

84

RECORD #84

TITLE: Clarification of Certain Requirements for Exclusive-Use Shipments

FICHE: 03579-256



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

August 29, 1980

Gentlemen:

Enclosed is IE Information Notice No. 80-32, "Clarification of Certain Requirements for Exclusive Use Shipments of Radioactive Materials." If you offer for transport or transport radioactive materials, --- including low-level radioactive wastes --- by exclusive-use highway vehicles, you should carefully review the information contained herein.

If you desire additional information regarding this matter, please contact the Director of the appropriate NRC Regional Office as specified in Appendix D, 10 CFR Part 20.

Sincerely,

A handwritten signature in cursive script that reads "James H. Sniezek".

James H. Sniezek, Director
Division of Fuel Facility and Materials
Safety Inspection
Office of Inspection and Enforcement

Enclosures:

1. IE Information Notice No. 80-32
2. Recently Issued IE Information Notices

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT
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IE Information Notice No. 80-32: CLARIFICATION OF CERTAIN REQUIREMENTS FOR
EXCLUSIVE-USE SHIPMENTS OF RADIOACTIVE
MATERIALS

Background

In mid-1979 the NRC initiated an enhanced program for inspection of shipments of radioactive materials, including, in particular, low level wastes. In conjunction with this effort, civil penalties have been assessed for violation of associated regulatory requirements. IE Bulletins 79-19 and 79-20, "Packaging of Low Level Radioactive Waste for Transport and Burial," issued August 8, 1979 and IE Information Notice 79-21, "Transportation and Commercial Burial of Radioactive Material," issued September 7, 1979, provide background in this regard.

During the past year, this augmented inspection/enforcement program has prompted a number of questions on the proper application of certain regulatory requirements. These questions involve mainly the problems and deficiencies associated with exclusive use highway shipments of low-level radioactive wastes. The purpose of this Notice is to discuss the questions and clarify the applicability of certain requirements.

Application of 49 CFR 173.393(i) and (j)

Numerous questions involve the application of the limits of radiation levels of exclusive use shipments as prescribed in 49 CFR 173.393(j). As stated therein, the regulation reads

(j) Packages for which the radiation dose rate exceeds the limits specified in paragraph (i) of this section, but does not exceed at any time during transportation any of the limits specified in paragraphs (j)(1) through (4) of this section may be transported in a transport vehicle which has been consigned as exclusive use (except aircraft). Specific instructions for maintenance of the exclusive use (sole use) shipment controls must be provided by the shipper to the carrier. Such instructions must be included with the shipping paper information:

- (1) 1,000 millirem per hour at 3 feet from the external surface of the package (closed transport vehicle only);
- (2) 200 millirem per hour at any point on the external surface of the car or vehicle (closed transport vehicle only);

- (3) Ten millirem per hour at any point 2 meters (six feet) from the vertical planes projected by the outer lateral surface of the car or vehicle; or if the load is transported in an open transport vehicle, at any point 2 meters (six feet) from the vertical planes projected from the outer edges of the vehicle.
- (4) 2 millirem per hour in any normally occupied position in the car or vehicle, except that this provision does not apply to private motor carriers.

The following questions and answers are intended to delineate the proper application of the limits cited above. The illustrations in Appendix A and B are intended to assist in clarifying the application of these limits.

Package Definition - Radiation Levels

1. Q. What limits would apply to packages being transported on an open, exclusive use transport vehicle?
 - A. If a shipment is being transported on an open transport vehicle (i.e., a vehicle not meeting the definition of 173.389(q)), no package on the vehicle may exceed the limits of 173.393(i). This limit applies whether or not the vehicle is restricted to exclusive use.
2. Q. What constitutes a closed transport vehicle?
 - A. A "closed transport vehicle" includes not only closed trailers and vans, but also arrangements where personnel barriers are fabricated around large packages carried on flat bed trailers. In meeting the requirements of a "closed transport vehicle," as defined in 173.389(q), if a flat-bed trailer is used and the radiation levels on the packages exceed the limits of 173.393(i), the vehicle must be equipped with a personnel barrier which restricts access to the cargo (packages). In such an instance, the radiation level limit of 173.393(j)(2) is to be applied at the exterior surface of the barrier (This barrier need not be solid, but may be a "see-through" screen, fence, cage, etc. which limits access from sides, top, and ends.) In practice, so-called "rag-top" trailers are sometimes used (e.g., a flat-bed with temporary sides or an open-top, which is equipped with a securely attached tarpaulin-type cover). When such covers are intact and secure all openings, they are generally acceptable as the closure of a "closed transport vehicle". A simple canvas covering wrapped about the packages on an open-top vehicle would not, however, be considered sufficient.
3. Q. In the situation described above, is such a "personnel barrier" considered to be the "package" or a component of the package?
 - A. The personnel barrier essentially becomes an integral part of the transport vehicle in such a case and may not be considered to be a component of the package. In such a case, the exterior of the

barrier would be placarded as required for the transport vehicle, and the packages inside marked as required for packages. Normally the package and vehicle are not considered to be the same, except in the case of unpackaged (bulk) shipment of Low Specific Activity (LSA) materials, as in a highway tank truck or rail tank car (see 173.392(d)(2)) or in certain specific, approved packaging systems (see 10 CFR 73.24(b)).

4. Q. In the above situation, then, what are the limits for radiation levels on the packages within such a personnel barrier?
 - A. 1000 mrem/hr at 3 ft, e.g., the limits for packages within a closed transport vehicle, as prescribed in 173.393(j)(1).
5. Q. If "packages" such as drums, for instance, are enclosed within an outer cask "shield" (as opposed to a personnel barrier or closed vehicle) wherein the outer cask shield is necessary to achieve compliance with the limit of either 173.393(i) or 173.393(j), may the inner drum(s) be considered to be the "package"?
 - A. No. In applying the definition of packaging as prescribed in 49 CFR 171.8, one must consider "... the assembly of one or more containers and any other components necessary to achieve compliance with the minimum packaging requirements...". Therefore, since the outer cask shield is necessary to achieve compliance with the radiation level limits, it is then considered as a necessary component of the packaging and the entire assembly, e.g., the inner drums and outer shield comprise the "package." It is also subject to the applicable package marking and labeling requirements, as well as the specification/certification requirements relative to its specific design.
6. Q. In the situation described above, would the levels of radiation on the inner drums be limited to the levels of 173.393(j)(1) e.g., 1000 mrem/hr at 3 ft.
 - A. No, since the inner drums are not the "package," only the radiation levels outside of the outer cask shield must meet the limits of 173.393(i) or (j), as applicable.
7. Q. In monitoring the radiation levels at the external surface of the transport vehicle, as prescribed in 173.393(j)(2), do the limits apply at the bottom and top of the vehicle, as well as at the sides?
 - A. Yes. 173.393(j)(2) states the limit in terms of "...200 millirem per hour at any point on the external surface of the car or vehicle...", therefore, the limit applies on the sides, top, and bottom of the transport vehicle. Some confusion has arisen on this rule in the past, in that some shippers have considered the underside of a highway trailer as an inaccessible location on the vehicle. This is not the case. The radiation levels on all surfaces of the vehicle must meet the requirements specified above.

8. Q. In the above situation, does this mean that in applying the limit of 173.393(j)(3) (e.g., 10 mrem/hr at 6 ft from the sides of the vehicle) the limit also applies at the top and bottom of the vehicle?
- A. No, 173.393(j)(3) imposes limits at 6 ft from the vertical planes projected at the outer lateral surface or outer edges of the vehicle, thus requiring measurements at the sides, front, and ends only.
9. Q. In 173.393(j)(3) the radiation level limit is prescribed at 10 mrem/hr at 2 m (6 ft) from the outer lateral surfaces of an exclusive use vehicle. Since 2 m is 6.6 ft, which limit would apply. 6 ft or 6.6 ft?
- A. 6.6 ft would apply.

Exclusive Use Shipment Requirements

10. Q. What is an "exclusive use" shipment?
- A. As defined in the DOT regulations, in 49 CFR 173.389(o)
- (o) "Exclusive Use" (also referred to as "sole use" or "Full Load" as used in IAEA regulations) means any shipment:
- (1) From a single consignor having the exclusive use of a transport vehicle or of an aircraft, or of a hold or compartment of an inland watercraft, or of a hold, compartment, or defined deck area of a seagoing vessel; and
 - (2) For which all initial, intermediate, and final loading and unloading is carried out by or under the direction of the consignor, consignee, or his designated agent.

It should be noted that the 173.389(o) definition is applicable to radioactive materials. DOT has stated its intent of the term "exclusive use" as generally meaning that a single consignor has complete use of the transport vehicle. This does not limit the consignor to shipping a single material, unless specifically restricted by a section of the regulations or some specific prohibition from loading and shipping certain materials in the same vehicle.

11. Q. Frequently shipments of radioactive waste are made as "exclusive use" shipments under arrangements whereby the original generator of the waste utilizes the services of a waste collector (i.e., "broker,") who in turn usually engages a common or contract carrier to transport the shipment or transports the material in his own vehicle as a private carrier. On occasion this "broker" may also be the consignee, e.g., a waste burial site operator. Because of this complex arrangement, confusion often arises as to which party is responsible for performing the regulatory requirements of the "shipper" or "consignor." Can you clarify this?

- A. This is often a confusing situation that needs clarification, principally because the regulations do not specifically define a "shipper" or "consignor" and yet specify regulatory requirements that apply to a "shipper" or person who "offers materials for transportation" by a carrier. In the nuclear waste transportation business, more than one party (e.g., the original "generator" and the "broker") can therefore be responsible for functions attributable to a "shipper."

In specific enforcement cases, the NRC Office of Inspection and Enforcement will make determinations based on which party actually performs a shipper function. For instance, if a party is the original "generator" who prepared the package for transport, this generator will be held responsible for the proper performance of the following shipper functions: selecting and preparing the package; filling and closing the package; measuring the radiation from the package; marking and labelling the package; preparing the shipping papers; loading the packages on the transport vehicle and measuring the radiation from the loaded transport vehicle. From that point on (i.e., after the loading of the vehicle and the "transfer" of the material from the generator to the broker/collector has taken place), the broker/collector will generally be held responsible for any ensuing shipper functions, such as those discussed in question 12.

12. Q. In the above situation, assume that a "broker" arranges for pickup or, himself picks up, radioactive waste from more than one generator's facility for transport as a single shipment by a common carrier or by himself as a private carrier. Is it not required that an exclusive use shipment be from a "single consignor"?

- A. Yes. For that reason it is imperative that the parties involved (the generators, broker and carrier) very thoroughly understand their respective roles and responsibilities. The single consignor for the exclusive use shipment has definite responsibilities. If the broker arranges for the pickup of radioactive waste from the facilities of more than one generator for transport as a single shipment by a common or contract carrier, or if the broker picks the material up and transports it in his own vehicle as a private carrier, the broker in effect becomes the "single consignor," having the exclusive use of the transport vehicle. It is important that the broker establish himself in the shipping paper documentation as the "single consignor." This must include the provision of appropriate instructions to the carrier for maintenance of exclusive use shipment controls. The broker is also responsible for providing appropriate supervision of the loading and storage of the multiple consignments to assure that the regulatory requirements are in fact met.

13. Q. In an exclusive use shipment of LSA materials, the shipper is required by 173.392(c)(9) to provide specific instructions to the carrier for maintenance of exclusive use shipment controls. What should such specific instructions include?

- A. The details of the specific instructions will vary, but the key word is "maintenance" of the controls. For instance, if the specific pattern of package loading is critical to maintain compliance with the radiation limits of 173.393(j), the shippers instructions should include appropriate instructions to the carrier to preclude the carrier from changing the loading pattern within the vehicle or shifting the cargo to a different vehicle (see 173.392(c)(4)). As an example of such a case, to satisfy a State requirement on axle weight limits, a carrier shifted packages within the vehicle; this caused the level of radiation at the exterior of the vehicle to exceed the limits. In another recent case, a carrier changed tractors on a shipment. The replacement tractor was of a different design from the original and caused the radiation level in the occupied area of the replacement tractor, which originally had been in compliance, to exceed the limits of 173.393(j)(4). Although changing of the tractor by a carrier is not prohibited, if the shipper has specified exclusive use controls, his instructions to the carrier should include direct advice that the shipper be notified if a change is made so that a decision can be made as to whether the radiation level pattern was affected by the tractor change.
14. Q. 49 CFR 173.393(j)(4) requires that the radiation level in any "...normally occupied position in the car or vehicle..." be limited to 2 mrem/hr. Where should this limit be applied in the case of a tractor with a sleeper cab.
- A. The most appropriate application of this rule is to consider the sleeper portion of such a tractor to be "normally occupied" and apply the 2 mrem/hr limit in that area. It is quite important to bear in mind that the limit of 173.393(j)(4) is intended to minimize the exposure of common carrier transport workers. In general, therefore, the existence of levels of radiation above background in any area of the cab of an exclusive-use shipment would best be interpreted by the shipper as an indicator that a thorough survey of the cab and evaluation of the loading is necessary to ensure that the radiation level is and remains below 2 mrem/hr. In addition, as a matter of practice, the radiation levels in the cab should be maintained as low as reasonably achievable and not be allowed to reach 2 mrem/hr on a routine basis.

Recent Examples of NRC Inspection/Enforcement Actions

Effective December 3, 1979, 10 CFR Part 71 was amended to require that all shipments of radioactive materials made by NRC licensees, other than shipments subject to the regulations of the U.S. Postal Service, be made in accordance with the regulations of the U.S. Department of Transportation in 49 CFR Parts 170-189. This amendment permits the Commission to inspect shipments of radioactive materials and to take enforcement action when warranted. On December 3, 1979, a letter was sent to all NRC licensees from the Director, Office of Inspection and Enforcement concerning the criteria for enforcement action for failure to comply with 10 CFR 71. This letter also stated that "severity Level I or II noncompliance will normally result in either civil penalties or more severe enforcement action." (See 44 Federal Register, page 77135, December 31, 1979.)

NRC inspectors have routinely inspected shipments of radioactive materials upon arrival at the disposal sites at Barnwell, South Carolina, Beatty, Nevada and Richland, Washington since September 1979. Enforcement action, including the imposition of civil penalties, were taken recently against NRC licensees who made shipments which were not in accordance with the regulations.

Examples of recent civil penalties imposed on NRC licensees for violations of 10 CFR 71/49 CFR involving shipments of waste to burial sites are:

1. A \$4000 civil penalty against a nuclear utility for excessive radiation levels (300 mrem/hr) on the surface of a package on an open transport vehicle (173.393(i), Severity Level II)
2. A \$5000.00 civil penalty against a nuclear utility for excessive radiation levels (17 mrem/hr) at 6 ft from the sides of an exclusive use vehicle (173.393(j)(3), Severity Level II)
3. A \$1000 civil penalty against a radioisotope supplier for failure to provide instructions on shipping papers for maintenance of exclusive use shipment controls (173.392(c)(9), Severity Level II)
4. Three civil penalties totalling \$5000 against an industrial laboratory for use of nonspecification Type A packaging, improper shipping paper description, and unauthorized transfer of liquids to a burial site (173.395(a)(1), 172.203(d)(1), and 10 CFR 30.41(b)(c), Severity Levels II and III)
5. Two civil penalties totalling \$8000 against a nuclear utility for excessive levels of radiation (300 mrem/hr) at the external surface of a closed vehicle and inadequate surveys of the vehicle (173.393(j)(2) and 173.393(n)(9), Severity Level II)
6. A \$5000 civil penalty against a nuclear utility for excessive radiation levels (600 mrem/hr) on the surface of an exclusive use vehicle (173.393(j)(2), Severity Level I)
7. A \$4000 civil penalty against a nuclear utility for excessive radiation levels (3.7 mrem/hr) in the truck cab of an exclusive use shipment (173.393(j)(4), Severity Level II)
8. A \$4000 civil penalty against a nuclear utility for excessive radiation levels (700 mrem/hr) at the bottom surface of a closed transport vehicle (173.393(j)(2), Severity Level I)

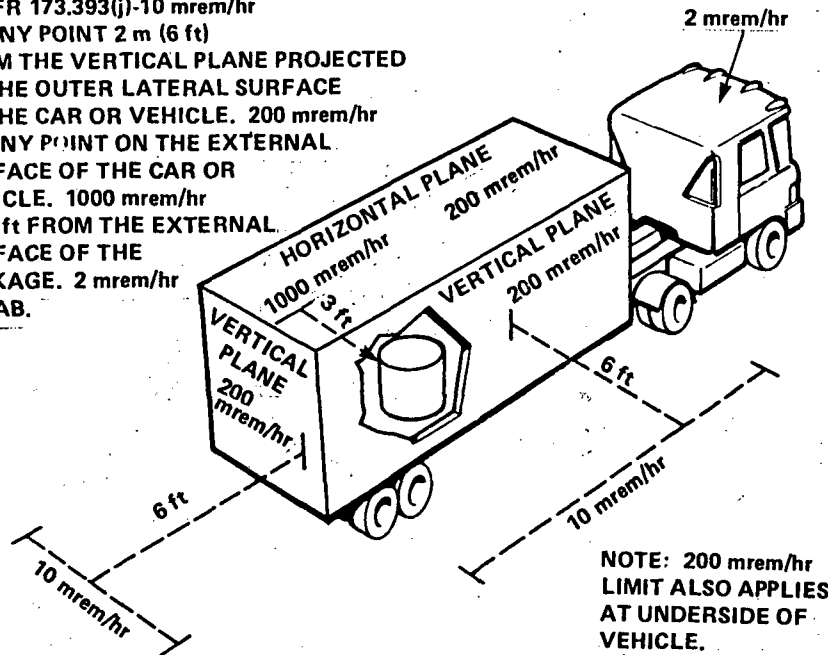
In addition, infractions and deficiencies were noted on other shipments. Noncompliance on matters such as the following were involved:

1. Packages not adequately blocked or braced to prevent shifting (173.392(c)(6)).
2. Vehicles not placarded or placards not visible (173.393(c)(8), 172.516(a)).
3. Shipping papers not complete (172.203(d)).

4. Packages identified as containing solids but actually containing free standing liquids (violation of burial site licensee requirements and NRC requirements on transfer of proper form of material, 10 CFR 20.301, 30.41)
5. Packages not marked as "Radioactive LSA" (173.392(c)(8)).
6. Packages of LSA were not strong, tight packages (173.392(c)(1)).

In addition to enforcement actions which may be taken by NRC, actions against agreement state licensee/shippers may also be taken by DOT or the states.

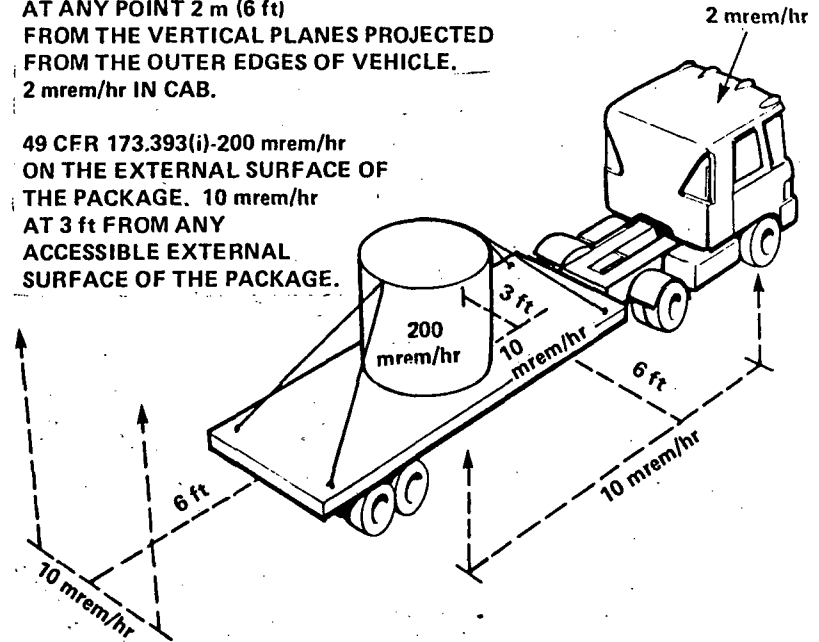
49 CFR 173.393(j)-10 mrem/hr
 AT ANY POINT 2 m (6 ft)
 FROM THE VERTICAL PLANE PROJECTED
 BY THE OUTER LATERAL SURFACE
 OF THE CAR OR VEHICLE. 200 mrem/hr
 AT ANY POINT ON THE EXTERNAL
 SURFACE OF THE CAR OR
 VEHICLE. 1000 mrem/hr
 AT 3 ft FROM THE EXTERNAL
 SURFACE OF THE
 PACKAGE. 2 mrem/hr
 IN CAB.



NOTE: 200 mrem/hr
 LIMIT ALSO APPLIES
 AT UNDERSIDE OF
 VEHICLE.

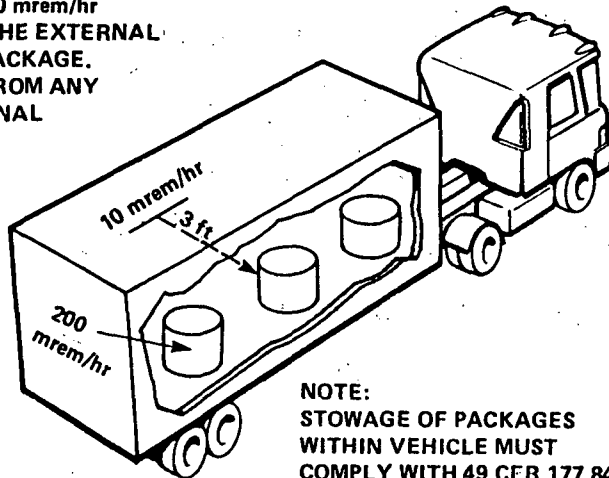
EXCLUSIVE-USE CLOSED TRANSPORT

49 CFR 173.393(j)-10 mrem/hr
 AT ANY POINT 2 m (6 ft)
 FROM THE VERTICAL PLANES PROJECTED
 FROM THE OUTER EDGES OF VEHICLE.
 2 mrem/hr IN CAB.



EXCLUSIVE-USE OPEN TRANSPORT

49 CFR 173.393(i)-200 mrem/hr
 AT ANY POINT ON THE EXTERNAL
 SURFACE OF THE PACKAGE.
 10 mrem/hr AT 3 ft FROM ANY
 ACCESSIBLE EXTERNAL
 SURFACE OF THE
 PACKAGE.



NOTE:
 TOTAL TI IS NOT
 TO EXCEED 50 PER
 49 CFR 177.842(a).

NOTE:
 STOWAGE OF PACKAGES
 WITHIN VEHICLE MUST
 COMPLY WITH 49 CFR 177.842(b).

**NON-EXCLUSIVE-USE OPEN OR CLOSED
 TRANSPORT**

APPENDIX A

IE INFORMATION NOTICE 80-32

**RADIATION
 LIMITS**

49 CFR 173.393(i) AND (j)

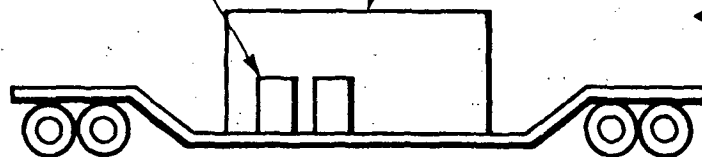
WHAT COMPRISES THE PACKAGE?

49 CFR 171.8 DEFINES PACKAGING SUCH THAT YOU MUST CONSIDER THE "... ASSEMBLY OF ONE OR MORE CONTAINERS AND ANY OTHER COMPONENTS NECESSARY TO ACHIEVE COMPLIANCE WITH THE MINIMUM PACKAGING REQUIREMENTS..."

THEREFORE:

INNER ASSEMBLY IS "PACKAGE"

OUTER ENCLOSURE IS A PERSONNEL BARRIER OR SIMULATED "CLOSED VEHICLE"

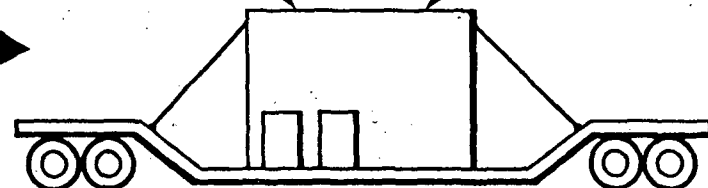


IN THIS SCENARIO, THE INNER PACKAGINGS MAY BE CONSIDERED TO BE THE "PACKAGE", PROVIDED THE OUTER ENCLOSURE IS NOT NECESSARY TO ACHIEVE COMPLIANCE WITH THE RADIATION LEVEL LIMIT OF 173.393(j)(2); i.e., 200 mrem/hr. LEVEL OF RADIATION ON EACH INNER "PACKAGE" MAY NOT EXCEED 1 rem/hr AT 3 ft FROM ITS SURFACE.

ENTIRE ASSEMBLY IS "PACKAGE"

OUTER ENCLOSURE IS A SHIELD

OR



IN THIS SCENARIO, THE ENTIRE ASSEMBLY (OUTER SHIELD PLUS INNER PACKAGINGS) MUST BE CONSIDERED AS THE "PACKAGE", SINCE THE OUTER SHIELD IS NECESSARY TO ACHIEVE COMPLIANCE WITH 173.393(j)(2). RADIATION LEVEL AT SURFACE OF "INNER" PACKAGINGS IS NOT LIMITED.

RECENTLY ISSUED
IE INFORMATION NOTICES

Information Notice No.	Subject	Date of Issue	Issued to
80-31	Maloperation of Gould-Brown Boveri Type 480 volt type K-600S and K-DON 600S circuit breakers	8/27/80	All light water reactor facilities holding OLs or CPs
80-30	Potential for unacceptable interaction between the control rod drive scram function and non-essential control air at certain GE BWR facilities	8/19/80	All boiling water reactor facilities holding power reactor OLs or CPs.
80-29	Broken studs on Terry turbine steam inlet flange	8/7/80	All light water reactor facilities holding power reactor OLs or CPs*
Supplement to 80-06	Notification of significant events at operating power reactor facilities	7/29/80	All holders of reactor and near-term OL applicants
80-28	Prompt reporting of required information to NRC	6/13/80	All applicants for and holders of nuclear power reactor CPs
80-27	Degradation of reactor coolant pump studs	6/11/80	All pressurized water reactor facilities holding power reactor OLs or CPs
80-26	Evaluation of contractor QA programs	6/10/80	All Part 50 licensees
80-25	Transportation of pyrophoric uranium	5/30/80	Material licensees in priority categories II-A, II-D, III-I and IV-DI; agreement state licensees in equivalent categories
80-24	Low level radioactive waste burial criteria	5/30/80	All NRC and agreement state licensees

* Operating Licenses or Construction Permits

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NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

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