February 4, 1975, as Amendment No. 103-23, to have an effective date of June 30, 1975.

Numerous petitions were subsequently received by FAA requesting an extension of the June 30, 1975, effective date, citing unclear specifications as to the radiation monitoring instrument needed to perform the required monitoring of radioactive materials packages, stating that criteria of plus or minus 20 percent accuracy was deficient, in the absence of specifying a range limit. The petitioners further stated that even when more definitive instrument specifications have been developed and published, that the instrument manufacturers and suppliers would require further time to supply the proper equipment to the aircraft operators, who, in turn, would need further time to properly train their cargo handling personnel in the use of such instruments.

The petitioners also stated that, as published, the rule was unclear as to which type of radiation, *i.e.*, gamma, beta, alpha, or neutron, or whether all four types were to be monitored. If the latter were to be the case, they stated that more than one type of instrument at each monitoring station would be required, since no single instrument was commercially available which had the capability of suitably detecting all of the types of radiation.

Several petitioners also requested reconsideration of the requirement for monitoring each package after its removal from the aircraft and prior to its next departure. They pointed out that the "planeside monitoring", which would be required as a result, presented serious, if not impossible, operational difficulties due to the nature of airline operations which involve short duration turnarounds and enroute stops, and are affected by factors such as weather conditions. They further pointed out that the monitoring of off-loaded packages could best be performed after transfer to the freight terminal. They argued that if such monitoring detected radiation or contamination in excess of some stated levels and the aircraft had already departed, monitoring of the aircraft could be performed at its next stop.

After consideration of the merits of the petitions, the FAA extended the effective date for compliance with the radiation monitoring requirements to January 1, 1976 (Amendment 103-25, Docket No. 14530, 40 FR 26673). FAA also announced at the same time that it had instituted a study to develop more realistic specifications for the radiation monitoring instrument.

Since March 1975, the Office of Hazardous Materials Operations of the Materials Transportation Bureau, in cooperation with the FAA, the Civil Aeromedical Institute, the Transportation Systems Center, and the U.S. Nuclear Regulatory Commission have studied the problem with the objective of clarifying the technical specification and use of the radiation monitoring instrument. Before arriving at a proposed clarification, it was the consensus of the above group that the objective of the monitoring had to be clearly identified. It recognized that there were two possible objectives in monitoring, *i.e.*, to detect levels of radiation or contamination resulting from the unusual and unlikely loss of shielding or breach of containment or to verify that the shipper's assigned transport index (T.I.) was in compliance. It was clearly recognized that either objective would dictate significantly different instrument specifications, and also that no single type of instrument could adequately detect all types of radiation. The group agreed that the principal objective of radiation monitoring by air carriers be to detect the radiation hazard situation and not to verify compliance of the T.I. The group also agreed that from the practical standpoint, gamma radiation was the most significant potential problem, recognizing that very few packages emitting only neutron radiation are transported, and also recognizing that alpha and beta radiation do not present an external radiation hazard. It was further recognized that monitoring for external gamma radiation alone might not in every case detect alpha or beta contamination from a leaking package.

The proposals herein afford an opportunity for interested persons to comment on what the Materials Transportation Bureau considers to be an appropriate and realistic instrument specification, as well as a practicable proposal for the application of the monitoring requirement.

Because these proposals on radiation monitoring are substantially different from the monitoring requirements finalized on February 4, 1975, and because the January 1, 1976, effective date for those requirements will pass before the proposals herein are finalized, the requirements of paragraph (d)(3) of section 103.3 and paragraphs (c), (d), and (e) of section 103.23, finalized on February 4, 1975 (Amdt. 103-23), have been revoked. (*See* Dkt. 13668 in this issue of the FEDERAL REGISTER.)

These proposals are substantially different from those finalized on February 4, 1975, in the following respects:

ACTION LEVEL

As proposed herein, the "action level" in performing the radiation monitoring would be 15 milliroentgens per hour (mr/hr). As published in § 103.23(d)(2) (Amdt. 103-23), the aircraft operator would have been required to verify that the measured T.I. was in agreement with that as assigned to the package label by the shipper or zero in the case of white labeled packages. The "action level" of 15 mr/hr is being proposed on the basis of what the Bureau believes to be a reasonable value for the average measurement error that might be experienced in relation to the maximum transport index allowed to be assigned by the shipper to a package carried aboard an aircraft. The proposal recognizes the objective stated above that the principal purpose of the radiation monitoring is to detect those unlikely situations involving levels of gamma radiation which indicate a loss of shielding or a breach of containment. This is consistent with the Bureau's position that verification of transport indexes assigned by shippers is not the principal purpose of monitoring by air carriers. The proposed "action level" of 15 mr/hr also will be more conducive to the utilization of "fixed" radiation monitors in an automated scanning "pass by" type system in those stations handling significant numbers of packages. Such systems can also be very effective in reducing potential exposure to any package handling personnel who may routinely handle the monitoring and processing of radioactive shipments. It should be understood that in citing the 15 mr/hr "action level", it is not intended to imply that such a level of radiation would be "acceptable" with respect to the shipper's requirements. No change is being proposed with regard to the maximum transport index of 10 which applies to the shipper of radioactive packages. Rather, the proposed aircraft operator monitoring is intended to provide an additional or backup safeguard.

INSTRUMENT SPECIFICATION

More definitive operating characteristics are being provided, specifying the required operational range, percent efficiency, energy range sensitivity, battery check capability, maximum response time, and nonsaturation feature at high levels of radiation.

"OFF-LOAD" INSPECTION AND MONITORING

As proposed herein, a visual inspection of each package would be required after off-loading each package from an aircraft, prior to its departure. In the event

this inspection reveals suspected leakage or damage to the package integrity, radiation monitoring would have to be performed immediately. After the visual inspection and transfer of the package into a freight terminal, and before release to another transport mode or to the consignee, the radiation monitoring would have to be carried out. In the event that the off-loaded package is to be transferred to another air carrier for carriage aboard an aircraft, the Bureau interprets the provisions of proposed § 103.23(c)(1) to require that the new air carrier monitor the package in accordance with § 103.23(d) before placing it in an aircraft.

The effective date for the amendments proposed herein would be six months after their publication. This would recognize the lead time necessary for manufacturers and suppliers of radiation monitoring equipment to deliver equipment to air carriers and for air carriers to train cargo handling personnel in the operation and use of the equipment.

In consideration of the foregoing, it is proposed to amend 14 CFR Part 103 by:

1. Amending § 103.3 by adding a new paragraph (d)(3) to read as follows:

§ 103.3 Certification requirements.

* * * * *

(d) * * *

(3) After (six months from date of publication of amendment), for radioactive materials, the inspection required by § 103.23(c) discloses that the radiation dose rate does not exceed any requirement set forth in § 103.23(d).

2. Amending § 103.23 by adding paragraphs (c), (d), and (e) to read as follows:

§ 103.23 Special requirements for radioactive materials.

* * * * *

(c) In addition to the inspection required by § 103.4 after (six months from the date of publication of amendment), the operator of the aircraft shall—

(1) Before placing any package of radioactive materials in an aircraft, monitor it in accordance with paragraph (d) of this section.

(2) After removal of any package containing radioactive materials from an aircraft, and before the next departure of the aircraft—

(i) Examine the package in accordance with § 103.4(a)(1); and

(ii) If the examination required by paragraph (c)(2)(i) of this section discloses that there may be leakage of the contents or that the integrity of the package has been compromised, monitor the package in accordance with paragraph (d) of this section.

(3) As soon as practicable after removal of a package containing radioactive materials from an aircraft, prior to release to another transport mode or to the consignee, perform radiation monitoring in accordance with paragraph (d) of this section.

(d) In conducting the radiation monitoring required by paragraph (c) of this section, the operator of the aircraft shall—

(1) Use a radiation monitoring instrument that—

(i) Has a range such that 2 milliroentgens per hour (mr/hr) through 99 mr/hr can be measured;

(ii) When the meter of the instrument reads 15 mr/hr, or any other readings normally used when monitoring a radioactive material package at a distance of three feet from the package, the true exposure rate does not differ from the instrument reading by more than 60 percent for gamma energies of 70 kev to 1.2 mev;

(iii) At exposure rates that exceed the range of the instrument, up to at least 100 roentgen per hour (r/hr), the exposure rate indicator is maintained at the upper end of the range, or is otherwise designed so as to provide a positive response in the event of "saturation" to high level radiation;

(iv) Has a battery check capability;

(v) Has a response time not exceeding 12 seconds;

(vi) Will satisfy the specifications in paragraphs (d)(i) through (v) of this section over the ranges of temperature and humidity to which the instrument will be subjected during operational use.

(2) Monitor the package on all sides (including top and bottom). If the monitoring indicates an exposure rate exceeding 15 mr/hr at three feet from any exterior surface of the package, the package shall not be placed aboard an aircraft or released to another mode of transportation and the requirements as set forth in paragraph (b) of this section shall be initiated.

(e) In conjunction with the radiation monitoring requirements prescribed in paragraphs (c) and (d) of this section, the aircraft operator shall establish periodic instrument calibration and maintenance procedures which must be approved by the FAA District Office charged with the overall inspection of its operations.

Interested persons are invited to submit views and comments on the proposal. Comments should refer to the docket number and be submitted to: Docket Section, Materials Transportation Bureau, U.S. Department of Transportation, Trans Point Building, Washington, D.C. 20590. All comments received before the colse of business on February 17, 1976 will be considered, and will be available in the docket for examination both before and after the closing date. Comments received after the closing date and too late for consideration will be treated as suggestions for future rule making.

(49 U.S.C. 1472(h)(1); 49 U.S.C. 1804; 49 CFR 1.53(e), (h); and paragraph (a)(3) of App. A to Part 102)

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