

APPLICATION FOR BYPRODUCT MATERIAL LICENSE
INDUSTRIAL

X a. NEW LICENSE

b. AMENDMENT TO:
LICENSE NUMBER

c. RENEWAL OF:
LICENSE NUMBER

19346

See attached instructions for details.

Completed applications are filed in duplicate with the Division of Fuel Cycle and Material Safety, Office of Nuclear Material Safety, and Safeguards, U.S. Nuclear Regulatory Commission, Washington, DC 20555 or applications may be filed in person at the Commission's office at 1717 H Street, NW, Washington, D. C. or 7915 Eastern Avenue, Silver Spring, Maryland.

2. APPLICANT'S NAME (Institution, firm, person, etc.)

University of Alaska, Anchorage

TELEPHONE NUMBER: AREA CODE - NUMBER EXTENSION
907-263-1410

3. NAME OF PERSON TO BE CONTACTED REGARDING THIS APPLICATION

Dr. Kristine Mann

03620

TELEPHONE NUMBER: AREA CODE - NUMBER EXTENSION
907-263-1237

30-17465

4. APPLICANT'S MAILING ADDRESS (Include Zip Code)

Biology Department
University of Alaska, Anchorage
3221 Providence Drive
Anchorage, AK 99504

5. STREET ADDRESS WHERE LICENSED MATERIAL WILL BE USED

Health Occupational Facility
University of Alaska, Anchorage
3221 Providence Drive
Anchorage, AK 99504

(IF MORE SPACE IS NEEDED FOR ANY ITEM, USE ADDITIONAL PROPERLY KEYED PAGES.)

6. INDIVIDUAL(S) WHO WILL USE OR DIRECTLY SUPERVISE THE USE OF LICENSED MATERIAL

(See Items 16 and 17 for required training and experience of each individual named below)

FULL NAME

TITLE

a. Dr. Kristine Mann

Assistant Professor, Biology

b. Dr. John Kennish

Assistant Professor, Chemistry

c.

7. RADIATION PROTECTION OFFICER

Dr. Kristine Mann

Attach a resume of person's training and experience as outlined in Items 16 and 17 and describe his responsibilities under Item 15.

8. LICENSED MATERIAL

L I N E	ELEMENT AND MASS NUMBER	CHEMICAL AND/OR PHYSICAL FORM	NAME OF MANUFACTURER AND MODEL NUMBER (If Sealed Source)	MAXIMUM NUMBER OF MILLCURIES AND/OR SEALED SOURCES AND MAXIMUM ACTI- VITY PER SOURCE WHICH WILL BE POSSESSED AT ANY ONE TIME
NO.	A	B	C	D
(1)	^3H	Any	Not Applicable	50 millicuries
(2)	^{14}C	Any	N.A.	50 millicuries
(3)	^{32}P	Any	N.A.	25 millicuries
(4)	^{35}S	Any	N.A.	20 millicuries

DESCRIBE USE OF LICENSED MATERIAL
E

- (1) All of the above will be used for the following: biochemical tracer studies in
- (2) cells and laboratory animals, analytical technique development, instrument
- (3) calibration, and student instruction.

(4)

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9. STORAGE OF SEALED SOURCES

LINE NO.	CONTAINER AND/OR DEVICE IN WHICH EACH SEALED SOURCE WILL BE STORED OR USED. A.	NAME OF MANUFACTURER B.	MODEL NUMBER C.
(1)	Not Applicable		
(2)			
(3)			
(4)			

10. RADIATION DETECTION INSTRUMENTS

LINE NO.	TYPE OF INSTRUMENT A	MANUFACTURER'S NAME B	MODEL NUMBER C	NUMBER AVAILABLE D	RADIATION DETECTED (alpha, beta, gamma, neutron) E	SENSITIVITY RANGE (milliroentgens/hour or counts/minute) F
(1)	Beta survey meter	Mini Instruments	5.10E	1	beta, alpha	.05 mr/hr
(2)	Liquid scintillation counter	Beckman	LS-7000	1	beta	40 cpm
(3)	³ H will be monitored by using wipes and counting in the liquid scintillation counter).					
(4)						

11. CALIBRATION OF INSTRUMENTS LISTED IN ITEM 10

☐ a. CALIBRATED BY SERVICE COMPANY

NAME, ADDRESS, AND FREQUENCY

☒ b. CALIBRATED BY APPLICANT

Attach a separate sheet describing method, frequency and standards used for calibrating instruments.

See attached sheet.

12. PERSONNEL MONITORING DEVICES

TYPE (Check and/or complete as appropriate.) A	SUPPLIER (Service Company) B	EXCHANGE FREQUENCY C
<input type="checkbox"/> (1) FILM BADGE		<input type="checkbox"/> MONTHLY
<input type="checkbox"/> (2) THERMOLUMINESCENCE DOSIMETER (TLD)		<input type="checkbox"/> QUARTERLY
<input type="checkbox"/> (3) OTHER (Specify): None		<input type="checkbox"/> OTHER (Specify):

13. FACILITIES AND EQUIPMENT (Check where appropriate and attach annotated sketch(es) and description(s).)

- ☒ a. LABORATORY FACILITIES, PLANT FACILITIES, FUME HOODS (Include filtration, if any), ETC.
- ☒ b. STORAGE FACILITIES, CONTAINERS, SPECIAL SHIELDING (fixed and/or temporary), ETC.
- ☐ c. REMOTE HANDLING TOOLS OR EQUIPMENT, ETC.
- ☐ d. RESPIRATORY PROTECTIVE EQUIPMENT, ETC.

See attached sheet.

14. WASTE DISPOSAL

a. NAME OF COMMERCIAL WASTE DISPOSAL SERVICE EMPLOYED

b. IF COMMERCIAL WASTE DISPOSAL SERVICE IS NOT EMPLOYED, SUBMIT A DETAILED DESCRIPTION OF METHODS WHICH WILL BE USED FOR DISPOSING OF RADIOACTIVE WASTES AND ESTIMATES OF THE TYPE AND AMOUNT OF ACTIVITY INVOLVED. IF THE APPLICATION IS FOR SEALED SOURCES AND DEVICES AND THEY WILL BE RETURNED TO THE MANUFACTURER, SO STATE.

See attached sheet.

INFORMATION REQUIRED FOR ITEMS 15, 16 AND 17

Describe in detail the information required for Items 15, 16 and 17. Begin each item on a separate page and key to the application as follows:

15. RADIATION PROTECTION PROGRAM. Describe the radiation protection program as appropriate for the material to be used including the duties and responsibilities of the Radiation Protection Officer, control measures, bioassay procedures (if needed), day-to-day general safety instruction to be followed, etc. If the application is for sealed source's also submit leak testing procedures, or if leak testing will be performed using a leak test kit, specify manufacturer and model number of the leak test kit.
16. FORMAL TRAINING IN RADIATION SAFETY. Attach a resume for each individual named in Items 6 and 7. Describe individual's formal training in the following areas where applicable. Include the name of person or institution providing the training, duration of training, when training was received, etc.
 - a. Principles and practices of radiation protection.
 - b. Radioactivity measurement standardization and monitoring techniques and instruments.
 - c. Mathematics and calculations basic to the use and measurement of radioactivity.
 - d. Biological effects of radiation.
17. EXPERIENCE. Attach a resume for each individual named in Items 6 and 7. Describe individual's work experience with radiation, including where experience was obtained. Work experience or on-the-job training should be commensurate with the proposed use. Include list of radioisotopes and maximum activity of each used.

18. CERTIFICATE

(This item must be completed by applicant)

The applicant and any official executing this certificate on behalf of the applicant named in Item 2, certify that this application is prepared in conformity with Title 10, Code of Federal Regulations, Part 30, and that all information contained herein, including any supplements attached hereto, is true and correct to the best of our knowledge and belief.

WARNING.—18 U.S.C., Section 1001; Act of June 25, 1948; 62 Stat. 749; makes it a criminal offense to make a willfully false statement or representation to any department or agency of the United States as to any matter within its jurisdiction.

a. LICENSE FEE REQUIRED
(See Section 170.31, 10 CFR 170)

Not Applicable

b. CERTIFYING OFFICIAL (Signature)

c. NAME (Type or print)

d. TITLE

e. DATE

(1) LICENSE FEE CATEGORY:

(2) LICENSE FEE ENCLOSED: \$

3-25-80.

Item 11: Calibration of Instruments.

- a). Survey meter: Arrangements have been made with the University of Alaska, Fairbanks, for calibration of the survey meter, once/year. Please refer to their license for details of their calibration equipment and procedures.

Dr. D.F. Holleman
Institute of Arctic Biology
University of Alaska, Fairbanks
Fairbanks, AK 99701

- b). Liquid scintillation counter: The liquid scintillation counter will be calibrated once/year by use of standardized solutions of the appropriate radioisotopes obtained from commercial vendors (New England Nuclear or Amersham).

Item 13: Facilities and Equipment.

The Research Laboratory is a laboratory with controlled access where radioisotopes will be received, packages inspected, and dilutions made. The radioisotopes will be used mainly in the Research Laboratory and the Preparatory Room, but occasionally in the other laboratories and in the cold room. They will be stored in Laboratory A or B in either the fume hood, refrigerator, or freezer, whichever is appropriate to the compound in question. The ^{32}P will be stored in a lead container and handled whenever possible behind plexiglass. The radioactive waste material will be monitored and controlled.

Please refer to the sketch of the laboratories on the next page.

Item 14: Waste Disposal.

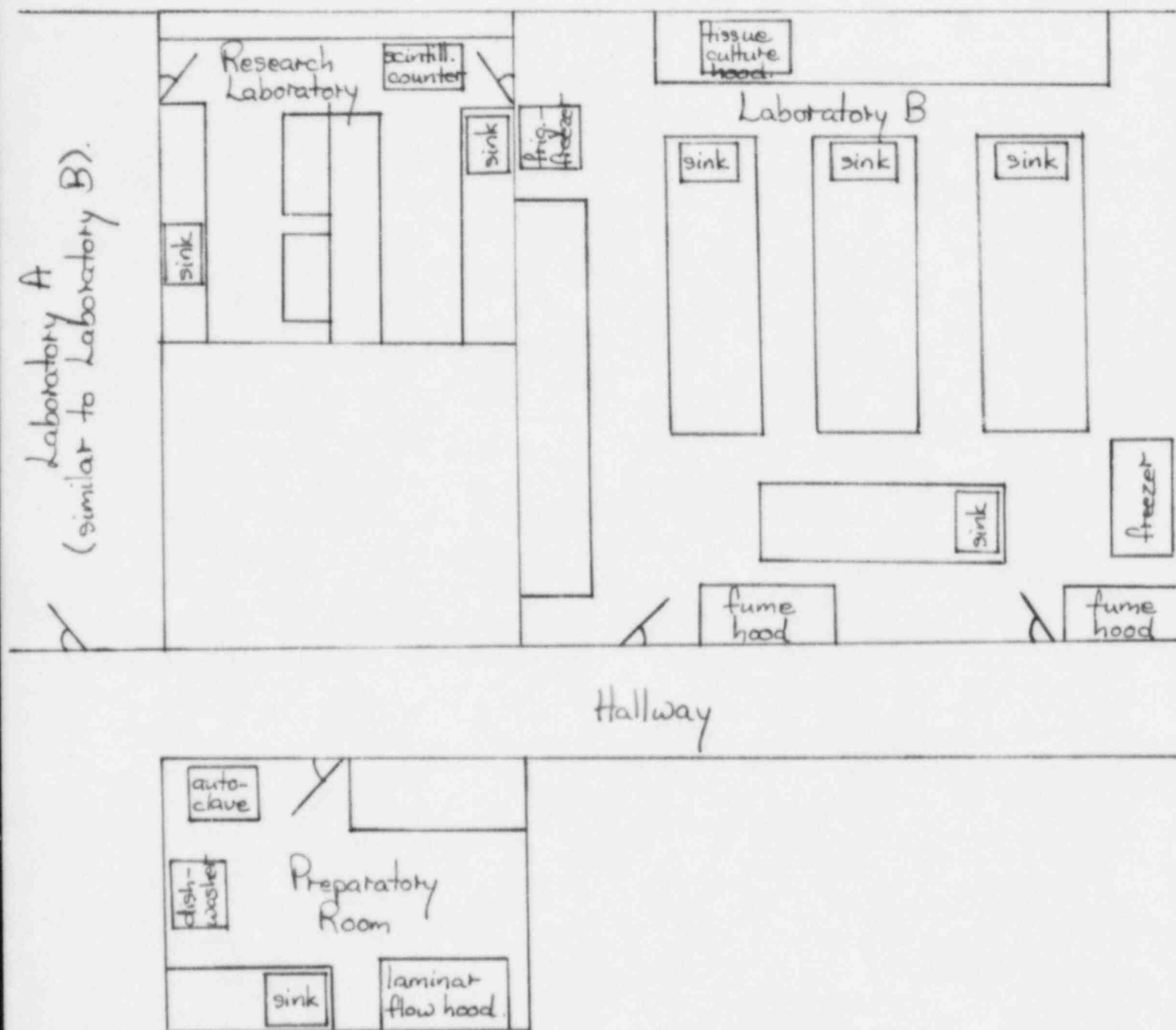
The radioactive waste will be disposed of either by release into the sanitary sewage system or by burial, according to the Nuclear Regulatory Commission Regulations 10 CFR 20.303 and 10 CFR 20.304 respectively. The only sinks that will be used for discharge of limited amounts of liquid radioactive waste and for washing radioactive glassware are the two in the Research Laboratory. The quantities disposed of in this manner will be well below the amounts stated in 10 CFR Appendix C. The ^{32}P and ^{35}S wastes will be stored until they have decayed through several half-lives and will then be disposed of either by discharge into the sewage system or by burial, whichever is appropriate. Animals used in radiotracer experiments, including any radioactive waste from the animals, will be disposed of by burial.

Item 15: Radiation Protection Program.

A. Control Measures for Radioisotopes:

1. Requisition: Only users will order the licensed radioisotopes. The license number will be included on all purchase orders.
2. Receipt: If the radioisotope arrives during off-hours, the material will be signed for and left with one of the Biology or Chemistry faculty

Item 13: Facilities and Equipment.



members. If none of the faculty members can be found, the delivery personnel will have access to the restricted area. Delivery and receipt of the radioisotope will be reported to the Radiation Protection Officer as soon as possible on the following day.

3. Opening Packages: Upon receipt of the licensed radioisotopes, the packages will be opened by the Radiation Protection Officer or a licensed user in the Research Laboratory. Disposable plastic gloves will be worn to handle the material; and the packing container, gloves, and packing material will be monitored for contamination. If there is bad contamination, the packing material will be disposed of by burial, and the outside of the vial containing the radioisotope will be decontaminated.
4. Inventory: An inventory of the licensed radioisotopes will be kept by the Radiation Protection Officer. This will be facilitated by a record sheet kept for each radioisotope, on which the user will record at the time of usage the date and amount of radioisotope withdrawn.
5. Routine Survey: Routine surveys of the areas where the radioisotopes are stored and used (bench tops, sinks, door knobs, and so on) will be done by the two licensed users or under their supervision. These areas will be monitored both with the survey meter and with periodic wipes, counted in the liquid scintillation counter. The frequency of the routine surveys will depend upon the frequency of use of radioisotopes.
6. Records: The Radiation Protection Officer will be in charge of keeping the records: inventory of the radioisotopes (requisitions, receipt, amount on hand, storage location, disposal, and so on), dates of routine laboratory surveys, and dates for instrument calibration.
7. Radioisotope Users: The radioisotopes will be used by the licensed users or by other persons under the direct supervision of the licensed users.
8. Sites of Radioisotope Use: As mentioned in item 13, the radioisotopes will be used mainly in the Research Laboratory and in the Preparatory Room, but occasionally in the other three laboratories and in the cold room. All of these rooms are in a single building, that is, the Health Occupational Facility, University of Alaska, Anchorage, Alaska.
9. Disposal of Radioisotopes: This will be done as described in item 14 and will be supervised by the Radiation Protection Officer.

B. Safety Rules:

Please refer to the enclosed copy of the safety rules. Our radiation protection program will ensure that all users are thoroughly familiar with the safety rules, prior to use of any radioisotope.

C. Emergency Procedures:

Please see the enclosed copy of the emergency procedures. All users will be well-informed of these procedures prior to use of any radioisotope.

Item 16. Formal Training

Kristine Mann

<u>Type of Training</u>	<u>Where Trained</u>	<u>Duration and When Trained</u>	<u>On the Job</u>	<u>Formal Course</u>
a). Principles and practice of radiation protection	Biology Department McGill University	1 month (1965)	Yes	No
	Tumor Virology Lab The Salk Institute	1 week (1976)	Yes	No
b). Radioactivity measurement standardization and moni- toring techniques and instruments	Biology Department McGill University	2 weeks (1965 & 1967)	Yes	No
c). Mathematics and calcula- tions basic to the use and measurement of radio- activity	Biology Department McGill University	3 weeks (1965 & 1967)	Yes	No
d). Biological effects of radiation	Biology Department McGill University	1 week (1965)	Yes	No
	Tumor Virology Lab The Salk Institute	2 days (1974)	Yes	No

Item 17. Experience with Radiation

Kristine Mann

<u>Isotope</u>	<u>Maximum Amount</u>	<u>Where Experience Gained</u>	<u>Duration</u>	<u>Type of Use</u>
^3H	10 millicuries	Biology Department McGill University	9 years (1964-1973)	biochemical tracer studies
		Tumor Virology Lab The Salk Institute	5 years (1974-1977, 1979)	"
^{14}C	5 millicuries	Biology Department McGill University	9 years	"
		Tumor Virology Lab The Salk Institute	5 years	"
^{35}S	5 millicuries	Tumor Virology Lab The Salk Institute	5 years	"
^{32}P	25 millicuries	Tumor Virology Lab The Salk Institute	2 years (1977 & 1979)	"

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Item 16. Formal Training

John M. Kennish

<u>Type of Training</u>	<u>Where Trained</u>	<u>Duration and When Trained</u>	<u>On the Job</u>	<u>Formal Course</u>
a). Principles and practice of radiation protection	Chemistry Department Rutgers University	5 months (1966)	No	Yes
b). Radioactivity measurement standardization and monitoring techniques and instruments	Chemistry Department Rutgers University	5 months (1966)	No	Yes
	Pharmacology Dept. University of Oregon Health Sciences Center	2 weeks (1977)	Yes	No
c). Mathematics and calculations basic to the use and measurement of radioactivity	Chemistry Department Rutgers University	5 months (1966)	No	Yes
	Chemistry Department Shippensburg State College	3 months (1970)	No	Yes
	Pharmacology Dept. University of Oregon Health Sciences Center	2 weeks (1977)	Yes	No
d). Biological effects of radiation	Chemistry Department Rutgers University	5 months (1966)	No	Yes
	Chemistry Department Shippensburg State College	3 months (1970)	No	Yes

Item 17. Experience with Radiation

John M. Kennish

<u>Isotope</u>	<u>Maximum Amount</u>	<u>Where Experience Gained</u>	<u>Duration</u>	<u>Type of Use</u>
^{14}C , ^{32}P , ^3H , ^{90}Sr , and ^{131}I	Various	Rutgers University Chemistry Department	5 months (1966)	educational experiments
^{14}C	5-10 millicuries	University of Oregon Health Sciences Center	2 years (1977-1979)	chemical carcino- gen metabolism studies
^3H	5-10 millicuries	University of Oregon Health Sciences Center	2 years (1977-1979)	"

SAFETY RULES FOR HANDLING RADIOISOTOPES

1. Accidents involving radioisotopes should be reported immediately to the radiation safety officer. Any questions involving the use of radioisotopes or radiological safety matters should be directed to the radiation safety officer.
2. Eating, storing, or preparing food, smoking, or applying cosmetics is forbidden in any area where radioactive materials are stored or used.
3. Direct contact with radioactive materials must be avoided by using protective laboratory coats, wearing rubber or disposable plastic gloves, and employing safety pipetters.
4. Film badges should be worn whenever working with gamma emitters at levels exceeding 100 uCi.
5. Work should be carried out under a hood in all cases where radioactive material may be lost by volatilization, dispersion of dust, or by spraying or splattering. Wherever possible, work with closed containers.
6. All radioactive samples should be properly labeled with the isotope and activity indicated, and covered.
7. Liquid wastes should not be poured into the drain or contaminated apparatus washed in the sink unless the levels of activity entering the sewer system have been calculated as permissible.
8. The disposal of solid wastes and contaminated articles (corks, paper wires, and the like) should be into designated containers and, under no consideration, into ordinary trash receptacles.
9. The storage of all radioactive material must be in properly designated locations.
10. At the close of a working period the laboratory work surfaces should be carefully monitored. Working period means each day in which radioisotopes were actually used in an experiment.
11. Before leaving the laboratory after working with active materials, each person should wash his hands thoroughly.
12. All laboratory glassware and equipment should be properly decontaminated after use before being returned to general usage in the radioisotope lab. All glassware and equipment should be properly decontaminated after use before returning to general usage.

Adapted from: Wang and Willis, Radiotracer Methodology in Science.
Prentice Hall (1965) p 253. March 24, 1966.

EMERGENCY PROCEDURES:

A. Accidents Involving the Release of Radioactive Material.

- 1) Notify all persons in the area. Simultaneously forestall further spillage and initiate isolation and decontamination procedures.
- 2) Keep the number of persons dealing with the spill to a minimum.
- 3) Beware of contamination on shoes, clothing, skin and hair in order to prevent spread to other areas.
- 4) Depending upon the seriousness of the spill or your inability to evaluate the seriousness, notify the Radiation Safety Officer.
- 5) Decontamination of personnel and the area shall be undertaken only by persons who are well acquainted with decontamination procedures.

B. Injuries to Personnel Complicated by Radioactive Contamination.

- 1) All life-saving procedures should be carried out immediately.
- 2) Wash minor wounds under running water immediately.
- 3) Notify Radiation Safety Officer.

C. Emergencies Involving Fires.

- 1) In the event of a fire, in order: all persons in the area, the Fire Department and the Radiation Safety Officer.