



RONAN ENGINEERING COMPANY  
MEASUREMENTS DIVISION  
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FAX

To: NRC  
Attention: John Lubinski  
Fax Number: 301-415-5369

Date: 05/17/94  
From: Bon Cahill  
Number of Pages: 9

Mr. Lubinski:

The application where the exempt sources could be applied is shown conceptually in the attached figure, D-9523-K.

By using a highly sensitive detector, we can do this application with CS-137 or CO-60 exempt sources in a source tube (rod) (see B-9392-K) and inserting the rod into a source well.

We would advise the customer to purchase exempt sources and place into a protective stainless steel tube B-9392-K and insert into a well inside the mold housing. The sources can be removed as required and the labeling on the sources is protected by the source tube or rod.

The customer would buy the detector, source rod, well and electronics from us. We would not only provide instructions on how to load the sources, but also provide safety instructions for handling, storage, and use, in addition to those supplied by the source supplier. (additional safety information, we would provide, is enclosed with this fax).

We believe that this procedure is in compliance with all the pertinent NRC regulations and need your verification.

If you have any questions or need further information, please let me know.

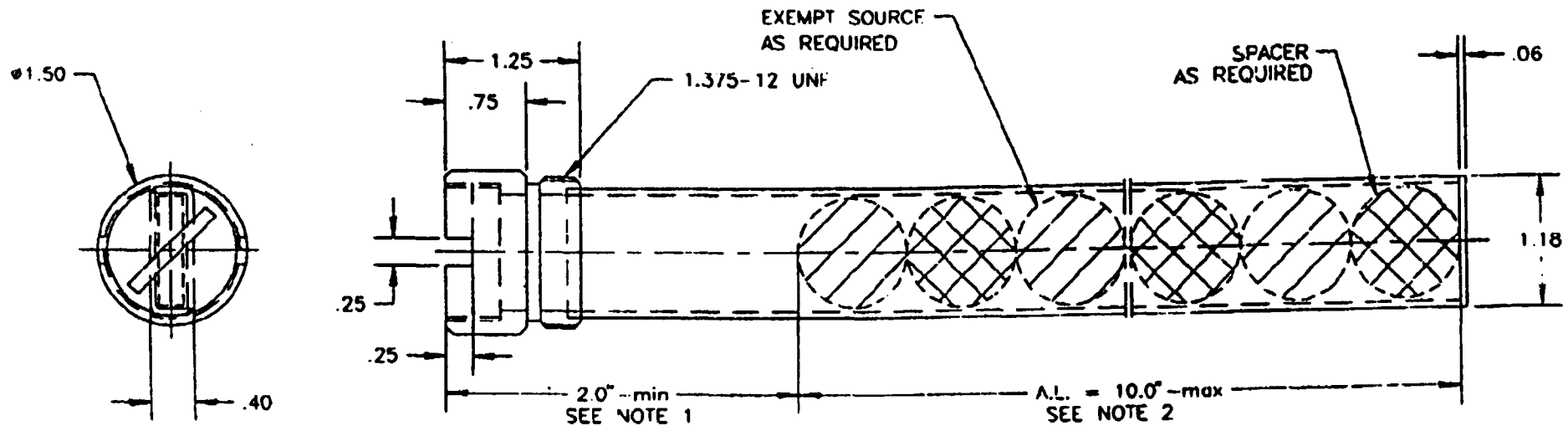
Thanks for your assistance,

A handwritten signature in cursive script that reads 'Bon Cahill'.

Bon Cahill  
General Manager  
Senior Physicist

Handwritten initials 'JC' with a checkmark next to them.

DATE	SYN	REVISION RECORD	DR	CK
5/17/94	1	ADDED INFORMATION PER DC	TEP	

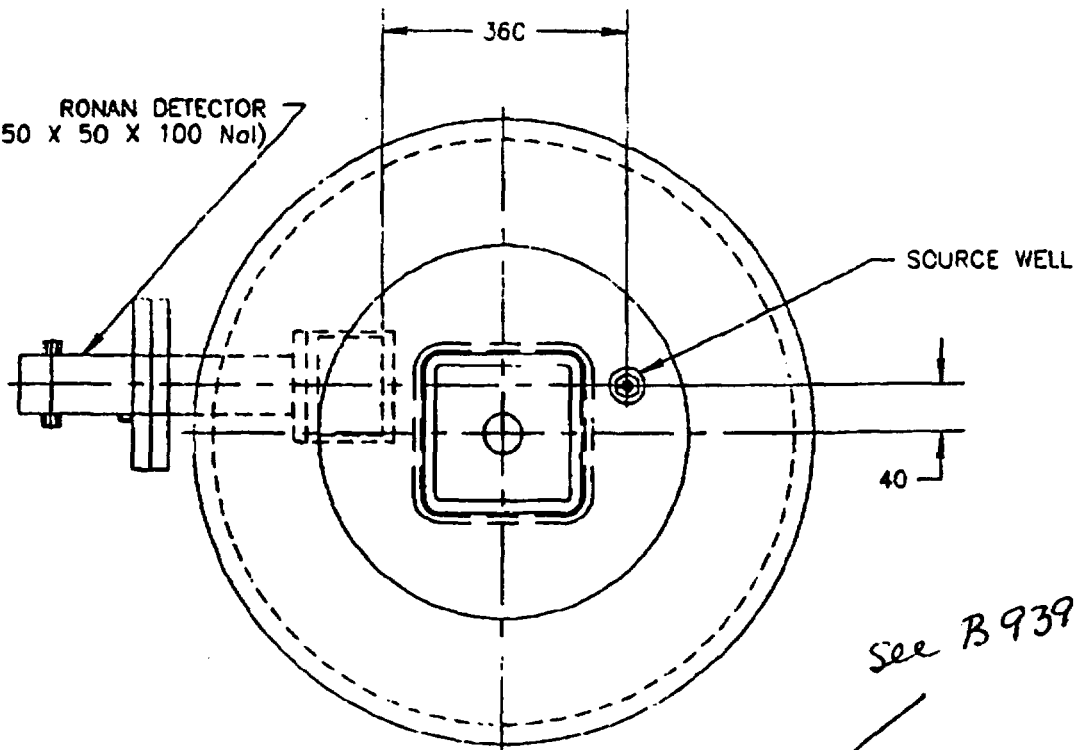


## NOTES:

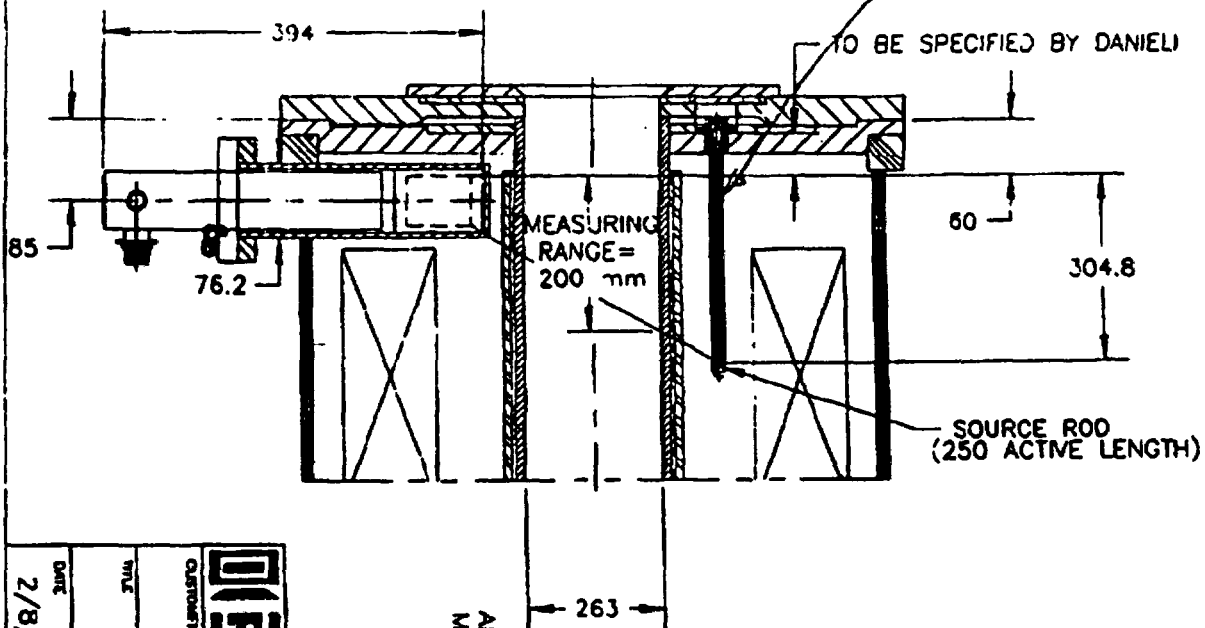
1. THIS DISTANCE IS TO BE SPECIFIED BY CUSTOMER.
2. A.L. - ACTIVE LENGTH, MAXIMUM NUMBER OF EXEMPT SOURCES ARE TEN.

<b>RONAN</b> MEASUREMENTS DIVISION	
CUSTOMER:	SCALE: NIS
DR. BY YSP	
APPR. BY	
TITLE: OUTLINE: EXEMPT SOURCE ROD	
DATE: 1/11/94	DRAWING NUMBER: B-9392-K
REV: 1	

RONAN DETECTOR  
(50 x 50 x 100 NaI)



See B 9392K



ALL DIMENSIONS ARE IN  
MILLIMETERS.



MEASUREMENTS DIVISION

CUSTOMER:

SCALE  
NTS

DATE BY  
JAN 87

DATE

CONFIGURATION:

MOLD LEVEL GAGE

2/8/94

DESIGNED BY  
B-9523-K

DATE	SYN	REVISION RECORD	BY
8/8/94	0	REV 001	TP

## INFORMATION REGARDING RADIOACTIVE SOURCES OF EXEMPT QUANTITIES OF BY PRODUCT MATERIAL

**General:** The federal regulations pertaining to the licensing for ownership, and use of byproduct radioactive material is found in CFR.10 part 30.

In paragraph 30.19, titled "Exempt Quantities", it states that any person is exempt from the requirements for license if they possess the byproduct in individual quantities that does not exceed the applicable quantity set forth in paragraph 30.71 Schedule B.

For Cs-137, that quantity is 10 microCuries( $\mu$ Ci) and for C0-60, that quantity is 1 microCurie( $\mu$ Ci). For gaging these are the primary high energy isotopes used.

For simplicity, a user may receive possess and use an exempt quantity source without a license because it qualifies as "Unlicensed Material".

The manufacturers of the exempt quantity source must possess a specific license and meet the requirements for the license under paragraph 32.18.

Under the condition of the license, the manufacturer must supply the exempt source quantity to the user individually packaged and no more than 10 such packaged quantities in a single transaction. The immediate container of each quantity shall bear a durable legible label which identifies the isotope and quantity of radioactivity and the words Radioactive Material.

In addition an accompanying brochure or label on the container states that the product is Radioactive Material/Not for Human Use - Introduction into Foods, Beverages, Cosmetics, Drugs or Medicinals for Introduction into Products

**Manufactured for Commercial Distribution is Prohibited.** Exempt quantities should not be combined. Also the accompanying brochure should contain radiation safety instructions pertaining to the safe handling, use, storage and disposal.

**User Responsibilities:**

**A) Proper Storage:** When not used, the exempt sources should be stored in a shielded container to prevent accidental damage to the sources and keep the radiation exposure as low as possible.

**B) Proper Handling:** The sources must be kept intact. They are not to be combined with each other or altered in any way so as to lose their identity as an individual exempt quantity. The label should be kept intact on the source and the sources preferably stored in separate individual containers. If multiple exempt sources are stored, they should be placed into a shielded container to keep the levels under 0.5mR/h on the surface.

**C) Proper Use:** The sources are intended to be used to provide ionizing radiation for gaging the level of steel.

The sources may also be used to test radiation detection instruments including survey meters.

The sources are not to be modified or broken apart. Nor may they be combined with each other to alter the exempt source content of the package.

When using several of the sources to provide ionizing radiation to a distributed or elongated detector, the sources should be kept sufficiently separated or shielded to

reduce the exposure to personnel.

**D) Unshielded Radiation Exposure from Exempt Sources:** Each exempt quantity source will provide a max radiation of 1mR/h on the surface (2") or 0.03mR/h at 1 foot away. At one meter or 39" the radiation is 0.003mR/h.

Normal background levels are 0.015 mR/h to 0.030mR/h so that the radiation from an exempt source is very difficult to detect, unless you get less than one foot from the source.

**E) Recommended Shielding:** Ronan recommends that based on personnel receiving a radiation exposure of no more than 100mR in a year, which is comparable to background exposure, that the sources be stored in a shield which limits the field to less than 0.5mR/h on the surface.

**F) Disposal:** A single exempt quantity may be disposed of safely through normal refuse disposal methods but is not meant to be incinerated. Exempt quantities should not be accumulated and lumped together for disposal.

# "IMPORTANT"

## INSTRUCTIONS FOR POSSESSION AND USE OF EXEMPT RADIOACTIVE MATERIAL

Certain quantities (30.71 B) of Radioactive Material are exempt from NRC or Agreement State licensing requirements.

Exempt radioactive material is not for Human use...introduction into foods, beverages, cosmetics, drugs or medicinals, or into products manufactured for commercial distribution...These quantities should not be combined.

### HANDLING

Disc Sources should be held by the metal or plastic sides or back. Be careful not to damage any foil used to cover the radioactive material.

Solid rod sources should be held at the end opposite the activity.

Never place radioactive material in the mouth, nor any items in contact with radioactive material in the mouth without first washing well to insure that they are free of contamination.

### CONTAMINATION

Loose radioactive material may be cleaned up with small quantities of detergent in water and absorbent materials.

### STORAGE

Store all sources in a secured container with visible identification. Always protect exempt sources when not in use.

## INSTRUCTIONS FOR DISPOSAL OF EXEMPT RADIOACTIVE MATERIAL

### INCINERATION

Never dispose of any exempt radioactive material or waste by incineration.

### NORMAL REFUSE

Exempt radioactive material should be placed in a plastic or metal container, marked as waste, and placed in normal refuse.

These instructions apply only to the exempt material ~~possessed under a specific license from the NRC or Agreement State~~ <sup>approved by the NRC</sup> and are meant as guides for your safe handling of the sources. Radioactive material possessed under a specific license from the NRC or Agreement State must be handled in accordance with those specific license requirements.

## Nuclear Regulatory Commission

## § 30.71 Schedule B.

§ 30.71

Byproduct material	Microcuries	Byproduct material	Microcuries
Antimony 122 (Sb 122)	100	Lanthanum 140 (La 140)	10
Antimony 124 (Sb 124)	0	Lutetium 177 (Lu 177)	100
Antimony 125 (Sb 125)	0	Manganese 52 (Mn 52)	10
Arsenic 73 (As 73)	100	Manganese 54 (Mn 54)	10
Arsenic 74 (As 74)	10	Manganese 56 (Mn 56)	100
Arsenic 76 (As 76)	100	Mercury 197m (Hg 197m)	100
Arsenic 77 (As 77)	10	Mercury 197 (Hg 197)	10
Barium 131 (Ba 131)	100	Mercury 203 (Hg 203)	100
Barium 133 (Ba 133)	10	Molybdenum 99 (Mo 99)	100
Barium 140 (Ba 140)	10	Neodymium 147 (Nd 147)	100
Bismuth 210 (Bi 210)	100	Neodymium 149 (Nd 149)	100
Bromine 82 (Br 82)	10	Nickel 58 (Ni 58)	0
Cadmium 109 (Cd 109)	10	Nickel 63 (Ni 63)	100
Cadmium 115m (Cd 115m)	100	Nickel 65 (Ni 65)	10
Cadmium 115 (Cd 115)	10	Niobium 93m (Nb 93m)	10
Calcium 45 (Ca 45)	10	Niobium 95 (Nb 95)	10
Calcium 47 (Ca 47)	100	Niobium 97 (Nb 97)	10
Carbon 14 (C 14)	100	Osmium 165 (Os 165)	100
Cerium 141 (Ce 141)	100	Osmium 181m (Os 181m)	100
Cerium 143 (Ce 143)	100	Osmium 181 (Os 181)	100
Cerium 144 (Ce 144)	100	Osmium 193 (Os 193)	100
Cesium 131 (Cs 131)	100	Palladium 103 (Pd 103)	100
Cesium 134m (Cs 134m)	1	Palladium 109 (Pd 109)	10
Cesium 134 (Cs 134)	10	Phosphorus 32 (P 32)	100
Cesium 135 (Cs 135)	10	Platinum 181 (Pt 181)	100
Cesium 136 (Cs 136)	10	Platinum 183m (Pt 183m)	100
Cesium 137 (Cs 137)	10	Platinum 183 (Pt 183)	100
Chlorine 36 (Cl 36)	10	Platinum 197m (Pt 197m)	100
Chlorine 38 (Cl 38)	100	Platinum 197 (Pt 197)	0.1
Chromium 51 (Cr 51)	10	Platinum 210 (Pt 210)	10
Cobalt 58m (Co 58m)	10	Potassium 42 (K 42)	100
Cobalt 58 (Co 58)	1	Praseodymium 142 (Pr 142)	100
Cobalt 60 (Co 60)	100	Praseodymium 143 (Pr 143)	10
Copper 64 (Cu 64)	10	Promethium 147 (Pm 147)	10
Dysprosium 165 (Dy 165)	100	Promethium 148 (Pm 148)	100
Dysprosium 166 (Dy 166)	100	Rhenium 186 (Re 186)	100
Erbium 166 (Er 166)	100	Rhenium 188 (Re 188)	100
Erbium 171 (Er 171)	100	Rhenium 193m (Re 193m)	100
Europium 152 0.2 h (Eu 152 0.2 h)	1	Rhodium 105 (Rh 105)	10
Europium 152 13 yr (Eu 152 13 yr)	1	Rubidium 88 (Rb 88)	10
Europium 154 (Eu 154)	10	Rubidium 87 (Rb 87)	100
Europium 155 (Eu 155)	1,000	Ruthenium 87 (Ru 87)	10
Fluorine 18 (F 18)	10	Ruthenium 103 (Ru 103)	10
Gadolinium 153 (Gd 153)	100	Ruthenium 106 (Ru 106)	10
Gadolinium 159 (Gd 159)	10	Ruthenium 108 (Ru 108)	10
Gallium 72 (Ga 72)	100	Samarium 151 (Sm 151)	100
Germanium 71 (Ge 71)	100	Samarium 153 (Sm 153)	10
Gold 198 (Au 198)	100	Scandium 46 (Sc 46)	100
Gold 199 (Au 199)	10	Scandium 47 (Sc 47)	10
Hafnium 181 (Hf 181)	100	Scandium 48 (Sc 48)	10
Hafnium 186 (Hf 186)	1,000	Selenium 75 (Se 75)	100
Hydrogen 3 (H 3)	100	Silicon 31 (Si 31)	10
Indium 113m (In 113m)	10	Silver 105 (Ag 105)	1
Indium 114m (In 114m)	100	Silver 110m (Ag 110m)	100
Indium 115m (In 115m)	10	Silver 111 (Ag 111)	10
Indium 115 (In 115)	1	Sodium 24 (Na 24)	10
Iodine 125 (I 125)	1	Strontium 85 (Sr 85)	1
Iodine 126 (I 126)	0.1	Strontium 86 (Sr 86)	0.1
Iodine 128 (I 128)	1	Strontium 89 (Sr 89)	10
Iodine 131 (I 131)	10	Strontium 91 (Sr 91)	10
Iodine 132 (I 132)	1	Strontium 92 (Sr 92)	100
Iodine 133 (I 133)	10	Sulfur 35 (S 35)	10
Iodine 134 (I 134)	10	Tantalum 182 (Ta 182)	10
Iodine 135 (I 135)	10	Technetium 96 (Tc 96)	100
Iridium 192 (Ir 192)	100	Technetium 97m (Tc 97m)	100
Iridium 194 (Ir 194)	100	Technetium 97 (Tc 97)	100
Iron 55 (Fe 55)	10	Technetium 98m (Tc 98m)	10
Iron 59 (Fe 59)	100	Technetium 99 (Tc 99)	10
Krypton 85 (Kr 85)	10	Tellurium 125m (Te 125m)	10
Krypton 87 (Kr 87)	10	Tellurium 127m (Te 127m)	100
		Tellurium 127 (Te 127)	10
		Tellurium 129m (Te 129m)	100
		Tellurium 129 (Te 129)	100



(a) Except as provided in paragraphs (c) and (d) of this section, any person is exempt from the requirements for a license set forth in section 81 of the Act and from the regulations in Parts 30 through 34 and 39 of this chapter to the extent that such person receives, possesses, uses, transfers, owns, or acquires byproduct material in individual quantities each of which does not exceed the applicable quantity set forth in § 30.71, Schedule B.

(b) Any person who possesses byproduct material received or acquired prior to September 25, 1971 under the

general license then provided in § 31.4 of this chapter is exempt from the requirements for a license set forth in section 81 of the Act and from the regulations in Parts 30 through 34 of this chapter to the extent that such person possesses, uses, transfers, or owns such byproduct material.

(c) This section does not authorize for purposes of commercial distribution the production, packaging, repackaging, or transfer of byproduct material or the incorporation of byproduct material into products intended for commercial distribution.

(d) No person may, for purposes of commercial distribution, transfer byproduct material in the individual quantities set forth in § 30.71, Schedule B, knowing or having reason to believe that such quantities of byproduct material will be transferred to persons exempt under this section or equivalent regulations of an Agreement State, except in accordance with a license issued under § 32.18 of this chapter, which license states that the byproduct material may be transferred by the licensee to persons exempt under this section or the equivalent regulations of an Agreement State.

(35 FR 6427, Apr. 22, 1970, as amended at 35 FR 16898, Aug. 26, 1971; 43 FR 6921, Feb. 17, 1978; 63 FR 6241, Mar. 17, 1998)

32.18 Manufacture, distribution and transfer of exempt quantities of byproduct material: Requirements for license.

An application for a specific license to manufacture, process, produce, package, repackage, or transfer quantities of byproduct material for commercial distribution to persons exempt pursuant to § 30.18 of this chapter or the equivalent regulations of an Agreement State will be approved if:

(a) The applicant satisfies the general requirements specified in § 30.33 of

this chapter: *Provided, however,* That the requirements of § 30.33(a) (2) and (3) of this chapter do not apply to an application for a license to transfer byproduct material manufactured, processed, produced, packaged, or repackaged pursuant to a license issued by an Agreement State;

(b) The byproduct material is not contained in any food, beverage, cosmetic, drug, or other commodity designed for ingestion or inhalation by, or application to, a human being;

(c) The byproduct material is in the form of processed chemical elements, compounds, or mixtures, tissue samples, bioassay samples, counting standards, plated or encapsulated sources, or similar substances, identified as radioactive and to be used for its radioactive properties, but is not incorporated into any manufactured or assembled commodity, product, or device intended for commercial distribution; and

(d) The applicant submits copies of prototype labels and brochures and the Commission approves such labels and brochures.

(35 FR 6428, Apr. 22, 1970, as amended at 43 FR 6922, Feb. 17, 1978)

§ 32.19 Same: Conditions of licenses.

Each license issued under § 32.18 is subject to the following conditions:

(a) No more than 10 exempt quantities set forth in § 30.71, Schedule B of this chapter shall be sold or transferred in any single transaction. For purposes of this requirement, an individual exempt quantity may be composed of fractional parts of one or more of the exempt quantities in § 30.71, Schedule B of this chapter, provided that the sum of such fractions shall not exceed unity.

(b) Each quantity of byproduct material set forth in § 30.71, Schedule B of this chapter shall be separately and individually packaged. No more than 10 such packaged exempt quantities shall be contained in any outer package for transfer to persons exempt pursuant to § 30.18 of this chapter. The outer package shall be such that the dose rate at the external surface of the package does not exceed 0.5 millirem per hour.

(c) The immediate container of each quantity or separately packaged fractional quantity of byproduct material shall bear a durable, legible label which (1) identifies the radioisotope and the quantity of radioactivity, and (2) bears the words "Radioactive Material."

(d) In addition to the labeling information required by paragraph (c) of this section, the label affixed to the immediate container, or an accompanying brochure, shall also (1) state that the content are exempt from NRC or Agreement State licensing requirements; (2) bear the words "Radioactive Material—Not for Human Use—Introduction Into Foods, Beverages, Cosmetics, Drugs, or Medicinals, or Into Products Manufactured for Commercial Distribution is Prohibited—Exempt Quantities Should Not be Combined"; and (3) set forth appropriate additional radiation safety precautions and instructions relating to the handling, use, storage, and disposal of the radioactive material.

(35 FR 6428, Apr. 22, 1970)