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MEDICAL SERVICE

CONTROL OF HAZARDS TO HEALTH FROM

RADIOACTIVE MATERIALS

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SECTION I

GENERAL

1. Purpose. Radioactive materials, because of the inherent danger coincidental with their use, handling, safekeeping, and disposal are hazards to health unless strict precautionary measures are observed. These regulations require that proper precautionary measures will be observed and are applicable to all Department of the Army users unless specifically exempt below. While much of the material contained herein has been taken from the United States Atomic Energy Commission's regulations governing the licensing of source, special nuclear and byproduct materials, these regulations also provide for the control of hazards to health from radioactive materials which are not under the jurisdiction of the Atomic Energy Commission. Examples of such materials are radium and radon. These regulations are not applicable to the procurement or use of radioactive materials

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ed in nuclear or radiological weapons, nuclear reactors, or to
tions of the Armed Forces Special Weapons Project. These reg-
ons do not govern the procedures for disposal of radioactive ma-
s due to friendly or enemy military actions.

Definitions. *a. Byproduct material.* Any radioactive material
ept special nuclear material) which is produced by irradiation of
rally occurring elements in a nuclear reactor or created by nuclear
tions.

Curie. That amount of radioactive material which disintegrates
e rate of 37 billion atoms per second.

Human use. The internal or external administration of radio-
ive material (byproduct material or otherwise) or the radiation
efrom, to human beings.

Microcurie. That amount of radioactive material which disinte-
tes at the rate of 37 thousand atoms per second.

Millicurie. That amount of radioactive material which disinte-
ates at the rate of 37 million atoms per second.

R. Research and development. For the purpose of these regulations,
s means—

- (1) Theoretical analyses, exploration, or experimentation; or
- (2) The extension of investigative findings and theories of a scientific or technical nature into practical application for experimental and demonstration purposes, including the experimental production and testing of models, devices, equipment, materials, and processes. "Research and development" as used does not include the internal or external administration of radioactive material or the radiation therefrom to human beings.

g. Radioactive materials. For the purpose of these regulations, they are defined as naturally occurring radioactive elements and isotopes such as radium and radon as well as byproduct, source, and special nuclear material or contaminated materials capable of emitting corpuscular or electromagnetic radiations. Included are radiotopes and emitters permanently incorporated into adopted or experimental items of equipment.

h. Sealed source. Any radioactive material that is encased in, and to be used in, a container in a manner intended to prevent leakage of the radioactive material or any of its daughter products.

i. Source material. Any material, except special nuclear material, which contains by weight one-twentieth of one percent (0.05%) of more of uranium, thorium, or any combination thereof. "Raw source material" means source material which has not been chemically processed in any manner and source material in the form of residues

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or tailings. "Refined source material" means source material other than raw source material. Plutonium, uranium 233, uranium enriched in the isotope 233 or in the isotope 235, or any other material which the Atomic Energy Commission, pursuant to the provisions of section 51 of the Atomic Energy Act of 1954, determines to be special nuclear material; or any material artificially enriched by any of the foregoing.

3. Responsibilities. *a. Installation and activity commanders.* These commanders having radioactive materials will be responsible for insuring their safe use, handling, and safekeeping and for the enforcement of measures prescribed by the Atomic Energy Commission, The Surgeon General, and the technical services concerned.

b. Continental United States and oversea commanders and heads of technical services. These commanders and heads of installations and will be responsible to insure that commanders of installations and activities under their jurisdiction are provided with proper authorization and with adequate means to safely handle radioactive materials. This includes the direct use of radioactive materials as well as the indirect use incident to storage or production of items of equipment containing such material. Particular attention of Army commanders is directed to the disposal of radioactive material. Such material will be disposed of according to the disposal instructions accompanying the item or in the event no such instructions accompany the item, specific disposal instructions will be requested through appropriate channels from the Chief Chemical Officer. Each head of technical service will assure that any item produced by or for that technical service for general or specific distribution will be classified as nonexpendable so that a lifetime record of the radioactive material will be maintained. Excluded are items not exceeding the provisions of schedules A and B (pars. 14 and 15) or those which contain less than one microcurie of radium and/or its daughter products.

a. The Surgeon General. The Surgeon General is responsible with supervision over policies and plans which pertain to the control of potential health hazards resulting from the procurement, handling, and the use of radioactive materials.

SECTION II

PROCUREMENT

4. Atomic Energy Commission—General licenses. *a. A general license authorizes the procurement of the byproduct items listed in*

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paragraphs 14 (schedule A) and 15 (schedule B) and source material items referred to in the note below. Generally licensed byproduct materials are obtained under the authority of Section 30.21, Part 30, Title 10, Code of Federal Regulations, and this authority should be noted in ordering generally licensed quantities. The general licenses are effective without the filing of applications with the Atomic Energy Commission or the issuance of licensing documents to particular persons:

- (1) To transfer, receive, acquire, own, possess and use byproduct material incorporated in a device or equipment which is listed in paragraph 14 and has been manufactured pursuant to a specific license issued by the Atomic Energy Commission.
- (2) To transfer, receive, acquire, own, possess and use and import the quantities of byproduct materials listed in paragraph 15, provided that no person will at any one time possess or use, pursuant to the general licensing provisions of this paragraph, more than ten such scheduled quantities.

Note. The Atomic Energy Commission's source material regulations (10 CFR 40) also contain provisions establishing general licenses for the receipt, possession and transfer of limited quantities of source material for specific uses.

The Atomic Energy Commission's special nuclear material regulations (10 C. F. R. 70) do not include any general license provisions as of the date of these regulations.

b. The general licenses provided in a(1) and (2) above are subject to the provisions of paragraph 15 and such other provisions as required by the Atomic Energy Commission. Attention is particularly directed to the Atomic Energy Commission's requirements for labeling of containers as embodied in the AEC regulation entitled: "Standards for Protection Against Radiation" (10 CFR 20). In addition, persons who transfer, receive, acquire, own, possess, use or import items listed in paragraphs 14 and 15 pursuant to the general licenses approved in a above:

- (1) Will not effect an increase in the radioactivity of said items or quantities by adding other radioactive material thereto, by combining byproduct material from two or more such items or quantities or by altering them in any other manner so as to increase thereby the rate of radiation therefrom.
- (2) Will not administer externally or internally, or direct the administration of, said scheduled items (pars. 14 and 15) or quantities or any part thereof to a human being for any purpose, including but not limited to diagnostic, therapeutic, and research purposes.

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- (3) Will not add, or direct the addition of, said scheduled items or quantities or any part thereof to any food, beverage, cosmetic, drug, or other product designed for ingestion or inhalation by, or application to, a human being.
- (4) Will not include said items or quantities or any part thereof in any device, instrument, apparatus (including component parts and accessories thereto) intended for use for diagnosis, treatment or prevention of disease in human beings or animals or otherwise intended to affect the structure or any function of the body of human beings or animals.

5. Atomic Energy Commission—Specific licenses. *a. General.* Those licenses are required for those items which are under the control of the Atomic Energy Commission and whose procurement and use require a specific license issued to named persons. Applications for those licenses will be submitted to The Surgeon General, Department of the Army, Washington 25, D. C., ATTN: MEDCE, through channels as may be directed by the head of the technical service concerned. Applications for byproduct materials will be filed on AEC Form 313, "Application for Byproduct Material License." Source materials application will be submitted on AEC Form 2, (Application for AEC License to Transfer, Deliver, Export or Receive Uranium or Thorium Source Material), and special nuclear material applications will be submitted by letter in accordance with the requirements of the Atomic Energy Commission for special nuclear material (Title 10, Part 70, Code of Federal Regulations). The Surgeon General will review the application to determine that adequate measures have been taken to protect health and transmit such approved applications to the Atomic Energy Commission. Information contained in previous applications, statements or reports filed with the Atomic Energy Commission may be incorporated by reference, provided that such references are clear and specific. Each application will be signed by the applicant or licensee or a person duly authorized to act for or in his behalf. The Surgeon General may notify the installation or activity commander direct if the expediency of the situation so demands; otherwise, the commander will be notified through channels of the action taken on the application.

b. Approval. Applications for specific licenses will clearly indicate that—

- (1) The applicant has suitable facilities and equipment (such as handling devices, work areas, shields, measuring and monitoring instruments) and operating procedures for the protection of health.

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- (2) The applicant has suitably trained and experienced personnel and is otherwise qualified to use the material for the requested purpose, and satisfies any special requirements contained in the following subparagraphs, when applicable.
- c. Human use.* An application for a specific byproduct material license for human use, including the use of sealed sources, will clearly indicate:
- (1) The applicant satisfies the general requirements of *a* and *b* above.
 - (2) The applicant has appointed a medical isotope committee of at least three members to evaluate all proposals for research, diagnosis, and therapeutic use of isotopes. Membership of the committee should include physicians expert in internal medicine, hematology, therapeutic radiology, and a person experienced in assay of radioisotopes and protection against ionizing radiations.
 - (3) The applicant possesses adequate facilities for the clinical care of patients.
 - (4) The physician designated on the application as the individual user has substantial experience in the proposed use, the handling and administration of radioisotopes and, where applicable, the clinical management of radioactive patients.
 - (5) The application is for a license to use unspecified quantities or multiple types of byproduct material; the applicant has previously received a reasonable number of licenses for a variety of byproduct materials for a variety of human uses.
 - (6) The medical facility concerned has been previously designated by The Surgeon General as authorized to use radioisotopes for human use.
 - (7) The human use is in accord with the policies of The Surgeon General.
- d. Multiple quantities—Research and development.* An application for a specific license for multiple quantities or types of byproduct material for use in research and development will be approved if—
- (1) The applicant satisfies the general requirements specified in *a* and *b* above.
 - (2) The applicant has received a reasonable number of licenses for a variety of radioisotopes for a variety of research and development uses.
 - (3) The applicant has established an isotope committee (composed of such persons as a radiological safety officer, a representative of the administrative office, and one or more persons

- trained or experienced in the safe use of radioactive materials) which will review and approve in advance of purchase of radioisotopes, such proposals for such uses.
- (4) The applicant has appointed a radiological safety officer who will advise on or be available for advice and assistance on radiological safety problems.
- e. Multiple quantities—Distribution.* An application for a specific license for multiple quantities or types of byproduct material for use in processing for distribution to other authorized persons will be approved by the Atomic Energy Commission and The Surgeon General if—
- (1) The applicant satisfies the general requirements specified in *a* and *b* above.
 - (2) The applicant has received a reasonable number of licenses for processing and distribution of a variety of isotopes.
 - (3) The applicant has appointed a radiological safety officer who will advise on or be available for advice and assistance on radiological safety problems.
- f. Placing purchase orders.* To obtain byproduct materials or service irradiations from a facility of the Atomic Energy Commission, it is necessary to submit AEC Form 375 (United States AEC Isotope Order Blank), to the facility where the material or service is requested. This form is not used when purchasing from a commercial supplier.
- 6. No license required.** *a.* The Atomic Energy Commission's special nuclear material regulations do not apply to the Department of Defense to the extent that the Department receives, possesses, and uses special nuclear material in accordance with direction of the President pursuant to Section 91 of the Atomic Energy Act of 1954.
- b.* Requests for materials (e. g., radium) which are not under the control of the Atomic Energy Commission and are of an activity of one microcurie or greater, will be forwarded (by letter) to The Surgeon General through such channels as prescribed by the head of the technical service concerned. Requests will describe the facilities to be used, the type and activity of the radioactive material requested, the name and qualifications of the individual responsible for their direct use and/or application, the purpose for which the isotopes are to be used; and the instruments, health protection, and monitoring provisions. If it is the purpose to incorporate this material into an item of equipment which will eventually be adopted for general or special distribution, provisions must be made for lifetime control and for final disposal of the material.

SECTION III

MISCELLANEOUS

7. **Transfer and use.** Transfer of radioactive materials which are covered by the provisions of these regulations beyond the control of the individual granted approval pursuant to the provisions of special licenses or diversion of such radioactive materials not described in the approved request, will not be made without prior approval of the Atomic Energy Commission, submitted through the Office of The Surgeon General, for those items under its jurisdiction or The Surgeon General for those items which are not under the jurisdiction of the Atomic Energy Commission and contain an activity of one microcurie or greater.

8. **New uses.** Plans and specifications for incorporating radioactive material into new items of issue will be submitted to The Surgeon General for review of existence of possible health hazards before the item is type-classified.

9. **Disposal.** The Chief Chemical Officer is responsible for the disposition of radioactive materials not disposed of by local procedures specifically indorsed by The Surgeon General and approved by local civil authorities. Commanders acting through command channels will request shipping instructions from the Chief Chemical Officer. The Surgeon General will provide, upon request, to the Chief Chemical Officer advice and guidance for the establishment of radiological safety criteria. The Chief Chemical Officer will in turn furnish requesting agencies all necessary information required for disposal of radioactive material and at that time furnish a copy of such instructions to The Surgeon General, Department of the Army, Washington 25, D. C., ATTN: MEDCE. All policies regarding methods of disposal established in Part 20 of the Atomic Energy Commission's regulations entitled: "Standards for Protection Against Radiation" (10 CFR 20).
10. **Change of personnel.** Notification of change of status of individual responsible for the direct use and/or application of radioactive material, i. e., the individual named as responsible on the procurement application, will be sent through channels unless the urgency of the situation requires direct communication to The Surgeon General together with a summary of the qualifications of the new responsible individual. These notifications will be forwarded by The Surgeon General to the Atomic Energy Commission when the materials involved are under its jurisdiction. This provision does not apply to material obtained under a general license.

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11. **Adopted items of equipment.** Within 6 months after the date of these regulations, each head of technical service responsible for the procurement and issue of adopted items of equipment which contain radioactive materials that are not exempt in paragraph 15, will forward one copy of the specifications to the Chief Chemical Officer, Department of the Army, Washington 25, D. C., ATTN: CMLWA-S, and one copy to The Surgeon General, Department of the Army, Washington 25, D. C., ATTN: MEDCE.

12. **Technical advice.** Technical advice relating to the safe handling and storage of equipment containing radioactive materials is a staff responsibility of The Surgeon General and will be furnished upon request through command channels or direct in cases of emergency requiring prompt action by The Surgeon General. Technical advice regarding the elimination of possible health hazards and/or the incorporation of health protective measures within the design and construction of facilities, including nuclear reactors, in which radioactive materials are to be used, will be furnished also upon similar request. To aid in carrying out the provisions of these regulations and to aid individual users of radioisotopes, there will be made available upon request to The Surgeon General, a radiological survey team which will perform "on site" surveys and provide recommendations to meet the requirements of these regulations as well as those of the Atomic Energy Commission.

13. **Records, inspections, and tests.** The following are records, inspections, and tests required by the Atomic Energy Commission for those individuals who are using materials that are under the jurisdiction of that agency:

a. *Records.* Each person who receives byproduct source or special nuclear material pursuant to a license issued in accord with Atomic Energy Commission regulations will keep records showing the receipt, transfer, and disposal of such material.

b. *Inspection.* Each licensee will afford to the Commission at all reasonable times opportunity to inspect byproduct, special nuclear, or source material and the premises and facilities wherein such material is used or stored. Each licensee will make available to the Commission for inspection, upon reasonable notice, records kept by him pursuant to Atomic Energy Commission regulations.

c. *Tests.* Each licensee will perform, or permit the Commission to perform, such tests as the Commission deems appropriate or necessary for the administration of their regulations including tests of byproduct, special nuclear, or source material; facilities wherein such material is utilized or stored; radiation detection or monitoring instru-

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ments; and other equipment or devices used in connection with the utilization or storage of such material.

14. Atomic Energy Commission—Schedule A. The following items are items listed by the Atomic Energy Commission under schedule A of its byproduct licensing regulation. The equipment when manufactured, tested and labeled by a manufacturer in accordance with the in a, b, c and d below incorporating byproduct material in a specific manufacturing, testing and labeling specifications contained in a specific license issued to him pursuant to the Atomic Energy Commission regulations, are under the "general license" provisions of the Commission's regulations (10 CFR 30).

a. *Static elimination device.* Devices designed for use as static eliminators which contain, as a sealed source or sources, byproduct material consisting of not more than 500 microcuries of polonium 210 per device.

b. *Spark gap and electronic tubes.* Spark gap tubes and electronic tubes which contain byproduct material consisting of not more than 5 microcuries per tube of Cesium 137 or Nickel 63 or Krypton 85 gas, or not more than one microcurie of Cobalt 60 per tube.

c. *Light meter.* Devices designed for use in measuring or determining light intensity which contains as a sealed source or sources, byproduct material consisting of a total of not more than 200 microcuries of Strontium 90 per device.

d. *Ion generating tube.* Devices designed for ionization of air which contain as a sealed source or sources byproduct material consisting of a total of not more than 500 microcuries of Polonium 210 per device.

15. Atomic Energy Commission—Schedule B. The following quantities of byproduct material are within the general license provisions of Atomic Energy Commission regulations (par. 4a).

Byproduct material	Column No. 1 Not as a sealed source (Micro-curies)	Column No. 11 As a sealed source (Micro-curies)
Antimony (Sb 124)	10	10
Arsenic 76 (As 76)	10	10
Arsenic 77 (As 77)	1	10
Barium 140—Lanthanum 140 (BaLa 140)	50	50
Barium 140 (Ba 7)	10	10
Beryllium 109—Silver 109 (CdAg 109)	10	10
Calcium 45 (Ca 45)	50	50
Carbon 14 (C 14)	1	10
Cerium 144—Praseodymium (CePr 144)	1	10
Cesium—Barium 137 (CeBa 137)	1	10
Chlorine 36 (Cl 36)	1	10

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Byproduct material	Column No. 1 Not as a sealed source (Micro-curies)	Column No. 11 As a sealed source (Micro-curies)
Chromium 51 (Cr 51)	50	50
Cobalt 60 (Co 60)	1	10
Copper 64 (Cu 64)	50	50
Europium 154 (Eu 154)	1	10
Fluorine 18 (F 18)	50	50
Gallium 72 (Ga 72)	10	10
Germanium 71 (Ge 71)	50	50
Gold 198 (Au 198)	10	10
Gold 199 (Au 199)	10	10
Hydrogen 8 (Tritium) (H 3)	250	250
Indium 114 (In 114)	1	10
Iodine 131 (I 131)	10	10
Iridium 192 (Ir 192)	50	50
Iron 55 (Fe 55)	1	10
Iron 59 (Fe 59)	1	10
Lanthanum 140 (La 140)	10	10
Manganese 52 (Mn 52)	1	10
Manganese 56 (Mn 56)	50	50
Molybdenum 99 (Mo 99)	10	10
Nickel 59 (Ni 59)	1	10
Nickel 63 (Ni 63)	1	10
Niobium 95 (Nb 95)	10	10
Palladium 109 (Pd 109)	10	10
Palladium 108—Rhodium 108 (PdRh 108)	50	50
Phosphorus 32 (P 32)	10	10
Polonium 210 (Po 210)	0.1	1
Potassium 42 (K 42)	10	10
Praseodymium 143 (Pr 143)	10	10
Promethium 147 (Pm 147)	10	10
Rhenium 186 (Re 186)	10	10
Rhodium 105 (Rh 105)	10	10
Rubidium 86 (Rb 86)	1	10
Ruthenium 106—Rhodium 106 (RuRh 106)	1	10
Samarium 153 (Sm 153)	10	10
Scandium 46 (Sc 46)	1	10
Silver 105 (Ag 105)	1	10
Silver 111 (Ag 111)	10	10
Sodium 22 (Na 22)	10	10
Sodium 24 (Na 24)	10	10
Strontium 89 (Sr 89)	1	10
Strontium 90—Yttrium 90 (Sr 90-Y90)	0.1	1
Sulfur 35 (S 35)	50	50
Tantalum 182 (Ta 182)	10	10
Technetium 96 (Tc 96)	1	10
Technetium 99 (Tc 99)	1	10
Tellurium 127 (Te 127)	10	10
Tellurium 129 (Te 129)	1	10

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Column No. I Not as a source (Micro- curies)	Column No. II As a source (Micro- curies)
50	60
10	10
10	10
10	10
1	10
1	10
1	10
10	10
1	10
1	10

Byproduct material

Thallium 204 (Tl 204)	10	10
Tin 113 (Sn 113)	10	10
Tungsten 185 (W 185)	1	10
Vanadium 48 (V 48)	1	10
Vanadium 90 (V 90)	1	10
Yttrium 91 (Y 91)	10	10
Zinc 65 (Zn 65)	1	10

Beta and/or Gamma emitting byproduct material not listed above

16. Procurement of Atomic Energy Commission regulations

and forms. Copies of the Atomic Energy Commission regulations, and blank forms pertaining to the use, licensing, etc., of byproducts, and special nuclear, or source material may be obtained upon direct request to the Atomic Energy Commission. Information on licensing of byproduct materials may be obtained from the Division of Civilian Application, Atomic Energy Commission, Washington 25, D. C. Information on special nuclear or source materials may be obtained from the Licensing Branch, Division of Civilian Application, Atomic Energy Commission, Washington 25, D. C.

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By Order of *Wilber N. Brycker*, Secretary of the Army:

MAXWELL D. TAYLOR,
General, United States Army,
Chief of Staff.

Official:

HERBERT M. JONES,
Major General, United States Army,
The Adjutant General.

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