OPERATING & EMERGENCY

PROCEDURES MANUAL

BAKER TESTING SERVICES INC.

This document is intended for the use by the employees of Baker Testing Services Inc.. Each radiographer and/or assistant radiographer shall familiarize themselves with the contents and be required to have it with them at all times while carrying out radiographic operations utilizing any sealed scurce.

PERSONNEL MONITORING EQUIPMENT & RADIATION DETECTION INSTRUMENTS

DOSIMETER

Prior to the use of any radiographic device each radiographer shall comply with the following:

A pocket dosimeter having a range from 0 to 200 mr must be worn in the upper trunk area. At the start of the work day each radiographer shall make sure his dosimeter is set at the "zero" marking. This can be accomplished by utilizing the Dosimeter Charger.

Simply insert the dosimeter end opposite the eye piece onto the recepticle provided on the charging unit. Turn the charger on and looking through the eye piece, observe the dosimeter reading. Next "zero" out the dosimeter by turning the knob provided on the charging unit so that the dosimeter reads zero. If the dosimeter will not respond or is damaged the radiographer will notify the Radiation Safety Officer and will be issued a replacement. Enter dosimeter number and reading into Dosimeter Log Book.

Frequent readings of pocket dosimeters (several times a work shift) should be made so that personnel are aware of exposure received. Should any personnel discover their pocket dosimeter is off scale, the Radiation Safety Officer shall be notified and that individual's film badge developed immediately. The individual shall be prohibited from performing radiographic operations until the magnitude of the exposure has been evaluated. The Radiation Safety Officer will be responsible for the issue, necessary maintenance, repair, replacement and storage of pocket dosimeters.

When dosimeters are not in use they shall be stored in the case provided with the recharger unit which is kept on the Chief Technician's desk.

PERSONNEL MONITORING EQUIPMENT & RADIATION DETECTION INSTRUMENTS

FILM BADGE

Prior to the use of any radiographic device each radiographer shall comply with the following:

A Film Badge must be worn on the upper trunk area by each radiographer each working day. These badges will be distributed by the Radiation Safety Officer or by his delegated authority. Badges should be identified by the wearer's social security number and worn only by that person. The badges will be collected once each month and sent to R.S. Landauer, Jr. & Co., Division of Technical Operations, Incorporated, 3 New England Executive Park, Suite 218, Burlington, Ma 01803 for processing. The results shall be kept for inspection in an office file accessible to radiographers.

When film badges are not in use they shall be stored in the recharger case along with the dosimeters. The case will be kept on the Chief Technician's desk.

PERSONNEL MONITORING EQUIPMENT & RADIATION DETECTION INSTRUMENTS

SURVEY METER

Prior to the use of any radiographic device each radiographer shall comply with the following:

Each radiographer shall select a survey meter at the start of each work shift. A Victoreen Model #492 or it's equivalent shall be used. He shall make certain that the survey meter is in operable condition and has not been physically damaged. The instrument shall be turned on and the selector positioned to "battery check" or "zero" position, depending on model used. If the batteries are sufficiently charged the dial indicator will swing to battery OK position. If insufficient or no movement is noted, it can be assumed the batteries are dead and need replacing. Replace batteries. Repeat procedure. If OK, proceed. If not, use another meter and notify the Radiation Safety Officer of malfunction. Each instrument shall have a calibration sticker with a calibration expiration date. The radiographer will take note of that date. If it has expired or is missing he will not under any circumstances use that meter. The Radiation Safety Officer must be notified and must issue a new meter or arrange to have the offending meter calibrated before any work can be done with that particular meter. The radiographer will not proceed with any radiographic work without a properly calibrated and functionally stable meter.

At least one calibrated and operable radiation survey meter shall be available at the location of radiographic operations whenever radiographic operations are being performed.

The survey meter should also be checked for operation by placing near a loaded projector and noting movement of the needle.

The Radiation Safety Officer or the Assistant Radiation Safety Officer shall be notified whenever there is a malfunction or defect of the survey meter.

PERSONNEL MONITORING EQUIPMENT & RADIATION DETECTION INSTRUMENTS

RADIATION SURVEY
PERMANENT SHIELDED FACILITY

Prior to the use of any radiographic device each radiographer shall comply with the following:

The radiographer shall make a radiation survey of the entrance to the restricted area. That level may not exceed 2 mr/hr. Upon entering the RESTRICTED area continual observation of the survey meter is mandatory. Any abrupt rise in radiation levels will indicate an abnormal situation. If this occurs, secure the area and notify the Radiation Safety Officer immediately. If all is "normal" proceed to projector. An initial survey with the survey meter of the projector will be made. A reading of $<$ 10 mr/hr at 1 meter or $<$ 200 mr/hr at the surface is satisfactory. Should this survey meter reveal higher values do not proceed. Maintain personal surveillance and have someone notify the Radiation Safety Officer.

The preparation for use and operation of the Gamma Ray projector should be carried out only in areas monitored with appropriate radiation measuring equipment.

The Daily Inspection and Utilization Log shall be filled out by the technicians any time a source is used. A new log shall be filled out each day even though it may be a continuation of the same job. Two utilization logs may be needed if the same source is used for different jobs. A separate log shall be filled out for each source used.

At the end of each work day when an exposure device has been used the last survey will be recorded in the Utilization Log. The last survey of the day will be made after the exposure device is in the storage area to determine that the sealed source is in the shielded position.

RADIATION SURVEYS - TEMPORARY JOB SITE

GENERAL

Upon arrival at a temporary job site, the radiographer in charge shall announce his presence to that person in charge of the job site. He shall explain the reason for his presence and seek to employ assistance in establishing and securing the area(s) he will be working. In all circumstances visual as well as radiation surveys shall be mandatory.

Whenever possible collimators such as the Technical Operations Model #799 shall be employed. The collimator is slipped over the source tip. Appendix 1, page 31.

1. The perimeter of the restricted area and the perimeter of the high radiation area shall be posted. "Caution"(or Danger) "Radiation Area" signs shall be conspicuously posted at the perimeter of the restricted area and "Caution" (or Danger) "High Radiation Area" signs shall be posted at the calculated 100 mr/h perimeter of the high radiation area. The use of "High Radiation Area" signs is not acceptable at the perimeter of the restricted area.

   Upon exposing the source, the radiographer shall survey the perimeter of the restricted area and adjust it as necessary. After returning the source to its storage position in the projector, a survey of the projector exterior shall be made in the following manner: The operator shall approach the projector from the rear with a survey meter. The survey meter shall be passed over the projector from the rear to a side, across the top to the other

side and then to the front and then up the guide tubes to the shout. The results of the survey should compare with the levels noted prior to commencing the operation. A higher or lower radiation level may indicate that the source is not properly stored and should be treated as an emergency situation.

Under no circumstances are unauthorized personnel allowed inside the perimeter of the restricted area. Should this condition arise, an immediate retraction of the source to it's shielded projector is warranted.

2. Determine the perimeter of the restricted area using the attached charts. Appendix 2, page 32.

If there is a need to stay at the temporary job site, make arrangement with contractor to supply a locked room. If a room is provided for storage of byproduct material by the contractor, the radiographer will maintain control of all keys. Survey exterior of room to ensure radiation less than 2 mr/hr and post "Caution, Radioactive Material" sign. If this can not be accomplished, the source projector shall be locked in the radiographer's vehicle.

The Daily Inspection and Utilization Log shall be filled out by the technicians any time a source is used. A new log shall be filled out each day even though it may be a continuation of the same job. Two utilization logs may be needed if the same source is used for different jobs. A separate log shall be filled out for each source used.

The last survey of the day of the exposure device will be recorded on the Utilization Log. The last survey of the day will be made after the exposure device is in the storage area to determine that the sealed source is in the shielded position.

EXPOSURE DEVICES

PROCEDURES FOR OPERATING

The exposure device used is the Technical Operations Model 660 Ir 192 Gamma Ray Projector. It should be noted that the Technical Operations Model 741 Co 60 Gamma Ray Projector has identical mechanical connections. For the purpose of simplicity and clarity only, the Model 660 Ir 192 is used in the narration.

1. At the radiographic focal point, position and secure the snout of the master guide tube.

2. Remove the plastic dust caps and attach additional extender guide tubes, as necessary, to the master guide tube.

3. Determine the position of the projector allowing for maximum possible operating shielding.

4. Lay out the guide tubes as straight as possible towards the projector. The bend radius of the guide tubes should not be under twenty inches. Small bend radii may restrict the movement of the control cable.

5. Remove the storage plug from the projector and attach the last guide tube to the projector.

   Never operate the system with more than three guide tube sections (including the master).

6. Determine the operating site of the control unit. For maximum safety, the operator should be located behind effective protective shielding such as steel castings or plates, etc.

7. Lay out the control cable as straight as possible toward the projector. The bend radius should not be less than three feet. Small bend radii may restrict the movement of the control cable.

8. Attach the control cable to the projector in the following sequence:

   a. Unlock the projector with the key provided and turn the connector selector ring from the lock position to the connect position. When the ring is in the connect position, the storage cover will disengage from the projector.

   b. Slide the control cable collar back and open the jaws of the control cable connector. The exposes the male position of the swivel connector.

   c. Engage the male and female portions of the swivel connector by depressing the spring-loaded locking pin toward the projector with the thumb nail.

   d. Release the locking pin and test that the connection has been properly made.

   e. Close the jaws of the control cable connector over the swivel-type connector. Slide the control cable collar over the connector jaws.

   f. Hold the control cable collar flush against the projector connector and rotate the selector ring from the connect position to the lock position until actual operation is ready to start.

9. Unlock the projector connector and rotate the selector ring to the operate position. The source is now free to move.

10. At the control unit rotate the hand crank in a counter clockwise direction to move the source out of the projector and into the guide tubes toward the radiographic focal point.

11. Continue to rotate the hand crank until the source reaches the snout which serves as a mechanical stop for the source. The odometer reading will include the total distance the source traveled (approx. 7 ft. for each guide tube section).

12. Exposure time should be calculated from the time the source reaches the snout.

13. To retract the source to the projector, rotate the crank hard in the clockwise direction. Continue to crank until a firm stop is felt. At this time the odometer should read zero, zero, zero. Do not rely on odometer reading. Always make a complete survey to ensure that source is retracted.

14. After an exposure the survey of the projector shall be made in the following manner.

    The operator should approach the projector from the control cable mode with a survey meter. The survey meter should be passed over the projector from the rear to a side, across the top to the other side and then to the front and then up the guide tubes to the snout.

15. After the survey has been completed on the projector, rotate the connector from the "operate" position to the "lock" position. Secure the projector with lock button.

    Each radiographer shall ensure at the end of the work day as part of his delegated responsibility that the gamma ray projector is properly stored.

16. Any malfunction or defect of the expsoure device shall be reported to the Radiation Safety Officer or the Assistant Radiation Safety Officer

17. The last survey of the day of the exposure device will be recorded on the Utilization Log. The last survey of the day will be made after the exposure device is in the storage area to determine that the sealed source is in the shielded position.

DISPOSAL OF SEALED SOURCES

All radioactive isotopes will be transported to Technical Operations, Burlington, MA for disposal. They will be transported in the exposure device with Radioactive Yellow II Labels attached. Shipping papers, a Purchase Order with disposal instructions and a calibrated meter will accompany the container.

At this time a new isotope may or may not be replaced in the container for transportation back to our laboratory.

If a new isotope is not required at this time, the container may be left at Technical Operations for future loading of a new isotope.

All transportation procautions outlined on the previous pages shall be followed.

TRANSPORTING RADIOACTIVE MATERIAL

1. Insure that the vehicle used is in good condition and carries the normal complement of safety equipment including radiation area signs, a length of rope, fire extinguisher, and a set of flares. The glove compartment shall contain the registration certificate and an operational flashlight. Additionally, the operator must have a calibrated and operable survey meter and be wearing a film badge and dosimeter.

2. Insure that the container is properly packaged, marked and labeled. See Table 1.

3. Insure that the proper shipping papers are completed. See sample Appendix 4.

4. No radioactive source will be transported by a passenger-carrying aircraft.

5. Place the radioactive material container in the vehicle. The container is not to be put in the passenger compartment. Secure the container against movement in the vehicle.

6. Survey the driver's compartment to insure that the radiation level does not exceed 2 milliroentgens per hour.

7. In addition to the radiation survey of the driver's compartment, a survey shall be made completely around the outside of the vehicle to insure the radiattion level does not exceed 2 mr/hr.

8. If the vehicle is transporting a package bearing a "RADIOACTIVE YELLOW III" label, the vehicle must be placarded on all four sides with a "RADIOACTIVE" placard.

   NOTE: Operation of a vehicle which is required to be placarded requires compliance with the Department of Transportation (DOT) Regulations.

9. The projector will be placed in a container that will effectively reduce the level of radiation at the surface to 50 mr/hr or 1 mr/hr at 3 ft. This should be checked with a survey meter.

10. If the vehicle becomes disabled on the road, do not leave the vehicle unguarded when going for help. A message for help may be sent by a passing motorist or the police be enlisted to guard the vehicle.

11. Should any kind of accident occur, make an immediate radiation survey to see where, if at all, the radiation levels are higher than normal. If any abnormal radiation areas exist, keep all persons out of them and get police assistance, if possible. If radioactive sources have escaped from their containers, notify the Radiation Safety Officer. Do not leave the scene without assuring that someone responsible (such as police) will keep people away from radiation areas.

12. Collect information pertinent to the accident, such as names of witnesses, names of people involved, names of police, license numbers, circumstances of the accident. Call the Radiation Safety Officer promptly giving him as much information as possible about the condition of the radioactive source.

13. If a source should escape from it's container, the vehicle operator shall make no attempt to restore the source by himself, but he shall wait for assistance from the Radiation Safety officer.

TABLE 1

Radioactive Label	Maximum Reading At Contact	Maximum Reading At 1 Meter
I White	< .5 MR	Background
II Yellow	< 50 MR	< 1 MR
III Yellow	< 200 MR	< 10 MR

OPERATIONAL PROCEDURE - PERMANENT SITE

1. The operator of the gamma ray projector shall be within the confines of the cell which is the encloed space surrounded by concrete blocks, one open border of which is marked with a red line. (This is the storage area also). All exposed sources should be kept at least one foot from all walls and inside the red line painted on the floor. In addition, all radiography will be performed using a collimator such as the Technical Operations D-17, and the area will be surveyed, roped and placarded as a temporary job site if it is not feasible to use a collimator. Ensure that the loading dock door is locked from the inside. The gamma alarm must be operational at all times and no one is inside the cell.

   IMPORTANT NOTICES

   A. Cobalt 60 will not be used or stored in the permanently shielded facility at 98 Reservoir Park Drive, Rockland, MA 02370.
   B. If Iridium 192 is used for taking radiographs in the afore mentioned facility it will be done with a maximum of 50 curies.
   C. Also, all radiography performed with Iridium 192 in this shielded facility will be accomplished with a D-17 tungsten collimator, or equivalent, pointed towards the floo
   D. During such use of Iridium 192 in the shielded facility the roof access will be locked and controlled.

2. Position and secure the snout of the master guide tube at the place of radiograph exposure.
3. Remove the plastic dust caps and attach additional extension guide tubes, as necessary, to the master guide tube. (Never more than two.)
4. Determine the position of the projector allowing for maximum possible operating shielding.
5. Lay out the guide tubes as straight as possible towards the projector. The bend radius of the guide tubes should not be under twenty inches. Small bend radii may restrict the movement of the control cables.
6. Remove the storage plug from the projector and attach the last guide tube to the projector.
7. All source manipulation of the central unit shall be done outside of the vault within the general work area i.e., outside the red line drawn at the entrance to the maze. This means that the radiographer is manipulating the source from behind the three foot thick sout wall of the vault.

8. Lay out the control cable as straight as possible toward the projector. The bend radius should not be less than three feet. Smaller bend radii may restrict the movement of the control cable.

9. Attach the control cable to the projector in the following sequence: Unlock the projector with the key provided and turn the connector selector ring from the lock position to the connect position. When the ring is in the connect position, the storage cover will disengage from the projector. Slide the control cable collar back and open the faws of the control cable connector. This exposes the male and female portions of the swivel connector by depressing the spring-loaded locking pin toward the projector with the thumb nail. Release the locking pin and test that the connection has been properly made. Close the jaws of the control cable connector over the swivel-type connector. Slide the control cable collar over the connector jaws. Hold the control cable collar flush against the projector connector and rotate the selector ring from the connect position to the lock position until actual operation is ready to start.

10. Unlock the projector connector and rotate the selector ring to the operate position. The source is now free to move.

11. At the control unit rotate the hand crank in a counter clockwise direction to move the source out of the projector and into the guide tubes toward the radiographic focal point.

12. Continue to rotate the hand crank until the source reaches the snout which serves as a mechanical stop for the source. The odometer reading will include the total distance the source traveled (approx. 7 ft. for each guide tube section).

13. Exposure time should be calculated from the time the source reaches the snout.

14. To retract the source to the projector, rotate the crank hard in the clockwise direction. Continue to crank until a firm stop is felt. At this time the odometer should read zero, zero, zero. Do not rely on odometer reading. Always make a complete survey to ensure that source is retracted.

15. After an exposure the survey of the projector shall be made in the following manner.

The operator should approach the projector from the control cable mode with a survey meter. The survey meter should be passed over the projector from the rear to a side, across the top to the other side and then to the front and then up the guide tubes to the snout.

16. After the survey has been completed on the projector, rotate the connector from the "operate" position to the "lock" position. Secure the projector with lock button. Record the survey reading.

Each radiographer shall ensure at the end of the work day as part of his delegated responsibility that the gamma ray projector is properly stored within the storage facility and that the loading dock door is secured from the inside and that the interior access door is properly locked. At no time should any authorized personnel leave the vault (storage facility) unlocked. If it cannot be locked he should notify the Radiation Safety Officer or the Assistant Radiation Safety Officer.

Kenneth F. Baker - Radiation Safety Officer
Office 617-871-4458
Home 617-878-5190

Donald M. Palmer - Assistant Radiation Safety Officer
Office 617-871-4458
Home 617-878-0942

OPERATING INSTRUCTIONS

SOURCE CHANGER TECHNICAL OPERATION MODEL 650

General

The source changer Model 650 is a portable shielding container for transferring encapsulated radioisotope sources into radiography projectors.

Shipment Data

Every loaded Model 650 source changer is shipped from Technical Operations, Burlington, Massachusetts, with the following items:

1. Source decay chart and leak test certification (keep for records)
2. Source I.D. plate (to be affixed to projector)
3. Return shipping labels
4. Tamperproof seals
5. Instruction manual

Operating Instructions

1. All precautions used when making radiographic exposures are applicable. Survey meters, film badges and dosimeters are required.
   - A. Locate source changer and projector in an area where the source may be exposed.
   - B. Place units so as to minimize any bend radius in the source guide tube and control cabling.
2. Set projector as for an exposure (secured, roped-off, placarded area)

3. Open source changer

   A. To remove cover: break seal and unbolt.

   B. To remove source holdown cap: break seal and unbolt.

   When cap is removed, source connector is exposed. Special care should be taken not to dislodge source when handling the changer.

4. Connect extension source guide tube from projector to the fitting above empty chamber. Avoid sharp bends.

5. Close and latch the source guides.

6. Crank source into the source changer.

   A. Survey this operation with a survey meter to be sure source has been transferred from projector to changer.

   B. With a survey meter, verify radiation level does not exceed 200 mr/hr at the surface of the changer.

7. Open guides. Disconnect cable from source assembly.

8. Disconnect the guide tube from changer. (If a new source is not to be transferred, go to step 15.)

9. Connect the guide tube to the fitting above chamber containing new source. Avoid sharp bends.

10. Crank projector drive cable until connector butts to source connector.

11. Couple the connectors.

    When testing connectors for proper connection, do not move source more than 1/2 inch from its stored position.

12. Close and latch the source guides.

13. Crank source to full retraction within projector.

    A. Survey this operation with a survey meter to be sure source has been transferred into the projector.

    B. With a survey meter verify radiation level does not exceed 200 mr/hr at the surface of the projector. Note in log book.

14. Disconnect the source guide tube from changer.

15. Affix ID plate of new source to projector.

16. Prepare source changer for shipping.

    A. Attach ID plate of old source to holdown cap.

    B. Bolt holdown cap in place and seal. (Source guides open)

    C. Bolt changer cover in place and seal.

    D. Survey 650

    E. Affix proper shipping labels and return to Technical Operations, Burlington, Massachusetts.

LEAK TESTING PROCEDURES

Leak tests will be performed every six months. No source without a valid leak test will be used or transported. Leak tests will be performed by the Radiation Safety Officer. The radioassay will be performed by Technical Operations, Burlington, Massachusetts. The procedure and data supplied is as follows: Appendix 3, page 33.

A Technical Operations Model 518 leak test kit will be used. The test is performed by removing the shipping plug from a projector, wiping the interior of the hole with a swab wetted with EDTA solution, and replacing the shipping plug. The swab is then placed in the plastic envelope and mailed to Technical Operations, where a radioassay is performed. A source is considered leaking if the presence of 0.005 uCi or removable contamination is detected. Leaking sources must be withdrawn from use and reported to the NRC.

Inspection & Maintenance of Radiographic Devices and Storage Containers

A program for inspection and maintenance of radiographic exposure devices and storage containers to assure proper functioning of components important to safety will be carried out on a daily basis. The radiographer will perform the inspection and assure compliance. A sample data sheet is attached. (Appendix 4, page 34.)

The radiographer in charge prior to using radiography equipment will, with the aid of his assistant if present, perform daily inspection and maintenance.

During daily inspection the guide tubes and control cables should be checked for nicks, cut, dents and crimping. The fittings should be checked for damaged threads and out of roundness. The source stop should be checked for looseness and damage. Projector Radioactive II Labels should be in place. Control crank and locking mechanism should be checked for proper operation.

Any malfunction or defect of the exposure device shall be reported to the Radiation Safety Officer or the Assistant Radiation Safety Officer.

The following guidelines are designed to provide the experience and knowledge to handle the kind of mishaps that may occur in the use of gamma ray projectors. By intelligent application of a few basic rules, almost any credible kind of accident can be fixed or at least put into a safe condition.

The first rule is under no circumstances should radiographic personnel attempt to perform operations involving source retrieval or recovery without the consent and direction of the Radiation Safety Officer (RSO).

The second rule is never attempt to operate, change sources, repair or service any isotope projector unless a calibrated, properly functioning radiation survey meter is at hand. In addition, a film badge and pocket dosimeter must be worn. The pocket dosimeter must be frequently observed to keep continual check on the radiation exposure.

The third rule is "Think". Think out to completion the steps one must take to remedy the trouble. Estimate the time each step will take. Estimate the radiation level one will be exposed to during each step. Re-survey the area and re-establish if necessary the perimeter of the restricted area. Compute the dose for each step by use of the inverse square law.

$$\frac{\text{Intensity}_A}{\text{Intensity}_B} = \frac{\text{Distance}_B^2}{\text{Distance}_A^2}$$

Notify the Radiation Safety Officer or Technical Operations Inc. before attempting to correct an emergency situation. The address and telephone number of Technical Operations is, Northwest Industrial Park, Burlington, Massachusetts 01803. Telephone (617) 272-2000 or Toll Free 1-800-225-1383.

Standards of Radiation Protection - CFR 20

Control of exposure to radiographic personnel and others to radiation shall be governed as follows:

A. No person in a restricted area may receive exposure in excess of the following limits.

   1. 1.25 rem per quarter to the whole body, head and trunk; active blood forming organs; lens of eyes; or gonads. An individual may receive up to 3 rem per quarter provided his accumulated occupational exposure does not exceed 5(N-18) rem where N is his age in years.

   2. 18.75 rem per quarter to the hands and forearms; feet and ankles.

   3. 7.5 rem per quarter to the skin of the whole body.

B. A person under 18 years old in a restricted area may not receive greater than 10 percent of the above exposure limits.

C. No person in an unrestricted area may receive exposure in excess of the following limits:

   1. Two MR in any one hour

   2. 100 MR in any seven consecutive days

In emergency procedures one may have to work in high radiation fields. If one can avoid them by all means do. When exposure is necessary the only way one can control the dose is by very careful timing. The following tables give the exposure time for a 20 and 50 mr dose from typical Co^{60} and/or Ir^{192} sources one may encounter.

In actual practice if one approaches, pauses, and retreats from an exposed source, the integrated dose must include that amount of radiation one receives during any movement. Ordinary walking speed is about 4ft/sec. Table 1 indicates one will receive a 50 mr dose in 5 seconds at 3 feet from a 50 curie Ir^{192} source. If one walks up to 3 feet, pauses 5 seconds, and retreats, the total dose is about 60 mr or 20% more than the dose received when one is at the 3 foot distance.

Computations of dose rates are necessary since instruments such as the Victoreen Model #492 have a top range of only 1 R/hr.

It must be emphasized that one exposes himself only when it is absolutely necessary. The most inexcusable exposure is the one, one acquires unwittingly. If one must work in a high radiation field, have someone else keep time to be sure one doesn't exceed the time allotted for the operation.

Table 1 50 Curie Ir^{192}

Distance Feet	3	6	12	24
Dose Rate R/hr	33	8.2	2.05	.51
Time for 20 mr	2 sec.	9 sec.	37 sec.	2.5 min.
Time for 50 mr	5 sec.	22 sec.	1.5 min.	6.2 min.

Table 2 50 Curie Co^{60}

Distance Feet	3	6	12	24
Dose Rate R/hr	80.6	20.1	5.0	1.3
Time for 20 mr	*	3.6 sec.	14.3 sec.	57 sec.
Time for 50 mr	2.2 sec.	8.9 sec.	36 sec.	2.4 min.

* Dose rates too high to even approach and retreat.

Again, before undertaking an emergency retrieval notify the Radiation Safety Officer and/or Technical Operations, Inc., Burlington, Massachusetts. Telephone (617) 272-2000 or Toll Free 1-800-225-1383.

Shielding for emergency source recovery is necessary if the time and distance alone will result in excessive exposure. Make use of temporary shielding whenever possible.

The actual site of the incident may provide the necessary shielding. It may be possible to drag the source guide tube so that the exposed source can be moved behind a barrier such as the corner of a building, a curbing, ditch or pile of material. In other cases it may be necessary to place shielding material over the source or between the source and yourself. Do not attempt to throw shielding material.

The shielding material can be any dense substance. Examples of good shielding materials are bagged material such as cement and sand. Castings, ingots, molds, etc. can afford excellent shielding. Unless conditions make complete shielding necessary, it is better to place the shielding beside the source to shade where you have to work. Take the time to devise a good workable method. Rehearse the procedure outside the radiation area, time the rehearsal and know what the expected dose will be. Don't take chances.

If your emergency requires moving the source, <u>never</u>, for even the most brief period, use your hands. For simple poking operations use a pole as long as practicable. A nail can be driven in the end of the pole for a simple hook. If the source tube is taped to the object being radiographed the tape may be cut with a knife attached to the pole. Different situations may call for different tools that must be made on the spot. Be sure to test your tools and practice with them before use.

It is very important when retrieving an exposed source to procede in a calm matter of fact way. Use correct terms. Avoid ex-

pressions such as, "not as hell". Know what you are doing. Explain the erection of barriers or evacuation of personnel as routine precautionary steps taken to prevent unnecessary exposure rather than excessive exposure.

Under no circumstances shall radiographic personnel attempt to perform operations involving source retrieval or recovery without the consent and direction of the Radiation Safety Officer (RSO).

The radiographer in charge shall maintain continuous surveillance of the restricted area in emergency situations until the emergency has been corrected.

When outside assistance is required, a person from the general public can be solicited but only to phone the RSO while the radiographer remains with the source.

Examples of Malfunctions

A. An Ir^{192} source has been exposed in a field situation and cannot be retracted to the storage position.

1. At no time shall the source be left unattended by qualified radiographic personnel.
2. Re-survey the area and re-establish if necessary the perimeter of the restricted area.
3. Think out your plan for retracting the source. If you surmise that the source can be retracted by simple straightening of the guide tube or simple repairs to the control cable, calculate the amount of radiation exposure you may receive and consider methods to minimize exposure utilizing time, distance and shielding as factors.
4. If you are not successful in retracting the source or have determined that it is not practical for you to try due to possible excessive exposure or other factors, you are to call upon the following persons for assistance.

Kenneth F. Baker - Radiation Safety Officer
Office 617-871-4458
Home 617-878-5190

Donald M. Palmer - Assistant Radiation Safety Officer
Office 617-871-4458
Home 617-878-0942

In the event neither of these individuals can be contacted you are to call Technical Operations, Burlington, MA at 617-272-2000. You can authorize them to perform any actions they deem necessary to rectify the situation.

Emergency In Transportation

B. A locked gamma ray projector is involved in an automobile accident.

1. If the projector does not appear to be damaged a survey of the outside of the projector shows radiation levels to be within acceptable limits (< 10mr/hr at 1 meter or < 200 mr/hr at the surface) bring the projector to Baker Testing Services Inc. or Technical Operations, Burlington, Massachusetts as soon as possible for more extensive investigation.

2. If the projector is damaged and the source exposed or appears to be damaged and cannot be surveyed because of damage to the survey meter, it is to be treated as though the source is exposed. Establish barriers around the projector. Do not attempt to move it until a radiation survey can be made. Do not leave the projector unattended by anyone other than qualified personnel employed by Baker Testing Services Inc. or Technical Operations. If there is reason to suspect any individual not employed by Baker Testing Services Inc. or Technical Operations Inc. not wearing a film badge and dosimeter has been potentially exposed, make every attempt to secure that individual's name, address, telephone number and next <u>immediate</u> location. Also, estimate distance and time of exposure.

The attending radiographer is responsible for radiation control and protection until relieved by an employee of Baker Testing Services Inc. or Technical Operations Inc. by direction of Baker Testing Services Inc.

These emergency procedures are intended for those that have had training in and have demonstrated knowledge of safe isotope handling practices.

Whenever possible, repairs are to be made at Technical Operations' laboratory, Burlington, Massachusetts.

GLOSSARY

ATOM

A particle of matter indivisible by chemical means. It is the smallest part of an element which still contains the chemical properties of that element.

ATOMIC NUMBER

The number of protons in the nucleus of an atom and also its positive charge. Each chemical element has its characteristic atomic number.

CONTAMINATION

Deposition of radioactive material where it is not desired.

CURIE

The basic unit to describe the intensity of activity in a sample. A curie is equal to 37 billion disintegrations per second (3.7×10^{10} dps).

DECAY

The spontaneous transformation of one nuclide into a different nuclide or a different energy state of the same nuclide. Also called radioactive disintegration.

ELEMENT

A chemical substance which cannot be divided into simpler substances by chemical means. A substance whose atoms all contain the same number of protons.

GAMMA RAY

High energy, short wavelength electromagnetic radiation, very penetrating, best shielded against by dense materials such as lead or depleted uranium, nuclear in origin.

HALF LIFE

The time in which half the atoms of a particular radioactive substance disintegrate into another nuclear form.

HALF VALUE LAYER

The thickness of any given absorber that will reduce the intensity of a beam of radiation to one-half its initial value.

ION

An atom that has lost or gained one or more electrons. By this ionization, it becomes electrically charged.

ISOTOPE

One of two or more atoms with the same atomic number but different mass numbers, i.e., Ir 191, Ir 192, Ir 194.

LEAK TEST

A test on sealed sources to assure that radioactive material is not being released.

LETHAL DOSE

A dose of ionizing radiation sufficient to cause death. $(LD\text{-}50)_{30}$ is the dose required to kill 50 percent of the individuals exposed within thirty days: approximately 450 roentgens.

MASS NUMBER

The sum of the number of neutrons and protons in a nucleus.

RADIATION ILLNESS

An acute organic disorder that follows exposure to relatively severe doses of ionizing radiation. It is characterized by nausea, vomiting, diarrhea, blood cell changes and, in later stages, hemorrhage and loss of hair. Large doses to the hands can cause severe burns and may necessitate amputation.

RADIOACTIVITY

The spontaneous decay of an unstable atomic nucleus, usually accompanied by the emission of ionizing radiation.

RADIOGRAPHER

Any person who performs or personally supervises radiographic operations and who is responsible for compliance with N.R.C. regulations and conditions of the license.

RADIOGRAPHY

Examination of the structure of materials by nondestructive methods utilizing sealed sources of byproduct material, or electrically generated X-rays.

REM

The unit of exposure dose of any ionizing radiation which produces the same biological effect as a unit of absorbed dose of X-rays (Roentgen Equivalent Man).

ROENTGEN

A unit of exposure to ionizing radiation. It is that amount of gamma or X-rays required to produce ions carrying 1 esu of charge in one cubic centimeter of dry air under standard conditions.

SEALED SOURCE

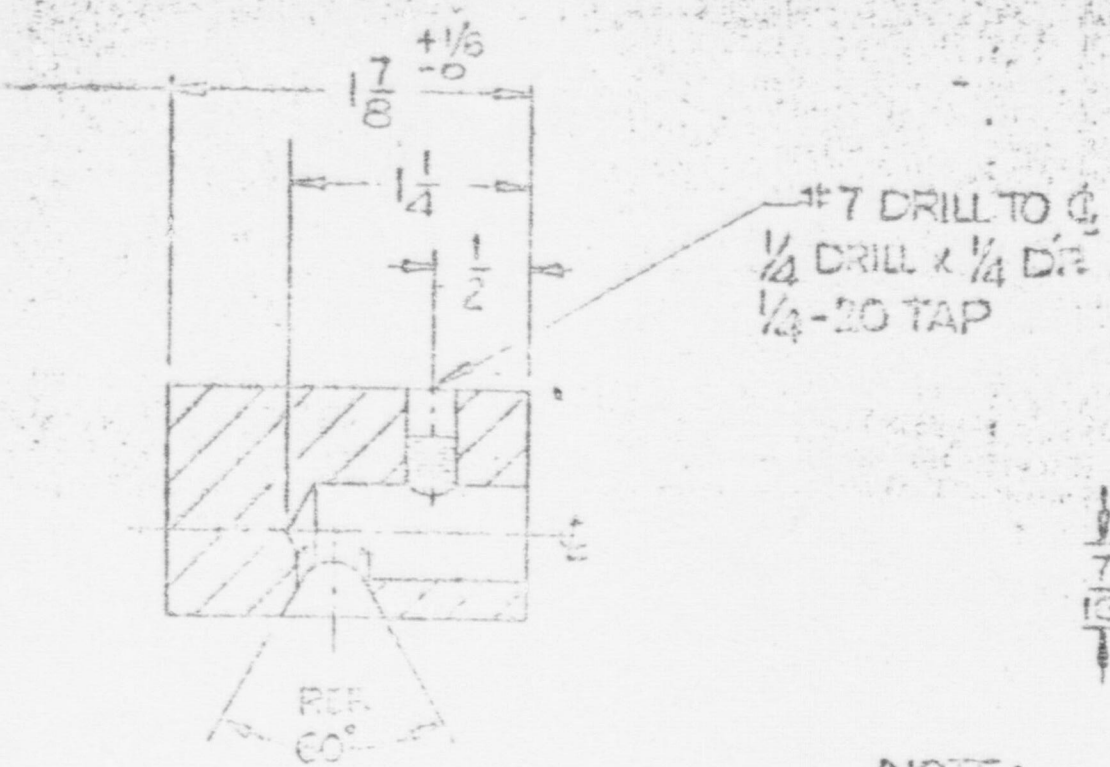
Any byproduct material that is encased in a capsule designed to prevent leakage.

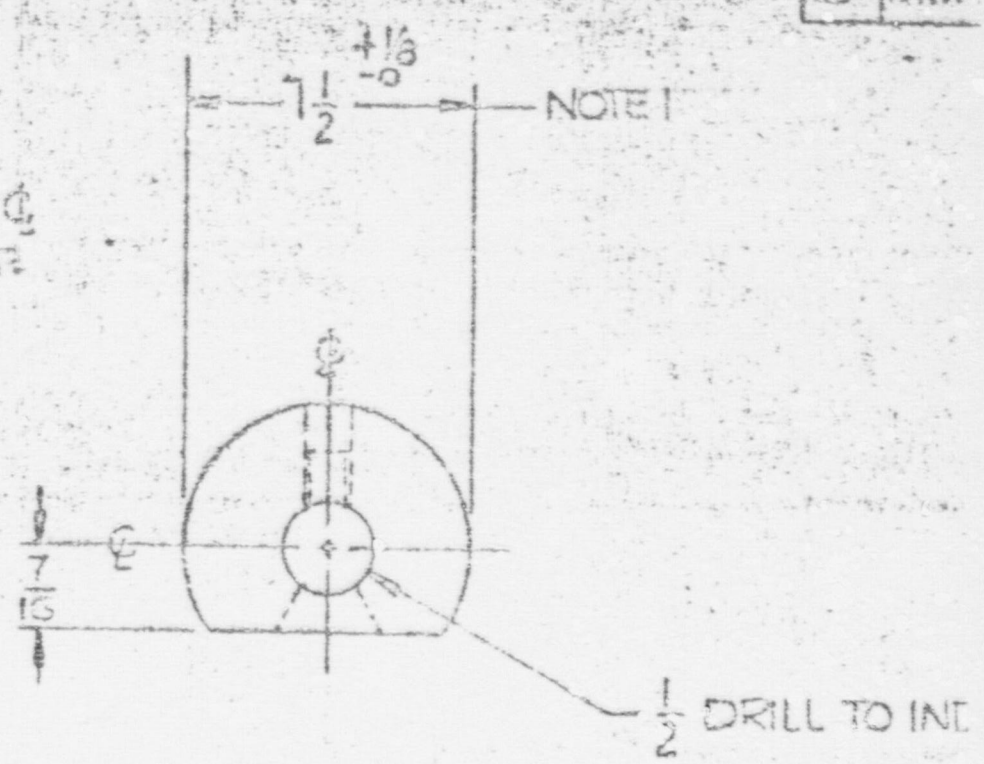
SPECIFIC ACTIVITY

The radioactivity of a radioisotope of an element per unit weight of the element in a sample.

APPENDIX 1

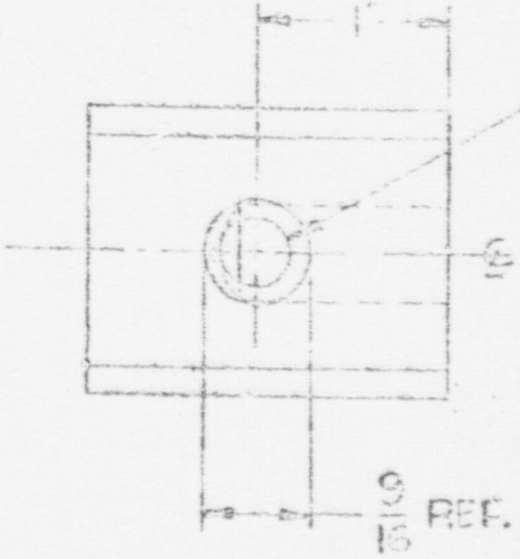
COLLIMATOR #799





NOTE:

1. DIAMETER & LENGTH CAN BE AS CAST



ATT. 1/16

WT = 1 3/4 LBS

MATERIALS: TUNGSTEN D-17	TECHNICAL PRODUCTS INC. RADIATION PRODUCTS DIVISION, BURLINGTON, MA 01803
FINISH	DWG TITLE: BEAM LIMITER
DRAWN BY: G.P. 5/13/76	UNLESS OTHERWISE SPECIFIED TOLERANCES ARE: .x ± .xx ± .xxx ± .C.D.
CHECKED BY	CLASSIFICATION

APPENDIX 2

CHARTS FOR DETERMINING LIMITS OF RESTRICTED AREA

RADIATION LEVEL/DISTANCE CHART A
Iridium-192 (unshielded)

5 curies	
feet	mR/hr
1.0	29500
16.0	100
*35.0	24.1
76.8	5
121.5	2

10 curies	
feet	mR/hr
1.0	59000
24.3	100
*35.0	48.2
108.6	5
171.8	2

15 curies	
feet	mR/hr
1.0	88500
29.7	100
*35.0	72.2
133.0	5
210.4	2

20 curies	
feet	mR/hr
1.0	118000
34.4	100
*35.0	96.3
153.6	5
242.9	2

25 curies	
feet	mR/hr
1.0	147500
*35.0	120.4
38.4	100
171.7	5
271.6	2

30 curies	
feet	mR/hr
1.0	177000
*35.0	144.5
42.0	100
188.1	5
297.5	2

35 curies	
feet	mR/hr
1.0	206500
*35.0	168.6
45.4	100
203.2	5
321.3	2

40 curies	
feet	mR/hr
1.0	236000
*35.0	192.6
48.6	100
217.2	5
343.5	2

45 curies	
feet	mR/hr
1.0	265500
*35.0	216.7
51.5	100
230.4	5
364.3	2

50 curies	
feet	mR/hr
1.0	295000
*35.0	240.8
54.3	100
242.8	5
384.0	2

55 curies	
feet	mR/hr
1.0	324500
*35.0	264.7
57.0	100
254.7	5
402.8	2

60 curies	
feet	mR/hr
1.0	354000
*35.0	289.0
59.5	100
266.1	5
420.7	2

65 curies	
feet	mR/hr
1.0	383500
*35.0	313.1
61.9	100
276.9	5
437.9	2

70 curies	
feet	mR/hr
1.0	413000
*35.0	337.1
64.3	100
287.4	5
454.4	2

75 curies	
feet	mR/hr
1.0	442500
*35.0	361.2
66.5	100
297.5	5
470.4	2

80 curies	
feet	mR/hr
1.0	472000
*35.0	385.3
68.7	100
307.2	5
485.8	2

85 curies	
feet	mR/hr
1.0	501500
*35.0	409.4
70.8	100
316.7	5
500.7	2

90 curies	
feet	mR/hr
1.0	531000
*35.0	433.5
72.8	100
325.9	5
515.3	2

95 curies	
feet	mR/hr
1.0	560500
*35.0	457.5
74.9	100
334.8	5
529.4	2

100 curies	
feet	mR/hr
1.0	590000
*35.0	481.6
76.8	100
343.5	5
543.1	2

105 curies	
feet	mR/hr
1.0	619500
*35.0	505.7
78.7	100
352.0	5
556.5	2

110 curies	
feet	mR/hr
1.0	649000
*35.0	529.8
80.6	100
360.3	5
569.6	2

115 curies	
feet	mR/hr
1.0	678500
*35.0	553.9
82.4	100
368.4	5
582.4	2

120 curies	
feet	mR/hr
1.0	708000
*35.0	557.9
84.1	100
376.3	5
595.0	2

* Average cranking distance (control box to free end of guide tube)

PART 6-e

RADIATION LEVEL/DISTANCE CHART B

Cobalt-60 (unshielded)

5 curies	
feet	mR/hr
1.0	72000
26.8	100
*40.0	45
120.0	5
189.7	2

10 curies	
feet	mR/hr
1.0	144000
37.9	100
*40.0	90
169.7	5
268.3	2

20 curies	
feet	mR/hr
1.0	288000
*40.0	180
53.7	100
240.0	5
379.5	2

30 curies	
feet	mR/hr
1.0	432000
*40.0	270
65.7	100
293.9	5
464.7	2

40 curies	
feet	mR/hr
1.0	576000
*40.0	360
75.9	100
339.4	5
536.6	2

50 curies	
feet	mR/hr
1.0	720000
*40.0	450
84.5	100
379.4	5
600.0	2

60 curies	
feet	mR/hr
1.0	864000
*40.0	540
92.9	100
415.7	5
657.3	2

70 curies	
feet	mR/hr
1.0	1008000
*40.0	630
100.4	100
449.1	5
709.9	2

80 curies	
feet	mR/hr
1.0	1152000
*40.0	720
107.3	100
480.0	5
758.9	2

90 curies	
feet	mR/hr
1.0	1296000
*40.0	810
113.8	100
509.1	5
805.0	2

100 curies	
feet	mR/hr
1.0	1440000
*40.0	900
120.0	100
536.6	5
848.5	2

110 curies	
feet	mR/hr
1.0	1584000
*40.0	990
125.8	100
562.8	5
890.7	2

* Average cranking distance (control box to free end of guide tube)

APPENDIX 3

LEAK TESTING PROCEDURE

N O T I C E

"Use of this Model 518 Leak Test Kit requires specific Atomic Energy Commission authorization. If your license does not have specific authorization you should submit an application for authorization. See Paragraph 6 of Section 30.24(g) of 10 CFR.

Use of this kit without specific authorization constitutes a violation of Atomic Energy Commission regulations."

TECHNICAL OPERATIONS, INC.
BURLINGTON, MASSACHUSETTS

10-30-61

NORTHWEST INDUSTRIAL PARK, BURLINGTON, MASSACHUSETTS 01803
PHONE (617) 272-2000 WATS LINE 800-225-1383

LEAK TEST

FIRM NAME: _____

SHIP TO ADDRESS: _____

_____

BILL TO ADDRESS: _____

PURCHASE ORDER NO. _____ CUSTOMER NO. _____

NRC OR STATE LICENSE NO. _____

Tech/Ops Gamma Ray Projector

MODEL NO. _____ SERIAL NO. _____

SOURCE MODEL NO. _____ SERIAL NO. _____

CURIES _____

Isotope (Check Which)

Co-60 _____
Ir-192 _____
Cs-137 _____
Other _____

DATE _____ BY _____

RETAIN THIS PORTION FOR YOUR RECORDS

LEAK TEST
IDENTIFICATION SHEET

FIRM NAME: _____

SHIP TO ADDRESS: _____

_____

BILL TO ADDRESS: _____

_____

PURCHASE ORDER NO. _____ CUSTOMER NO. _____

NRC OR STATE LICENSE NUMBER: _____

Tech/Ops Gamma Ray Projector

MODEL NO. _____ SERIAL NO. _____

SOURCE MODEL NO. _____ SERIAL NO. _____

CURIES _____

Isotope (Check Which)

Co-60 _____
Ir-192 _____
Cs-137 _____
Other _____

DATE _____ WIPE PERFORMED BY _____

PLEASE FILL OUT AND RETURN THIS SHEET TO TECH/OPS WITH TEST KIT FOR RADIOASSAY. THANK YOU. RADIOASSAY, MICROCURIES _____

RADIOASSAY PERFORMED BY _____

TECHNICAL OPERATIONS, INCORPORATED

LEAK TEST KIT MODEL 518

INSTRUCTIONS FOR USE

This kit is designed for use on Technical Operations Gamma Ray Projectors It provides a convenient and safe method of performing leak tests of radiographic sources in accordance with AEC regulations, which require such tests at intervals of not more than 6 months.

CONTENTS

Flexible swab holder with swab
Vial of EDTA solution
Plastic Envelope
Mailing Box
Identification Sheet

PROCEED IN THIS MANNER:

1. Be sure source is fully retracted into projector. (Use a survey meter to be sure that radiation levels are normal.)
2. Remove source tube from face of shield or remove shipping plug.
3. Wet the swab with EDTA solution. Shake off excess and insert the swab into the hole in the shield. Wipe the interior of the hole thoroughly by rotating swab holder.
4. Withdraw swab and place in plastic envelope.
5. The swab should now be monitored by turning the survey meter to its most sensitive range. Place the meter in a low background area and move the swab in its plastic envelope to the meter, not the meter to the swab.

6. If there is no indication on the meter, or if the indication is no more than 0.2 MR per hour above background, put the plastic envelope with the swab in the mailing box and mail to Technical Operations, Incorporated, Burlington, Massachusetts. Be sure to fill out and return the identification sheet.

7. If the swab should show more than 0.2 MR per hour, do not mail. Contact Technical Operations, Inc., for specific instructions.

NOTE: If the survey meter available does not have the capability of detecting as little as 0.2 MR per hour, ship the wipe-test swab to Technical Operations, Inc., via express. Do not ship if the radiation from the swab exceeds 2 MR per hour and contact Technical Operations, Inc., for specific instructions. The wipe-test swab will be subjected to a precise radio assay when received by Technical Operations, and a leak-test certificate will be mailed promptly. The AEC requires that this certificate be kept with your records and that it be available for inspection.

APPENDIX 4

SAMPLE DAILY INSPECTION AND UTILIZATION LOG SHIPPING PAPERS

INSPECTION AND UTILIZATION LOG

Date_____

Radiographer:_____ Initial Dosimeter Reading_____mR

Radiographer's Asst._____ Initial Dosimeter Reading_____mR

Survey Meter Serial Number_____ Date of Calibration_____

Gamma Ray Projector:

Model:_____ Serial Number_____

Surface Radiation Level Prior to Exposures_____mR/hr

Radioactive Source

Isotope:_____Serial Number_____Activity_____Ci

Daily Inspection (initial all entries)

Condition of Guide Tubes_____

Condition of Control Cables_____

Condition of Swaged Fittings_____

Condition of Source Stop_____

Condition of Projector Labeling_____

Condition of Control Crank_____

Condition of Locking Mechanism_____

Location_____ Time_____

Duration of Exposures_____

Distance to High Radiation Area Boundary_____Ft.

Distance to Radiation Area Boundary_____Ft.

Radiation Level at Boundary of Restricted Area_____mR/hr

Surface Radiation Level After Exposures_____mR/hr

If any malfunction or damage is noted the Radiation Safety Officer will be notified and that piece of equipment will be taken out of service for review and/or repair.

Storage of Gamma Ray Projector:

Projector Locked_____

Maximum Surface Radiation Level_____

Storage Vault Locked_____

Final Dosimeter Reading Name:_____mR

Name:_____mR

Remarks:

Signature of Radiographer_____

DELIVERY RECEIPT

FROM

BAKER TESTING SERVICES INC.
98 Reservoir Park Drive
Rockland, MA 02370
(617) 871-4458

VIA Radioactive Material Special Form, U.S.A.

DATE | YOUR NO. | OUR NO.

DELIVERED TO

✓	QUANTITY	NO.	DESCRIPTION
		650	Iridium 192 Projector
			Radioactive Yellow II Labels
			Transport Index
			USA/9033/B Type B
			This is to certify that the above named materials
			are properly classified, described, packaged, marked,
			labeled and are in proper condition for transportation
			according to the applicable regulations of the
			Department of Transportation.

NO PACKAGES | WEIGHT

RECEIVED IN GOOD ORDER BY

X

PART 19

NOTICES, INSTRUCTIONS, AND REPORTS TO WORKERS; INSPECTIONS

Sec.

AUTHORITY: Secs. 53, 63, 81, 103, 104, 161, Pub. L. 83-703, 68 Stat. 930, 933, 935, 936, 937, 948, as amended (42 U.S.C. 2073, 2093, 2111, 2133, 2134, 2201); Sec. 401, Pub. L. 93-438, 88 stat. 1254 (42 U.S.C. 5891)

40 FR 8774

§ 19.1 Purpose.

The regulations in this part establish requirements for notices, instructions, and reports by licensees to individuals participating in licensed activities, and options available to such individuals in connection with Commission inspections of licensees to ascertain compliance with the provisions of the Atomic Energy Act of 1954, as amended, Title II of the Energy Reorganization Act of 1974, and regulations, orders, and licenses thereunder regarding radiological working conditions.

§ 19.2 Scope.

The regulations in this part apply to all persons who receive, possess, use, or transfer material licensed by the Nuclear Regulatory Commission pursuant to the regulations in Parts 30 through 35, 40, or 70 of this chapter, including persons licensed to operate a production or utilization facility pursuant to Part 50 of this chapter.

38 FR 22217

§ 19.3 Definitions.

As used in this part:

(a) "Act" means the Atomic Energy Act of 1954, (68 Stat. 919) including any amendments thereto;

(b) "Commission" means the United States Nuclear Regulatory Commission;

(c) "Worker" means an individual engaged in activities licensed by the Commission and controlled by a licensee, but does not include the licensee.

(d) "License" means a license issued under the regulations in Parts 30 through 35, 40, or 70 of this chapter, including licenses to operate a production or utilization facility pursuant to Part 50 of this chapter. "Licensee" means the holder of such a license.

(e) "Restricted area" means any area access to which is controlled by the licensee for purposes of protection of individuals from exposure to radiation and radioactive materials. "Restricted area" shall not include any areas used as residential quarters, although a separate room or rooms in a residential building may be set apart as a restricted area.

38 FR 22217

§ 19.4 Interpretations.

Except as specifically authorized by the Commission in writing, no interpretation of the meaning of the regulations in this part by any officer or employee of the Commission other than a written interpretation by the General Counsel will be recognized to be binding upon the Commission.

40 FR 8774

§ 19.5 Communications.

Except where otherwise specified in this part, all communications and reports concerning the regulations in this part should be addressed to the Director, Office of Inspection and Enforcement, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555. Communications, reports, and applications may be delivered in person at the Commission's offices at 1717 H Street, NW., Washington, D.C.; or at 7920 Norfolk Avenue, Bethesda, Maryland.

38 FR 22217

§ 19.11 Posting of notices to workers.

(a) Each licensee shall post current copies of the following documents: (1) The regulations in this part and in Part 20 of this chapter; (2) the license, license conditions, or documents incorporated into a license by reference, and amendments thereto; (3) the operating procedures applicable to licensed activities; (4) any notice of violation involving radiological working conditions, proposed imposition of civil penalty, or order issued pursuant to Subpart B of Part 2 of this chapter, and any response from the licensee.

(b) If posting of a document specified in paragraph (a) (1), (2) or (3) of this section is not practicable, the licensee may post a notice which describes the document and states where it may be examined.

40 FR 8774

(c) Form NRC-3, "Notice to Employees", shall be posted by each licensee wherever individuals work in or frequent any portion of a restricted area.

NOTE: Copies of Form NRC-3 may be obtained by writing to the Director of the appropriate U.S. Nuclear Regulatory Commission Inspection and Enforcement Regional Office listed in Appendix "D", Part 20 of this chapter, or the Director, Office of Inspection and Enforcement, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555.

38 FR 22217

(d) Documents, notices, or forms posted pursuant to this section shall appear in a sufficient number of places to permit individuals engaged in licensed activities to observe them on the way to or from any particular licensed activity location to which the document applies, shall be conspicuous, and shall be replaced if defaced or altered.

(e) Commission documents posted pursuant to paragraph (a)(4) of this section shall be posted within 2 working days after receipt of the documents from the Commission; the licensee's response, if any, shall be posted within 2 working days after dispatch by the licensee. Such documents shall remain posted for a minimum of 5 working days or until action correcting the violation has been completed, whichever is later.

§ 19.12 Instructions to workers.

All individuals working in or frequenting any portion of a restricted area shall be kept informed of the storage, transfer, or use of radioactive materials or of radiation in such portions of the restricted area; shall be instructed in the health protection problems associated with exposure to such radioactive materials or radiation, in precautions or procedures to minimize exposure, and in the purposes and functions of protective devices employed; shall be instructed in, and instructed to observe, to the extent within the worker's control, the applicable provisions of Commission regulations

and licenses for the protection of personnel from exposures to radiation or radioactive materials occurring in such areas; shall be instructed of their responsibility to report promptly to the licensee any condition which may lead to or cause a violation of Commission regulations and licenses or unnecessary exposure to radiation or to radioactive material; shall be instructed in the appropriate response to warnings made in the event of any unusual occurrence or malfunction that may involve exposure to radiation or radioactive material; and shall be advised as to the radiation exposure reports which workers may request pursuant to § 19.13. The extent of these instructions shall be commensurate with potential radiological health protection problems in the restricted area.

§ 19.13 Notifications and reports to individuals.

(a) Radiation exposure data for an individual, and the results of any measurements, analyses, and calculations of radioactive material deposited or retained in the body of an individual, shall be reported to the individual as specified in this section. The information reported shall include data and results obtained pursuant to Commission regulations, orders or license conditions, as shown in records maintained by the licensee pursuant to Commission regulations. Each notification and report shall: be in writing; include appropriate identifying data such as the name of the licensee, the name of the individual, the individual's social security number; include the individual's exposure information; and contain the following statement:

> This report is furnished to you under the provisions of the Nuclear Regulatory Commission regulation 10 CFR Part 19. You should preserve this report for further reference.

(b) At the request of any worker, each licensee shall advise such worker annually of the worker's exposure to radiation or radioactive material as shown in records maintained by the licensee pursuant to § 20.401(a) and (c).

(c) At the request of a worker formerly engaged in licensed activities controlled by the licensee, each licensee shall furnish to the worker a report of the worker's exposure to radiation or radioactive material. Such report shall be furnished within 30 days from the time the request is made, or within 30 days after the exposure of the individual has been determined by the licensee, whichever is later; shall cover, within the period of time specified in the request, each calendar quarter in which the worker's activities involved exposure to radiation from radioactive materials licensed by the Commission; and shall include the dates and locations of licensed activities in which the worker participated during this period.

(d) When a licensee is required pursuant to § 20.405 or § 20.408 of this chapter to report to the Commission any exposure of an individual to radiation or radioactive material the licensee shall also provide the individual a report on his exposure data included therein. Such report shall be transmitted at a time not later than the transmittal to the Commission.

§ 19.14 Presence of representatives of licensees and workers during inspections.

(a) Each licensee shall afford to the Commission at all reasonable times opportunity to inspect materials, activities, facilities, premises, and records pursuant to the regulations in this chapter.

(b) During an inspection, Commission inspectors may consult privately with workers as specified in § 19.15. The licensee or licensee's representative may accompany Commission inspectors during other phases of an inspection.

(c) If, at the time of inspection, an individual has been authorized by the workers to represent them during Commission inspections, the licensee shall notify the inspectors of such authorization and shall give the workers' representative an opportunity to accompany the inspectors during the inspection of physical working conditions.

(d) Each workers' representative shall be routinely engaged in licensed activities under control of the licensee and shall have received instructions as specified in § 19.12.

(e) Different representatives of licensees and workers may accompany the inspectors during different phases of an inspection if there is no resulting interference with the conduct of the inspection. However, only one workers' representative at a time may accompany the inspectors.

(f) With the approval of the licensee and the workers' representative an individual who is not routinely engaged in licensed activities under control of the license, for example, a consultant to the licensee or to the workers' representative, shall be afforded the opportunity to accompany Commission inspectors during the inspection of physical working conditions.

(g) Notwithstanding the other provisions of this section, Commission inspectors are authorized to refuse to permit accompaniment by any individual who deliberately interferes with a fair and orderly inspection. With regard to areas containing information classified by an agency of the U.S. Government in the interest of national security, an individual who accompanies an inspector may have access to such information only if authorized to do so. With regard to any area containing proprietary information, the workers' representative for that area shall be an individual previously authorized by the licensee to enter that area.

§ 19.15 Consultation with workers during inspections.

(a) Commission inspectors may consult privately with workers concerning matters of occupational radiation protection and other matters related to applicable provisions of Commission regulations and licenses to the extent the inspectors deem necessary for the conduct of an effective and thorough inspection.

(b) During the course of an inspection any worker may bring privately to the attention of the inspectors, either orally or in writing, any past or present condition which he has reason to believe may have contributed to or caused any violation of the act, the regulations in this chapter, or license condition, or any unnecessary exposure of an individual to radiation from licensed radioactive material under the licensee's control. Any such notice in writing shall comply with the requirements of § 19.16(a).

(c) The provisions of paragraph (b) of this section shall not be interpreted as authorization to disregard instructions pursuant to § 19.12.

§ 19.16 Requests by workers for inspections.

(a) Any worker or representative of workers who believes that a violation of the Act, the regulations in this chapter, or license conditions exists or has occurred in license activities with regard to radiological working conditions in which the worker is engaged, may request an inspection by giving notice of the alleged violation to the Director of Inspection and Enforcement, to the Director of the appropriate Commission Regional Office, or to Commission inspectors. Any such notice shall be in writing, shall set forth the specific grounds for the notice, and shall be signed by the worker or representative of workers. A copy shall be provided the licensee by the Director of Inspection and Enforcement, Regional Office Director, or the inspector no later than at the time of inspection except that, upon the request of the worker giving such notice, his name and the name of individuals referred to therein shall not appear in such copy or on any record published, released, or made available by the Commission, except for good cause shown.

(b) If, upon receipt of such notice, the Director of Inspection and Enforcement or Regional Office Director determines that the complaint meets the requirements set forth in paragraph (a) of this section, and that there are reasonable grounds to believe that the alleged violation exists or has occurred, he shall cause an inspection to be made as soon as practicable, to determine if such alleged violation exists or has occurred. Inspections pursuant to this section need not be limited to matters referred to in the complaint.

(c) No licensee shall discharge or in any manner discriminate against any worker because such worker has filed any complaint or instituted or caused to be instituted any proceeding under the regulations in this chapter or has testified or is about to testify in any such proceeding or because of the exercise by such worker on behalf of himself or others of any option afforded by this part.

§ 19.17 Inspections not warranted; informal review.

(a) If the Director of Inspection and Enforcement or of the appropriate Regional Office determines, with respect to a complaint under § 19.16, that an inspection is not warranted because there are no reasonable grounds to believe that a violation exists or has occurred, he shall notify the complainant in writing of such determination. The complainant may obtain review of such determination by submitting a written statement of posi-

38 FR 22217

tion with the Executive Director for Operations, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, who will provide the licensee with a copy of such statement by certified mail, excluding, at the request of the complainant, the name of the complainant. The licensee may submit an opposing written statement of position with the Executive Director for Operations who will provide the complainant with a copy of such statement by certified mail. Upon the request of the complainant, the Executive Director for Operations or his designee may hold an informal conference in which the complainant and the licensee may orally present their views. An informal conference may also be held at the request of the licensee, but disclosure of the identity of the complainant will be made only following receipt of written authorization from the complainant. After considering all written and oral views presented, the Executive Director for Operations shall affirm, modify, or reverse the determination of the Director of Inspection and Enforcement or of the appropriate Regional Office and furnish the complainant and the licensee a written notification of his decision and the reason therefor.

(b) If the Director of Inspection and Enforcement or of the appropriate Regional Office determines that an inspection is not warranted because the requirements of § 19.16(a) have not been met, he shall notify the complainant in writing of such determination. Such determination shall be without prejudice to the filing of a new complaint meeting the requirements of § 19.16(a).

[38 FR 2221]

§ 19.30 Violations.

An injunction or other court order may be obtained prohibiting any violation of any provision of the Act or Title II of the Energy Reorganization Act of 1974, or any regulation or order issued thereunder.

[40 FR 8774]

A court order may be obtained for the payment of a civil penalty imposed pursuant to section 234 of the Act for violation of section 53, 57, 62, 63, 81, 82, 101, 103, 104, 107, or 109 of the Act or any rule, regulation, or order issued thereunder, or any term, condition or limitation of any license issued thereunder, or for any violation for which a license may be revoked under section 186 of the Act. Any person who willfully violates any provision of the Act or any regulation or order issued thereunder may be guilty of a crime and, upon conviction, may be punished by fine or imprisonment or both, as provided by law.

[38 FR 2221]

§ 19.31 Application for exemptions.

The Commission may, upon application by any licensee or upon its own initiative, grant such exemptions from the requirements of the regulations in this part as it determines are authorized by law and will not result in undue hazard to life or property.

§ 19.32 Discrimination prohibited.

No person shall on the ground of sex be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity licensed by the Nuclear Regulatory Commission. This provision will be enforced through agency provisions and rules similar to those already established, with respect to racial and other discrimination, under title VI of the Civil Rights Act of 1964. This remedy is not exclusive, however, and will not prejudice or cut off any other legal remedies available to a discriminatee.

[40 FR 8774]

PART 20

STANDARDS FOR PROTECTION AGAINST RADIATION

GENERAL PROVISIONS

PERMISSIBLE DOSES, LEVELS, AND CONCENTRATIONS

PRECAUTIONARY PROCEDURES

WASTE DISPOSAL

RECORDS, REPORTS, AND NOTIFICATION

EXCEPTIONS AND ADDITIONAL REQUIREMENTS

ENFORCEMENT

AUTHORITY: The provisions of this Part 20 issued under secs. 53, 63, 65, 81, 103, 104, 161, 68 Stat. 930, 933, 935, 936, 937, 948, as amended; 42 U.S.C. 2073, 2093, 2095, 2111, 2133, 2134, 2201. For the purposes of sec. 223, 68 Stat. 958, as amended; 42 U.S.C. 2273, §§ 20.401-20.409, issued under sec. 161 o., 68 Stat. 950, as amended; 42 U.S.C. 2201 (o). Secs. 202, 206, Pub. L. 93-438, 88 Stat. 1244, 1246 (42 U.S.C. 5842, 5846).

§ 20.1 Purpose.

(a) The regulations in this part establish standards for protection against radiation hazards arising out of activities under licenses issued by the Nuclear Regulatory Commission and are issued pursuant to the Atomic Energy Act of 1954, as amended, and the Energy Reorganization Act of 1974.

(b) The use of radioactive material or other sources of radiation not licensed by the Commission is not subject to the regulations in this part. However, it is the purpose of the regulations in this part to control the possession, use, and transfer of licensed material by any licensee in such a manner that exposure to such material and to radiation from such material, when added to exposures to unlicensed radioactive material and to other unlicensed sources of radiation in the possession of the licensee, and to radiation therefrom, does not exceed the standards of radiation protection prescribed in the regulations in this part.

(c) In accordance with recommendations of the Federal Radiation Council, approved by the President, persons engaged in activities under licenses issued by the Nuclear Regulatory Commission pursuant to the Atomic Energy Act of 1954, as amended, and the Energy Reorganization Act of 1974 should, in addition to complying with the requirements set forth in this part, make every reasonable effort to maintain radiation exposures, and releases of radioactive materials in effluents to unrestricted areas, as low as is reasonably achievable. The term "as low as is reasonably achievable" means as low as is reasonably achievable taking into account the state of technology, and the economics of improvements in relation to benefits to the public health and safety, and other societal and socioeconomic considerations, and in relation to the utilization of atomic energy in the public interest.

§ 20.2 Scope.

The regulations in this part apply to all persons who receive, possess, use, or transfer material licensed pursuant to the regulations in Parts 30 through 35, 40, or 70 of this chapter, including persons licensed to operate a production or utilization facility pursuant to Part 50 of this chapter.

§ 20.3 Definitions.

(a) As used in this part:

(1) "Act" means the Atomic Energy Act of 1954 (68 Stat. 919) including any amendments thereto;

(2) "Airborne radioactive material" means any radioactive material dispersed in the air in the form of dusts, fumes, mists, vapors, or gases;

(3) "Byproduct material" means any radioactive material (except special nuclear material) yielded in or made radioactive by exposure to the radiation incident to the process of producing or utilizing special nuclear material;

(4) "Calendar quarter" means not less than 12 consecutive weeks nor more than 14 consecutive weeks. The first calendar quarter of each year shall begin in January and subsequent calendar quarters shall be such that no day is included in more than one calendar quarter or omitted from inclusion within a calendar quarter. No licensee shall change the method observed by him of determining calendar quarters except at the beginning of a calendar year.

(5) "Commission" means the Nuclear Regulatory Commission or its duly authorized representatives;

(6) "Government agency" means any executive department, commission, independent establishment, corporation, wholly or partly owned by the United States of America which is an instrumentality of the United States, or any board, bureau, division, service, office, officer, authority, administration, or other establishment in the executive branch of the Government;

(7) "Individual" means any human being;

(8) "Licensed material" means source material, special nuclear material, or by-product material received, possessed, used, or transferred under a general or specific license issued by the Commission pursuant to the regulations in this chapter;

(9) "License" means a license issued under the regulations in Part 30, 40, or 70 of this chapter. "Licensee" means the holder of such license;

(10) "Occupational dose" includes exposure of an individual to radiation (i) in a restricted area; or (ii) in the course of employment in which the individual's duties involve exposure to radiation; provided, that "occupational dose" shall not be deemed to include any exposure of an individual to radiation for the purpose of medical diagnosis or medical therapy of such individual.

(11) "Person" means (i) any individual, corporation, partnership, firm, association, trust, estate, public or private institution, group, Government agency other than the Commission or the Administration (except that the Administration shall be considered a person within the meaning of the regulations in this part to the extent that its facilities and activities are subject to the licensing and related regulatory authority of the Commission pursuant to section 202 of the Energy Reorganization Act of 1974 (88 Stat. 1244)), any State, any foreign government or nation or any political subdivision of any such government or nation, or other entity; and (ii) any legal successor, representative, agent, or agency of the foregoing.

(12) "Radiation" means any or all of the following: alpha rays, beta rays, gamma rays, X-rays, neutrons, high-speed electrons, high-speed protons, and other atomic particles; but not sound or radio waves, or visible, infrared, or ultraviolet light;

(13) "Radioactive material" includes any such material whether or not subject to licensing control by the Commission;

(14) "Restricted area" means any area access to which is controlled by the licensee for purposes of protection of individuals from exposure to radiation and radioactive materials. "Restricted area" shall not include any areas used as residential quarters, although a separate room or rooms in a residential building may be set apart as a restricted area;

(15) "Source material" means (i) uranium or thorium, or any combination thereof, in any physical or chemical form; or (ii) ores which contain by weight one-twentieth of one percent (0.05%) or more of a. uranium, b. thorium or c. any combination thereof. Source material does not include special nuclear material.

(16) "Special nuclear material" means (1) plutonium, uranium 233, uranium enriched in the isotope 233 or in the isotope 235, and any other material which the Commission, pursuant to the provisions of section 51 of the act, determines to be special nuclear material, but does not include source material; or (ii) any material artificially enriched by any of the foregoing but does not include source material;

(17) "Unrestricted area" means any area access to which is not controlled by the licensee for purposes of protection of individuals from exposure to radiation and radioactive materials, and any area used for residential quarters.

(18) "Administration[1]" means the Energy Research and Development Administration or its duly authorized representatives.

(b) Definitions of certain other words and phrases as used in this part are set forth in other sections, including:

(1) "Airborne radioactivity area" defined in § 20.203;

(2) "Radiation area" and "high radiation area" defined in § 20.202;

(3) "Personnel monitoring equipment" defined in § 20.202;

(4) "Survey" defined in § 20.201;

(5) Units of measurement of dose (rad, rem) defined in § 20.4;

(6) Units of measurement of radioactivity defined in § 20.5.

§ 20.4 Units of radiation dose.

(a) "Dose," as used in this part, is the quantity of radiation absorbed, per unit of mass, by the body or by any portion of the body. When the regulations in this part specify a dose during a period of time, the dose means the total quantity of radiation absorbed, per unit of mass, by the body or by any portion of the body during such period of time. Several different units of dose are in current use. Definitions of units as used in this part are set forth in paragraphs (b) and (c) of this section.

(b) The rad, as used in this part, is a measure of the dose of any ionizing radiation to body tissues in terms of the energy absorbed per unit mass of the tissue. One rad is the dose corresponding to the absorption of 100 ergs per gram of tissue. (One millirad (mrad) = 0.001 rad.)

(c) The rem, as used in this part, is a measure of the dose of any ionizing radiation to body tissue in terms of its estimated biological effect relative to a dose of one roentgen (r) of X-rays. (One millirem (mrem) = 0.001 rem.) The relation of the rem to other dose units depends upon the biological effect under consideration and upon the conditions of irradiation. For the purpose of the regulations in this part, any of the following is considered to be equivalent to a dose of one rem:

(1) A dose of 1 r due to X— or gamma radiation;

(2) A dose of 1 rad due to X—, gamma, or beta radiation;

(3) A dose of 0.1 rad due to neutrons or high energy protons;

(4) A dose of 0.05 rad due to particles heavier than protons and with sufficient energy to reach the lens of the eye;

If it is more convenient to measure the neutron flux, or equivalent, than to determine the neutron dose in rads, as provided in subparagraph (2) of this paragraph, one rem of neutron radiation may, for purposes of the regulations in this part, be assumed to be equivalent to 14 million neutrons per square centimeter incident upon the body; or, if there exists sufficient information to estimate with reasonable accuracy the approximate distribution in energy of the neutrons, the incident number of neutrons per square centimeter equivalent to one rem may be estimated from the following table:

NEUTRON FLUX DOSE EQUIVALENTS

Neutron energy (Mev)	Number of neutrons per square centimeter equivalent to a dose of 1 rem (neutrons/cm²)	Average flux to deliver 100 millirem in 40 hours (neutrons/cm² per sec.)
Thermal	970×10^6	670
0.0001	720×10^6	500
0.005	820×10^6	570
0.02	400×10^6	280
0.1	120×10^6	80
0.5	43×10^6	30
1.0	26×10^6	18
2.5	29×10^6	20
5.0	26×10^6	18
7.5	24×10^6	17
10	24×10^6	17
10 to 30	14×10^6	10

(d) For determining exposures to X or gamma rays up to 3 Mev, the dose limits specified in §§ 20.101 to 20.104, inclusive, may be assumed to be equivalent to the "air dose". For the purpose of this part "air dose" means that the dose is measured by a properly calibrated appropriate instrument in air at or near the body surface in the region of highest dosage rate.

§ 20.5 Units of radioactivity.

(a) Radioactivity is commonly, and for purposes of the regulations in this part shall be, measured in terms of disintegrations per unit time or in curies. One curie = 3.7×10^{10} disintegrations per second (dps) = 2.2×10^{12} disintegrations per minute (dpm). Commonly used submultiples of the curie are the millicurie and the microcurie:

(1) One millicurie (mCi) [1] = 0.001 curie (Ci) [1] = 3.7×10^7 dps.

(2) One microcurie (μCi) [1] = 0.000001 curie = 3.7×10^4 dps.

[1] Wherever possible, the appropriate unit should be written out as "curie(s)," "millicurie(s)," or "microcurie(s)," and the abbreviations should not be used.

40 FR 8774 · 25 FR 10914 · 25 FR 13952 · 27 FR 5905 · 25 FR 10914 · 25 FR 13351 · 40 FR 8774 · 25 FR 10914 · 25 FR 10914 · 38 FR 29314

D of any incident involving byproduct, source, or special nuclear material possessed by him and which may have caused or threatens to cause:

(1) Exposure of the whole body of any individual to 25 rems or more of radiation; exposure of the skin of the whole body of any individual of 150 rems or more of radiation; or exposure of the feet, ankles, hands or forearms of any individual to 375 rems or more of radiation; or

(2) The release of radioactive material in concentrations which, if averaged over a period of 24 hours, would exceed 5,000 times the limits specified for such materials in Appendix B, Table II; or

(3) A loss of one working week or more of the operation of any facilities affected; or

(4) Damage to property in excess of $200,000.‡

(b) *Twenty-four hour notification.* Each licensee shall within 24 hours notify by telephone and telegraph, mailgram, or facsimile, the Director of the appropriate NRC Regional Office listed in Appendix D of any incident involving licensed material possessed by him and which may have caused or threatens to cause:

(1) Exposure of the whole body of any individual to 5 rems or more of radiation; exposure of the skin of the whole body of any individual to 30 rems or more of radiation; or exposure of the feet, ankles, hands, or forearms to 75 rems or more of radiation; or

(2) The release of radioactive material in concentrations which, if averaged over a period of 24 hours, would exceed 500 times the limits specified for such materials in Appendix B, Table II; or

(3) A loss of one day or more of the operation of any facilities affected; or

(4) Damage to property in excess of $2,000.‡

(c) Any report filed with the Commission pursuant to this section shall be prepared so that names of individuals who have received exposure to radiation will be stated in a separate part of the report.

§ 20.404 [Deleted 38 FR 22220.]

§ 20.405 Reports of overexposures and excessive levels and concentrations.

(a) In addition to any notification required by § 20.403, each licensee shall make a report in writing within 30 days to the appropriate NRC Regional Office listed in Appendix D with a copy to the Director of Inspection and Enforcement, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, of:

(1) each exposure of an individual to radiation in excess of the applicable limits in §§ 20.101 or 20.104 (a) or the license; (2) each exposure of an individual to radioactive material in excess of the applicable limits in §§ 20.103(a)(1), 20.103(a)(2), 20.104(b) or the license; (3) levels of radiation or concentrations of radioactive material in a restricted area in excess of any other applicable limit in the license; (4) any incident for which notification is required by § 20.403; and (5) levels of radiation or concentrations of radioactive material (whether or not involving excessive exposure of any individual) in an unrestricted area in excess of ten times any applicable limit set forth in this part or in the license. Each report required under this paragraph shall describe the extent of exposure of individuals** to radiation or to radioactive material, including estimates of each individual's exposure as required by paragraph (b) of this section; levels of radiation and concentrations of radioactive material involved; the cause of the exposure, levels or concentrations; and corrective steps taken or planned to assure against a recurrence.

(b) Any report filed with the Commission pursuant to this section shall include for each individual exposed the name, social security number, and date of birth; and an estimate of the individual's exposure. The report shall be prepared so that this information is stated in a separate part of the report.

(c) [Deleted 38 FR 22220.]

§ 20.406 [Deleted 38 FR 22220.]

§ 20.407 Personnel monitoring reports.

Each person described in § 20.408 of this part shall, within the first quarter of each calendar year, submit to the Director of Management and Program Analysis, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, the reports specified in paragraphs (a) and (b) of this section covering the preceding calendar year.[1] All other persons specifically licensed by the Commission shall, within the first quarter of calendar years 1979 and 1980, submit to the Director of Management and Program Analysis, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, the reports specified in paragraphs (a) and (b) of this section covering the preceding calendar years 1978 and 1979.[1,2]

(a) A report of either (1) the total number of individuals for whom personnel monitoring was required under §§ 20.202(a) or 34.33(a) of this chapter during the calendar year; or (2) the total number of individuals for whom personnel monitoring was provided during the calendar year. *Provided, however,* That such total includes at least the number of individuals required to be reported under paragraph (a)(1) of this section. The report shall indicate whether it is submitted in accordance with paragraph (a)(1) or (a)(2) of this section. If personnel monitoring was not required to be provided to any individual by the licensee under §§ 20.202(a) or 34.33(a) of this chapter during the calendar year, the licensee shall submit a negative report indicating that such personnel monitoring was not required.

(b) A statistical summary report of the personnel monitoring information recorded by the licensee for individuals for whom personnel monitoring was either required or provided, as described in paragraph (a) of this section, indicating the number of individuals whose total whole body exposure recorded during the previous calendar year was in each of the following estimated exposure ranges:

Estimated whole body exposure range (rems)[3]	Number of individuals in each range
No measurable exposure	
Measurable exposure less than 0.1	
0.1 to 0.25	
0.25 to 0.5	
0.5 to 0.75	
0.75 to 1	
1 to 2	
2 to 3	
3 to 4	
4 to 5	
5 to 6	
6 to 7	
7 to 8	
8 to 9	
9 to 10	
10 to 11	
11 to 12	
12 +	

[3] Individual values exactly equal to the values separating exposure ranges will be reported in the higher range.

The low exposure range data are required in order to obtain better information about the exposures actually recorded. This section does not require improved measurements.

§ 20.408 Reports of personnel monitoring on termination of employment or work.

(a) This section applies to each person licensed by the Commission to:

(1) Operate a nuclear reactor designed to produce electrical or heat energy pursuant to § 50.21(b) or § 50.22 of this chapter or a testing facility as defined in § 50.2(r) of this chapter;

(2) Possess or use byproduct material for purposes of radiography pursuant to Parts 30 and 34 of this chapter;

(3) Process or use at any one time, for purposes of fuel processing, fabrication, or reprocessing, special nuclear material in a qantity exceeding 5,000 grams of contained uranium-235, uranium-233, or plutonium or any combination thereof pursuant to Part 70 of this chapter; or

(4) Possess or use at any one time, for processing or manufacturing for distribution pursuant to part 30, 32, or 33 of this chapter, byproduct material in quantities exceeding any one of the following quantities:

[1] A licensee whose license expires or terminates prior to, or on the last day of the calendar year, shall submit reports at the expiration or termination of the license, covering that part of the year during which the license was in effect.

[2] The Commission will evaluate the data obtained for 1978 and 1979 pursuant to this paragraph, and the benefits derived therefrom and may take action, including publication of notice of proposed rulemaking, to extend or otherwise modify this reporting requirement.

‡ Amended 42 FR 43965.

** Amended 43 FR 29270.

41 FR 52300 — 27 FR 5905 — 41 FR 16445 — 27 FR 5906 — 28 FR 6822 — 42 FR 20138 — 41 FR 52300 — 41 FR 52300 — 35 FR 15067 — 43 FR 44827 — 43 FR 44827

Radionuclide [1]	Quantity in curies
Cesium-137	1
Cobalt-60	1
Gold-198	100
Iodine-131	1
Iridium-192	10
Krypton-85	1,000
Promethium-147	10
Technetium-99m	1,000

[1] The Commission may require, as a license condition, or by rule, regulation or order pursuant to § 20.502, reports from licensees who are licensed to use radionuclides not on this list, in quantities sufficient to cause comparable radiation levels.

(b) When an individual terminates employment with a licensee described in paragraph (a) of this section, or an individual assigned to work in such a licensee's facility but not employed by the licensee, completes the work assignment in the licensee's facility, the licensee shall furnish to the Director of Management and Program Analysis, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, a report of the individual's exposures to radiation and radioactive material, incurred during the period of employment or work assignment in the licensee's facility, containing information recorded by the licensee pursuant to §§ 20.401(a) and 20.108. Such report shall be furnished within 30 days after the exposure of the individual has been determined by the licensee or 90 days after the date of termination of employment or work assignment, whichever is earlier.

43 FR 44827

§ 20.409 Notifications and reports to individuals.

(a) Requirements for notifications and reports to individuals of exposure to radiation or radioactive material are specified in § 19.13 of this chapter.

(b) When a licensee is required pursuant to §§ 20.405 or 20.408 to report to the Commission any exposure of an individual to radiation or radioactive material, the licensee shall also notify the individual. Such notice shall be transmitted at a time not later than the transmittal to the Commission, and shall comply with the provisions of § 19.13(a) of this chapter.

38 FR 22220

Exceptions and Additional Requirements

25 FR 10914

§ 20.501 Applications for exemptions.

The Commission may, upon application by any licensee or upon its own initiative, grant such exemptions from the requirements of the regulations in this part as it determines are authorized by law and will not result in undue hazard to life or property.

§ 20.502 Additional requirements.

The Commission may, by rule, regulation, or order, impose upon any licensee such requirements, in addition to those established in the regulations in this part, as it deems appropriate or necessary to protect health or to minimize danger to life or property.

25 FR 10914

§ 20.601 Violations.

An injunction or other court order may be obtained prohibiting any violation of any provision of the Atomic Energy Act of 1954, as amended, or Title II of the Energy Reorganization Act of 1974, or any regulation or order issued thereunder. A court order may be obtained for the payment of a civil penalty imposed pursuant to section 234 of the Act for violation of section 53, 57, 62, 63, 81, 82, 101, 103, 104, 107, or 109 of the Act, or section 206 of the Energy Reorganization Act of 1974, or any rule, regulation, or order issued thereunder, or any term, condition, or limitation of any license issued thereunder, or for any violation for which a license may be revoked under section 186 of the Act. Any person who willfully violates any provision of the Act or any regulation or order issued thereunder may be guilty of a crime and, upon conviction, may be punished by fine or imprisonment or both, as provided by law.

40 FR 8774

APPENDIX A [Reserved]

NOTE—The reporting and record keeping requirements contained in this part have been approved by the General Accounting Office under B-180225 (R0043), (R0044), and (R0084).

Appendix D

UNITED STATES NUCLEAR REGULATORY COMMISSION

INSPECTION AND ENFORCEMENT REGIONAL OFFICES

Region	Address	Telephone	
		Daytime	Nights and Holidays
I Connecticut, Delaware, District of Columbia, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont	Region I, USNRC Office of Inspection and Enforcement 631 Park Avenue King of Prussia, Pa. 19406	‡ (215) 337-5000	‡ (215) 337-5000
II Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, Panama Canal Zone, Puerto Rico, South Carolina, Tennessee, Virginia, Virgin Islands, and West Virginia	† Region II, USNRC Office of Inspection and Enforcement 101 Marietta Street Suite 3100 Atlanta, Georgia 30303	† (404) 221-4503	† (404) 221-4503
III Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Ohio, and Wisconsin	Region III, USNRC Office of Inspection and Enforcement 799 Roosevelt Road Glen Ellyn, Ill. 60137	(312) 858-2660	(312) 858-2660
IV Arkansas, Colorado, Idaho, Kansas, Louisiana, Montana, Nebraska, New Mexico, North Dakota, Oklahoma, South Dakota, Texas, Utah, and Wyoming	Region IV, USNRC Office of Inspection and Enforcement 611 Ryan Plaza Drive Suite 1000 Arlington, Texas 76012	(817) 334-2841	(817) 334-2841
V Alaska, Arizona, California, Hawaii, Nevada, Oregon, Washington, and U.S. territories and possessions in the Pacific	Region V, USNRC Office of Inspection and Enforcement 1990 N. California Blvd. Suite 202 Walnut Creek, Calif. 94596	(415) 486-3141	(415) 486-3141

40 FR 42557

*Amended 41 FR 55851.

†Amended 43 FR 32741.

‡ Amended 43 FR 52201.

PART 21

REPORTING OF DEFECTS AND NONCOMPLIANCE

GENERAL PROVISIONS

AUTHORITY: Sec. 161, Pub. L. 83-703, 68 Stat. 948; sec. 234, Pub. L. 91-161, 83 Stat. 444; sec. 206, Pub. L. 93-438, 88 Stat. 1246 (42 U.S.C. 2201, 2282, 5846).

GENERAL PROVISIONS

§ 21.1 Purpose.

The regulations in this part establish procedures and requirements for implementation of section 206 of the Energy Reorganization Act of 1974. That section requires any individual director or responsible officer of a firm constructing, owning, operating or supplying the components of any facility or activity which is licensed or otherwise regulated pursuant to the Atomic Energy Act of 1954, as amended, or the Energy Reorganization Act of 1974, who obtains information reasonably indicating: (a) That the facility, activity or basic component supplied to such facility or activity fails to comply with the Atomic Energy Act of 1954, as amended, or any applicable rule, regulation, order, or license of the Commission relating to substantial safety hazards or (b) that the facility, activity, or basic component supplied to such facility or activity contains defects, which could create a substantial safety hazard, to immediately notify the Commission of such failure to comply or such defect, unless he has actual knowledge that the Commission has been adequately informed of such defect or failure to comply.

42 FR 28891

§ 21.2 Scope.

The regulations in this part apply, except as specifically provided otherwise in Parts 31, 34, 35, 40, or 70 of this chapter, to each individual, partnership, corporation, or other entity licensed pursuant to the regulations in this chapter to possess, use, and/or transfer within the United States source, byproduct and/or special nuclear materials, or to construct, manufacture, possess, own, operate and or transfer within the United States, any production or utilization facility, and to each director (see § 21.3(f)) and responsible officer (see § 21.3(j)) of such a licensee. The regulations in this part apply also to each individual, corporation, partnership or other entity doing business within the United States, and each director and responsible officer of such organization, that constructs (see § 21.3(c)) a production or utilization facility licensed for manufacture, construction or operation (see § 21.3(h)) pursuant to Part 50 of this chapter or supplies (see § 21.3(l)) basic components (see § 21.3(a)) for a facility or activity licensed, other than for export, under Parts 30, 40, 50, 70, or 71.

42 FR 28891

Nothing in these regulations should be deemed to preclude either an individual or a manufacturer/supplier of a commercial grade item (see § 21.3(a-1)) not subject to the regulations in this part from reporting to the Commission a known or suspected defect or failure to comply and, as authorized by law, the identity of anyone so reporting will be withheld from disclosure.[1]

43 FR 4862

[1] NRC Regional Offices will accept collect telephone calls from individuals who wish to speak to NRC representatives concerning nuclear safety-related problems. The location and telephone numbers (for nights and holidays as well as regular hours) are listed below:

Region:	
I (Philadelphia)	(215) 337-5000*
II (Atlanta)	(404) 221-4503
III (Chicago)	(312) 858-2660
IV (Dallas)	(817) 334-2841
V (San Francisco)	(415) 486-3141

§ 21.3 Definitions.

As used in this part, (a) "Basic component," when applied to nuclear power reactors means a plant structure, system, component or part thereof necessary to assure (1) the integrity of the reactor coolant pressure boundary, (2) the capability to shut down the reactor and maintain it in a safe shutdown condition, or

42 FR 26891

(3) the capability to prevent or mitigate the consequences of accidents which could result in potential offsite exposures comparable to those referred to in § 100.11 of this chapter.

42 FR 36803

"Basic component," when applied to other facilities and when applied to other activities licensed pursuant to Parts 30, 40, 50, 70 or 71 of this chapter, means a component, structure, system, or part thereof that is directly procured by the licensee of a facility or activity subject to the regulations in this part and in which a defect (see § 21.3(d)) or failure to comply with any applicable regulation in this chapter, order, or license issued by the Commission could create a substantial safety hazard (see § 21.3(k)). In all cases "basic component" includes design, inspection, testing, or consulting services important to safety that are associated with the component hardware, whether these services are performed by the component supplier or others.

42 FR 28891

A commercial grade item is not a part of a basic component until after dedication (see § 21.3(c-1)).

43 FR 49621

(a-1) "Commercial grade item" means an item that is (1) not subject to design or specification requirements that are unique to facilities or activities licensed pursuant to part 30, 40, 50, 70, or 71 of this chapter and (2) used in applications other than facilities or activities licensed pursuant to part 30, 40, 50, 70, or 71 of this chapter and (3) to be ordered from the manufacturer/supplier on the basis of specifications set forth in the manufactur-

* Amended 43 FR 52201.

er's published product description (for example a catalog).

(b) "Commission" means the Nuclear Regulatory Commission or its duly authorized representatives.

(c) "Constructing" or "construction" means the design, manufacture, fabrication, placement, erection, installation, modification, inspection, or testing of a facility or activity which is subject to the regulations in this part and consulting services related to the facility or activity that are important to safety.

(c-1) "Dedication" of a commercial grade item occurs after receipt when that item is designated for use as a basic component.

(d) "Defect" means:

(1) A deviation (see § 21.3 (e)) in a basic component delivered to a purchaser for use in a facility or an activity subject to the regulations in this part if, on the basis of an evaluation (see § 21.3(g)), the deviation could create a substantial safety hazard; or

(2) The installation, use, or operation of a basic component containing a defect as defined in paragraph (d)(1) of this section; or

(3) A deviation in a portion of a facility subject to the construction permit or manufacturing licensing requirements of Part 50 of this chapter provided the deviation could, on the basis of an evaluation, create a substantial safety hazard and the portion of the facility containing the deviation has been offered to the purchaser for acceptance; or

(4) A condition or circumstance involving a basic component that could contribute to the exceeding of a safety limit, as defined in the technical specifications of a license for operation issued pursuant to Part 50 of this chapter.

(e) "Deviation" means a departure from the technical requirements included in a procurement document (see § 21.3 (i)).

(f) "Director" means an individual, appointed or elected according to law, who is authorized to manage and direct the affairs of a corporation, partnership or other entity. In the case of an individual proprietorship, "director" means the individual.

(g) "Evaluation" means the process accomplished by or for a licensee to determine whether a particular deviation could create a substantial safety hazard.

(h) "Operating" or "operation" means the operation of a facility or the conduct of a licensed activity which is subject to the regulations in this part and consulting services related to operations that are important to safety.

(i) "Procurement document" means a contract that defines the requirements which facilities or basic components must meet in order to be considered acceptable by the purchaser.

(j) "Responsible officer" means the president, vice-president or other individual in the organization of a corporation, partnership, or other entity who is vested with executive authority over activities subject to this part.

(k) "Substantial safety hazard" means a loss of safety function to the extent that there is a major reduction in the degree of protection provided to public health and safety for any facility or activity licensed, other than for export, pursuant to Parts 30, 40, 50, 70 and 71.

(l) "Supplying" or "supplies" means contractually responsible for a basic component used or to be used in a facility or activity which is subject to the regulations in this part.

§ 21.4 Interpretations.

Except as specifically authorized by the Commission in writing, no interpretation of the meaning of the regulations in this part by any officer or employee of the Commission other than a written interpretation by the General Counsel will be recognized to be binding upon the Commission.

§ 21.5 Communications.

Except where otherwise specified in this part, all communications and reports concerning the regulations in this part should be addressed to the Director, Office of Inspection and Enforcement, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, or to the Director of a Regional Office at the address specified in Appendix D of Part 20 of this chapter. Communications and reports also may be delivered in person at the Commission's offices at 1717 H Street NW., Washington, D.C.; at 7920 Norfolk Avenue, Bethesda, Md.; or at a Regional Office at the location specified in Appendix D of Part 20 of this chapter.

§ 21.6 Posting requirements.

Each individual partnership, corporation or other entity subject to the regulations in this part, shall post current copies of the following documents in a conspicuous position on any premises within the United States where the activities subject to this part are conducted (1) the regulations in this part, (2) Section 206 of the Energy Reorganization Act of 1974, and (3) procedures adopted pursuant to the regulations in this part.

If posting of the regulations in this part or the procedures adopted pursuant to the regulations in this part is not practicable, the licensee or firm subject to the regulations in this part may, in addition to posting section 206, post a notice which describes the regulations/procedures, including the name of the individual to whom reports may be made, and states where they may be examined.

The effective date of this section has been deferred until January 6, 1978.

§ 21.7 Exemptions.

The Commission may, upon application of any interested person or upon its own initiative, grant such exemptions from the requirements of the regulations in this part as it determines are authorized by law and will not endanger life or property or the common defense and security and are otherwise in the public interest.

[A] Suppliers of commercial grade items are exempt from the provisions of this part to the extent that they supply commercial grade items.

NOTIFICATION

§ 21.21 Notification of failure to comply or existence of a defect.

(a) Each individual, corporation, partnership or other entity subject to the regulations in this part shall adopt appropriate procedures to (1) provide for (i) evaluating deviations or (ii) informing the licensee or purchaser of the deviation in order that the licensee or purchaser may cause the deviation to be evaluated unless the deviation has been corrected; and (2) assure that a director or responsible officer is informed if the construction or operation of a facility, or activity, or a basic component supplied for such facility or activity:

(i) Fails to comply with the Atomic Energy Act of 1954, as amended, or any applicable rule, regulation, order or license of the Commission relating to a substantial safety hazard, or

(ii) Contains a defect. The effective date of this paragraph has been deferred until January 6, 1978.

(b)(1) A director or responsible officer subject to the regulations of this part or a designated person shall notify the Commission when he obtains information reasonably indicating a failure to comply or a defect affecting (i) the construction or operation of a facility or an activity within the United States that is subject to the licensing requirements under Parts 30, 40, 50, 70 or 71 and that is within his organization's responsibility or (ii) a basic component that is within his organization's responsibility and is supplied for a facility or an activity within the United States that is subject to the licensing requirements under Parts 30, 40, 50, 70 or 71. The above notification is not required if such individual has actual knowledge that the Commission has been adequately informed of such defect or such failure to comply.

(2) Initial notification required by this paragraph shall be made within two days following receipt of the information. Notification shall be made to the Director, Office of Inspection and Enforcement, or to the Director of a Regional Office. If initial notification is by means other than written communication, a written report shall be submitted to the appropriate Office within 5 days after the information is obtained. Three copies of each report shall be submitted to the Director, Office of Inspection and Enforcement.

(3) The written report required by this paragraph shall include, but need not be limited to, the following information, to the extent known:

(i) Name and address of the individual or individuals informing the Commission.

(ii) Identification of the facility, the activity, or the basic component supplied for such facility or such activity within the United States which fails to comply or contains a defect.

PART 30

RULES OF GENERAL APPLICABILITY TO DOMESTIC LICENSING OF BYPRODUCT MATERIAL★★

GENERAL PROVISIONS

EXEMPTIONS

LICENSES

RECORDS, INSPECTIONS, TESTS, PROCEDURES, AND REPORTS†

ENFORCEMENT

SCHEDULES

AUTHORITY: Secs. 81, 82, 161, 182, 183, 68 Stat. 935, 948, 953, 954, as amended (42 U.S.C. 2111, 2112, 2201, 2232, 2233); secs. 202, 206, 88 Stat. 1244, 1246 (42 U.S.C. 5842 and 5846).

Section 30.34(b) also issued under sec. 184, 68 Stat. 954, as amended (42 U.S.C. 2234). For the purposes of sec. 223, 68 Stat. 958, as amended (42 U.S.C. 2273), § 30.34(c) issued under sec. 161b., 68 Stat. 948 (42 U.S.C. 2201(b)) and §§ 30.51 and 30.52 issued under sec. 161, 68 Stat. 950, as amended (42 U.S.C. 2201(o)).

40 FR 8774

§ 30.1 Purpose and Scope.

This part prescribes rules applicable to all persons in the United States governing domestic** licensing of byproduct material under the Atomic Energy Act of 1954, as amended (68 Stat. 919), and under Title II of the Energy Reorganization Act of 1974 (88 Stat. 1242), and exemptions from the domestic** licensing requirements permitted by section 81 of the Act.

40 FR 8185

§ 30.2 Resolution of conflict.

The requirements of this part are in addition to, and not in substitution for, other requirements of this chapter. In any conflict between the requirements in this part and a specific requirement in another part of the regulations in this chapter, the specific requirement governs.

§ 30.3 Activities requiring license.

Except for persons exempt as provided in this part and Part 150 of this chapter, no person shall manufacture, produce, transfer, receive, acquire, own, possess, or use,** byproduct material except as authorized in a specific or general license issued pursuant to the regulations in this chapter.

30 FR 8185

§ 30.4 Definitions.

As used in this part and Parts 31-35** of this chapter:

(a) "Act" means the Atomic Energy Act of 1954, (68 Stat. 919)* including any amendments thereto;

40 FR 8774

(a-1) "Administration" means the Energy Research and Development Administration or its duly authorized representatives;

30 FR 8185

(b) Terms defined in section 11 of the Act shall have the same meaning when used in the regulations in this part and Parts 31-35** to the extent such terms are not specifically defined in this part;

† Amended 37 FR 9207.

‡ Added 37 FR 9207.

** Amended 43 FR 6915.

* Amended 36 FR 1466.

(c) "Agreement State" means any state with which the Atomic Energy Commission or the Nuclear Regulatory Commission has entered into an effective agreement under subsection 274b. of the Act. "Non-Agreement State" means any other State; 40 FR 8774

(d) "Byproduct material" means any radioactive material (except special nuclear material) yielded in or made radioactive by exposure to the radiation incident to the process of producing or utilizing special nuclear material;

(e) "Commission" means the Nuclear Regulatory Commission and its duly authorized representatives;

(f) "Curie" means that amount of radioactive material which disintegrates at the rate of 37 billion atoms per second;

(g) "Government agency" means any executive department, commission, independent establishment, corporation, wholly or partly owned by the United States of America which is an instrumentality of the United States, or any board, bureau, division, service, office, officer, authority, administration, or other establishment in the executive branch of the Government; 30 FR 8185

(h) "Human use" means the internal or external administration of byproduct material, or the radiation therefrom, to human beings;

(i) "License" except where otherwise specified means a license for byproduct material issued pursuant to the regulations in this part and Parts 31-35† of this chapter;

(j)(1) "Microcurie" means that amount of radioactive material which disintegrates at the rate of 37 thousand atoms per second; 38 FR 29314

(2) "Millicurie" means that amount of radioactive material which disintegrates at the rate of 37 million atoms per second;

(k) "Person" means (1) any individual, corporation, partnership, firm, association, trust, estate, public or private institution, group, Government agency other than the Commission or the Administration, except that the Administration shall be considered a person within the meaning of the regulations in this part to the extent that its facilities and activities are subject to the licensing and related regulatory authority of the Commission pursuant to section 202 of the Energy Reorganization Act of 1974 (88 Stat. 1244),[5] any State or any political subdivision of or any political entity within a State, any foreign government or nation or any political subdivision of any such government or nation, or other entity; and (2) any legal successor, representative, agent, or agency of the foregoing; 40 FR 8774

(l) "Physician" means an individual licensed by a State or territory of the United States, the District of Columbia or the Commonwealth of Puerto Rico to dispense drugs in the practice of medicine;

(m) "Production facility" means production facility as defined in the regulations contained in Part 50 of this chapter;

(n) "Radiographer" means any individual who performs or who, in attendance at the site where the sealed source or sources are being used, personally supervises radiographic operations and who is responsible to the licensee for assuring compliance with the requirements of the Commission's regulations and the conditions of the license; 30 FR 8185

(o) "Radiographer's assistant" means any individual who, under the personal supervision of a radiographer, uses radiographic exposure devices, sealed sources or related handling tools, or radiation* survey instruments in radiography;

(p) "Radiography" means the examination of the structure of materials by nondestructive methods, utilizing sealed sources of byproduct materials;

(q) "Research and development" means (1) theoretical analysis, 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 in this part and Parts 31-35† does not include the internal or external administration of byproduct material, or the radiation therefrom, to human beings; 30 FR 8185

(r) "Sealed source" means any byproduct material that is encased in a capsule designed to prevent leakage or escape of the byproduct material;

(s) "Source material" means source material as defined in the regulations contained in Part 40 of this chapter;

(t) "Special nuclear material" means special nuclear material as defined in the regulations contained in Part 70 of this chapter;

(u) "United States", when used in a geographical sense, includes all territories and possessions of the United States, the Canal Zone and Puerto Rico;

(v) "Utilization facility" means a utilization facility as defined in the regulations contained in Part 50 of this chapter;

(w) "Commencement of construction" means any clearing of land, excavation, or other substantial action that would adversely affect the natural environment of a site but does not include changes desirable for the temporary use of the land for public recreational uses, necessary borings to determine site characteristics or other preconstruction monitoring to establish background information related to the suitability of a site or to the protection of environmental values. 37 FR 5745

§ 30.5 Interpretations.

Except as specifically authorized by the Commission in writing, no interpretation of the meaning of the regulations in this part and Parts 31-35† by any officer or employee of the Commission other than a written interpretation by the General Counsel will be recognized to be binding upon the Commission. 30 FR 8185

§ 30.6 Communications.

Except where otherwise specified, all communications and reports concerning

† Amended 43 FR 6915.

[5] The Administration facilities and activities identified in section 202 are:

(1) Demonstration Liquid Metal Fast Breeder reactors when operated as part of the power generation facilities of an electric utility system, or when operated in any other manner for the purpose of demonstrating the suitability for commercial application of such a reactor.

(2) Other demonstration nuclear reactors, except those in existence on January 19, 1975, when operated as part of the power generation facilities of an electric utility system, or when operated in any other manner for the purpose of demonstrating the suitability for commercial application of such a reactor.

(3) Facilities used primarily for the receipt and storage of high-level radioactive wastes resulting from licensed activities.

(4) Retrievable Surface Storage Facilities and other facilities authorized for the express purpose of subsequent long-term storage of high-level radioactive waste generated by the Administration, which are not used for, or are part of, research and development activities.

* Amended 36 FR 1466.

(iii) Identification of the firm constructing the facility or supplying the basic component which fails to comply or contains a defect.

(iv) Nature of the defect or failure to comply and the safety hazard which is created or could be created by such defect or failure to comply.

(v) The date on which the information of such defect or failure to comply was obtained.

(vi) In the case of a basic component which contains a defect or fails to comply, the number and location of all such components in use at, supplied for, or being supplied for one or more facilities or activities subject to the regulations in this part.

(vii) The corrective action which has been, is being, or will be taken; the name of the individual or organization responsible for the action; and the length of time that has been or will be taken to complete the action.

(viii) Any advice related to the defect or failure to comply about the facility, activity or basic component that has been, is being, or will be given to purchasers or licensees.

(4) The director or responsible officer may authorize an individual to provide the notification required by this paragraph, provided that, this shall not relieve the director or responsible officer of his or her responsibility under this paragraph.

(c) Individuals subject to paragraph (b) may be required by the Commission to supply additional information related to the defect or failure to comply.

PROCUREMENT DOCUMENTS

§ 21.31 Procurement documents.

Each individual, corporation, partnership or other entity subject to the regulations in this part shall assure that each procurement document for a facility, or a basic component issued by him, her or it on or after January 6, 1978 specifies, when applicable, that the provisions of 10 CFR Part 21 apply.

INSPECTIONS, RECORDS

§ 21.41 Inspections.

Each individual, corporation, partnership or other entity subject to the regulations in this part shall permit duly authorized representatives of the Commission, to inspect its records, premises, activities, and basic components as necessary to effectuate the purposes of this part.

§ 21.51 Maintenance of records.

(a) Each licensee of a facility or activity subject to the regulations in this part shall maintain such records in connection with the licensed facility or activity as may be required to assure compliance with the regulations in this part.

(b) Each individual, corporation, partnership, or other entity subject to the regulations in this part shall prepare records in connection with the design, manufacture, fabrication, placement, erection, installation, modification, inspection, or testing of any facility, basic component supplied for any licensed facility or to be used in any licensed activity sufficient to assure compliance with the regulations in this part. After delivery of the facility or component and prior to the destruction of the records relating to evaluations (see § 21.3(g)) or notifications to the Commission (see § 21.21), such records shall be offered to the purchaser of the facility or component. If such purchaser determines any such records:

(1) Are not related to the creation of a substantial safety hazard, he may authorize such records to be destroyed, or

(2) Are related to the creation of a substantial safety hazard, he shall cause such records to be offered to the organization to which he supplies basic components or for which he constructs a facility or activity.

If such purchaser is unable to make the determination as required above then the responsibility for making the determination shall be transferred to the individual, corporation, partnership, or other entity subject to the regulations in this part that issued the procurement documents to the purchaser. In the event that the determination cannot be made at that level then the responsibility shall be transferred in a similar manner to another individual, corporation, partnership, or other entity subject to the regulations in this part, until, if necessary, the licensee shall make the determination.

(c) Records that are prepared only for the purpose of assuring compliance with the regulations in this part and are not related to evaluations or notifications to the Commission may be destroyed after delivery of the facility or component.

(d) The effective date of the section has been deferred until January 6, 1978.

ENFORCEMENT

§ 21.61 Failure to notify.

Any director or responsible officer subject to the regulations in this part who knowingly and consciously fails to provide the notice required by § 21.21 shall be subject to a civil penalty in an amount not to exceed $5,000 for each failure to provide such notice and a total amount not to exceed $25,000 for all failures to provide such notice occurring within any period of thirty consecutive days. Each day of failure to provide the notice required by § 21.21 shall constitute a separate failure for the purpose of computing the applicable civil penalty.

NOTE.—The reporting and record keeping requirements contained in this part have been approved by the General Accounting Office under B-180225 (RO 446).

42 FR 28891

42 FR 28891

the regulations in this part and Parts 31-35† and applications filed under them, should be addressed to the Director of Nuclear Material Safety and Safeguards, U.S. Nuclear Regulatory Commission, Washington, D.C., 20555. Communications, reports and applications may be delivered in person at the Commission's offices at 1717 H Street N.W., Washington, D.C., or **7920 Norfolk Aven. , Bethesda, Md.

EXEMPTIONS

§ 30.11 Specific exemptions.

(a) The Commission may, upon application of any interested person or upon its own initiative, grant such exemptions from the requirements of the regulations in this part and Parts 31-35† of this chapter as it determines are authorized by law and will not endanger life or property or the common defense and security and are otherwise in the public interest.

(b) Any person subject to the provisions of §§ 30.32(1) and 30.33(a)(5) may request an exemption from the requirements of those provisions. The Commission may grant an exemption from the provisions of § 30.32(1) and 30.33(a)(5) upon considering and balancing the following factors:

(1) Whether conduct of the proposed activities will give rise to a significant adverse impact on the environment and the nature and extent of such impact, if any;

(2) Whether redress of any adverse environmental impact from conduct of the proposed activities can reasonably be effected should such redress be necessary;

(3) Whether conduct of the proposed activities would foreclose subsequent adoption of alternatives; and

(4) The effect of delay conducting such activities on the public interest. During the period of any exemption granted pursuant to this paragraph (b), any activities conducted shall be carried out in such a manner as will minimize or reduce their environmental impact.

§ 30.12 Persons using byproduct material under certain Energy Research and Development Administration and Nuclear Regulatory Commission contracts.

Except to the extent that Administration facilities or activities of the types subject to licensing pursuant to section 202 of the Energy Reorganization Act of 1974 are involved, any prime contractor of the Administration is exempt from the requirements for a license set forth in sections 81 and 82 of the Act and from the regulations in this part to the extent that such contractor, under his prime contract with the Administration manufactures, produces, transfers, receives, acquires, owns, possesses, or uses† byproduct material for: (a) the performance of work for the Administration at a United States Government-owned or controlled site, including the transportation of byproduct material to or from such site and the performance of contract services during temporary interruptions of such transportation; (b) research in, or development, manufacture, storage, testing or transportation of, atomic weapons or components thereof; or (c) the use or operation of nuclear reactors or other nuclear devices in a United States Government-owned vehicle or vessel. In addition to the foregoing exemptions and subject to the requirement for licensing of Administration facilities and activities pursuant to section 202 of the Energy Reorganization Act of 1974, any prime contractor or subcontractor of the Administration or the Commission is exempt from the requirements for a license set forth in sections 81 and 82 of the Act and from the regulations in this part to the extent that such prime contractor or subcontractor manufactures, produces, transfers, receives, acquires, owns, possesses, or uses† byproduct material under his prime contract or subcontract when the Commission determines that the exemption of the prime contractor or subcontractor is authorized by law, and that, under the terms of the contract or subcontract, there is adequate assurance that the work thereunder can be accomplished without undue risk to the public health and safety.

§ 30.13 Carriers.

Common and contract carriers, freight forwarders, warehousemen, and the U.S. Postal Service are exempt from the regulations in this part and Parts 31-35† of this chapter and the requirements for a license set forth in section 81 of the Act to the extent that they transport or store byproduct material in the regular course of carriage for another or storage incident thereto.

§ 30.14 Exempt concentrations.

(a) Except as provided in paragraphs (c) and (d) of this section, any person is exempt from the requirements for a license set forth in section 81 of the Act and from the regulations in this part and Parts 31-35† of this chapter to the extent that such person receives, possesses, uses, transfers, owns or acquires products or materials containing byproduct material in concentrations not in excess of those listed in § 30.70.

(b) This section shall not be deemed to authorize the import of byproduct material or products containing byproduct material.

(c) A manufacturer, processor, or producer of a product or material in an Agreement State is exempt from the requirements for a license set forth in section 81 of the Act and from the regulations in this part and Parts 31, 32, 33, and 34† to the extent that he transfers byproduct material contained in a product or material in concentrations not in excess of those specified in § 30.70 and introduced into the product or material by a licensee holding a specific license issued by an Agreement State, the Commission, or the Atomic Energy Commission expressly authorizing such introduction. This exemption does not apply to the transfer of byproduct material contained in any food, beverage, cosmetic, drug, or other commodity or product designed for ingestion or inhalation by or application to, a human being.

(d) No person may introduce byproduct material into a product or material knowing or having reason to believe that it will be transferred to persons exempt under this section or equivalent regulations of an Agreement State, except in accordance with a license issued pursuant to § 32.11 of this chapter or the general license provided in § 150.20 of Part 150.

§ 30.15 Certain items containing byproduct material.

(a) Except for persons who apply byproduct material to, or persons who incorporate byproduct material into, the following products, or persons who initially transfer† for sale or distribution the following products containing byproduct material, any person is exempt from the requirements for a license set

† Amended 43 FR 6915.

** Amended 34 FR 19546.

forth in section 81 of the Act and from the regulations in Parts 20 and 30-35* of this chapter to the extent that such person receives, possesses, uses, transfers,* owns, or acquires the following products:

(1) Timepieces or hands or dials containing not more than the following specified quantities of byproduct material and not exceeding the following specified levels of radiation:

(i) 25 millicuries of tritium per timepiece,

(ii) 5 millicuries of tritium per hand,

(iii) 15 millicuries of tritium per dial (bezels when used shall be considered as part of the dial),

(iv) 100 microcuries of promethium-147 per watch or 200 microcuries of promethium-147 per any other timepiece,

(v) 20 microcuries of promethium-147 per watch hand or 40 microcuries of promethium-147 per other timepiece hand,

(vi) 60 microcuries of promethium-147 per watch dial or 120 microcuries of promethium-147 per other timepiece dial (bezels when used shall be considered as part of the dial),

(vii) The levels of radiation from hands and dials containing promethium-147 will not exceed, when measured through 50 milligrams per square centimeter of absorber:

(*a*) For wrist watches, 0.1 millirad per hour at 10 centimeters from any surface,

(*b*) For pocket watches, 0.1 millirad per hour at 1 centimeter from any surface,

(*c*) For any other timepiece, 0.2 millirad per hour at 10 centimeters from any surface.

(2) Lock illuminators containing not more than 15 millicuries of tritum or not more than 2 millicuries of promethium-147 installed in automobile locks. The levels of radiation from each lock illuminator containing promethium-147 will not exceed 1 millirad per hour at 1 centimeter from any surface when measured through 50 milligrams per square centimeter of absorber.

(3) Balances of precision containing not more than 1 millicurie of tritium per balance or not more than 0.5 millicurie of tritum per balance part.

(4) Automobile shift quadrants containing not more than 25 millicuries of tritium.

(5) Marine compasses containing not more than 750 millicuries of tritium gas and other marine navigational instruments containing not more than 250 millicuries of tritium gas.

(6) Thermostat dials and pointers containing not more than 25 millicuries of tritium per thermostat.

(7) [Deleted 34 FR 6651.]

(8) Electron tubes. *Provided*, That each tube does not contain more than one of the following specified quantities of byproduct material:

(i) 150 millicuries of tritium per microwave receiver protector tube or 10 millicuries of tritium per any other electron tube;

(ii) 1 microcurie of cobalt-60;

(iii) 5 microcuries of nickel-63;

(iv) 30 microcuries of krypton-85;

(v) 5 microcuries of cesium-137;

(vi) 30 microcuries of promethium-147;

And provided further, That the levels of radiation from each electron tube containing byproduct material do not exceed 1 millirad per hour at 1 centimeter from any surface when measured through 7 milligrams per square centimeter of absorber.[3]

(9) Ionizing radiation measuring instruments containing, for purposes of internal calibration or standardization, a source of byproduct material not exceeding the applicable quantity set forth in § 30.71, Schedule B.

(10) Spark gap irradiators containing not more than 1 microcurie of cobalt-60 per spark gap irradiator for use in electrically ignited fuel oil burners having a firing rate of at least 3 gallons per hour (11.4 liters per hour).

(b) Any person who desires to apply byproduct material to, or to incorporate byproduct material into, the products exempted in paragraph (a) of this section, or who desires to initially transfer* for sale or distribution such products containing byproduct material, should apply for a specific license pursuant to § 32.14 of this chapter, which license states that the product may be distributed by the licensee to persons exempt from the regulations pursuant to paragraph (a) of this section.

§ 30.16 Resins containing scandium-46 and designed for sand-consolidation in oil wells.

Any person is exempt from the requirements for a license set forth in section 81 of the Act and from the regulations in Parts 20 and 30-35* of this chapter to the extent that such person receives, possesses, uses, transfers,* owns, or acquires synthetic plastic resins containing scandium-46 which are designed for sand-consolidation in oil wells, and which have been manufactured or initially transferred* for sale or distribution, in accordance with a specific license issued pursuant to § 32.17 of this chapter or equivalent regulations of an Agreement State. The exemption in this section does not authorize the manufacture or initial transfer for sale or distribution* of any resins containing scandium-46.

§ 30.18 Exempt quantities.

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

(b) Any person who possesses byproduct material received or acquired prior to September 25, 1971, under the general license then provided in § 31.4 of this chapter is exempt from the requirements for a license set forth in section 81 of the Act and from the regulations in Parts 30-34 of this chapter to the extent that such person possesses, uses, transfers, or owns such byproduct material.

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

(d) No person may, for purposes of commercial distribution,* transfer byproduct material in the individual quantities set forth in § 30.71 Schedule

* Amended 43 FR 6915.

[3] For purposes of this subparagraph "electron tubes" include spark gap tubes, power tubes, gas tubes including glow lamps, receiving tubes, microwave tubes, indicator tubes, pickup tubes, radiation detection tubes, and any other completely sealed tube that is designed to conduct or control electrical currents.

FORM NRC-163a U.S. NUCLEAR REGULATORY COMMISSION

PRIVACY ACT STATEMENT

Pursuant to 5 U.S.C. 552a(e)(3), enacted into law by section 3 of the Privacy Act of 1974 (Public Law 93-579), the following statement is furnished to individuals who supply information to the Nuclear Regulatory Commission on Forms NRC-313, NRC-313a, or NRC-313r. This information is maintained in a system of records designated as NRC-3 and described at 40 Federal Register 45334 (October 1, 1975).

1. FORM NUMBER (AND DATE)	2. FORM TITLE
NRC-313	Application for Byproduct Material License
NRC-313a	Application for Byproduct Material License, Supplement A--Human Use
NRC-313r	Application for Byproduct Material License--Use of Sealed Sources in Radiography

3. AUTHORITY Sections 81 and 161(b) of the Atomic Energy Act of 1954, as amended (42 U.S.C. 2111 and 2201(b)).

4. PRINCIPAL PURPOSE(S) The information is evaluated by the NRC staff pursuant to the criteria set forth in 10 CFR Parts 30-36 to determine whether the application meets the requirements of the Atomic Energy Act of 1954, as amended, and the Commission's regulations, for the issuance of a byproduct material license or amendment thereof.

5. ROUTINE USES The information may be used: (a) to provide records to State health departments for their information and use; and (b) to provide information to Federal, State, and local health officials and other persons in the event of incident or exposure, for their information, investigation, and protection of the public health and safety. The information may also be disclosed to appropriate Federal, State, and local agencies in the event that the information indicates a violation or potential violation of law and in the course of an administrative or judicial proceeding. In addition, this information may be transferred to an appropriate Federal, State, or local agency to the extent relevant and necessary for an NRC decision or to an appropriate Federal agency to the extent relevant and necessary for that agency's decision about you. A copy of the license issued will routinely be placed in the NRC's Public Document Room, 1717 H Street, N.W., Washington, D.C.

6. WHETHER DISCLOSURE IS MANDATORY OR VOLUNTARY AND EFFECT ON INDIVIDUAL OF NOT PROVIDING INFORMATION Disclosure of the requested information is voluntary. If the requested information is not furnished, however, the application for byproduct material license, or amendment thereof, will not be processed.

7. SYSTEM MANAGER(S) AND ADDRESS
Director, Division of Fuel Cycle and Material Safety
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

B, knowing or having reason to believe that such quantities of byproduct material will be transferred to persons exempt under this section or equivalent regulations of an Agreement State, except in accordance with a license issued under § 32.18 of this chapter, which license states that the byproduct material may be transferred by the licensee to persons exempt under this section or the equivalent regulations of an Agreement State.

36 FR 16898

§ 30.19 Self-luminous products containing tritium, krypton-85, or promethium-147.

(a) Except for persons who manufacture, process, produce, or initially transfer for sale or distribution* self-luminous products containing tritium, krypton-85, or promethium-147,* and except as provided in paragraph (c) of this section, any person is exempt from the requirements for a license set forth in section 81 of the Act and from the regulations in Parts 20 and 30-35* of this chapter to the extent that such person receives, possesses, uses, transfers,* owns, or acquires tritium, krypton-85, or promethium-147 in self-luminous products manufactured, processed, produced, or initially* transferred in accordance with a specific license issued pursuant to § 32.22 of this chapter, which license authorizes the initial* transfer of the product for use under this section.

34 FR 9025

(b) Any person who desires to manufacture, process, or produce self-luminous products containing tritium, krypton-85, or promethium-147, or to transfer* such products for use pursuant to paragraph (a) of this section, should apply for a license pursuant to § 32.22 of this chapter, which license states that the product may be transferred by the licensee to persons exempt from the regulations pursuant to paragraph (a) of this section or equivalent regulations of an Agreement State.

(c) The exemption in paragraph (a) of this section does not apply to tritium, krypton-85, or promethium-147 used in products primarily for frivolous purposes or in toys or adornments.

39 FR 6653

§ 30.20 Gas and aerosol detectors containing byproduct material.

(a) Except for persons who manufacture, process, produce, or initially transfer for sale or distribution* gas and aerosol detectors containing byproduct material,* any person is exempt from the requirements for a license set forth in section 81 of the Act and from the regulations in Parts 20 and 30-35* of this chapter to the extent that such person receives, possesses, uses, transfers,* owns, or acquires byproduct material in gas and aerosol detectors designed to protect life or property from fires and airborne hazards, and manufactured, processed, produced, or initially* transferred in accordance with a specific license issued pursuant to § 32.26 of this chapter, which license authorizes the initial transfer of the product for use under this section.

34 FR 6663

(b) Any person who desires to manufacture, process, or produce gas and aerosol detectors containing byproduct material, or to initially* transfer such products for use pursuant to paragraph (a) of this section, should apply for a license pursuant to § 32.26 of this chapter, which license states that the product may be initially* transferred by the licensee to persons exempt from the regulations pursuant to paragraph (a) of this section or equivalent regulations of an Agreement State.

LICENSES

§ 30.31 Types of licenses.

Licenses for byproduct material are of two types: General and specific. Specific licenses are issued to named persons upon applications filed pursuant to the regulations in this part and Parts 32-35.* General licenses are effective without the filing of applications with the Commission or the issuance of licensing documents to particular persons.

40 FR 8185

§ 30.32 Application for specific licenses.

(a) Applications for specific licenses should be filed in duplicate on Form NRC-313, "Application for Byproduct Material License," with the Director of Nuclear Material Safety and Safeguards, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555.

40 FR 50703

Applications may be filed in person at the Commission's offices at 1717 H Street, N.W., Washington, D.C., or 7920 Norfolk Avenue, Bethesda, Maryland. Information contained in previous applications, statements, or reports filed with the Commission or the Atomic Energy Commission may be incorporated by reference, provided that such references are clear and specific.

40 FR 8774

(b) The Commission may at any time after the filing of the original application, and before the expiration of the license, require further statements in order to enable the Commission to determine whether the application should be granted or denied or whether a license should be modified or revoked.

(c) Each application shall be signed by the applicant or licensee or a person duly authorized to act for and on his behalf.

(d) An application for license filed pursuant to the regulations in this part and Parts 32-35* will be considered also as an application for licenses authorizing other activities for which licenses are required by the Act, provided that the application specifies the additional activities for which licenses are requested and complies with regulations of the Commission as to applications for such licenses.

30 FR 8185

(e) Each application for a byproduct material license, other than a license exempted from Part 170 of this chapter, shall be accompanied by the fee prescribed in § 170.31 of this chapter. No fee will be required to accompany an application for renewal or amendment of a license, except as provided in § 170.31 of this chapter.

35 FR 145

(f) An application for a license to receive and possess byproduct material for commercial waste disposal by land burial or for the conduct of any other activity which the Commission determines will significantly affect the quality of the environment shall be filed at least 9 months prior to commencement of construction of the plant or facility in which the activity will be conducted and shall be accompanied by any Environmental Report required pursuant to Part 51** of this chapter.

37 FR 5745

§ 30.33 General requirements for issuance of specific licenses.

(a) An application for a specific license will be approved if:

(1) The application is for a purpose authorized by the Act;

(2) The applicant's proposed equipment and facilities are adequate to protect health and minimize danger to life or property;

(3) The applicant is qualified by training and experience to use the material for the purpose requested in such

30 FR 8185

* Amended 43 FR 6915.

** Amended 39 FR 26279.

manner as to protect health and minimize danger to life or property;

(4) The applicant satisfies any special requirements contained in Parts 32-35;* and

(5) In the case of an application for a license to receive and possess byproduct material for commercial waste disposal by land burial or for the conduct of any other activity which the Commission determines will significantly affect the quality of the environment, the Director of Nuclear Material Safety and Safeguards or his designee, before commencement of construction of the plan or facility in which the activity will be conducted, on the basis of information filed and evaluations made pursuant to Part 51** of this chapter, has concluded, after weighing the environmental, economic, technical, and other benefits against environmental costs and considering available alternatives, that the action called for is the issuance of the proposed license, with any appropriate conditions to protect environmental values. Commencement of construction prior to such conclusion may be grounds for denial of a license to receive and possess byproduct material in such plant or facility.

(b) Upon a determination that an application meets the requirements of the Act, and the regulations of the Commission, the Commission will issue a specific license authorizing the possession and use of byproduct material (Form NRC-374, "Byproduct Material License").

§ 30.34 Terms and conditions of licenses.

(a) Each license issued pursuant to the regulations in this part and the regulations in Parts 31-35* shall be subject to all the provisions of the Act, now or hereafter in effect, and to all valid rules, regulations and orders of the Commission.

(b) No license issued or granted pursuant to the regulations in this part and Parts 31-35,* nor any right under a license shall be transferred, assigned or in any manner disposed of, either voluntarily or involuntarily, directly or indirectly, through transfer of control of any license to any person, unless the Commission shall, after securing full information, find that the transfer is in accordance with the provisions of the Act and shall give its consent in writing.

(c) Each person licensed by the Commission pursuant to the regulations in this part and Parts 31-35* shall confine his possession and use of the byproduct material to the locations and purposes authorized in the license. Except as otherwise provided in the license, a license issued pursuant to the regulations in this part and Parts 31-35* of this chapter shall carry with it the right to receive, acquire, own, and possess,* byproduct material. Preparation for shipment and transport of byproduct material shall be in accordance with the provisions of Part 71 of this chapter.

(d) Each license issued pursuant to the regulations in this part and Parts 31-35* shall be deemed to contain the provisions set forth in section 183b.-d., inclusive, of the Act, whether or not these provisions are expressly set forth in the license.

(e) The Commission may incorporate, in any license issued pursuant to the regulations in this part and Parts 31-35,* at the time of issuance, or thereafter by appropriate rule, regulation or order, such additional requirements and conditions with respect to the licensee's receipt, possession, use and transfer of byproduct material as it deems appropriate or necessary in order to:

(1) Promote the common defense and security;

(2) Protect health or to minimize danger to life or property;

(3) Protect restricted data;

(4) Require such reports and the keeping of such records, and to provide for such inspections of activities under the license as may be necessary or appropriate to effectuate the purposes of the Act and regulations thereunder.

§ 30.35 [Deleted 40 FR 8774.]

§ 30.36 Expiration of licenses.

Except as provided in § 30.37(b), each specific license shall expire at the end of the day, in the month and year stated therein.

§ 30.37 Applications for renewal of licenses.

(a) Applications for renewal of a specific license shall be filed in accordance with § 30.32.

(b) In any case in which a licensee, not less than thirty (30) days prior to the expiration of his existing license, has filed an application in proper form for renewal or for a new license, such existing license shall not expire until the application has been finally determined by the Commission.

§ 30.38 Applications for amendment of licenses.

Applications for amendment of a license shall be filed in accordance with § 30.32 and shall specify the respects in which the licensee desires his license to be amended and the grounds for such amendment.

§ 30.39 Commission action on applications to renew or amend.

In considering an application by a licensee to renew or amend his license the Commission will apply the applicable criteria set forth in § 30.33 and Parts 32-35* of this chapter.

§ 30.41 Transfer of byproduct material.

(a) No licensee shall transfer byproduct material except as authorized pursuant to this section.

(b) Except as otherwise provided in his license and subject to the provisions of paragraphs (c) and (d) of this section, any licensee may transfer byproduct material:

(1) To the Administration,

(2) To the agency in any Agreement State which regulates radioactive material pursuant to an agreement under section 274 of the Act;

(3) To any person exempt from the licensing requirements of the Act and regulations in this part, to the extent permitted under such exemption;

(4) To any person in an Agreement State, subject to the jurisdiction of that State, who has been exempted from the licensing requirements and regulations of that State, to the extent permitted under such exemption;

(5) To any person authorized to receive such byproduct material under terms of a specific license or a general license or their equivalents issued by the Atomic Energy Commission, the Commission, or an Agreement State; or

(6) To a person abroad pursuant to an export license issued under Part 110 of this chapter;

(7) ‡ As otherwise authorized by the Commission in writing.

* Amended 43 FR 6915.

** Amended 39 FR 26279.

‡ Redesignated 43 FR 6915.

(c) Before transferring byproduct material to a specific licensee of the Commission or an Agreement State or to a general licensee who is required to register with the Commission or with an Agreement State prior to receipt of the byproduct material, the licensee transferring the material shall verify that the transferee's license authorizes the receipt of the type, form, and quantity of byproduct material to be transferred.

(d) The following methods for the verification required by paragraph (c) of this section are acceptable:

(1) The transferor may have in his possession, and read, a current copy of the transferee's specific license or registration certificate;

(2) The transferor may have in his possession a written certification by the transferee that he is authorized by license or registration certificate to receive the type, form, and quantity of byproduct material to be transferred, specifying the license or registration certificate number, issuing agency and expiration date;

(3) For emergency shipments the transferor may accept oral certification by the transferee that he is authorized by license or registration certificate to receive the type, form, and quantity of byproduct material to be transferred specifying the license or registration certificate number, issuing agency and expiration date: *Provided*, That the oral certification is confirmed in writing within 10 days;

(4) The transferor may obtain other sources of information compiled by a reporting service from official records of the Commission or the licensing agency of an Agreement State as to the identity of licensees and the scope and expiration dates of licenses and registration; or

(5) When none of the methods of verification described in paragraphs (d)(1) to (4) of this section are readily available or when a transferor desires to verify that information received by one of such methods is correct or up-to-date, the transferor may obtain and record confirmation from the Commission or the licensing agency of an Agreement State that the transferee is licensed to receive the byproduct material.

38 FR 33968

RECORDS, INSPECTIONS, TESTS, PROCEDURES, AND REPORTS†

§ 30.51 Records.

(a) Each person who receives byproduct material pursuant to a license issued pursuant to the regulations in this part and Parts 31-35* shall keep records showing the receipt, transfer,* and disposal of such byproduct material.

(b) Records which are required by the regulations in this part and Parts 31-35* or by license condition shall be maintained for the period specified by the appropriate regulation or license condition. If a retention period is not otherwise specified by regulation or license condition, such records shall be maintained until the Commission authorizes their disposition.

(c)(1) Records of receipt of byproduct material which must be maintained pursuant to paragraph (a) of this section shall be maintained as long as the licensee retains possession of the byproduct material and for two years following transfer,* or disposal of the byproduct material. (2) [Deleted 43 FR 6915.] (3) Records of transfer of byproduct material shall be maintained by the licensee who transferred the material for five years after such transfer. (4) Records of disposal of byproduct material shall be maintained in accordance with § 20.401 (c) of this chapter.

41 FR 18300

(d)(1) Records which must be maintained pursuant to this part and Parts 31-35* may be the original or a reproduced copy of microform if such reproduced copy or microform is duly authenticated by authorized personnel and the microform is capable of producing a clear and legible copy after storage for the period specified by Commission regulations.

(2) If there is a conflict between the Commission's regulations in this part and Parts 31-35,* license condition, or other written Commission approval or authorization pertaining to the retention period for the same type of record, the retention period specified in the regulations in this part and Parts 31-35* for such records shall apply unless the Commission, pursuant to § 30.11, has granted a specific exemption from the record retention requirements specified in the regulations in this part or Parts 31-35.*

30 FR 8185

§ 30.52 Inspections.

(a) Each licensee shall afford to the Commission at all reasonable times opportunity to inspect byproduct material and the premises and facilities wherein byproduct material is used or stored.

(b) Each licensee shall make available to the Commission for inspection, upon reasonable notice, records kept by him pursuant to the regulations in this chapter.

§ 30.53 Tests.

Each licensee shall perform, or permit the Commission to perform, such tests as the Commission deems appropriate or necessary for the administration of the regulations in this part and Parts 31-35,* including tests of:

(a) Byproduct material;

(b) Facilities wherein byproduct material is utilized or stored;

(c) Radiation detection and monitoring instruments; and

(d) Other equipment and devices used in connection with the utilization or storage of byproduct material.

37 FR 6135

§ 30.54 Control and accounting procedures for tritium.

(a) Except as specified in paragraph (b) of this section, each licensee who is authorized to possess at any one time and location more than 10,000 curies of tritium shall establish and maintain written material control and accounting procedures that are sufficient to enable the licensee to account for the tritium in his possession under specific license.

37 FR 9207

The written material control and accounting procedures shall be maintained as long as the licensee retains possession of the tritium and for two years following transfer* of the tritium.

41 FR 18300

(b) Written material control and accounting procedures are not required for (1) tritium produced or possessed within a production or utilization facility incidental to the operation of the facility; and * (2) tritium contained in spent fuel, other than tritium intentionally produced in or recovered from a production or utilization facility for any subsequent use.* (3) [Deleted 43 FR 6915.] (4) [Deleted 43 FR 6915.]

37 FR 9207

§ 30.55 Tritium reports.

(a) Except as specified in paragraph (d) of this section, each licensee who transfers or receives at any one time 1,000 curies or more of tritium shall complete and distribute a Nuclear Material Transaction‡ Report on Form NRC-741, in accordance with the printed instructions for completing the form. Each licensee who transfers such material

† Amended 37 FR 9207.

* Amended 43 FR 6915.

‡ Amended 38 FR 2330.

shall submit a completed copy of Form NRC-741 to the Commission and three copies to the receiver of the material promptly after the transfer takes place. Each licensee who receives such material shall submit a completed copy of Form NRC-741 to the Commission and to the shipper of the material within ten (10) days after the material is received. The Commission's copies of the report shall be submitted to the U.S. Energy Research and Development Administration, Post Office Box E, Oak Ridge, Tennessee 37830, and shall include the Reporting Identification Symbol (RIS) assigned by the Commission to the licensee.

(b) Except as specified in paragraph (d) and (e) of this section, each licensee who is authorized to possess at any one time and location more than 10,000 curies of tritium shall submit to the Commission within thirty (30) days after March 31 and September 30† of each year a statement of his tritium inventory to the nearest hundredth of a gram calculated as 10,000 curies per gram.

The reports shall be submitted to the U.S. Energy Research and Development Administration, Post Office Box E, Oak Ridge, Tennessee 37830, and shall include the Reporting Identification Symbol (RIS) assigned by the Commission to the licensee.

(c) Except as specified in paragraph (d) of this section, each licensee who is authorized to possess‡ tritium shall report promptly to the appropriate NRC Regional Office listed in Appendix D of Part 20 of this chapter by telephone and telegraph, mailgram, or facsimile any incident in which an attempt has been made or is believed to have been made to commit a theft or unlawful diversion of more than 10 curies of such material at any one time or more than 100 curies of such material in any one calendar year. The initial report shall be followed within a period of fifteen (15) days by a written report submitted to the appropriate NRC Regional Office which sets forth the details of the incident and its consequences. Copies of such written report shall be sent to the Director of Inspection and Enforcement, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555.

Subsequent to the submission of the written report required by this paragraph, the licensee shall promptly inform the Office of Inspection and Enforcement by means of a written report of any substantive additional information, which becomes available to the licensee, concerning an attempted or apparent theft or unlawful diversion of tritium.

(d) The reports described in this section are not required for tritium possessed pursuant to a general license provided in Part 31 of this chapter or for tritium contained in spent fuel.

(e) The reports described in paragraph (b) of this section are not required for (1) tritium produced or possessed within a production or utilization facility incidental to the operation of the facility, other than tritium intentionally produced by or recovered from a production or utilization facility for any subsequent use.‡ (2) [Deleted 43 FR 6915.] (3) [Deleted 43 FR 6915.]

ENFORCEMENT

§ 30.61 Modification and revocation of licenses.

(a) The terms and conditions of each license issued pursuant to the regulations in this part and Parts 31-35‡ shall be subject to amendment, revision or modification by reason of amendments to the Act, or by reason of rules, regulations and orders issued in accordance with the terms of the Act.

(b) Any license may be revoked, suspended or modified, in whole or in part, for any material false statement in the application or any statement of fact required under section 182 of the Act, or because of conditions revealed by such application or statement of fact or any report, record or inspection or other means which would warrant the Commission to refuse to grant a license on an original application, or for violation of, or failure to observe any of the terms and provisions of the Act or of any rule, regulation or order of the Commission.

(c) Except in cases of willfulness or those in which the public health, interest or safety requires otherwise, no license shall be modified, suspended or revoked unless, prior to the institution of proceedings therefor, facts or conduct which may warrent such action shall have been called to the attention of the licensee in writing and the licensee shall have been accorded an opportunity to demonstrate or achieve compliance with all lawful requirements.

§ 30.62 Right to cause the withholding or recall of byproduct materials.

The Commission may cause the withholding or recall of byproduct material from any licensee who is not equipped to observe or fails to observe such safety standards to protect health as may be established by the Commission, or who uses such materials in violation of law or regulation of the Commission, or in a manner other than as disclosed in the application therefor or approved by the Commission.

§ 30.63 Violations.

An injunction or other court order may be obtained prohibiting any violation of any provision of the Atomic Energy Act of 1954, as amended, or Title II of the Energy Reorganization Act of 1974, or any regulation or order issued thereunder. A court order may be obtained for the payment of a civil penalty imposed pursuant to section 234 of the Act for violation of sections 53, 57, 62, 63, 81, 82, 101, 103, 104, 107, or 109 of the Act, or section 206 of the Energy Reorganization Act of 1974, or any rule, regulation, or order issued thereunder, or any term, condition, or limitation of any license issued thereunder, or for any violation for which a license may be revoked under section 186 of the Act. Any person who willfully violates any provision of the Act or any regulation or order issued thereunder may be guilty of a crime and, upon conviction, may be punished by fine or imprisonment or both, as provided by law.

† Amended 42 FR 33265.

‡ Amended 43 FR 6915.

SCHEDULES

§ 30.70 Schedule A—Exempt concentrations.

30 FR 8185

Element (atomic number)	Isotope	Column I Gas concentration μCi/ml[1] †	Column II Liquid and solid concentration μCi/ml[2] †
Antimony (51)	Sb 122		3×10^{-3}
	Sb 124		2×10^{-4}
	Sb 125		1×10^{-3}
Argon (18)	A 37	1×10^{-3}	
	A 41	4×10^{-7}	
Arsenic (33)	As 73		5×10^{-3}
	As 74		5×10^{-4}
	As 76		2×10^{-4}
	As 77		8×10^{-4}
Barium (56)	Ba 131		2×10^{-3}
	Ba 140		3×10^{-4}
Beryllium (4)	Be 7		2×10^{-2}
Bismuth (83)	Bi 206		4×10^{-4}
Bromine (35)	Br 82	4×10^{-7}	3×10^{-3}
Cadmium (48)	Cd 109		2×10^{-3}
	Cd 115m		3×10^{-4}
	Cd 115		3×10^{-4}
Calcium (20)	Ca 45		9×10^{-5}
	Ca 47		5×10^{-4}
Carbon (6)	C 14	1×10^{-6}	8×10^{-3}
Cerium (58)	Ce 141		9×10^{-4}
	Ce 143		4×10^{-4}
	Ce 144		1×10^{-4}
Cesium (55)	Cs 131		2×10^{-2}
	Cs 134m		6×10^{-2}
	Cs 134		9×10^{-5}
Chlorine (17)	Cl 38	9×10^{-7}	4×10^{-3}
Chromium (24)	Cr 51		2×10^{-2}
Cobalt (27)	Co 57		5×10^{-3}
	Co 58		1×10^{-3}
	Co 60		5×10^{-4}
Copper (29)	Cu 64		3×10^{-3}
Dysprosium (66)	Dy 165		4×10^{-3}
	Dy 166		4×10^{-4}
Erbium (68)	Er 169		9×10^{-4}
	Er 171		1×10^{-3}
Europium (63)	Eu 152 (T/2=9.2 Hrs)		6×10^{-4}
	Eu 155		2×10^{-3}
Fluorine (9)	F 18	2×10^{-6}	8×10^{-3}
Gadolinium (64)	Gd 153		2×10^{-3}
	Gd 159		8×10^{-4}
Gallium (31)	Ga 72		4×10^{-4}
Germanium (32)	Ge 71		2×10^{-2}
Gold (79)	Au 196		2×10^{-3}
	Au 198		5×10^{-4}
	Au 199		2×10^{-3}
Hafnium (72)	Hf 181		7×10^{-4}
Hydrogen (1)	H 3	5×10^{-6}	3×10^{-2}
Indium (49)	In 113m		1×10^{-2}
	In 114m		2×10^{-4}
Iodine (53)	I 126	3×10^{-9}	2×10^{-5}
	I 131	3×10^{-9}	2×10^{-5}
	I 132	8×10^{-8}	6×10^{-4}
	I 133	1×10^{-8}	7×10^{-5}
	I 134	2×10^{-7}	1×10^{-3}
Iridium (77)	Ir 190		2×10^{-3}
	Ir 192		4×10^{-4}
	Ir 194		3×10^{-4}
Iron (26)	Fe 55		8×10^{-3}
	Fe 59		6×10^{-4}
Krypton (36)	Kr 85m	1×10^{-6}	
	Kr 85	3×10^{-6}	
Lanthanum (57)	La 140		2×10^{-4}
Lead (82)	Pb 203		4×10^{-3}
Lutetium (71)	Lu 177		1×10^{-3}
Manganese (25)	Mn 52		3×10^{-4}
	Mn 54		1×10^{-3}
	Mn 56		1×10^{-3}
Mercury (80)	Hg 197m		2×10^{-3}
	Hg 197		3×10^{-3}
	Hg 203		2×10^{-4}
Molybdenum (42)	Mo 99		2×10^{-3}
Neodymium (60)	Nd 147		6×10^{-4}
	Nd 149		3×10^{-3}
Nickel (28)	Ni 65		1×10^{-3}
Niobium (Columbium) (41)	Nb 95		1×10^{-3}
	Nb 97		9×10^{-3}
Osmium (76)	Os 185		7×10^{-4}
	Os 191m		3×10^{-2}
	Os 191		2×10^{-3}
	Os 193		6×10^{-4}
Palladium (46)	Pd 103		3×10^{-3}
	Pd 109		9×10^{-4}
Phosphorus (15)	P 32		2×10^{-4}
Platinum (78)	Pt 191		3×10^{-3}
	Pt 193m		1×10^{-2}
	Pt 197m		1×10^{-2}
	Pt 197		1×10^{-3}
Potassium (19)	K 42		3×10^{-3}
Praseodymium (59)	Pr 142		3×10^{-4}
	Pr 143		5×10^{-6}
Promethium (61)	Pm 147		2×10^{-3}
	Pm 149		4×10^{-4}
Rhenium (75)	Re 183		6×10^{-3}
	Re 186		9×10^{-4}
	Re 188		6×10^{-4}

30 FR 8185

[1] Values are given only for those materials normally used as gases.

[2] μCi/gm for solids.

† Amended 38 FR 29314.

Element (atomic number)	Isotope	Column I Gas concentration μCi/ml[1] †	Column II Liquid and solid concentration μCi/ml[2] †
Rhodium (45)	Rh 103m		1×10^{-1}
	Rh 105		1×10^{-3}
Rubidium (37)	Rb 86		7×10^{-4}
Ruthenium (44)	Ru 97		4×10^{-3}
	Ru 103		8×10^{-4}
	Ru 105		1×10^{-3}
	Ru 106		1×10^{-4}
Samarium (62)	Sm 153		8×10^{-4}
Scandium (21)	Sc 46		4×10^{-4}
	Sc 47		9×10^{-4}
	Sc 48		3×10^{-4}
Selenium (34)	Se 75		3×10^{-3}
Silicon (14)	Si 31		9×10^{-3}
Silver (47)	Ag 105		1×10^{-3}
	Ag 110m		3×10^{-4}
	Ag 111		4×10^{-4}
Sodium (11)	Na 24		2×10^{-3}
Strontium (38)	Sr 85*		1×10^{-3}
	Sr 89		1×10^{-4}
	Sr 91		7×10^{-4}
	Sr 92		7×10^{-4}
Sulfur (16)	S 35	9×10^{-8}	6×10^{-4}
Tantalum (73)	Ta 182		4×10^{-4}
Technetium (43)	Tc 96m		1×10^{-1}
	Tc 96		1×10^{-3}
Tellurium (52)	Te 125m		2×10^{-3}
	Te 127m		6×10^{-4}
	Te 127		3×10^{-3}
	Te 129m		3×10^{-4}
	Te 131m		6×10^{-4}
	Te 132		3×10^{-4}
Terbium (65)	Tb 160		4×10^{-4}
Thallium (81)	Tl 200		4×10^{-3}
	Tl 201		3×10^{-3}
	Tl 202		1×10^{-3}
	Tl 204		1×10^{-3}
Thulium (69)	Tm 170		5×10^{-4}
	Tm 171		5×10^{-3}
Tin (50)	Sn 113		9×10^{-4}
	Sn 125		2×10^{-4}
Tungsten (Wolfram) (74)	W 181		4×10^{-3}
	W 187		7×10^{-4}
Vanadium (23)	V 48		3×10^{-4}
Xenon (54)	Xe 131m	4×10^{-6}	
	Xe 133	3×10^{-6}	
	Xe 135	1×10^{-6}	
Ytterbium (70)	Yb 175		1×10^{-3}
Yttrium (39)	Y 90		2×10^{-4}
	Y 91m		3×10^{-2}
	Y 91		3×10^{-4}
	Y 92		6×10^{-4}
	Y 93		3×10^{-4}
Zinc (30)	Zn 65		1×10^{-3}
	Zn 69m		7×10^{-4}
	Zn 69		2×10^{-2}
Zirconium (40)	Zr 95		6×10^{-4}
	Zr 97		2×10^{-4}
Beta and/or gamma emitting byproduct material not listed above with half-life less than 3 years.		1×10^{-10}	1×10^{-6}

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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 § 30.14 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:

$$\frac{\text{Concentration of Isotope A in Product}}{\text{Exempt concentration of Isotope A}} + \frac{\text{Concentration of Isotope B in Product}}{\text{Exempt concentration of Isotope B}} \leq 1$$

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§ 30.71 Schedule B.

Byproduct material	*Microcuries*
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 131 (Cs 131)	1,000

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[1] Values are given only for those materials normally used as gases.

[2] μCi/g for solids.

† Amended 38 FR 29314.

** Added 36 FR 16898.

* Added 38 FR 3982.

Byproduct material	*Microcuries*
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 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 9.2h (Eu 152 9.2h)	100
Europium 152 13 yr (Eu 152 13 yr)	1
Europium 154 (Eu 154)	1
Europium 155 (Eu 155)	10
Fluorine 18 (F 18)	1,000
Gadolinium 153 (Gd 153)	10
Gadolinium 159 (Gd 159)	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 113m (In 113m)	100
Indium 114m (In 114m)	10
Indium 115m (In 115m)	100
Indium 115 (In 115)	10
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 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
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
Phosphorous 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
Praseodymium 142 (Pr 142)	100
Praseodymium 143 (Pr 143)	100
Promethium 147 (Pm 147)	10
Promethium 149 (Pm 149)	10
Rhenium 186 (Re 186)	100
Rhenium 188 (Re 188)	100
Rhodium 103m (Rh 103m)	100
Rhodium 105 (Rh 105)	100
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 (Sc 75)	10
Silicon 31 (Si 31)	100
Silver 105 (Ag 105)	10
Silver 110m (Ag 110m)	1
Silver 111 (Ag 111)	100
Sodium 24 (Na 24)	10
Strontium 85 (Sr 85)	10
Strontium 89 (Sr 89)	1
Strontium 90 (Sr 90)	0.1
Strontium 91 (Sr 91)	10
Strontium 92 (Sr 92)	10
Sulfur 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 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 byproduct material not listed above other than alpha emitting byproduct material	0.1

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NOTE.—The reporting and record keeping requirements contained in this part have been approved by the General Accounting Office under B-180225 (R0079), (R0089), and (R0173).

PART 34 LICENSES FOR RADIOGRAPHY AND RADIATION SAFETY REQUIREMENTS FOR RADIOGRAPHIC OPERATIONS

Sec.

Authority: Secs. 81, 161, 182, 183, 68 Stat. 935, 948, 953, 954, as amended; 42 U.S.C. 2111, 2201, 2232, 2233. For the purposes of sec. 223, 68 Stat. 958, as amended, 42 U.S.C. 2273, §§ 34.11(d), 34.25(c), 34.26, 34.27, 34.28(b), 34.29(c), 34.31(c), 34.33(b), 34.33(e), and 34.43(c) issued under sec. 161o, 68 Stat. 950, as amended, 42 U.S.C. 2201(o), unless otherwise noted.

§ 34.1 Purpose and scope.

This part prescribes requirements for the issuance of licenses for the use of sealed sources containing byproduct material and radiation safety requirements for persons using such sealed sources in radiography. The provisions and requirements of this part are in addition to, and not in substitution for, other requirements of this chapter. In particular, the provisions of Part 30 of this chapter apply to applications and licenses subject to this part. Nothing in this part shall apply to uses of byproduct material for medical diagnosis or therapy.

[30 FR 8185]

§ 34.2 Definitions.

As used in this part:

(a) "Radiography" means the examination of the structure of materials by nondestructive methods, utilizing sealed sources of byproduct materials;

(b) "Radiographer" means any individual who performs or who, in attendance at the site where the sealed source or sources are being used, personally supervises radiographic operations and who is responsible to the licensee for assuring compliance with the requirements of the Commission's regulations and the conditions of the license;

(c) "Radiographer's assistant" means any individual who, under the personal supervision of a radiographer, uses radiographic exposure devices, sealed sources or related handling tools, or radiation survey instruments in radiography;

(d) "Radiographic exposure device" means any instrument containing a sealed source fastened or contained therein, in which the sealed source or shielding thereof may be moved, or otherwise changed, from a shielded to unshielded position for purposes of making a radiographic exposure;

[30 FR 8185]

(e) "Sealed source" means any byproduct material that is encased in a capsule designed to prevent leakage or escape of the byproduct material;

(f) "Storage container" means a device in which sealed sources are transported or stored.

[44 FR 50805]

(g) "Source changer" means a device designed and used for replacement of sealed sources in radiographic exposure devices, including those also used for transporting and storage of sealed sources;

(h) "Permanent radiographic installation" means a shielded installation or structure designed or intended for radiography and in which radiography is regularly performed.

[49 FR 2792]

§ 34.3 Applications for specific licenses.

A person may file an application for specific license for use of sealed sources in radiography in duplicate on NRC Form 313, "Application for Material License," in accordance with the provisions of § 30.32 of this chapter.

[49 FR 19623]

§ 34.6 Information collection requirements: OMB approval.

(a) The Nuclear Regulatory Commission has submitted the information collection requirements contained in this part to the Office of Management and Budget (OMB) for approval as required by the Paperwork Reduction Act of 1980 (44 U.S.C. 3501 et seq.). OMB has approved the information collection requirements contained in this part under control number 3150-0007.

(b) The approved information collection requirements contained in this part appear in §§ 34.11, 34.24, 34.25, 34.26, 34.27, 34.28, 34.29, 34.31, 34.32, 34.33, and 34.43.

49 FR 19623

(c) This part contains information collection requirements in addition to those approved under the control number specified in paragraph (a) of this section. These information collection requirements and the control numbers under which they are approved are as follows:

(1) In § 34.3, Form NRC–313R is approved under control number 3150–0023.

Subpart A—Specific Licensing Requirements

§ 34.11 Issuance of specific licenses for use of sealed sources in radiography.

An application for a specific license for use of sealed sources in radiography will be approved if:

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

(b) The applicant will have an adequate program for training radiographers and radiographers' assistants and submits to the Commission a schedule or description of such program which specifies the:

(1) Initial training;

(2) Periodic training;

(3) On-the-job training;

(4) Means to be used by the licensee to determine the radiographer's knowledge and understanding of and ability to comply with Commission regulations and licensing requirements, and the operating and emergency procedures of the applicant; and

(5) Means to be used by the licensee to determine the radiographer's assistant's knowledge and understanding of and ability to comply with the operating and emergency procedures of the applicant;

(c) The applicant has established and submits to the Commission satisfactory written operating and emergency procedures as described in §34.32;

30 FR 8185

44 FR 50805

(d) The applicant will have an internal inspection system adequate to assure that Commission regulations, Commission license provisions, and the applicant's operating and emergency procedures are followed by radiographers and radiographers assistants; the inspection system shall include the performance of internal inspections at intervals not to exceed three months and the retention of records of such inspections for two years;

(e) The applicant submits a description of its over-all organizational structure pertaining to the radiography program, including specified delegations of authority and responsibility for operation of the program; and

(f) The applicant who desires to conduct his own leak tests has established adequate procedures to be followed in leak testing sealed sources, for possible leakage and contamination and submits to the Commission a description of such procedures including:

(1) Instrumentation to be used;

(2) Method of performing test, e.g., points on equipment to be smeared and method of taking smear; and

(3) Pertinent experience of the person who will perform the test.

Subpart B—Radiation Safety Requirements

EQUIPMENT CONTROL

30 FR 8185

§ 34.21 Limits on levels of radiation for radiographic exposure devices and storage containers.

Radiographic exposure devices measuring less than four (4) inches from the sealed source storage position to any exterior surface of the device shall have no radiation level in excess of 50 milliroentgens per hour at six (6) inches from any exterior surface of the device. Radiographic exposure devices measuring a minimum of four (4) inches from the sealed source storage position to any exterior surface of the device, and all storage containers for sealed sources or for radiographic exposure devices, shall have no radiation level in excess of 200 milliroentgens per hour at any exterior surface, and ten (10) milliroentgens per hour at one meter from any exterior surface. The radiation levels specified are with the sealed source in the shielded (i.e., "off") position.

44 FR 50805

§ 34.22 Locking of radiographic exposure devices, storage containers, and source changers.

(a) Each radiographic exposure device shall have a lock or outer locked container designed to prevent unauthorized or accidental removal of the sealed source from its shielded position. The exposure device or its container shall be kept locked when not under the direct surveillance of a radiographer or a radiographer's assistant or as otherwise may be authorized in § 34.41. In addition, during radiographic operations the sealed source assembly shall be secured in the shielded position each time the source is returned to that position.

(b) Each sealed source storage container and source changer shall have a lock or outer locked container designed to prevent unauthorized or accidental removal of the sealed source from its shielded position. Storage containers and source changers shall be kept locked when containing sealed sources except when under the direct surveillance of a radiographer or a radiographer's assistant.

44 FR 50805

§ 34.23 Storage precautions.

Locked radiographic exposure devices and storage containers shall be physically secured to prevent tampering or removal by unauthorized personnel.

§ 34.24 Radiation survey instruments.

The licensee shall maintain sufficient calibrated and operable radiation survey instruments to make physical radiation surveys as required by this part and Part 20 of this chapter.

41 FR 18300

Each radiation survey instrument shall be calibrated at intervals not to exceed three months and after each instrument servicing and a record shall be maintained of the results of each instrument calibration and date thereof for two years after the date of calibration.

Instrumentation required by this section shall have a range such that two milliroentgens per hour through one roentgen per hour can be measured.

30 FR 8185

§ 34.25 Leak testing, repair, tagging, opening, modification and replacement of sealed sources.

(a) The replacement of any sealed source fastened to or contained in a radiographic exposure device and leak testing, repair, tagging, opening or any other modification of any sealed source shall be performed only by persons specifically authorized by the Commission to do so.

(b) Each sealed source shall be tested for leakage at intervals not to exceed 6 months. In the absence of a certificate from a transferor that a test has been made within the 6 months prior to the transfer, the sealed source shall not be put into use until tested.

(c) The leak test shall be capable of detecting the presence of 0.005 microcurie of removable contamination on the sealed source. An acceptable leak test for sealed sources in the possession of a radiography licensee would be to test at the nearest accessible point to the sealed source storage position, or other appropriate measuring point, by a procedure to be approved pursuant to §34.11(f).

[30 FR 8185]

Records of leak test results shall be kept in units of microcuries and maintained for inspection by the Commission for six months after the next required leak test is performed or until the sealed source is transferred or disposed of.

[41 FR 18300]

(d) Any test conducted pursuant to paragraphs (b) and (c) of this section which reveals the presence of 0.005 microcurie or more of removable radioactive material shall be considered evidence that the sealed source is leaking. The licensee shall immediately withdraw the equipment involved from use and shall cause it to be decontaminated and repaired or to be disposed of, in accordance with Commission regulations. A report shall be filed, within 5 days of the test, with the Director of Nuclear Material Safety and Safeguards, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555, describing the equipment involved, the test results, and the corrective action taken. A copy of such report shall be sent to the Director of the appropriate Nuclear Regulatory Commission's Inspection and Enforcement Regional Office listed in Appendix D of Part 20 of this chapter "Standards for Protection Against Radiation."

(e) A sealed source which is not fastened to or contained in a radiographic exposure device shall have permanently attached to it a durable tag at least one (1) inch square bearing the prescribed radiation caution symbol in conventional colors, magenta or purple on a yellow background, and at least the instructions: "Danger–Radioactive Material–Do Not Handle–Notify Civil Authorities if Found."

[30 FR 8185]

§ 34.26 Quarterly inventory.

Each licensee shall conduct a quarterly physical inventory to account for all sealed sources received and possessed under his license. The records of the inventories shall be maintained for two years from the date of the inventory for inspection by the Commission, and shall include the quantities and kinds of byproduct material, location of sealed sources, and the date of the inventory.

[41 FR 18300]

§ 34.27 Utilization logs.

Each licensee shall maintain current logs, which shall be kept available for two years from the date of the recorded event, for inspection by the Commission, at the address specified in the license, showing for each sealed source the following information:

[30 FR 8185]

(a) A description (or make and model number) of the radiographic exposure device or storage container in which the sealed source is located.

(b) The identity of the radiographer to whom assigned, and

(c) The plant or site where used and dates of use.

[44 FR 50805]

§ 34.28 Inspection and maintenance of radiographic exposure devices, storage containers, and source changers.

(a) The licensee shall check for obvious defects in radiographic exposure devices, storage containers, and source changers prior to use each day the equipment is used.

(b) The licensee shall conduct a program for inspection and maintenance of radiographic exposure devices, storage containers, and source changers at intervals not to exceed three months or prior to the first use thereafter to assure proper functioning of components important to safety. Records of these inspections and maintenance shall be kept for two years.

§ 34.29 Permanent radiographic installations.

(a) Permanent radiographic installations having high radiation area entrance controls of the types described in § 20.203(c) (2)(ii), (2)(iii), or (4) shall also meet the following special requirement.

(b) Each entrance that is used for personnel access to the high radiation area in a permanent radiographic installation to which this section applies shall have both visible and audible warning signals to warn of the presence of radiation. The visible signal shall be actuated by radiation whenever the source is exposed. The audible signal shall be actuated when an attempt is made to enter the installation while the source is exposed.

(c) The alarm system shall be tested at intervals not to exceed three months or prior to the first use thereafter of the source in the installation. Records of the tests shall be kept for two years.

PERSONAL RADIATION SAFETY REQUIREMENTS FOR RADIOGRAPHERS AND RADIOGRAPHERS' ASSISTANTS

§ 34.31 Training.

(a) The licensee shall not permit any individual to act as a radiographer until such individual:

(1) Has been instructed in the subjects outlined in Appendix A of this part;

(2) Has received copies of and instruction in NRC regulations contained in this part and in the applicable sections of Parts 19 and 20 of this chapter, NRC license(s) under which the radiographer will perform radiography, and the licensee's operating and emergency procedures;

(3) Has demonstrated competence to use the licensee's radiographic exposure devices, sealed sources, related handling tools, and survey instruments; and

(4) Has demonstrated understanding of the instructions in this paragraph (a) by successful completion of a written test and a field examination on the subjects covered.

[44 FR 50805]

(b) The licensee shall not permit any individual to act as a radiographer's assistant until such individual:

(1) Has received copies of and instruction in the licensee's operating and emergency procedures;

(2) Has demonstrated competence to use, under the personal supervision of the radiographer, the radiographic exposure devices, sealed sources, related handling tools, and radiation survey instruments that the assistant will use; and

(3) Has demonstrated understanding of the instructions in this paragraph (b) by successfully completing a written or oral test and a field examination on the subjects covered.

(c) Records of the above training, including copies of written tests and dates of oral tests and field examinations, shall be maintained for three years.

§ 34.32 Operating and emergency procedures.

The licensee's operating and emergency procedures shall include instructions in at least the following:

(a) The handling and use of licensed sealed sources and radiographic exposure devices to be employed such that no person is likely to be exposed to radiation doses in excess of the limits established in Part 20 of this chapter "Standards for Protection Against Radiation".

(b) Methods and occasions for conducting radiation surveys;

(c) Methods for controlling access to radiographic areas;

(d) Methods and occasions for locking and securing radiographic exposure devices, storage containers and sealed sources;

(e) Personnel monitoring and the use of personnel monitoring equipment;

(f) Transporting sealed sources to field locations, including packing of radiographic exposure devices and storage containers in the vehicles, posting of vehicles and control of the sealed sources during transportation;

(g) Minimizing exposure of persons in the event of an accident;

(h) The procedure for notifying proper persons in the event of an accident; and

(i) Maintenance of records.

(j) The inspection and maintenance of radiographic exposure devices and storage containers.

(k) Steps that must be taken immediately by radiography personnel in the event a pocket dosimeter is found to be off-scale.

(l) The procedure(s) for identifying and reporting defects and noncompliance, as required by Part 21 of this chapter.

§ 34.33 Personnel monitoring.

(a) The licensee shall not permit any individual to act as a radiographer or a radiographer's assistant unless, at all times during radiographic operations, each such individual wears a direct reading pocket dosimeter and either a film badge or a thermoluminescent dosimeter (TLD). Pocket dosimeters shall have a range from zero to at least 200 milliroentgens and shall be recharged at the start of each shift. Each film badge and TLD shall be assigned to and worn by only one individual.

(b) Pocket dosimeters shall be read and exposures recorded daily.

(c) Pocket dosimeters shall be checked at periods not to exceed one year for correct response to radiation. Acceptable dosimeters shall read within plus or minus 30 percent of the true radiation exposure.

(d) If an individual's pocket dosimeter is discharged beyond its range, his film badge or TLD shall be immediately sent for processing.

(e) Reports received from the film badge or TLD processor shall be kept for inspection until the Commission authorizes their disposal. Records of daily pocket dosimeter readings shall be kept for two years.

PRECAUTIONARY PROCEDURES IN RADIOGRAPHIC OPERATIONS

§ 34.41 Security.

During each radiographic operation the radiographer or radiographer's assistant shall maintain a direct surveillance of the operation to protect against unauthorized entry into a high radiation area, as defined in Part 20 of this chapter, except (a) where the high radiation area is equipped with a control device or an alarm system as described in § 20.203(c)(2) of this chapter, or (b) where the high radiation area is locked to protect against unauthorized or accidental entry.

§ 34.42 Posting.

Notwithstanding any provisions in § 20.204(c) of this chapter, areas in which radiography is being performed shall be conspicuously posted as required by § 20.203(b) and (c)(5) of this chapter.

§ 34.43 Radiation surveys.

(a) At least one calibrated and operable radiation survey instrument shall be available at the location of radiographic operations whenever radiographic operations are being performed.

(b) A survey with a radiation survey instrument shall be made after each radiographic exposure to determine that the sealed source has been returned to its shielded position. The entire circumference of the radiographic exposure device shall be surveyed. If the radiographic exposure device has a source guide tube, the survey shall include the guide tube.

(c) A record of the survey required in paragraph (b) shall be maintained for two years when the survey is the last survey prior to locking the radiographic exposure device and ending direct surveillance of the operation.

§ 34.44 Supervision of radiographers' assistants.

Whenever a radiographer's assistant uses radiographic exposure devices, uses sealed sources or related source handling tools, or conducts radiation surveys required by § 34.43(b) to determine that the sealed source has returned to the shielded position after an exposure, he shall be under the personal supervision of a radiographer. The personal supervision shall include (a) the radiographer's personal presence at the site where the sealed sources are being used, (b) the ability of the radiographer to give immediate assistance if required, and (c) the radiographer's watching the assistant's performance of the operations referred to in this section.

EXEMPTIONS

§ 34.51 Applications for exemptions.

The Commission may, upon application by any licensee or upon its own initiative, grant such exemptions from the requirements of the regulations in this part as it determines are authorized by law and will not result in undue hazard to life or property.

Appendix A

I. Fundamentals of Radiation Safety

A. Characteristics of gamma radiation.
B. Units of radiation dose (mrem) and quantity of radioactivity (curie).
C. Hazards of exposure to radiation.
D. Levels of radiation from licensed material.
E. Methods of controlling radiation dose:
1. Working time.
2. Working distances.
3. Shielding.

II. Radiation Detection Instrumentation To Be Used

A. Use of radiation survey instruments:
1. Operation.
2. Calibration.
3. Limitations.
B. Survey techniques.
C. Use of personnel monitoring equipment:
1. Film badges and thermoluminescent dosimeters (TLD's).
2. Pocket dosimeters.

III. Radiographic Equipment To Be Used

A. Remote handling equipment.
B. Radiographic exposure devices.
C. Storage containers.

IV. Inspection and Maintenance Performed by the Radiographers

V. Case Histories of Radiography Accidents

NOTE.—The reporting and record keeping requirements contained in this part have been approved by the General Accounting Office under B-180225 (R0052), (R0335).