

Commonwealth of Puerto Rico
State Office of Civil Defense
San Juan, Puerto Rico

RULES AND REGULATIONS FOR USE AND CUSTODY OF RADIATION
SOURCE SETS
CDV-784 OR 786
JULY 10, 1974

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PREFACE

AUTHORITY

Civil Defense Act No. 183, Commonwealth of Puerto Rico dated, May 1, 1951.

PURPOSE

To establish policies, procedures, and regulations governing the custody and use of Radiation Training Source Sets CDV-784 or 786 within the Commonwealth of Puerto Rico under Atomic Energy Commission No. 52-03569-02 for the instruction of Radiological Monitors or for the calibration of radiological instruments.

REFERENCES

- A. United States Atomic Energy Commission Rules and Regulations Title 10, Code of Federal Regulations, Part 20, Standards for Protection Against Radiation.
- B. Regulations for the Control of Radiation in Puerto Rico No. 1, promulgated pursuant to the provisions of Act No. 79 of June 24, 1965, as amended.

I. GENERAL DISPOSITIONS

A. Storage and use of Radiation Source Sets

- 1. Source Sets will be stored in a locked, unoccupied, isolated area which will be designated as a restricted area, conspicuously posted with signs bearing the radiation caution symbol and the words "Caution Radiation Area".
- 2. Restricted area must be locked and capsules also locked within their lead "Pig" when not being used.
- 3. Storage work of the Source Sets will be performed only by authorized personnel.
- 4. Copy of Form AEC-3 "Notice to employees" will be posted at the entrance of the restricted area.
- 5. Source Sets will be only used for the training of Radiological Monitors or the calibration of Radiological Instruments.

6. Source Sets will only be used by the authorized handlers under their supervision and in their presence.
7. Source Sets will never be left unattended when the lead "Pig" is open.
8. Training area will be considered as a restricted area during the periods when capsules are out of the lead "Pig".
9. When Source Sets are used the Instructor will:
 - a. Count the number of capsules on a piece of disposable paper, the Source Set CDV-784 should contain six (6) capsules, while the CDV-786 twelve (12).
 - b. Verify that each capsule is properly ringed and tagged, if sources are missing, improperly tagged or ringed, immediately notify the Radiation Protection Officer.
 - c. Monitor each capsule with a Radiological Instrument CDV-700 to verify that the capsule contains the radioactive material. This operation should be performed at a distance from other capsules so that radiation levels are not significantly above background. Count the capsules as they are turned into the lead "pig".

Note:

Capsules will only be handled with the tongs provided for this use.

10. Each trainee as well as any individual entering a restricted area will wear a CDV-138 dosimeter.
 - a. Before students enter the restricted area, the Instructor will survey the area to determine the perimeter of the radiation area as follows:
 1. Remove all capsules from the lead "pig".
 2. Using a Radiological Instrument CDV-700 determine the distance from capsules where the radiation level is 2 mr/hr.
 3. Post "Danger - Radiation Area" signs at all points of approach to this 2 mr/hr area.
- B. Handlers of Source Sets
1. Source Sets will be issued to handlers only under the following conditions:
 - a. Petitioner is a certified handler.

- b. Handler controls the use and security of storage area similar to the one described in paragraph 1.
- c. Storage area has been inspected and approved by the Radiation Protection Officer.
- d. The petition has been favorably recommended by the Radiation Protection Officer and approved by the State Radiation Protection Committee.
- e. Any relocation of the Source Set from its permanent storage area will require prior approval by the State Radiation Protection Committee.

C. Posting of Restricted Areas

1. Restricted areas will be conspicuously posted with signs bearing the radiation caution symbol and the words "Caution Radiation Area." This applies to temporary storage area as well as permanent areas. Signs will be sufficient in number and placed to be clearly visible from any approach to the area.

D. Exposure of Individuals to Radiation

1. Source Sets will not be used or stored in such a manner as to cause any individual in a restricted area to receive a whole body dose in excess of 1,250 mr in any calendar quarter.

E. Records

1. The State Radiation Protection Committee shall insure that records are maintained showing the radiation exposure of each individual who enters a restricted area under such circumstances that he receives or is almost to receive a dose in any calendar quarter in excess of 25% of the values here specified:
 - a. Whole body, head and trunk, active blood forming organs, lens of eye or gonads.
 - b. Hands and forearms, feet and ankles - 18.75 REMS.
 - c. Skin of whole body 7.5 REMS.

Records of above radiation exposures will be maintained indefinitely or until the AEC authorizes their disposal.

F. Reports of Overexposure to Radiation

1. Any exposure of an individual to radiation in excess of the limits

established in paragraph E will be reported immediately to the State Protection Radiation Committee.

2. The State Protection Radiation Committee will investigate any report of overexposure and notify the AEC within 24 hours of any incident involving radioactive material which have caused or will cause.
 - a. Exposure of the whole body of an individual to 5 REMS or more of radiation.
 - b. Exposure of the skin of the whole body of an individual to 30 REMS or more of radiation.
 - c. Exposure of the feet, ankles, hands and forearms of an individual to 75 REMS or more radiation.

G. Loss of Radioactive Material

1. In the eventuality that an empty source capsules is discovered, the handler of the Source Set will:
 - a. Remove all capsules from the lead "Pig" and monitor for contamination.
 - b. Monitor all personnel present in the area.
 - c. Remove the Source Set, in its lead "Pig", from the area being used.
 - d. Monitor the area until the source material is located.
 - e. If the source material is found in loss soil, it should also be scooped up into the lead "Pig".
 - f. If the source material is found, making use of the tongs return it to the lead "Pig".
 - g. Once the source material is found, it should be returned to the lead "Pig", being marked and sealed. Immediately notify the Radiation Protection Office, State Office of Civil Defense, telephone numbers: 737-5021, 743-4324, 722-5950, or 863-0729, if this is not possible, notify one of the members of the State Protection Radiation Committee.
 - h. Remonitor the area, equipment and personnel.
 - i. If the source material cannot be found restrict the area.

H. Leak Tests

1. Leak tests will be performed on each Source Set immediately upon receipt and at least every six (6) months thereafter. The State RADEF Officer will be notified of the result, aforementioned results will be maintained in file. Leak tests will be performed by or under the supervision of the Custodian in the following manner:
 - a. Remove the small lead "Pig" which is within the big lead "Pig".
 - b. Moisten a piece of paper, wet strength, with it crush the inner parts of the big lead "Pig".
 - c. Using a Radiological Instrument CDV-700, determine the background count at a distance far enough from the sources so that they do not affect the reading. With the shield open and the range on the most sensitive scale X-1, hold the open window as close as possible to, but not in contact with, the paper and monitor it thoroughly. Any reading of the instrument which exceeds normal background should be attributed to the contamination of the lead "Pig".

A slight momentary increase in the natural background at the time of checking, should not alarm the custodian as this could be due to a variation of the natural background or to deflection in the meter of the instrument.

- d. If the test reveals contamination, the Custodian will take immediate action to prevent the spread of the contamination. The sources and contaminated paper will be replaced in the lead "pig" and the State RADEF Officer notified.

The entire set will be kept secure and locked pending for shipping instructions.

In accordance with a condition of the license, the RADEF Officer will notify A.E.C. of any leaky capsules within thirty (30) days after completion of test.

- e. Moisten a piece of paper, wet-strength, wrap and wipe each capsule.
- f. Using a Radiological Instrument CDV-700 with the shield open and the range on the most sensitive scale X-1, hold the open window as close as possible to, but not in contact with, the paper and monitor thoroughly. Any reading of the instrument which exceeds

normal background should be attributed to the contamination of the capsules.

- g. As soon as the capsules are checked, place them in the big lead "Pig". This will reduce the radiation exposure.
- h. Check the radioactive contamination of the small lead "Pig". If the results are negative, place the capsules in the small lead "Pig", enclose in the big lead "Pig", relock the cover and store the Source Set to its normal storage location.

I. Transportation of Source Sets

- 1. When a Source Set is transported in a vehicle the following procedure will be followed:
 - a. The capsules will be enclosed in the big lead "Pig" and its cover secured with the four (4) bolts.
 - b. The area of the vehicle in which passengers will travel as well as its surroundings will be monitored with a Radiological Instrument CDV-700. If a dose rate of more than 2 mr/hr is detected, extra shielding will be placed around the Source Set in order to reduce the dose rate within the limit established.
 - c. A certified Source Set Handler will drive or travel in the vehicle. A dosimeter CDV-138 will be positioned in the passengers area at the point nearest the Source Set. Total dose of exposure will be recorded.
 - d. A Radiological Instrument CDV-700 will be carried always in the vehicle, so there is a monitoring capability in case of an accident.

J. Disposal of Source Sets, Capsules, Waste

- 1. No disposal of radioactive material is authorized to Source Sets handlers.

II. CERTIFICATION OF SOURCE SET HANDLERS

- A. Normally, applicants who have successfully completed the Radiological Monitoring for Instructors Course (RMI) offered by the DCPA Staff College, DCPA Training Centers or College Extension Programs will be certified. In addition, the applicant should have college level training in the Physical Sciences or equivalent experience.
- B. All applications will be reviewed by the State Radiation Protection Committee, which will vote unanimously.