Serial Number **1951/156**

THE TRANSPORT OF RADIOACTIVE SUBSTANCES REGULATIONS 1951

B. C. FREYBERG, Governor-General

ORDER IN COUNCIL

At the Government House at Wellington, this 18th day of July, 1951

Present:

HIS EXCELLENCY THE GOVERNOR-GENERAL IN COUNCIL

PURSUANT to the Radioactive Substances Act, 1949, His Excellency the Governor-General, acting by and with the advice and consent of the Executive Council, doth hereby make the following regulations.

REGULATIONS

1. These regulations may be cited as the Transport of Radioactive Substances Regulations 1951, and shall come into force on the day after the date of their notification in the *Gazette*.

2. In these regulations, unless the context otherwise requires,—

"Significant", in relation to any contamination or radiation, means about 500 alpha disintegrations per 100 square centimetres per minute, or about 0·1 milliroentgens equivalent physical per hour of beta or gamma radiation:

"Unit" or "radiation unit", in relation to a radioactive substance packed for transport, means a measure of the amount of radiation received per hour at a distance of one metre from the substance, one unit for hard gamma radiation being equal to one milliroentgen, and for other radiation being that amount which has the same effect on photographic film as one milliroentgen of the hard gamma rays produced by filtering radium rays with one half inch of lead:

Expressions used herein which are defined in the Radioactive Substances Act, 1949, have the meanings so defined:

Expressions used herein which are defined in regulation 2 of or in the Schedule to the Radiation Protection Regulations 1951* have the meanings so defined.

3. (1) No person shall offer any radioactive substance for transportation by rail, ship, or aircraft, or by any licensed transport service within the meaning of the Transport Act, 1949, unless the radioactive substance is packed, shielded, labelled, and marked in accordance with the provisions of these regulations.

(2) No person shall send any radioactive substance by post, or offer any radioactive substance for transportation by post.

* Statutory Regulations 1951, Serial number 1951/155, page 482.

CLASSIFICATION OF RADIOACTIVE SUBSTANCES FOR TRANSPORT PURPOSES

4. For the purpose of these regulations, radioactive substances are hereby divided into the following groups according to the type of rays emitted at any time while in transit, namely :—

Group I : Radioactive substances that emit gamma rays only or both gamma rays and electrically charged corpuscular rays :

Group II : Radioactive substances that emit neutrons and either or both of the types of radiation emitted by substances in Group I :

Group III : Radioactive substances that emit electrically charged corpuscular rays only ; that is, alpha rays or beta rays.

REQUIREMENTS FOR PACKAGING AND SHIELDING

5. Radioactive substances belonging to Group I shall be so packed and shielded that at any time during transportation the gamma radiation at 1 metre (39·3 in.) from any point on the radioactive source will not exceed 10 milliroentgens per hour. The shield shall be so designed that it will maintain its efficiency under conditions normally incident to transportation, and the shielding shall be sufficient to prevent the escape of any primary corpuscular radiation to the exterior of the outer transport container.

6. (1) Radioactive substances belonging to Group II shall be so packed and shielded that at any time during transportation the radiation measured at 1 metre (39·3 in.) from any point on the radioactive source will not exceed the following limits :—

(*a*) 10 milliroentgens per hour of gamma radiation ; or

(*b*) 10 milliroentgens equivalent physical per hour of electrically charged corpuscular radiation ; or

(*c*) 2 milliroentgens equivalent physical per hour of neutrons :

Provided that if more than one of the types of radiation named in the last three preceding paragraphs is present, the radiation of each type shall be reduced by shielding so that the total does not exceed the equivalent of the radiation named in any of those paragraphs.

(2) The shielding for radioactive substances in Group II shall be designed so as to maintain its efficiency under conditions normally incident to transportation, and so that human beings shall be provided with adequate protection against fast or slow neutrons and all ionizing radiation originating in the radioactive substance or any part of the aggregate constituting the complete package.

7. Radioactive substances in Group III shall be packed in suitable inner containers completely enclosed in such material as will prevent the escape of primary corpuscular radiation to the exterior of the transport container, and secondary radiation at the surface of the container shall not exceed 10 milliroentgens equivalent physical per twenty-four hours, at any time during transportation. The enclosure shall be so designed as to maintain its efficiency under conditions normally incident to transportation.

8. Liquid radioactive materials in Group I, Group II, or Group III shall, in addition to such of the requirements of the last three preceding regulations as may be applicable, be packed inside a second gastight container. The innermost container shall be surrounded on all sides and within the shield by an absorbent material sufficient to absorb the entire liquid contents and of such nature that its efficiency will not be impaired by chemical reaction with the contents:

Provided that no absorbent material need be provided in accordance with the foregoing provisions of this regulation where the radioactive substance is packed in a metal container made of stainless steel, malleable iron, or brass, not more than 3 in. in diameter or 8 in. in length, having a minimum wall thickness of one eighth of an inch, and being hermetically sealed and closed by screws, or in such other container as may from time to time be approved by the Director-General of Health.

9. Not more than 2 curies of radium, polonium, or any other member of the radium family and not more than that amount of any other radioactive substance that undergoes 10^{11} disintegrations per second may be packed in one outer transport container except by special arrangements with and under conditions approved by the Director-General of Health.

10. Radioactive substances which present special hazards due to their tendency to remain fixed in the human body for long periods of time (such as radium, plutonium, or strontium) shall, in addition to complying with such of the foregoing provisions of these regulations as may be applicable, be packed in inner metal containers of stainless steel, malleable iron, or brass, not more than 3 in. in diameter or 8 in. in length, having a minimum wall thickness of one eighth of an inch, and being hermetically sealed and closed by screws, or in such other containers as may from time to time be approved by the Director-General of Health.

11. (1) All radioactive substances shall be so packed and shielded that the degree of fogging of undeveloped photographic film under conditions normally incident to transportation (twenty-four hours at 15 ft. from the package) will not exceed that produced by 11·5 milliroentgens of penetrating gamma rays of radium filtered by one half of an inch of lead.

(2) The design and preparation of the package shall be such that there will be no significant radioactive surface contamination on any part of the container.

(3) The smallest dimension of any outer transport container for radioactive substances shall be not less than 4 in.

(4) All outer transport containers of radioactive substances shall be of such design that the gamma radiation will not exceed 200 milliroentgens per hour or their equivalent at any point of readily accessible surface. Containers shall be equipped with handles and protective devices when necessary in order to comply with this requirement.

(5) The outside of the transport container for any radioactive substance shall be a wooden or fibreboard box or such other equally efficient container as may from time to time be approved by the Director-General of Health.

12. No person shall offer for transportation by post, rail, ship, or aircraft, or by any licensed transport service as aforesaid any container or accessory which has been used for shipment of any radioactive substance, unless the container or accessory is sufficiently free of radioactive contamination that there is no significant alpha or beta radiation at the surface, and that the gamma radiation at any surface is less than 10 milliroentgens for twenty-four hours.

Labelling and Marking of Packages

13. (1) Each outer transport container of a radioactive substance in Group I or Group II shall be labelled with a properly executed label in the form set out in form No. 1 in the First Schedule to these regulations.

(2) Each outer transport container of a radioactive substance in Group III shall be labelled with a properly executed label in the form set out in form No. 2 in the First Schedule to these regulations.

Safety Precautions in Transit

14. (1) No person responsible for the time being for the custody while in transit of a container of radioactive substance in Group I or Group II (that is, one carrying a red label) shall place or permit the same to remain in any vehicle, ship, aircraft, depot, room, or other place closer than 3 ft. to an area which may be continuously occupied by passengers, employees, or shipments of animals. When more than one such container is present, the distance from occupied areas shall be computed from the table set out in the Second Schedule to these regulations by adding the number of units shown on labels on the containers.

(2) No person responsible for the time being for the custody while in transit of a container of radioactive substance in Group I or Group II shall place or permit the same to remain closer than 15 ft. to any package containing undeveloped film labelled as such. If more than one such container is present, the distance shall be computed from the said table by adding the number of units shown on the labels on the packages.

(3) No person shall transport more than 40 units of any radioactive substance in Group I or Group II in any vehicle or aircraft at any one time or store more than 40 units of any such radioactive substance in any depot, room, or other place in course of transit at any one time.

(4) The person responsible for the time being for the custody while in transit of any container of radioactive substance shall so block and brace the same in course of transit so as to prevent any shift of lading under conditions normally incident to transportation.

(5) No person shall carry any container of radioactive substance in Group I or Group II which is provided with handles except by the handles so provided.

(6) No person shall load or carry any radioactive substance in the same vehicle or aircraft or in the same hold or other compartment of any ship with explosives within the meaning of the Explosive and Dangerous Goods Act, 1908, and labelled as such.

(7) If for any reason a package containing radioactive substance in Group I or Group II would otherwise remain in the same room or vehicle or in the same hold or compartment of a ship for a period longer than twenty-four hours, the person responsible for the time

being for the custody of the same shall move it to a different room, vehicle, hold, or compartment, as the case may be, or to some other place, every twenty-four hours.

15. (1) Where any accident to a vehicle, ship, or aircraft results in breakage of, or unusual delay to, any shipment of radioactive substance, the person responsible for the time being for the custody thereof while in transit shall segregate the package or substance as far as possible from human contact, and shall immediately notify the consignor and the Director-General of Health.

(2) Where a package containing radioactive substance has been broken and it appears likely that the inner container may have been damaged, the person responsible for the time being for the custody thereof while in transit shall exercise great care to prevent contact with or inhalation of radioactive substance by any person.

16. No person shall load or carry any radioactive substance on any motor vehicle or aircraft when it is engaged in the carriage of passengers, except where no other practicable means of transportation is available.

EXEMPTIONS

17. The foregoing provisions of these regulations relating to the packing, marking, and labelling of radioactive substances shall not apply with respect to the transport of any radioactive substance which complies with the following conditions:—

(*a*) The package shall be such that there can be no leakage of radioactive substance under conditions normally incident to transportation;

(*b*) The package shall not contain more than 0·1 millicuries of radium or polonium or more than that amount of Sr^{89}, Sr^{90}, or Ba^{140} which disintegrates at a rate of more than 5×10^6 atoms per second or that amount of any other radioactive substance which disintegrates at a rate of more than 50×10^6 atoms per second;

(*c*) The package must be such that no significant alpha, beta, or neutron radiation is emitted from the exterior of the package, and the gamma radiation at any surface of the package must be less than 10 milliroentgens for twenty-four hours.

18. The foregoing provisions of these regulations relating to the packing, marking, and labelling of radioactive substances shall not apply with respect to the transport of manufactured articles (other than liquids), such as instruments or clock dials, of which radioactive substances are a component part, or of luminous compounds, when securely packed in strong outer containers, provided the gamma radiation at any surface of the package is less than 10 milliroentgens in twenty-four hours.

19. Notwithstanding anything contained in these regulations, where any container of radioactive substance arrives in New Zealand from the United Kingdom, Canada, or the United States of America it shall be deemed to comply with the provisions of these regulations relating to the packing, marking, and labelling of radioactive substances if it is packed, labelled, and marked in accordance with the law in that behalf in force for the time being in the country from which it was despatched.

20. (1) In any case where the Director-General of Health, upon application being made to him in writing by the person concerned, is satisfied that strict compliance with these regulations is not possible or would involve expenditure or hardship out of proportion to the degree of freedom from radiation hazard to be achieved by that compliance, he may exempt any particular person from compliance with specified provisions of these regulations, or may modify the requirements of any such specified provision if he is satisfied that adequate freedom from radiation hazards can and will otherwise be secured.

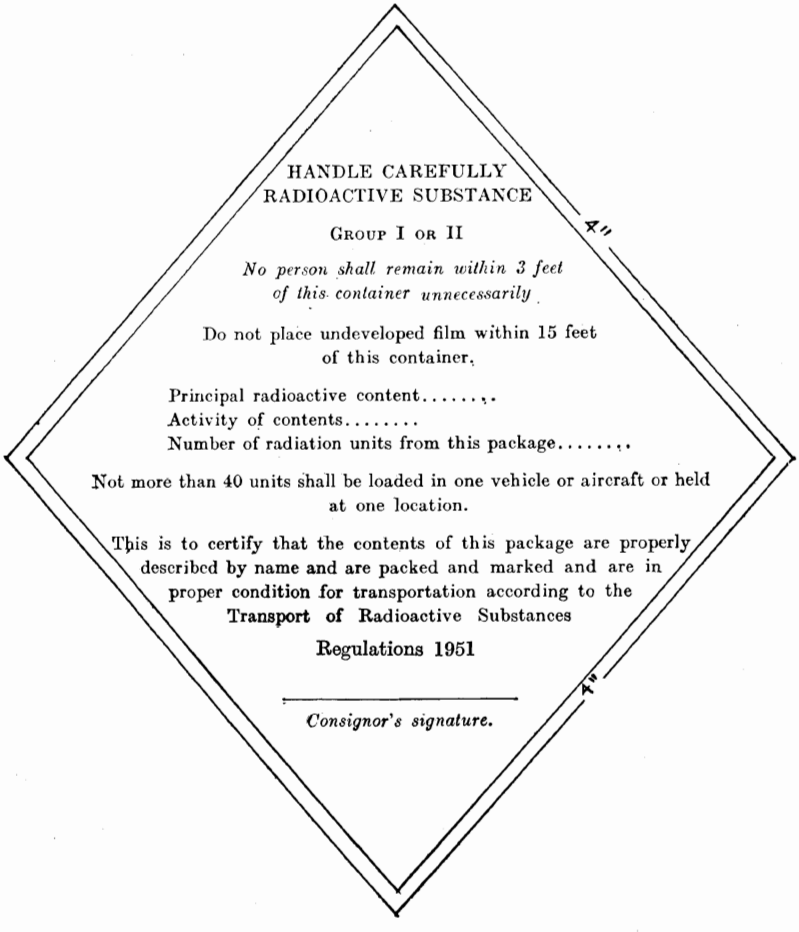
(2) Any exemption or modification granted by the Director-General in accordance with the last preceding subclause may be revoked by him at any time.

SCHEDULES

FIRST SCHEDULE

Reg. 13 (1)] [Form No. 1

GROUP I OR GROUP II RADIOACTIVE SUBSTANCES LABEL
(Red printing on white)

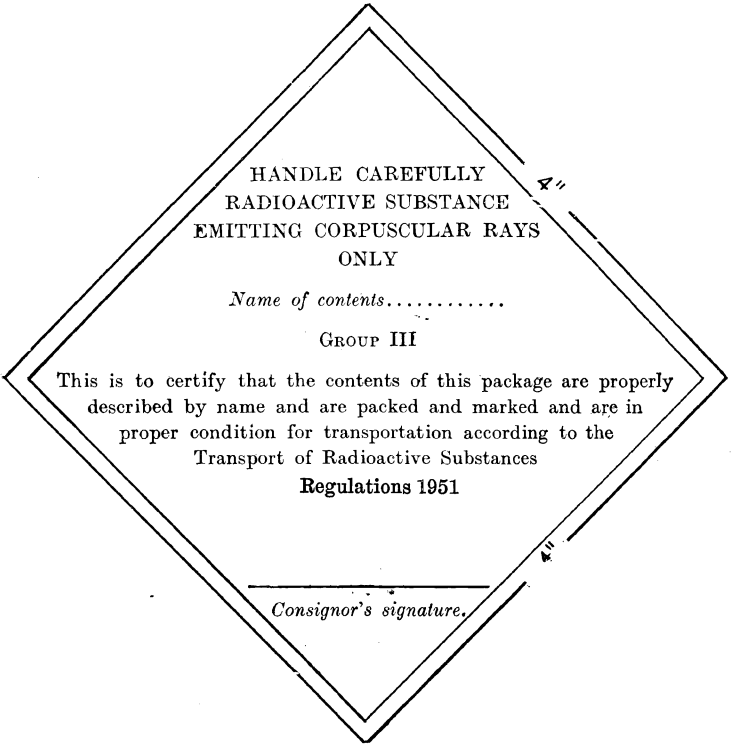


FIRST SCHEDULE—*continued*

Reg. 13 (2)] [Form No. 2

GROUP III RADIOACTIVE SUBSTANCES LABEL

(Blue printing on white)



Reg. 14 (1) (2)]

SECOND SCHEDULE

TABLE FOR COMPUTING DISTANCES TO BE ALLOWED BETWEEN PACKAGES OF RADIOACTIVE SUBSTANCES AND OCCUPIED AREAS OR UNDEVELOPED FILM

Total Number of Units.	Distance, in Feet, to Area That May be Continuously Occupied by Passengers or Employees for Periods—		Minimum Distance, in Feet, to Nearest Undeveloped Film for Period not Exceeding Twenty-four Hours.
	Up to Eight Hours.	Exceeding Eight Hours, but not Exceeding Twenty-four Hours.	
1 to 10 ..	3	5	15
11 to 20 ..	4	7	20
21 to 30 ..	5	9	25
31 to 40 ..	6	10	30

NOTE.—The distance in the table shall be measured from the nearest point of the container or containers.

T. J. SHERRARD,
Clerk of the Executive Council.

Issued under the authority of the Regulations Act, 1936.
Date of notification in *Gazette*: 19th day of July, 1951.
These regulations are administered in the Department of Health.