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Subject: Requested Information Concerning 1994 Changes to the SSR from the SR-2 Committee

SENT BY: Joyce K. Davidson, Health Physicist

Location: HHS Regulations and Licensure - Radioactive Materials Program

Total Number of Pages (including cover page): 13

Comments: Steve Collins asked me to fax you a copy of this information.

Date: March 27, 1997

Sent by: JKD

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SP-5-13
Cross Reference - SP-6-7
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June 20, 1994

To: State Radiation Control Program Director and
person revising regulations

The SR-2 Committee of the CRCPD has finished another round of revisions to the draft Parts A, D, and J, Agency Form X, Agency Form Y, and Agency Form Z of the Suggested State Regulations for Control of Radiation. The enclosed is a listing of every change that we suggest since the December 1992 version that was sent to you. You may have already found most of the changes that resulted from computer processing (e.g., the lost of subscripts in the tables of Appendix B to Part D). The draft document has not yet been approved by the CRCPD Board of Directors. This information is provided for your information and use in updating your rules and to maintain some level of compatibility with the U.S. Nuclear Regulatory Commission.

If you have any questions, try calling me, Joyce Davidson (NE), or Kathy Schneider (NRC).

LIST OF CHANGES MADE NOVEMBER 1993 AND MAY 1994

The following changes to Parts A, D, J, Agency Form X, Agency Form Y, and Agency Form Z were agreed to by the SR-2 Committee at its November 1993 and May 1994 meetings. Additionally, for Parts A and D, the rule that should be used for Section titles is that there is no period following the title unless text follows without a carriage return, if text follows without a carriage return, then there is a period and it is underscored as is the Section title. These changes had not been made in the latest version sent to you (December 1992).

Part A

Definition of "Calendar quarter"--The last sentence was changed to read "The method observed by the licensee or registrant for determining calendar quarters shall only be changed at the beginning of a year."

Definition of "Controlled area"--Deleted it.

Definition of "Curie"--Changed "radioactivity" to "activity" and revised after " 3.7×10^{10} " to read "disintegrations or transformations per second (dps or tps)."

Definition of "Instrument traceability"--added as follows: "means the ability to show that an instrument has been calibrated at specified time intervals using a national standard or a transfer standard. If a transfer standard is used, the calibration must be at a laboratory accredited by a program which requires continuing participation in measurement quality assurance with the National Institute of Standards and Technology or other equivalent national or international program."

Definition of "Lost or missing licensed [or registered] source of radiation"-- revised as follows: "'Lost or missing source of radiation" means licensed [or registered] source of radiation whose location is unknown. This definition includes, but is not limited to, radioactive material that has been shipped but has not reached its planned destination and whose location cannot be readily traced in the transportation system."

Definition of "Member of the public"--revised as follows: "means any individual except during any period in which the individual receives an occupational dose."

Definition of "Occupational dose"--revised as follows: "means the dose received by an individual in the course of employment in which the individual's assigned duties for the licensee or registrant involve exposure to sources of radiation, whether or not the sources of radiation are in the possession or the licensee, registrant, or other person. Occupational dose does not include dose received: from background radiation, or as a patient from medical practices, or from voluntary participation in medical research program, or as a member of the public."

Definition of "Protective apron"--was added as follows: "means an apron made of radiation-attenuating materials used to reduce exposure to radiation "

Definition of "Public dose"--revised as follows: "means the dose received by a member of the public from sources of radiation from licensed ~~or~~ registered operations. Public dose does not include occupational dose, or dose received from background radiation, or dose received as a patient from medical practice, or dose received from voluntary participation in medical research programs."

Definition of "Pyrophoric liquid"--the first two lines were revised as follows: "Pyrophoric material" means any liquid that ignites spontaneously in dry or moist air at or below 130 °F (54.4 °C) or any solid material,"...

Definition of ["Qualified expert"--in the 4th and 5th lines--after "Radiology" placed a comma (",") and after "Health Physics," insert "or the American Board of Medical Physics,"...

Definition of "Regulations of the U.S. Department of Transportation"--added "(U.S. DOT)" before "means"...

Definition of "Rem"--changed "sievert" to "Sv"

Definition of "Sealed source"--revised as follows: "means any container of radioactive material which has been constructed in such a manner as to prevent the escape of any radioactive material "

Definition of "Source traceability"--added as follows: "means the ability to show that a source of radiation has been calibrated either by the national standards laboratory of the National Institute of Standards and Technology (NIST), or by a laboratory which participates in a continuing measurement quality assurance program with NIST or other equivalent national or international program."

Definition of "Traceable to National Standard"--added as follows: "[See "Instrument traceability" or "Source traceability"]."

Part D

D.1b --added "in an emergency" to the end of the section before the period

D.3, Definition of "Reference Man"--changed "workers" to "employees".

D.201c ii.--added the subsection language shown after the entry for D.201f. below.

D.201d --changed "presented" to "specified".

So the above changes results in D.201c. through D.201f. changed to read as follows:

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- c. The assigned deep dose equivalent and shallow dose equivalent shall be for the portion of the body receiving the highest exposure:
- i. The deep dose equivalent, eye dose equivalent and shallow dose equivalent may be assessed from surveys or other radiation measurements for the purpose of demonstrating compliance with the occupational dose limits, if the individual monitoring device was not in the region of highest potential exposure, or the results of individual monitoring are unavailable; or
 - ii. When a protective apron is worn while working with medical fluoroscopic equipment and monitoring is conducted as specified in D.502a.iv., the effective dose equivalent for external radiation shall be determined as follows:
 - (1) When only one individual monitoring device is used and it is located at the neck outside the protective apron, the reported deep dose equivalent shall be the effective dose equivalent for external radiation; or
 - (2) When only one individual monitoring device is used and it is located at the neck outside the protective apron, and the reported dose exceeds 25 percent of the limit specified in D.201a., the reported deep dose equivalent value multiplied by 0.3 shall be the effective dose equivalent for external radiation; or
 - (3) When individual monitoring devices are worn, both under the protective apron at the waist and outside the protective apron at the neck, the effective dose equivalent for external radiation shall be assigned the value of the sum of the deep dose equivalent reported for the individual monitoring device located at the waist under the protective apron multiplied by 1.5 and the deep dose equivalent reported for the individual monitoring device located at the neck outside the protective apron multiplied by 0.04
- d. Derived air concentration (DAC) and annual limit on intake (ALI) values are specified in Table 1 of Appendix B and may be used to determine the individual's dose and to demonstrate compliance with the occupational dose limits. See D.1107.
- e. Notwithstanding the annual dose limits, the licensee or registrant shall limit the soluble uranium intake by an individual to 10 milligrams in a week in consideration of chemical toxicity. See footnote 3 of Appendix B.
- f. The licensee or registrant shall reduce the dose that an individual may be allowed to receive in the current year by the amount of occupational dose received while employed by any other person during the current year. See D.205.

D 202b.iii --next to the last line changed H_{50} to $H_{T,50}$.

D 202c.--deleted "also".

D 205a --deleted "or controlled".

D 205b ii --deleted "; and" and add " ".

D 205b iii --deleted.

D 205d.ii --revised to read as follows:

"Licensees or registrants are not required to partition historical dose between external dose equivalent(s) and internal committed dose equivalent(s). Further, occupational exposure histories obtained and recorded on Agency Form Y or equivalent before [the effective date of these regulations], might not have included effective dose equivalent, but may be used in the absence of specific information on the intake of radionuclides by the individual."

D.208c --revised to read as follows:

"The dose to an embryo/fetus shall be taken as the sum of:

- i The dose to the embryo/fetus from radionuclides in the embryo/fetus and radionuclides in the declared pregnant woman, and
- ii The dose that is most representative of the dose to the embryo/fetus from external radiation, that is, in the mother's lower torso region.
 - (1) If multiple measurements have not been made, assignment of the highest deep dose equivalent for the declared pregnant woman shall be the dose to the embryo/fetus, in accordance with D.205c.; or
 - (2) If multiple measurements have been made, assignment of the deep dose equivalent for the declared pregnant woman from the individual monitoring device which is most representative of the dose to the embryo/fetus shall be the dose to the embryo/fetus. Assignment of the highest deep dose equivalent for the declared pregnant woman to the embryo/fetus is not required unless that dose is also the most representative deep dose equivalent for the region of the embryo/fetus."

D.301a.i --changed the beginning to "Except as provided in D.301a.iii., the total" ... and changed the comma (",") at the end to a semicolon (";").

D.301a.ii --changed the period (".") at the end to "; and"

D.301a.iii.--added "iii. The total effective dose equivalent to individual members of the public from

infrequent exposure to radiation from radiation machines does not exceed 5 mSv (0.5 rem) "

D.301b.--changed "controlled" to "restricted".

D.302a.--deleted "and controlled" both times it appeared.

D.302b ii (2), first line--changed "continually" to "continuously".

D.401d.--added the following: "Records of test results for sealed sources shall be made pursuant to D.1104."

D.501b --added to the end before the period the following: "except when a more frequent interval is specified in another applicable Part of these regulations or a license condition".

D.502a iv.--the new section was inserted as follows:

"Individuals working with medical fluoroscopic equipment.

- (1) An individual monitoring device used for the dose to an embryo/fetus of a declared pregnant woman, pursuant to D.208a, shall be located under the protective apron at the waist.
- (2) An individual monitoring device used for eye dose equivalent shall be located at the neck, or an unshielded location closer to the eye, outside the protective apron.
- (3) When only one individual monitoring device is used to determine the effective dose equivalent for external radiation pursuant to D.201c ii., it shall be located at the neck outside the protective apron. When a second individual monitoring device is used, for the same purpose, it shall be located under the protective apron at the waist. The second individual monitoring device is required for a declared pregnant woman."

D.503--The new section was inserted as follows:

Sec. D.503 Location of Individual Monitoring Devices.

Each licensee or registrant shall ensure that individuals who are required to monitor occupational doses in accordance with D.502a wear individual monitoring devices as follows:

- a. An individual monitoring device used for monitoring the dose to the whole body shall be worn at the unshielded location of the whole body likely to receive the highest exposure. When a protective apron is worn, the location of the individual monitoring device is typically at the neck (collar).
- b. An individual monitoring device used for monitoring the dose to an embryo/fetus of a declared pregnant woman, pursuant to D.208a, shall be located at the waist under any

protective apron being worn by the woman.

- c. An individual monitoring device used for monitoring the eye dose equivalent, to demonstrate compliance with D.201a.ii.(1), shall be located at the neck (collar), outside any protective apron being worn by the monitored individual, or at an unshielded location closer to the eye.
- d. An individual monitoring device used for monitoring the dose to the extremities, to demonstrate compliance with D.201a.ii.(2), shall be worn on the extremity likely to receive the highest exposure. Each individual monitoring device shall be oriented to measure the highest dose to the extremity being monitored.

D.601a.i.--the fourth line was changed by inserting "or" after "radiation".

D.703a.ii --the first line was changed as follows: "The licensee or registrant may use" after "testing or certification," added "provided" before "the licensee" and immediately following that changed to read as follows: "...or registrant has submitted to the Agency and the Agency has approved an application"...and deleted "reliable".

D.801 and D.802--These sections were replaced with a new D.801 as follows:

Sec. D.801 Security and Control of Licensed or Registered Sources of Radiation.

- a. The licensee or registrant shall secure licensed or registered radioactive material from unauthorized removal or access.
- b. The licensee or registrant shall maintain constant surveillance, and use devices or administrative procedures to prevent unauthorized use of licensed or registered radioactive material that is in an unrestricted area and that is not in storage.
- c. The registrant shall secure registered radiation machines from unauthorized removal.
- d. The registrant shall use devices or administrative procedures to prevent unauthorized use of registered radiation machines.

D.903b.--was rephrased after the words "provided that the" as follows: "requirements of G.38a.ii or G.44a.ii. of these regulations are met" and a new D.903c. was added as follows:

- c. Rooms or other areas in hospitals that are occupied by patients are not required to be posted with caution signs, provided that:
 - i. A patient being treated with a permanent implant could be released from confinement pursuant to G.26 of these regulations, or
 - ii. A patient being treated with a therapeutic radiopharmaceutical could be released from confinement pursuant to G.38c. of these regulations.

D.903c --was redesignated D.903d.; changed "c" to "d".

D.903d.--was redesignated D.903e.; changed "d" to "e".

D.906b.ii.--after "Appendix A" changed "to" to "of" and added to footnote 3 after "Labeled" the following: "means labeled"...

D.906c --replaced all after the first use of "normal working hours" as follows: "or if there is evidence of degradation of package integrity, such as a package that is crushed, wet, or damaged. If a package is received after working hours, and has no evidence of degradation of package integrity, the package shall be monitored no later than 3 hours from the beginning of the next working day."

D.1004--the words "amounts and forms" were changed to "form and concentration".

D.1202c.--reversed the order of "c" and "d" and relettered them.

D.1202d --reversed the order of "c" and "d" and relettered them and changed the original D.1202d as follows: "...D.1202a. and b. by initial contact by telephone to the Agency and shall confirm the initial contact by telegram,"...

D.1206a iii., footnote "a"--changed "D.1302" to "A.7 of these regulations"

PART D, APPENDIX B, first page--inserted after "...100 days." clarifying sentence as follows: "The class (D, W, or Y) given in the column headed "Class" applies only to the inhalation ALIs and DACs given in Table I, column 2 and 3."

PART D, APPENDIX B, third page--inserted "ml" after " 2.4×10^9 "

PART D, APPENDIX B, second page--deleted the period in "St. wall = stomach wall," so it reads "St wall"...

PART D, APPENDIX B, third page, under Table II, the second paragraph, next to the last line--replaced "they were" with "was the case"...

PART D, APPENDIX B, next paragraph after these last change above--changed "0.1 rem" to "1 mSv (0.1 rem)".

PART D, APPENDIX B, fourth page, under Table III, at the end of the paragraph-- changed "0.5 rem" to "5 mSv (0.5 rem)".

PART D, APPENDIX B, entry for 16 Sulfur-35 vapor--shifted each number one column to the right.

PART D, APPENDIX B, entry for 38 Strontium-80, both D and Y--added a "3" subscript after "SrTiO".

PART D, APPENDIX B, entry for 42 Molybdenum-90, Y--added a "2" subscript after "MoS".

PART D, APPENDIX B, entry for 43 Technetium-97m, D--moved "St wall" from Table I, Col. 1 to Col. 2.

PART D, APPENDIX B, entry for 62 Samarium-146, W--changed "4E2" to "4E-2" in Table I, Col. 2.

PART D, APPENDIX B, entry for 62 Samarium-147, W--changed "4E2" to "4E-2" in Table I, Col. 2.

PART D, APPENDIX B, entry for 64 Gadolinium-148, D--changed "2E-2" to "2E-2" in Table I, Col. 2.

PART D, APPENDIX B, entry for 68 Erbium-172, W--changed "E+3" to "1E+3" in Table I, Col. 1.

PART D, APPENDIX B, entry for 75 Rhenium-187, D--moved "St wall" from Table I, Col. 1 to Col. 2.

PART D, APPENDIX B, entry for 82 Lead-210, D--changed "6E1" to "6E-1" in Table I, Col. 1 and changed "2E1" to "2E-1" in Table I, Col. 2.

PART D, APPENDIX B, entry for 86 Radon-220--changed "working level months" to "WLM" in Table I, Col. 2 and moved "(or 1.0 WL)" from Table II, Col. 1 to Table I, Col. 3 after changing "working level" to "WL".

PART D, APPENDIX B, entry for 86 Radon-222--changed "working level months" to "WLM" in Table I, Col. 2 and moved "(or 1.0 WL)" from Table II, Col. 1 to Table I, Col. 3 after changing "working level" to "WL".

PART D, APPENDIX B, entry for 92 Uranium-230, D, W, and Y--added the appropriate subscripts so it now reads "D, UF₆, UO₂F₂, UO₂(NO₃)₂", "W, UO₃, UF₄, UCl₄", and "Y, UO₂, U₃O₈".

PART D, APPENDIX B, entry for 94 Plutonium-234, W and Y--added the subscript "2" to PuO both places.

PART D, APPENDIX B, the third line of the next two entries after 101 Mendelevium-258--added a hyphen ("-") after "fis".

PART D, APPENDIX B, FOOTNOTES, 2 at the end--changed reference to "D.203".

PART D, APPENDIX B, FOOTNOTES, 3 at the end of the first sentence--changed reference to "D.201e".

PART D, APPENDIX B, NOTE 2, the page following the last change--after "If it is known that AC-

227-D,W,Y,"...moved "1E-14" from Table II, Col. 2 to Col. 1.

PART D, APPENDIX B, NOTE 2., two paragraphs below the last change--moved "1E-12" from Table II, Col. 2 to Col. 1.

PART D, APPENDIX B, NOTE 4., third line--deleted the 10 CFR 20 reference after "Appendix B".

PART D, APPENDIX B, NOTE 4., Example, first line--changed "CA, CB, and CC" to have subscripts as follows " C_A , C_B , and C_C " and in the equation deleted the underscore mark from under the less than or equals to symbol.

PART D, APPENDIX C, entry for Indium-110m--deleted the "m" so it is "Indium-110".

PART D, APPENDIX C, entry for Indium-110m--changed "(69.1m)" to "(69.1 min)".

PART D, APPENDIX C, entry for Indium-110--changed "(4.9h)" to "(4.9 h)".

PART D, APPENDIX C, entry for Antimony-120--changed "(16m)" to "(16 min)".

PART D, APPENDIX C, entry for Antimony-120--changed "(5.76d)" to "(5.76 d)".

PART D, APPENDIX C, entry for Antimony-128--changed "(10.4m)" to "(10.4 min)".

PART D, APPENDIX C, entry for Antimony-128--changed "(9.01h)" to "(9.01 h)".

PART D, APPENDIX C, entry for Europium-150--changed "(12.62h)" to "(12.62 h)".

PART D, APPENDIX C, entry for Europium-150--changed "(34.2y)" to "(34.2 y)".

PART D, APPENDIX C, entry for Terbium-156m--changed "(5.0h)" to "(5.0 h)".

PART D, APPENDIX C, entry for Terbium-156m--changed "(24.4h)" to "(24.4 h)".

PART D, APPENDIX C, entry for Rhenium-182--changed "(12.7h)" to "(12.7 h)".

PART D, APPENDIX C, entry for Rhenium-182--changed "(64.0h)" to "(64.0 h)", note to use the zero not the capital letter o.

PART D, APPENDIX C, entry for Iridium-192m--changed "(1.4m)" to "(1.4 min)".

PART D, APPENDIX C, entry for Iridium-192--changed "(73.8d)" to "(73.8 d)".

PART D, APPENDIX C, entry for Neptunium-236--changed "(1.15E+5)" to "(1.15E+5 y)".

PART D, APPENDIX C, entry for Neptunium-236--changed "(22.5h)" to "(22.5 h)".

Note for PART D, APPENDIX C, entry for Neptunium-237--do not change "0.001" because 10 CFR 20, APPENDIX C has a typographical error of "1.001".

PART D, APPENDIX D, III.(b)(5), fourth line--insert "the license is terminated and" before "disposition".

Part J

J.12a.--deleted the word "area".

J.12a i., after "sources of radiation in"--changed to read as follows: "the licensee's or registrant's workplace."

J.12a iii., after "material"--delete "occurring in such areas".

J.12b., after "problems"--changed to read as follows: "present in the workplace".

J.13b --changed "advise" to "furnish to" and after "annually" insert "a written report".

J.13c., line 1--before "report" insert "written".

J.13d., line 1--change "D.1203" to read as follows: "D.1202, D.1203, or D.1204" and on line 4, before "report" insert "written".

Agency Form X

REPORTS OF YOUR RADIATION EXPOSURE HISTORY, 1.--changed the Sections references to read as follows: "D.201, D.207, and D.208".

REPORTS OF YOUR RADIATION EXPOSURE HISTORY, 2. and 2. (a)--changed the first comma (",") to a semicolon (";") and moved "and if you request information on your radiation exposures," to the beginning of 2.(a)

REPORTS OF YOUR RADIATION EXPOSURE HISTORY, 2. and 2. (b)--replaced "advise" with "furnish to" and after "annually" inserted "a written report"...

Agency Form Y

Instructions on back side of the form, top block, parenthetical note--changed to read as follows: "(All doses should be stated in centisieverts (rem))".

Agency Form Z

Front page, Item 10.D--changed to read as follows: "INTAKE IN kBq or uCi".

Front page, heading above Items 11-18--changed to read as follows: "DOSES (in centisievert (rem))".

Instructions on back side of the form, top block, parenthetical note--changed to read as follows: "(All doses should be stated in centisieverts (~~rem~~))".

Instructions on back side of the form, Item 10D--changed to read as follows: "Enter the intake of each radionuclide in kBq or μCi ($1 \text{ kBq} = 37 \mu\text{Ci}$). Clearly indicate the unit used."