



## ADMINISTRATIVE RULES OF MONTANA

### 37.14.552 TRANSPORTATION: PREPARATION OF MATERIAL

- (1) For the purposes of this rule, a licensee who transports his own licensed material as a private carrier is considered to have delivered such material to a carrier for transport.
- (2) No licensee shall deliver any radioactive material to a carrier for transport, unless:
  - (a) the licensee complies with the applicable requirements of the regulations, appropriate to the mode of transport, of the US department of transportation insofar as such regulations relate to the packaging of radioactive material, and to the monitoring, marking and labeling of those packages;
  - (b) the licensee has established procedures for opening and closing packages in which radioactive material is transported to provide safety and to assure that, prior to the delivery to a carrier for transport, each package is properly closed for transport; and
  - (c) prior to delivery of a package to a carrier for transport, the licensee shall assure that any special instructions needed to safely open the package are sent to or have been available to the consignee.
- (3) Section (2) of this rule shall not apply to the transportation of licensed material, or to the delivery of licensed material to a carrier for transport, where such transportation is subject to the regulations of the US department of transportation or the US postal service.

#### SCHEDULE A

#### EXEMPT CONCENTRATIONS

|                 |         | Column I                 | Column II                |
|-----------------|---------|--------------------------|--------------------------|
|                 |         | Gas                      | Liquid & Solid           |
| Element         |         | Concentration            | Concentration            |
| (atomic number) | Isotope | $\mu$ Ci/ml <sup>1</sup> | $\mu$ Ci/ml <sup>2</sup> |

|               |         |                    |                    |
|---------------|---------|--------------------|--------------------|
| Antimony (51) | Sb-122  |                    | $3 \times 10^{-4}$ |
|               | Sb-124  |                    | $2 \times 10^{-4}$ |
|               | Sb-125  |                    | $1 \times 10^{-3}$ |
| Argon (18)    | Ar-37   | $1 \times 10^{-3}$ |                    |
|               | Ar-41   | $4 \times 10^{-7}$ |                    |
| Arsenic (33)  | As-73   |                    | $5 \times 10^{-3}$ |
|               | As-74   |                    | $5 \times 10^{-4}$ |
|               | As-76   |                    | $2 \times 10^{-4}$ |
|               | As-77   |                    | $8 \times 10^{-4}$ |
| Barium (56)   | Ba-131  |                    | $2 \times 10^{-3}$ |
|               | Ba-140  |                    | $3 \times 10^{-4}$ |
| Beryllium (4) | Be-7    |                    | $2 \times 10^{-2}$ |
| Bismuth (83)  | Bi-206  |                    | $4 \times 10^{-4}$ |
|               |         |                    |                    |
| Bromine (35)  | Br-82   | $4 \times 10^{-7}$ | $3 \times 10^{-3}$ |
| Cadmium (48)  | Cd-109  |                    | $2 \times 10^{-3}$ |
|               | Cd-115m |                    | $3 \times 10^{-4}$ |
|               | Cd-115  |                    | $3 \times 10^{-4}$ |
| Calcium (20)  | Ca-45   |                    | $9 \times 10^{-5}$ |
|               | Ca-47   |                    | $5 \times 10^{-4}$ |
| Carbon (6)    | C-14    | $1 \times 10^{-6}$ | $8 \times 10^{-3}$ |
| Cerium (58)   | Ce-141  |                    | $9 \times 10^{-4}$ |
|               | Ce-143  |                    | $4 \times 10^{-4}$ |
|               | Ce-144  |                    | $1 \times 10^{-4}$ |

|                 |         |                    |                    |
|-----------------|---------|--------------------|--------------------|
| Cesium (55)     | Cs-131  |                    | $2 \times 10^{-2}$ |
|                 | Cs-134m |                    | $6 \times 10^{-2}$ |
|                 | Cs-134  |                    | $9 \times 10^{-5}$ |
| Chlorine (17)   | Cl-38   | $9 \times 10^{-7}$ | $4 \times 10^{-3}$ |
|                 |         |                    |                    |
| Chromium (24)   | Cr-51   |                    | $2 \times 10^{-2}$ |
| Cobalt (27)     | Co-57   |                    | $5 \times 10^{-3}$ |
|                 | Co-58   |                    | $1 \times 10^{-3}$ |
|                 | Co-60   |                    | $5 \times 10^{-4}$ |
| Copper (29)     | Cu-64   |                    | $3 \times 10^{-3}$ |
| Dysprosium (66) | Dy-165  |                    | $4 \times 10^{-3}$ |
|                 | Dy-166  |                    | $4 \times 10^{-4}$ |
|                 |         |                    |                    |

---

<sup>1</sup> Values are given in Column I only for those materials normally used as gases.

<sup>2</sup>  $\mu$  Ci/gm for solids.

|                 |         | Column I                 | Column II                |
|-----------------|---------|--------------------------|--------------------------|
|                 |         | Gas                      | Liquid & Solid           |
| Element         |         | Concentration            | Concentration            |
| (atomic number) | Isotope | $\mu$ Ci/ml <sup>1</sup> | $\mu$ Ci/ml <sup>2</sup> |
| Erbium (68)     | Er-169  |                          | $9 \times 10^{-4}$       |
|                 | Er-171  |                          | $1 \times 10^{-3}$       |
| Europium (63)   | Eu-152  | $6 \times 10^{-4}$       |                          |

|                 |         |                    |                    |
|-----------------|---------|--------------------|--------------------|
|                 | Eu-155  |                    | (Tr=9.2 h)         |
|                 |         |                    | $2 \times 10^{-3}$ |
| Fluorine (9)    | F-18    | $2 \times 10^{-6}$ | $8 \times 10^{-3}$ |
| Gadolinium (64) | Gd-153  |                    | $2 \times 10^{-3}$ |
|                 | Gd-159  |                    | $8 \times 10^{-4}$ |
| Gallium (31)    | Ga-72   |                    | $4 \times 10^{-4}$ |
| Germanium (32)  | Ge-71   |                    | $2 \times 10^{-2}$ |
| Gold (79)       |         |                    |                    |
|                 | Au-196  |                    | $2 \times 10^{-3}$ |
|                 | Au-198  |                    | $5 \times 10^{-4}$ |
|                 | Au-199  |                    | $2 \times 10^{-3}$ |
| Hafnium (72)    | Hf-181  |                    | $7 \times 10^{-4}$ |
| Hydrogen (1)    | H-3     | $5 \times 10^{-6}$ | $3 \times 10^{-2}$ |
| Indium (49)     | In-113m |                    | $1 \times 10^{-2}$ |
|                 | In-114m |                    | $2 \times 10^{-4}$ |
| Iodine (53)     | I-126   | $3 \times 10^{-9}$ | $2 \times 10^{-5}$ |
|                 | I-131   | $3 \times 10^{-9}$ | $2 \times 10^{-5}$ |
|                 | I-132   | $8 \times 10^{-8}$ | $6 \times 10^{-4}$ |
|                 | I-133   | $1 \times 10^{-8}$ | $7 \times 10^{-5}$ |
|                 | I-134   | $2 \times 10^{-7}$ | $1 \times 10^{-3}$ |
| Iridium (77)    | Ir-190  |                    | $2 \times 10^{-3}$ |
|                 | Ir-192  |                    | $4 \times 10^{-4}$ |
|                 | Ir-194  |                    |                    |

|                 |         |                    |                    |
|-----------------|---------|--------------------|--------------------|
| Iron (26)       | Fe-55   |                    | $3 \times 10^{-4}$ |
|                 | Fe-59   |                    | $8 \times 10^{-3}$ |
|                 |         |                    | $6 \times 10^{-4}$ |
| Krypton (36)    | Kr-85m  | $1 \times 10^{-6}$ |                    |
|                 | Kr-85   | $3 \times 10^{-6}$ |                    |
| Lanthanum (57)  | La-140  |                    | $2 \times 10^{-4}$ |
| Lead (82)       | Pb-203  |                    | $4 \times 10^{-3}$ |
| Lutetium (71)   | Lu-177  |                    | $1 \times 10^{-3}$ |
| Manganese (25)  | Mn-52   |                    | $3 \times 10^{-4}$ |
|                 | Mn-54   |                    | $1 \times 10^{-3}$ |
| Mercury (80)    | Mn-56   | $1 \times 10^{-3}$ | $1 \times 10^{-3}$ |
|                 | Hg-197m |                    | $2 \times 10^{-3}$ |
|                 | Hg-197  |                    | $3 \times 10^{-3}$ |
| Molybdenum (42) | Hg-203  |                    | $2 \times 10^{-4}$ |
|                 | Mo-99   |                    | $2 \times 10^{-3}$ |

---

<sup>1</sup> Values are given in Column I only for those materials normally used as gases.

<sup>2</sup>  $\mu$  Ci/gm for solids.

| Element         |         | Column I | Column II      |
|-----------------|---------|----------|----------------|
| (atomic number) | Isotope | Gas      | Liquid & Solid |

|                   |         | Concentration<br>$\mu\text{ Ci/ml}^1$ | Concentration<br>$\mu\text{ Ci/ml}^2$ |
|-------------------|---------|---------------------------------------|---------------------------------------|
| Neodymium (60)    | Nd-147  |                                       | $6 \times 10^{-4}$                    |
|                   | Nd-149  |                                       | $3 \times 10^{-3}$                    |
| Nickel (28)       | Ni-65   |                                       | $1 \times 10^{-3}$                    |
| Niobium           | Nb-95   |                                       | $1 \times 10^{-3}$                    |
| (Columbium) (41)  | Nb-97   |                                       | $9 \times 10^{-3}$                    |
| Osmium (76)       | Os-185  |                                       | $7 \times 10^{-4}$                    |
|                   | Os-191m |                                       | $3 \times 10^{-2}$                    |
|                   | Os-191  |                                       | $2 \times 10^{-3}$                    |
|                   | Os-193  |                                       | $6 \times 10^{-4}$                    |
| Palladium (46)    | Pd-103  |                                       | $3 \times 10^{-3}$                    |
|                   | Pd-109  |                                       | $9 \times 10^{-4}$                    |
| Phosphorus (15)   | P-32    |                                       | $2 \times 10^{-4}$                    |
| Platinum (78)     | Pt-191  |                                       | $1 \times 10^{-3}$                    |
|                   | Pt-193m |                                       | $1 \times 10^{-2}$                    |
|                   | Pt-197m |                                       | $1 \times 10^{-2}$                    |
|                   | Pt-197  |                                       | $1 \times 10^{-3}$                    |
| Potassium (19)    | K-42    |                                       | $3 \times 10^{-3}$                    |
| Praseodymium (59) | Pr-142  |                                       | $3 \times 10^{-4}$                    |
|                   | Pr-143  |                                       | $5 \times 10^{-4}$                    |

|                 |         |                    |
|-----------------|---------|--------------------|
| Promethium (61) | Pm-147  | $2 \times 10^{-3}$ |
|                 | Pm-149  | $4 \times 10^{-4}$ |
| Rhenium (75)    | Re-183  | $6 \times 10^{-3}$ |
|                 | Re-186  | $9 \times 10^{-4}$ |
|                 | Re-188  | $6 \times 10^{-4}$ |
| Rhodium (45)    | Rh-103m | $1 \times 10^{-1}$ |
|                 | Rh-105  | $1 \times 10^{-3}$ |
| Rubidium (37)   | Rb-86   | $7 \times 10^{-4}$ |
| Ruthenium (44)  | Ru-97   | $4 \times 10^{-3}$ |
|                 | Ru-103  | $8 \times 10^{-4}$ |
|                 | Ru-105  | $1 \times 10^{-3}$ |
|                 | Ru-106  | $1 \times 10^{-4}$ |
| Samarium (62)   | Sm-153  | $8 \times 10^{-4}$ |
| Scandium (21)   | Sc-46   | $4 \times 10^{-4}$ |
|                 | Sc-47   | $9 \times 10^{-4}$ |
|                 | Sc-48   | $3 \times 10^{-4}$ |
| Selenium (34)   | Se-75   | $3 \times 10^{-3}$ |
| Silicon (14)    | Si-31   | $9 \times 10^{-3}$ |

---

<sup>1</sup> Values are given in Column I only for those materials

normally used as gases.

<sup>2</sup>  $\mu$  Ci/gm for solids.

|                 |         | Column I                 | Column II                |
|-----------------|---------|--------------------------|--------------------------|
|                 |         | Gas                      | Liquid & Solid           |
| Element         |         | Concentration            | Concentration            |
| (atomic number) | Isotope | $\mu$ Ci/ml <sup>1</sup> | $\mu$ Ci/ml <sup>2</sup> |
| Silver (47)     | Ag-105  |                          | $1 \times 10^{-3}$       |
|                 | Ag-110m |                          | $3 \times 10^{-4}$       |
|                 | Ag-111  |                          | $4 \times 10^{-4}$       |
| Sodium (11)     | Na-24   |                          | $2 \times 10^{-3}$       |
| Strontium (38)  | Sr-85   |                          | $1 \times 10^{-3}$       |
|                 | Sr-89   |                          | $1 \times 10^{-4}$       |
|                 | Sr-91   |                          | $7 \times 10^{-4}$       |
|                 | Sr-92   |                          | $7 \times 10^{-4}$       |
| Sulfur (16)     | S-35    | $9 \times 10^{-8}$       | $6 \times 10^{-4}$       |
| Tantalum (73)   | Ta-182  |                          | $4 \times 10^{-4}$       |
| Technetium (43) | Tc-96m  |                          | $1 \times 10^{-1}$       |
|                 | Tc-96   |                          | $1 \times 10^{-3}$       |
| Tellurium (52)  | Te-125m |                          | $2 \times 10^{-3}$       |
|                 | Te-127m |                          | $6 \times 10^{-4}$       |
|                 | Te-127  |                          | $3 \times 10^{-3}$       |
|                 | Te-129m |                          | $3 \times 10^{-4}$       |
|                 | Te-131m |                          |                          |

|                |         |                    |                    |
|----------------|---------|--------------------|--------------------|
|                | Te-132  |                    | $6 \times 10^{-4}$ |
|                |         |                    | $3 \times 10^{-4}$ |
| Terbium (65)   | Tb-160  |                    | $4 \times 10^{-4}$ |
| Thallium (81)  | Tl-200  |                    | $4 \times 10^{-3}$ |
|                | Tl-201  |                    | $3 \times 10^{-3}$ |
|                | Tl-202  |                    | $1 \times 10^{-3}$ |
|                | Tl-204  |                    | $1 \times 10^{-3}$ |
| Thulium (69)   | Tm-170  |                    | $5 \times 10^{-4}$ |
|                | Tm-171  |                    | $5 \times 10^{-3}$ |
| Tin (50)       | Sn-113  |                    | $9 \times 10^{-4}$ |
|                | Sn-125  |                    | $2 \times 10^{-4}$ |
| Tungsten       | W-181   |                    | $4 \times 10^{-3}$ |
| (Wolfram) (74) | W-187   |                    | $7 \times 10^{-4}$ |
| Vanadium (23)  | V-48    |                    | $3 \times 10^{-4}$ |
| Xenon (54)     | Xe-131m | $4 \times 10^{-6}$ |                    |
|                | Xe-133  | $3 \times 10^{-6}$ |                    |
|                | Xe-135  | $1 \times 10^{-6}$ |                    |
| Ytterbium (70) | Yb-175  |                    | $1 \times 10^{-3}$ |

---

<sup>1</sup> Values are given in Column I only for those materials normally used as gases.

$2 \mu \text{Ci/gm}$  for solids.

| Element<br>(atomic number)                                                                                    | Isotope | Column I Gas<br>Concentration $\mu \text{Ci/ml}^1$ | Column II                                               |
|---------------------------------------------------------------------------------------------------------------|---------|----------------------------------------------------|---------------------------------------------------------|
|                                                                                                               |         |                                                    | Liquid & Solid<br>Concentration<br>$\mu \text{Ci/ml}^2$ |
| Yttrium (39)                                                                                                  | Y-90    |                                                    | $2 \times 10^{-4}$                                      |
|                                                                                                               | Y-91m   |                                                    | $3 \times 10^{-2}$                                      |
|                                                                                                               | Y-91    |                                                    | $3 \times 10^{-4}$                                      |
|                                                                                                               | Y-92    |                                                    | $6 \times 10^{-4}$                                      |
|                                                                                                               | Y-93    |                                                    | $3 \times 10^{-4}$                                      |
| Zinc (30)                                                                                                     | Zn-65   |                                                    | $1 \times 10^{-3}$                                      |
|                                                                                                               | Zn-69m  |                                                    | $7 \times 10^{-4}$                                      |
|                                                                                                               | Zn-69   |                                                    | $2 \times 10^{-2}$                                      |
| Zirconium (40)                                                                                                | Zr-95   |                                                    | $6 \times 10^{-4}$                                      |
|                                                                                                               | Zr-97   |                                                    | $2 \times 10^{-4}$                                      |
| Beta and/or gamma<br>emitting radioactive<br>material not listed<br>above with half-life<br>less than 3 years |         | $1 \times 10^{-10}$                                | $1 \times 10^{-6}$                                      |

NOTE 1: Many radioisotopes disintegrate into isotopes which are also radioactive. In expressing the concentrations in Schedule A the activity stated is that of the parent isotope and takes into account the daughters.

NOTE 2: For purposes of ARM 37.14.506 where there is involved a combination of isotopes, the limit for the combination should be derived as follows: determine for each isotope in the product the ratio between the concentration present in the product and the exempt concentration established in Schedule A for the specific isotope when not in combination. The sum of such ratios may not exceed "1" (i.e., unity) .

EXAMPLE:      Concentration of Isotope A in Product +  
                          Exempt concentration of Isotope A  
                          Concentration of Isotope B in Product # 1  
                          Exempt concentration of Isotope B

---

<sup>1</sup> Values are given in Column I only for those materials normally used as gases.

<sup>2</sup>  $\mu$  C1/gm for solids.

## SCHEDULE B

### EXEMPT QUANTITIES

| <u>Radioactive Material</u> | <u>Microcuries</u> |
|-----------------------------|--------------------|
| Antimony-122 (Sb 122)       | 100                |
| Antimony-124 (Sb 124)       | 10                 |
| Antimony-125 (Sb 125)       | 10                 |
| Arsenic-73 (As 73)          | 100                |
| Arsenic-74 (As 74)          | 10                 |
| Arsenic-76 (As 76)          | 10                 |
| Arsenic-77 (As 77)          | 100                |
| Barium-131 (Ba 131)         | 10                 |

|                        |       |
|------------------------|-------|
| Barium-133 (Ba 133)    | 10    |
| Barium-140 (Ba 140)    | 10    |
| Bismuth-210 (Bi 210)   | 1     |
| Bromine-82 (Br 82)     | 10    |
| Cadmium-109 (Cd 109)   | 10    |
| Cadmium-115m (Cd 115m) | 10    |
| Cadmium-115 (Cd 115)   | 100   |
| Calcium-45 (Ca 45)     | 10    |
| Calcium-47 (Ca 47)     | 10    |
| Carbon-14 (C 14)       | 100   |
| Cerium-141 (Ce 141)    | 100   |
| Cerium-143 (Ce 143)    | 100   |
| Cerium-144 (Ce 144)    | 1     |
| Cesium-129 (Cs 129)    | 100   |
| Cesium-131 (Cs 131)    | 1,000 |
| Cesium-134m (Cs 134m)  | 100   |
| Cesium-134 (Cs 134)    | 1     |
| Cesium-135 (Cs 135)    | 10    |
| Cesium-136 (Cs 136)    | 10    |
| Cesium-137 (Cs 137)    | 10    |
| Chlorine-36 (Cl 36)    | 10    |
| Chlorine-38 (Cl 38)    | 10    |
| Chromium-51 (Cr 51)    | 1,000 |
| Cobalt-57 (Co 57)      | 100   |
| Cobalt-58m (Co 58m)    | 10    |
| Cobalt-58 (Co 58)      | 10    |
| Cobalt-60 (Co 60)      | 1     |

|                            |     |
|----------------------------|-----|
| Copper-64 (Cu 64)          | 100 |
| Dysprosium-165 (Dy 165)    | 10  |
| Dysprosium-166 (Dy 166)    | 100 |
| Erbium-169 (Er 169)        | 100 |
| Erbium-171 (Er 171)        | 100 |
| Europium-152 (Eu 152)9.2h  | 100 |
| Europium-152 (Eu 152)13 yr | 1   |
| Europium-154 (Eu 154)      | 1   |

---

|                      |             |
|----------------------|-------------|
| Radioactive Material | Microcuries |
|----------------------|-------------|

|                         |       |
|-------------------------|-------|
| Europium-155 (Eu 155)   | 10    |
| Fluorine-18 (F 18)      | 1,000 |
| Gadolinium-153 (Gd 153) | 10    |
| Gadolinium-159 (Gd 159) | 100   |
| Gallium-67 (Ga 67)      | 100   |
| Gallium-72 (Ga 72)      | 10    |
| Germanium-71 (Ge 71)    | 100   |
| Gold-198 (Au 198)       | 100   |
| Gold-199 (Au 199)       | 100   |
| Hafnium-181 (Hf 181)    | 10    |
| Holmium-166 (Ho 166)    | 100   |
| Hydrogen-3 (H 3)        | 1,000 |
| Indium-111 (In 111)     | 100   |
| Indium-113m (In 113m)   | 100   |
| Indium-114m (In 114m)   | 10    |
| Indium-115m (In 115m)   | 100   |

|                        |     |
|------------------------|-----|
| Indium-115 (In 115)    | 10  |
| Iodine-123 (I 123)     | 100 |
| Iodine-125 (I 125)     | 1   |
| Iodine-126 (I 126)     | 1   |
| Iodine-129 (I 129)     | 0.1 |
| Iodine-131 (I 131)     | 1   |
| Iodine-132 (I 132)     | 10  |
| Iodine-133 (I 133)     | 1   |
| Iodine-134 (I 134)     | 10  |
| Iodine-135 (I 135)     | 10  |
| Iridium-192 (Ir 192)   | 10  |
| Iridium-194 (Ir 194)   | 100 |
| Iron-52 (Fe 52)        | 10  |
| Iron-55 (Fe 55)        | 100 |
| Iron-59 (Fe 59)        | 10  |
| Krypton-85 (Kr 85)     | 100 |
| Krypton-87 (Kr 87)     | 10  |
| Lanthanum-140 (La 140) | 10  |
| Lutetium-177 (Lu 177)  | 100 |
| Manganese-52 (Mn 52)   | 10  |
| Manganese-54 (Mn 54)   | 10  |
| Manganese-56 (Mn 56)   | 10  |
| Mercury-197m (Hg 197m) | 100 |
| Mercury-197 (Hg 197)   | 100 |
| Mercury-203 (Hg 203)   | 10  |
| Molybdenum-99 (Mo 99)  | 100 |
| Neodymium-147 (Nd 147) | 100 |

|                           |             |
|---------------------------|-------------|
| Neodymium-149 (Nd 149)    | 100         |
| Nickel-59 (Ni 59)         | 100         |
| Nickel-63 (Ni 63)         | 10          |
| Nickel-65 (Ni 65)         | 100         |
| Niobium-93m (Nb 93m)      | 10          |
| Radioactive Material      | Microcuries |
| Niobium-95 (Nb 95)        | 10          |
| Niobium-97 (Nb 97)        | 10          |
| Osmium-185 (Os 185)       | 10          |
| Osmium-191m (Os 191m)     | 100         |
| Osmium-191 (Os 191)       | 100         |
| Osmium-193 (Os 193)       | 100         |
| Palladium-103 (Pd 103)    | 100         |
| Palladium-109 (Pd 109)    | 100         |
| Phosphorus-32 (P 32)      | 10          |
| Platinum-191 (Pt 191)     | 100         |
| Platinum-193m (Pt 193m)   | 100         |
| Platinum-193 (Pt 193)     | 100         |
| Platinum-197m (Pt 197m)   | 100         |
| Platinum-197 (Pt 197)     | 100         |
| Polonium-210 (Po 210)     | 0.1         |
| Potassium-42 (K 42)       | 10          |
| Potassium-43 (K 43)       | 10          |
| Praseodymium-142 (Pr 142) | 100         |
| Praseodymium-143 (Pr 143) | 100         |
| Promethium-147 (Pm 147)   | 10          |

|                         |     |
|-------------------------|-----|
| Promethium-149 (Pm 149) | 10  |
| Radium-226 (Ra 226)     | 0.1 |
| Rhenium-186 (Re 186)    | 100 |
| Rhenium-188 (Re 188)    | 100 |
| Rhodium-103m (Rh 103m)  | 100 |
| Rhodium-105 (Rh 105)    | 100 |
| Rubidium-81 (Rb 81)     | 10  |
| Rubidium-86 (Rb 86)     | 10  |
| Rubidium-87 (Rb 87)     | 10  |
| Ruthenium-97 (Ru 97)    | 100 |
| Ruthenium-103 (Ru 103)  | 10  |
| Ruthenium-105 (Ru 105)  | 10  |
| Ruthenium-106 (Ru 106)  | 1   |
| Samarium-151 (Sm 151)   | 10  |
| Samarium-153 (Sm 153)   | 100 |
| Scandium-46 (Sc 46)     | 10  |
| Scandium-47 (Sc 47)     | 100 |
| Scandium-48 (Sc 48)     | 10  |
| Selenium-75 (Se 75)     | 10  |
| Silicon-31 (Si 31)      | 100 |
| Silver-105 (Ag 105)     | 10  |
| Silver-110m (Ag 110m)   | 1   |
| Silver-111 (Ag 111)     | 100 |
| Sodium-22 (Na 22)       | 10  |
| Sodium-24 (Na 24)       | 10  |
| Strontium-85 (Sr 85)    | 10  |
| Strontium-89 (Sr 89)    | 1   |

| Radioactive Material     | Microcuries |
|--------------------------|-------------|
| Strontium-90 (Sr 90)     | 0.1         |
| Strontium-91 (Sr 91)     | 10          |
| Strontium-92 (Sr 92)     | 10          |
| Sulphur-35 (S 35)        | 100         |
| Tantalum-182 (Ta 182)    | 10          |
| Technetium-96 (Tc 96)    | 10          |
| Technetium-97m (Tc 97m)  | 100         |
| Technetium-97 (Tc 97)    | 100         |
| Technetium-99m (Tc 99m)  | 100         |
| Technetium-99 (Tc 99)    | 10          |
| Tellurium-125m (Te 125m) | 10          |
| Tellurium-127m (Te 127m) | 10          |
| Tellurium-127 (Te 127)   | 100         |
| Tellurium-129m (Te 129m) | 10          |
| Tellurium-129 (Te 129)   | 100         |
| Tellurium-131m (Te 131m) | 10          |
| Tellurium-132 (Te 132)   | 10          |
| Terbium-160 (Tb 160)     | 10          |
| Thallium-200 (Tl 200)    | 100         |
| Thallium-201 (Tl 201)    | 100         |
| Thallium-202 (Tl 202)    | 100         |
| Thallium-204 (Tl 204)    | 10          |
| Thulium-170 (Tm 170)     | 10          |
| Thulium-171 (Tm 171)     | 10          |

|                        |       |
|------------------------|-------|
| Tin-113 (Sn 113)       | 10    |
| Tin-125 (Sn 125)       | 10    |
| Tungsten-181 (W 181)   | 10    |
| Tungsten-185 (W 185)   | 10    |
| Tungsten-187 (W 187)   | 100   |
| Vanadium-48 (V 48)     | 10    |
| Xenon-131m (Xe 131m)   | 1,000 |
| Xenon-133 (Xe 133)     | 100   |
| Xenon-135 (Xe 135)     | 100   |
| Ytterbium-175 (Yb 175) | 100   |
| Yttrium-87 (Y 87)      | 10    |
| Yttrium-90 (Y 90)      | 10    |
| Yttrium-91 (Y 91)      | 10    |
| Yttrium-92 (Y 92)      | 100   |
| Yttrium-93 (Y 93)      | 100   |
| Zinc-65 (Zn 65)        | 10    |
| Zinc-69m (Zn 69m)      | 100   |
| Zinc-69 (Zn 69)        | 1,000 |
| Zirconium-93 (Zr 93)   | 10    |
| Zirconium-95 (Zr 95)   | 10    |
| Zirconium-97 (Zr 97)   | 10    |

Any radioactive material not listed above other than alpha emitting radioactive material 0.1

Note 1: For purposes of ARM 37.14.521 where there is involved a combination of isotopes, the limit for the combination should be derived as follows:

Determine the amount of each isotope possessed and 1,000 times the amount in

Schedule B for each of those isotopes when not in combination. The sum of the ratios of those quantities may not exceed 1 (i.e., unity) .

Example:

$$\frac{\text{Amt. of Isotope A possessed}}{1000 \times \text{Schedule B quantity for Isotope A}} + \frac{\text{Amt. of Isotope B possessed}}{1000 \times \text{Schedule B quantity for Isotope B}} \leq 1$$

$$\frac{\text{1000 x Schedule B quantity for Isotope A}}{1000 \times \text{Schedule B quantity for Isotope B}} \leq 1$$

## SCHEDULE C

### GROUPS OF MEDICAL USES OF RADIOACTIVE MATERIAL

Group I. Use of prepared radiopharmaceuticals for certain diagnostic studies involving measurements of uptake, dilution and excretion (does not include uses involving imaging and tumor localizations)

- (1) Iodine-131 as sodium iodide ( $\text{Na } ^{131}\text{I}$ ) for measurement of thyroid uptake.
- (2) Iodine-125 as sodium iodide ( $\text{Na } ^{125}\text{I}$ ) for measurement of thyroid uptake.
- (3) Iodine-131 as iodinated human serum albumin (IHSA) for determination of blood and blood plasma volume and for studies of cardiovascular function and protein turnover.
- (4) Iodine-125 as iodinated human serum albumin (IHSA) for determination of blood and blood plasma volume and for studies of cardiovascular function and protein turnover.
- (5) Iodine-131 as labeled rose bengal for liver function studies.
- (6) Iodine-125 as labeled rose bengal for liver function studies.
- (7) Iodine-131 as labeled fats or fatty acids for fat absorption studies.
- (8) Iodine-125 as labeled fats or fatty acids for fat absorption studies.

- (9) Iodine-131 as labeled iodopyracet, sodium iodohippurate, sodium diatrizoate, diatrizoate methylglucamine, sodium diprotrizoate, sodium acetrizoate, or sodium iothalamate for kidney function studies.
- (10) Iodine-125 as labeled iodopyracet, sodium iodohippurate, sodium diatrizoate, diatrizoate methylglucamine, sodium diprotrizoate, sodium acetrizoate, or sodium iothalamate for kidney function studies.
- (11) Cobalt-57 as labeled cyanocobalamin for intestinal absorption studies.
- (12) Cobalt-58 as labeled cyanocobalamin for intestinal absorption studies.
- (13) Cobalt-60 as labeled cyanocobalamin for intestinal absorption studies.
- (14) Chromium-51 as sodium chromate for determination of red blood cell volume and studies of red blood cell survival time and gastrointestinal blood loss.
- (15) Chromium-51 as labeled human serum albumin for gastrointestinal protein loss studies.
- (16) Iron-59 as chloride, citrate, or sulfate for iron turnover studies.
- (17) Potassium-42 as chloride for potassium space determinations.
- (18) Sodium-24 as chloride for sodium space determinations.
- (19) Technetium-99m as pertechnetate for blood flow studies.
- (20) Mercury as chlormerodrin for kidney function studies.
- (21) Any radioactive material in a radiopharmaceutical and for a diagnostic use involving measurements of uptake, dilution, or excretion for which a "Notice of Claimed Investigational Exemption for a New Drug" (IND) has been accepted by the Food and Drug Administration (FDA) .
- (22) Iodine-123 as sodium iodide (NaI) for measurement of thyroid uptake.

Group II. Use of prepared radiopharmaceuticals for diagnostic studies involving imaging and tumor localizations

- (1) Iodine-131 as sodium iodide for thyroid imaging.
- (2) Iodine-125 as sodium iodide for thyroid imaging.
- (3) Iodine-131 as iodinated human serum albumin (IHSA) for brain tumor localizations and cardiac imaging.
- (4) Iodine-131 as macroaggregated iodinated human serum albumin for lung imaging.
- (5) Iodine-131 as colloidal (microaggregated) iodinated human serum albumin for liver imaging.

- (6) Iodine-131 as labeled rose bengal for liver imaging.
- (7) Iodine-131 as iodopyracet, sodium iodohippurate, sodium diatrizoate, diatrizoate methyglucamine, sodium diprotrizoate, or sodium acetrizoate for kidney imaging.
- (8) Iodine-131 as sodium iodipamide for cardiac imaging.
- (9) Iodine-131 as iodinated human serum albumin (IHSA) for placenta localization.
- (10) Chromium-51 as sodium chromate for spleen imaging.
- (11) Chromium-51 as labeled human serum albumin for placenta localization.
- (12) Gold-198 in colloidal form for liver imaging.
- (13) Mercury-197 as labeled chlormerodrin for kidney and brain imaging.
- (14) Mercury-203 as labeled chlormerodrin for brain imaging.
- (15) Selenium-75 as labeled selenomethionine for pancreas imaging.
- (16) Strontium-85 as nitrate or chloride for bone imaging in patients with suspected or diagnosed cancer.
- (17) Technetium-99m as pertechnetate for brain imaging.
- (18) Technetium-99m as pertechnetate for thyroid imaging.
- (19) Technetium-99m as pertechnetate for salivary gland imaging.
- (20) Technetium-99m as pertechnetate for blood pool imaging, including placenta localization.
- (21) Technetium-99m as labeled sulfur colloid for liver, spleen, and bone marrow imaging.
- (22) Technetium-99m as labeled macroaggregated human serum albumin for lung imaging.
- (23) Any radioactive material in a radiopharmaceutical prepared from a reagent kit listed in (4) of Group III.
- (24) Any radioactive material in a radiopharmaceutical and for a diagnostic use involving imaging for which a "Notice of Claimed Investigational Exemption for a New Drug" (IND) has been accepted by the Food and Drug Administration (FDA) .
- (25) Fluorine-18 in solution for bone imaging.
- (26) Strontium-87m for bone imaging.
- (27) Iodine-125 as fibrinogen for detection and monitoring of developing deep vein thrombosis.
- (28) Ytterbium-169 as labeled diethylenetriamine-pentaacetic acid (DTPA) for cisternography.
- (29) Iodine-123 as sodium iodide (NaI) for thyroid imaging.

(30) Indium-113m as chloride for blood pool imaging, including placenta localization.

Group III. Use of generators and reagent kits for the preparation and use of radiopharmaceuticals containing radioactive material for certain diagnostic uses

(1) Molybdenum-99/technetium-99m generators for the elution of technetium-99m as pertechnetate for:

(i) brain imaging;

(ii) thyroid imaging;

(iii) salivary gland imaging;

(iv) blood pool imaging including placenta localization;

(v) blood flow studies; and

(vi) use with reagent kits for preparation and use of radiopharmaceuticals containing technetium-99m as provided in (4) and (5) of this group.

(2) Yttrium-87/strontium-87m generators for the elution of strontium-87m for bone imaging.

(3) Technetium-99m as pertechnetate for use with reagent kits for preparation and use of radiopharmaceuticals containing technetium-99m as provided in (4) and (5) of this group.

(4) Reagent kits for preparation of technetium-99m labeled:

(i) sulfur colloid for liver, spleen, and bone marrow imaging;

(ii) iron-ascorbate-diethylenetriaminepentaacetic acid complex for kidney imaging;

(iii) diethylenetriaminepentaacetic acid (Sn) for kidney imaging and kidney function studies;

(iv) diethylenetriaminepentaacetic acid (Sn) for brain imaging;

(v) human serum albumin microspheres for lung imaging;

(vi) polyphosphates for bone imaging;

(vii) macroaggregated human serum albumin for lung imaging;

(viii) distannous etidronate complex for bone imaging;

(ix) stannous pyrophosphate for bone and cardiac imaging;

(x) human serum albumin for heart blood pool imaging; and

(xi) medronate sodium for bone imaging.

(5) Any generator or reagent kit for preparation and diagnostic use of a radiopharmaceutical containing radioactive material for which generator or reagent kit a "Notice of Claimed Investigational Exemption for a New Drug" (IND) has been accepted by the Food and Drug Administration (FDA) .

(6) Tin-113m/indium-113m generators for the elution of indium-113m as chloride for:

(i) blood pool imaging including placenta localization.

Group IV. Use of prepared radiopharmaceuticals for certain therapeutic uses that do not normally require hospitalization for purposes of radiation safety

(1) Iodine-131 as iodide for treatment of hyperthyroidism and cardiac dysfunction.

(2) Phosphorus-32 as soluble phosphate for treatment of polycythemia vera, leukemia, and bone metastases.

(3) Phosphorus-32 as colloidal chromic phosphate for intracavitary treatment of malignant effusions.

(4) Any radioactive material in a radiopharmaceutical and for a therapeutic use not normally requiring hospitalization for purposes of radiation safety for which a "Notice of Claimed Investigational Exemption for a New Drug" (IND) has been accepted by the Food and Drug Administration (FDA) .

Group V. Use of prepared radiopharmaceuticals for certain therapeutic uses that normally require hospitalization for purposes of radiation safety

(1) Gold-198 as colloid for intracavitary treatment of malignant effusions.

(2) Iodine-131 as iodide for treatment of thyroid carcinoma.

(3) Any radioactive material in a radiopharmaceutical and for a therapeutic use normally requiring hospitalization for radiation safety reasons for which a "Notice of Claimed Investigational Exemption for a New Drug" (IND) has been accepted by the Food and Drug Administration (FDA) .

Group VI. Use of sources and devices containing radioactive material for certain medical uses

(1) Americium-241 as a sealed source in a device for bone mineral analysis.

(2) Cesium-137 encased in needles and applicator cells for topical, interstitial, and intracavitary treatment of cancer.

- (3) Cobalt-60 encased in needles and applicator cells for topical, interstitial, and intracavitary treatment of cancer.
- (4) Gold-198 as seeds for interstitial treatment of cancer.
- (5) Iodine-125 as a sealed source in a device for bone mineral analysis.
- (6) Iridium-192 as seeds encased in nylon ribbon for interstitial treatment of cancer.
- (7) Strontium-90 sealed in an applicator for treatment of superficial eye conditions.
- (8) Radon-222 as seeds for topical, interstitial, and intracavitary treatment of cancer.
- (9) Radium-226 as a sealed source for topical, interstitial, and intracavitary treatment of cancer.
- (10) Iodine-125 as seeds for interstitial treatment of cancer.

#### SCHEDULE D

##### LIMITS FOR BROAD LICENCES

| <u>Radioactive<br/>Material</u> | <u>Col. I<br/>curies</u> | <u>Col. II<br/>curies</u> |
|---------------------------------|--------------------------|---------------------------|
| Antimony-122                    | 1                        | 0.01                      |
| Antimony-124                    | 1                        | 0.01                      |
| Antimony-125                    | 1                        | 0.01                      |
| Arsenic-73                      | 10                       | 0.1                       |
| Arsenic-74                      | 1                        | 0.01                      |
| Arsenic-76                      | 1                        | 0.01                      |
| Arsenic-77                      | 10                       | 0.1                       |
| Barium-131                      | 10                       | 0.1                       |
| Barium-140                      | 1                        | 0.01                      |
| Beryllium-7                     | 10                       | 0.1                       |
| Bismuth-210                     | 0.1                      | 0.001                     |
| Bromine-82                      | 10                       | 0.1                       |
| Cadmium-109                     | 1                        | 0.01                      |
| Cadmium-115m                    | 1                        | 0.01                      |
| Cadmium-115                     | 10                       | 0.1                       |
| Calcium-45                      | 1                        | 0.01                      |
| Calcium-47                      | 10                       | 0.1                       |
| Carbon-14                       | 100                      | 1.                        |

|                     |     |       |
|---------------------|-----|-------|
| Cerium-141          | 10  | 0.1   |
| Cerium-143          | 10  | 0.1   |
| Cerium-144          | 0.1 | 0.001 |
| Cesium-131          | 100 | 1.    |
| Cesium-134m         | 100 | 1.    |
| Cesium-134          | 0.1 | 0.001 |
| Cesium-135          | 1   | 0.01  |
| Cesium-136          | 10  | 0.1   |
| Cesium-137          | 0.1 | 0.001 |
| Chlorine-36         | 1   | 0.01  |
| Chlorine-38         | 100 | 1.    |
| Chromium-51         | 100 | 1.    |
| Cobalt-57           | 10  | 0.1   |
| Cobalt-58m          | 100 | 1.    |
| Cobalt-58           | 1   | 0.01  |
| Cobalt-60           | 0.1 | 0.001 |
| Copper-64           | 10  | 0.1   |
| Dysprosium-165      | 100 | 1.    |
| Dysprosium-166      | 10  | 0.1   |
| Erbium-169          | 10  | 0.1   |
| Erbium-171          | 10  | 0.1   |
| Europium-152 (9.2h) | 10  | 0.1   |
| Europium-152 (13 y) | 0.1 | 0.001 |
| Europium-154        | 0.1 | 0.001 |
| Europium-155        | 1   | 0.01  |
| Fluorine-18         | 100 | 1.    |

Radioactive  
Material

Col. I  
curies

Col. II  
curies

|                |     |       |
|----------------|-----|-------|
| Gadolinium-153 | 1   | 0.01  |
| Gadolinium-159 | 10  | 0.1   |
| Gallium-72     | 10  | 0.1   |
| Germanium-71   | 100 | 1.    |
| Gold-198       | 10  | 0.1   |
| Gold-199       | 10  | 0.1   |
| Hafnium-181    | 1   | 0.01  |
| Holmium-166    | 10  | 0.1   |
| Hydrogen-3     | 100 | 1.    |
| Indium-113m    | 100 | 1.    |
| Indium-114m    | 1   | 0.01  |
| Indium-115m    | 100 | 1.    |
| Indium-115     | 1   | 0.01  |
| Iodine-125     | 0.1 | 0.001 |
| Iodine-126     | 0.1 | 0.001 |
| Iodine-129     | 0.1 | 0.001 |
| Iodine-131     | 0.1 | 0.001 |
| Iodine-132     | 10  | 0.1   |
| Iodine-133     | 1   | 0.01  |
| Iodine-134     | 10  | 0.1   |
| Iodine-135     | 1   | 0.01  |
| Iridium-192    | 1   | 0.01  |
| Iridium-194    | 10  | 0.1   |
| Iron-55        | 10  | 0.1   |
| Iron-59        | 1   | 0.01  |
| Krypton-85     | 100 | 1.    |
| Krypton-87     | 10  | 0.1   |
| Lanthanum-140  | 1   | 0.01  |
| Lutetium-177   | 10  | 0.1   |
| Manganese-52   | 1   | 0.01  |
| Manganese-54   | 1   | 0.01  |
| Manganese-56   | 10  | 0.1   |
| Mercury-197m   | 10  | 0.1   |
| Mercury-197    | 10  | 0.1   |
| Mercury-203    | 1   | 0.01  |
| Molybdenum-99  | 10  | 0.1   |

|               |     |      |
|---------------|-----|------|
| Neodymium-147 | 10  | 0.1  |
| Neodymium-149 | 10  | 0.1  |
| Nickel-59     | 10  | 0.1  |
| Nickel-63     | 1   | 0.01 |
| Nickel-65     | 10  | 0.1  |
| Niobium-93m   | 1   | 0.01 |
| Niobium-95    | 1   | 0.01 |
| Niobium-97    | 100 | 1.   |
| Osmium-185    | 1   | 0.01 |
| Osmium-191m   | 100 | 1.   |
| Osmium-191    | 10  | 0.1  |

| <u>Radioactive<br/>Material</u> | <u>Col. I<br/>curies</u> | <u>Col. II<br/>curies</u> |
|---------------------------------|--------------------------|---------------------------|
| Osmium-193                      | 10                       | 0.1                       |
| Palladium-103                   | 10                       | 0.1                       |
| Palladium-109                   | 10                       | 0.1                       |
| Phosphorus-32                   | 1                        | 0.01                      |
| Platinum-191                    | 10                       | 0.1                       |
| Platinum-193m                   | 100                      | 1.                        |
| Platinum-193                    | 10                       | 0.1                       |
| Platinum-197m                   | 100                      | 1.                        |
| Platinum-197                    | 10                       | 0.1                       |
| Polonium-210                    | 0.1                      | 0.0001                    |
| Potassium-42                    | 1                        | 0.01                      |
| Praseodymium-142                | 10                       | 0.1                       |
| Praseodymium-143                | 10                       | 0.1                       |
| Promethium-147                  | 1                        | 0.01                      |
| Promethium-149                  | 10                       | 0.1                       |
| Radium-226                      | 0.01                     | 0.0001                    |
| Rhenium-186                     | 10                       | 0.1                       |
| Rhenium-188                     | 10                       | 0.1                       |
| Rhodium-103m                    | 1,000                    | 10.                       |
| Rhodium-105                     | 10                       | 0.1                       |
| Rubidium-86                     | 1                        | 0.01                      |

|                |       |        |
|----------------|-------|--------|
| Rubidium-87    | 1     | 0.01   |
| Ruthenium-97   | 100   | 1.     |
| Ruthenium-103  | 1     | 0.01   |
| Ruthenium-105  | 10    | 0.1    |
| Ruthenium-106  | 0.1   | 0.001  |
| Samarium-151   | 1     | 0.01   |
| Samarium-153   | 10    | 0.1    |
| Scandium-46    | 1     | 0.01   |
| Scandium-47    | 10    | 0.1    |
| Scandium-48    | 1     | 0.01   |
| Selenium-75    | 1     | 0.01   |
| Silicon-31     | 10    | 0.1    |
| Silver-105     | 1     | 0.01   |
| Silver-110m    | 0.1   | 0.001  |
| Silver-111     | 10    | 0.1    |
| Sodium-22      | 0.1   | 0.001  |
| Sodium-24      | 1     | 0.01   |
| Strontium-85m  | 1,000 | 10.    |
| Strontium-85   | 1     | 0.01   |
| Strontium-89   | 1     | 0.01   |
| Strontium-90   | 0.01  | 0.0001 |
| Strontium-91   | 10    | 0.1    |
| Strontium-92   | 10    | 0.1    |
| Sulphur-35     | 10    | 0.1    |
| Tantalum-182   | 1     | 0.01   |
| Technetium-96  | 10    | 0.1    |
| Technetium-97m | 10    | 0.1    |

| Radioactive<br>Material | Col. I<br><u>curies</u> | Col. II<br><u>curies</u> |
|-------------------------|-------------------------|--------------------------|
| Technetium-97           | 10                      | 0.1                      |
| Technetium-99m          | 100                     | 1.                       |
| Technetium-99           | 1                       | 0.01                     |
| Tellurium-125m          | 1                       | 0.01                     |

|                |       |      |
|----------------|-------|------|
| Tellurium-127m | 1     | 0.01 |
| Tellurium-127  | 10    | 0.1  |
| Tellurium-129m | 1     | 0.01 |
| Tellurium-129  | 100   | 1.   |
| Tellurium-131m | 10    | 0.1  |
| Tellurium-132  | 1     | 0.01 |
| Terbium-160    | 1     | 0.01 |
| Thallium-200   | 10    | 0.1  |
| Thallium-201   | 10    | 0.1  |
| Thallium-202   | 10    | 0.1  |
| Thallium-204   | 1     | 0.01 |
| Thulium-170    | 1     | 0.01 |
| Thulium-171    | 1     | 0.01 |
| Tin-113        | 1     | 0.01 |
| Tin-125        | 1     | 0.01 |
| Tungsten-181   | 1     | 0.01 |
| Tungsten-185   | 1     | 0.01 |
| Tungsten-187   | 10    | 0.1  |
| Vanadium-48    | 1     | 0.01 |
| Xenon-131m     | 1,000 | 10.  |
| Xenon-133      | 100   | 1.   |
| Xenon-135      | 100   | 1.   |
| Ytterbium-175  | 10    | 0.1  |
| Yttrium-90     | 1     | 0.01 |
| Yttrium-91     | 1     | 0.01 |
| Yttrium-92     | 10    | 0.1  |
| Yttrium-93     | 1     | 0.01 |
| Zinc-65        | 1     | 0.01 |
| Zinc-69m       | 10    | 0.1  |
| Zinc-69        | 100   | 1.   |
| Zirconium-93   | 1     | 0.01 |
| Zirconium-95   | 1     | 0.01 |
| Zirconium-97   | 1     | 0.01 |

Any radioactive material other than source material, special nuclear material, or alpha emitting radioactive material not listed above. 0.1 0.001

**Authorizing statute(s):** Sec. 75-3-202, MCA

**Implementing statute(s):** Sec. 75-3-201 and 75-3-202, MCA

---

**History:** NEW, 1980 MAR p. 1069, Eff. 3/28/80; TRANS, from DHES, 1996 MAR p. 433; TRANS, from DEQ, 2000 MAR p. 189.