

APPLICATION FOR MATERIAL LICENSE

INSTRUCTIONS: SEE THE APPROPRIATE LICENSE APPLICATION GUIDE FOR DETAILED INSTRUCTIONS FOR COMPLETING APPLICATION. SEND TWO COPIES OF THE ENTIRE COMPLETED APPLICATION TO THE NRC OFFICE SPECIFIED BELOW.

FEDERAL AGENCIES FILE APPLICATIONS WITH:

U.S. NUCLEAR REGULATORY COMMISSION
DIVISION OF FUEL CYCLE AND MATERIAL SAFETY, NMSS
WASHINGTON, DC 20555

ALL OTHER PERSONS FILE APPLICATIONS AS FOLLOWS, IF YOU ARE LOCATED IN:

CONNECTICUT, DELAWARE, DISTRICT OF COLUMBIA, MAINE, MARYLAND, MASSACHUSETTS, NEW JERSEY, NEW YORK, PENNSYLVANIA, RHODE ISLAND, OR VERMONT, SEND APPLICATIONS TO:

U.S. NUCLEAR REGULATORY COMMISSION, REGION I
NUCLEAR MATERIAL SECTION B
631 PARK AVENUE
KING OF PRUSSIA, PA 19406

ALABAMA, FLORIDA, GEORGIA, KENTUCKY, MISSISSIPPI, NORTH CAROLINA, PUERTO RICO, SOUTH CAROLINA, TENNESSEE, VIRGINIA, VIRGIN ISLANDS, OR WEST VIRGINIA, SEND APPLICATIONS TO:

U.S. NUCLEAR REGULATORY COMMISSION, REGION II
MATERIAL RADIATION PROTECTION SECTION
101 MARIETTA STREET, SUITE 2900
ATLANTA, GA 30323

IF YOU ARE LOCATED IN:

ILLINOIS, INDIANA, IOWA, MICHIGAN, MINNESOTA, MISSOURI, OHIO, OR WISCONSIN, SEND APPLICATIONS TO:

U.S. NUCLEAR REGULATORY COMMISSION, REGION III
MATERIALS LICENSING SECTION
796 ROOSEVELT ROAD
GLEN ELLYN, IL 60137

ARKANSAS, COLORADO, IDAHO, KANSAS, LOUISIANA, MONTANA, NEBRASKA, NEW MEXICO, NORTH DAKOTA, OKLAHOMA, SOUTH DAKOTA, TEXAS, UTAH, OR WYOMING, SEND APPLICATIONS TO:

U.S. NUCLEAR REGULATORY COMMISSION, REGION IV
MATERIAL RADIATION PROTECTION SECTION
611 RYAN PLAZA DRIVE, SUITE 1000
ARLINGTON, TX 76011

ALASKA, ARIZONA, CALIFORNIA, HAWAII, NEVADA, OREGON, WASHINGTON AND U.S. TERRITORIES AND POSSESSIONS IN THE PACIFIC, SEND APPLICATIONS TO:

U.S. NUCLEAR REGULATORY COMMISSION, REGION V
MATERIAL RADIATION PROTECTION SECTION
1450 MARIA LANE, SUITE 210
WALNUT CREEK, CA 94596

PERSONS LOCATED IN AGREEMENT STATES SEND APPLICATIONS TO THE U.S. NUCLEAR REGULATORY COMMISSION ONLY IF THEY WISH TO POSSESS AND USE LICENSED MATERIAL IN STATES SUBJECT TO U.S. NUCLEAR REGULATORY COMMISSION JURISDICTION.

1. THIS IS AN APPLICATION FOR (Check one/initials in ())

- A. NEW LICENSE
- B. AMENDMENT TO LICENSE NUMBER _____
- C. RENEWAL OF LICENSE NUMBER _____

2. NAME AND MAILING ADDRESS OF APPLICANT (Include Zip Code)

Bell Telephone Laboratories, Inc.
600 Mountain Avenue
Murray Hill, NJ 07974
Attn: S. S. Voris

3. ADDRESS(ES) WHERE LICENSED MATERIAL WILL BE USED OR POSSESSED.

600 Mountain Avenue
Murray Hill, NJ 07974

9002050172 BB1214
REG 1 LIC 30
29-28260-01 PDR

4. NAME OF PERSON TO BE CONTACTED ABOUT THIS APPLICATION

Stephen S. Voris, Radiological Safety Officer

TELEPHONE NUMBER

201-582-4645

SUBMIT ITEMS 5 THROUGH 11 ON 8 1/2 x 11" PAPER. THE TYPE AND SCOPE OF INFORMATION TO BE PROVIDED IS DESCRIBED IN THE LICENSE APPLICATION GUIDE.

5. RADIOACTIVE MATERIAL
a. Element and mass number, b. chemical and/or physical form, and c. maximum amount which will be possessed at any one time.

6. PURPOSE(S) FOR WHICH LICENSED MATERIAL WILL BE USED.

7. INDIVIDUAL(S) RESPONSIBLE FOR RADIATION SAFETY PROGRAM AND THEIR TRAINING AND EXPERIENCE.

8. TRAINING FOR INDIVIDUALS WORKING IN OR FREQUENTING RESTRICTED AREAS.

9. FACILITIES AND EQUIPMENT.

10. RADIATION SAFETY PROGRAM

11. WASTE MANAGEMENT.

12. LICENSEE FEES (See 10 CFR 170 and Section 170.31)

FEE CATEGORY 3N AMOUNT ENCLOSED \$ 930

13. CERTIFICATION (Must be completed by applicant) THE APPLICANT UNDERSTANDS THAT ALL STATEMENTS AND REPRESENTATIONS MADE IN THIS APPLICATION ARE BINDING UPON THE APPLICANT.

THE APPLICANT AND ANY OFFICIAL EXECUTING THIS CERTIFICATION ON BEHALF OF THE APPLICANT, NAMED IN ITEM 2, CERTIFY THAT THIS APPLICATION IS PREPARED IN CONFORMITY WITH TITLE 10, CODE OF FEDERAL REGULATIONS, PARTS 30, 32, 33, 34, 35, AND 40 AND THAT ALL INFORMATION CONTAINED HEREIN IS TRUE AND CORRECT TO THE BEST OF THEIR 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.

SIGNATURE—CERTIFYING OFFICER

J. L. Kestler

TYPED/PRINTED NAME

J. L. Kestler

TITLE Secretary & General

Attorney, General Legal

DATE

7/19/88

Matters

14. VOLUNTARY ECONOMIC DATA

| ANNUAL RECEIPTS | |
|-----------------|-----------|
| < \$250K | \$1M-3.5M |
| \$250K-500K | \$3.5M-7M |
| \$500K-750K | \$7M-10M |
| \$750K-1M | > \$10M |

d. NUMBER OF EMPLOYEES (Total for entire facility excluding outside contractors)

c. NUMBER OF BEDS

6. WOULD YOU BE WILLING TO FURNISH COST INFORMATION (Dollar and/or staff hours) ON THE ECONOMIC IMPACT OF CURRENT NRC REGULATIONS OR ANY FUTURE PROPOSED NRC REGULATIONS THAT MAY AFFECT YOU? (NRC regulations permit it to protect confidential commercial or financial—proprietary—information furnished to the agency in confidence)

YES

NO

FOR NRC USE ONLY

TYPE OF FEE

APP

FEE LOG

Aug. 14

FEE CATEGORY

3N "OFFICIAL RECORD COPY"

COMMENTS

109372

APPROVED BY

S. Kimberly

AMOUNT RECEIVED

\$930

CHECK NUMBER

74-220461

ML10

04 AUG 1988

DATE

8/16/88

5. Radioactive Material

| <u>Element and Mass Number</u> | <u>Chemical and/or Physical Form</u> | <u>Maximum Activity Per Source</u> |
|------------------------------------|--|---|
| 1. Cesium-137 | Sealed source (J. L. Shepherd, Model 28-8B) | Not to exceed 26 curies/source |
| 2. Cesium-137 | Sealed source (Atomchem Corporation, Rad-Lab Model 1023) | Not to exceed 500 millicuries/ source |
| 3. Cesium-137 | Sealed source (Dosimeter Corporation of American, Model 3060) | Not to exceed 10 microcuries/ source |

6. Purpose for which Licensed Material will be Used

The following purposes are keyed to the sources listed in Item 5:

1. To be used for low to high range (0.05 mR/h to 5 R/h) calibration of radiation protection instrumentation.
2. To be used, as a backup to source 1, for low to medium range (0.05 mR/h to 100 mR/h) calibration of radiation protection instrumentation.
3. To be used for direct reading dosimeter calibration.

7. Responsible Individuals - Training and Experience

The AT&T Bell Labs radiation protection program is implemented by the Radiation Protection Department (RPD) under the auspices of the Radiation Protection Committee (RPC). The RPC is responsible for the approval of all radiation safety regulations developed by the RPD, therefore they have immediate responsibility for the radiation protection program. The current membership of the RPC and their backgrounds are presented in Attachment 7A.

Stephen S. Voris (Ionizing Radiation Manager, RPD) is the Radiological Safety Officer for the Murray Hill facility. He is responsible for the day-to-day radiation protection program and ensuring compliance with NRC regulations and license conditions. His training and experience is listed in Attachment 7A.

All instrument calibrations will be performed or directly supervised by:

1. Jack W. Rodgers (Health Physicist, RPD).

In addition to the information provided in Attachment 7A, he has nine years experience supervising and performing radiation protection instrument calibrations. His training was gained at Bell Labs using 0.3 to 260 curie Cs-137 sources for calibration.

2. Glenn M. Sturchio (Associate Health Physicist, RPD).

M.S., Radiation Science, Rutgers University.

Six years experience calibrating radiation protection instrumentation. His initial on-the-job training was completed at Medi+Physics, South Plainfield, NJ (1982-1984) using a 0.1 curie Cs-137 source. While at the University of California, Davis, (1985-1987), he supervised and performed instrument calibrations using a 130 curie Cs-137 calibrator. At Bell Labs he uses 0.3 to 260 curie Cs-137 sources for calibration.

The Radiation Protection Department maintains a library of manufacturer's instruction manuals for the radiation protection instruments calibrated. These manuals are routinely referred to for instrument specific details during the calibration procedure.

Radiation Protection Committee

Mr. G. M. Wilkening - Chairman

B. S. in Chemistry; M. S. in Industrial Hygiene; Fellow in Environmental Medicine, John Hopkins University. At present, Director, Environmental Health, Environmental Management and Safety.

Dr. M. M. Weiss - Vice-Chairman

Ph.D. in Physics, majoring in nuclear physics and paramagnetic resonance spectroscopy. Radiation physics, radar development; nine years with Health Physics Section of Brookhaven National Laboratory. Member of Technical Staff since October, 1956 and at present Manager, Radiation Protection Department Certified Health Physicist. Radiological Safety Officer for the Holmdel Laboratory in New Jersey.

J. A. Seaber - Recording SecretaryM. L. Comstock, M. D.

Medical Director, Short Hills, Summit and Whippany, New Jersey.

Mr. W. W. Crawford

B. S. in Chemistry, University of Maryland. Completed training program in radiation protection from the Harvard School of Public Health. At present, Safety Engineer in the PA Facilities and Services Department. Responsible for developing and coordinating safety and industrial hygiene programs for three Pennsylvania locations.

R. M. Cuta, M. D.

General Medical Director, Holmdel, New Jersey.

Mr. F. A. D'Amelio

Manager, Facilities Operation, Murray Hill.

Mr. J. L. Kestler

Secretary and General Attorney, General Legal Matters.

W. S. Mainker, M. D.

Medical Director, Murray Hill, New Jersey.

Dr. J. W. Mitchell

B. S. degree in Chemistry from the Agricultural and Technical State University of North Carolina at Greensboro and Ph.D. degree in Analytical Chemistry from Iowa State University at Ames. Member of Technical Staff since 1970. At present, Head of the Analytical Chemistry Department.

Dr. R. L. Remke

Ph.D. in Electrical Engineering, majoring in the electronic properties of materials. Member of Technical Staff for eight years. Presently studying the effect of gamma, electron, and heavy ion irradiation on GaAs devices and circuits. Radiological Safety Officer for the Reading Laboratory in Pennsylvania.

Mr. J. W. Rodgers

Eighteen years experience in radiation physics research activities. Completed training programs in radiation protection at Harvard School of Public Health and Rutgers University. Health Physicist in the Radiation Protection Department since 1979. Radiological Safety Officer for Whippany Laboratory in New Jersey and the Columbus facility in Ohio.

L. G. Shoner, M. D.

Medical Director, Holmdel and Crawford Hill, New Jersey.

Mr. S. S. Voris

B. S. in Chemistry; M. S. in Radiation Science, Rutgers, 1981. Environmental Control Administration, Public Health Service Course in Occupational Radiation Protection. Twenty-five years experience in radiochemistry and health physics. At present, Ionizing Radiation Manager in the Radiation Protection Department. Radiological Safety Officer for the Murray Hill and Chester Laboratories in New Jersey.

Dr. G. K. Wertheim

Ph.D. in Physics, majoring in Nuclear Physics. Member of the Technical Staff since 1955. Engaged in study of x-ray photoelectron spectroscopy.

8. Training for Individuals Working in Restricted Areas

The radiation protection training which is available to AT&T Bell Labs employees is presented in the Radiation Protection Training catalog (Attachment 8A). Members of the Radiation Protection Department who calibrate instruments have attended both "R-101: Fundamentals of Ionizing Radiation Protection" and "R-106: Emergency Response Training Program." An attendance sheet for each training course is completed and placed into the training file for documentation.

Special instruction and assistance on an as needed basis is provided to all personnel entering the radiation laboratory by the Radiation Protection Department.

RADIATION PROTECTION TRAINING



Radiation Protection Department

RADIATION PROTECTION TRAINING



Radiation Protection Department

Radiation Protection Department

INTRODUCTION

The Radiation Protection Department (RPD) has the responsibility at Bell Laboratories to insure the safe use of all radiation sources and to insure compliance with all applicable governmental rules, regulations and standards. In order to meet these responsibilities the RPD has developed a radiation protection program which includes various services deemed necessary to accomplish these purposes. In addition, the RPD has developed a program to assist the technical organizations using radiation sources in accomplishing their objectives. These services include specially supervised radiation safe facilities for radioisotope work, specialized instrumentation and measurements, direct assistance in performing experiments or projects as needed and special consulting services on radiation related matters as needed.

One of the major functions of the RPD is to insure that all Bell Laboratory radiation workers are fully aware of the special nature of working with radiation sources, its potential hazards, the consequences of improper use and the applicable regulatory requirements. To accomplish this purpose a series of courses, seminars and informational presentations have been developed and are described in this brochure. It should be noted that some of these offerings are required, others are optional.

Radiation sources can be divided into two major categories, ionizing and nonionizing.

Ionizing radiation sources are further divided into two classes, machine sources, and radioactive materials. Nonionizing radiation sources can be considered as radiofrequency sources, infrared sources, light sources and ultraviolet sources. The last three categories of sources can be further subdivided into coherent sources (lasers), and noncoherent sources (discharge lamps, plasmas, etc.).

The department staff who will be giving these courses and lectures are trained in physics, chemistry, electrical engineering, electronics and health physics. In many cases they have participated in the national and international development of radiation protection standards, guidelines, rules and regulations.

RPD

LISTING OF COURSES

R-101: Fundamentals of Ionizing Radiation Protection

Description - This course introduces the fundamental tools for working with ionizing radiation sources in a safe manner. The course includes a brief discussion of the nature of ionizing radiation, how it is produced and the recommended protective measures. It includes a discussion of the biological effects of ionizing radiation and the resulting exposure standards developed to insure their safe use. It describes the Bell Laboratory radiation protection program and the responsibilities of the radiation worker, supervision, and the Radiation Protection Department. It also discusses special services available to the radiation worker.

Who should attend - This course is *required* for all radiation workers as soon as they begin work with radiation sources.

Tuition - None

Prerequisites - All those classified as radiation workers.

Length - 2 hours

Instructors - M. M. Weiss, S. S. Voris, J. W. Rodgers

Schedule - This course is scheduled four times a year. It is also available upon special request.

R-102: Understanding the Radon Problem

Description - This lecture reviews the fundamentals of the physics and geology of radon, how and why it is a problem, and the biological impact of this naturally occurring radioactive gas. It will discuss the potential health effects and what can be done to avoid or mitigate these effects.

Who should attend - Those responsible for the plant environment. Those interested in the environmental radon problems.

Tuition - None

Prerequisites - None

Length - 1-1/2 hrs.

Instructors - M. M. Weiss, S. S. Voris

Schedule - Upon request by groups of 10 or more.

R-103: Video Display Terminals (VDT's) - "Is There a Hazard?"

Description - This lecture will explore the various health effects claimed to result from intensive use of VDT's. It will cover the investigations and measurements of the physical VDT environment including radiation, glare, reflections and static charge. It will also examine the ergonomic aspects of this issue and will highlight remedial or initial office design to alleviate or mitigate some or all of the discomfort or adverse health effect claims.

Who should attend - Supervisors of employees using VDT's. Personnel with special health concerns. Personnel responsible for designing offices where VDT's are to be installed.

Tuition - None

Prerequisites - None

Length - 1-1/2 - 2 hrs.

Instructors - M. M. Weiss

Schedule - Upon request for groups of 10 or more.

R-104: Radiation Protection for Radiographers

Description - This course covers the radiation protection curriculum specified for radiographers in the State regulations. It includes the following subjects:

- (1) Fundamentals of radiation safety
 - (a) characteristics of gamma and x-radiation
 - (b) units of radiation dose (mrem) and quantity of radioactivity (Curie)
 - (c) hazards of excessive exposure of radiation
 - (d) levels of radiation from sources of radiation
 - (e) methods of controlling radiation dose
 - i) working time
 - ii) working distances
 - iii) shielding

- (2) Radiation detection instrumentation to be used
 - (a) use of radiation survey instruments
 - (i) operation
 - (ii) calibration
 - (iii) limitations
 - (b) survey techniques
 - (c) use of personal monitoring equipment
 - (i) film badges
 - (ii) pocket dosimeters
 - (iii) pocket chambers

- (3) Radiographic equipment to be used
 - (a) remote handling equipment
 - (b) radiographic exposure devices and sealed sources
 - (c) storage containers
 - (d) operation and control of x-ray equipment

- (4) The requirements of pertinent federal and state regulations

- (5) The licensee's or registrant's written operating and emergency procedures

- (6) Inspection and maintenance performed by radiographers

- (7) Case histories of radiography accidents.

Who should attend - All radiation workers who plan to do industrial radiography, non-destructive testing

Tuition - None

Prerequisites - None

Length - 1 day

Instructors - M. M. Weiss, S. S. Voris

Schedule - Upon request or as prescribed by the Radiation Protection Department

R-105: Radiation Protection Services - An Overview

Description - This presentation is aimed at the immediate supervisors of radiation workers and is a brief discussion of the radiation protection program, offered special services by the RPD, the responsibilities of the radiation workers and their supervisors and how they can get assistance from the RPD to meet their responsibilities.

Who should attend - All supervisors of radiation workers

Tuition - None

Prerequisites - None

Length - 1 hour

Instructors - M. M. Weiss, R. C. Petersen

Schedule - Upon request or as scheduled by the Radiation Protection Department (to be announced)

R-106: Emergency Response Training Program

Description - This training program is directed to all personnel at Murray Hill who are responsible for responding to an emergency in the 1G radiation laboratory. It will include a visit and explanation in detail of what this laboratory's function is and what can be expected in each area of the laboratory. The recommended emergency responses of different scenarios will be reviewed with the participants and will culminate in a surprise mock emergency practice session.

Who should attend - The watch engineers, the emergency rescue squads, medical personnel

Tuition - None

Prerequisites - Some training in general emergency response, first aid

Length - Approximately 2 hours

Instructors - S. S. Voris, J. W. Rodgers

Schedule - As announced by the Radiation Protection Department in consultation with the supervision of the participants.

R201: Fundamentals of Nonionizing Radiation

Description - This course is designed to provide the student with a basic knowledge of nonionizing radiation, how it is generated and its properties and protection procedures. Included in the course are discussions of the following: the nature of nonionizing radiation; biological interaction mechanisms; biological effects; commonly used sources of nonionizing radiation including rf heaters, lasers, noncoherent light sources, plasma generators; typical exposure levels associated with commonly used sources; exposure standards; and responsibilities of the worker, supervision, and the Radiation Protection Department. It also discusses special services available to those working with sources of nonionizing radiation.

Who should attend - This course is intended for those working with nonionizing radiation sources, laboratory safety inspectors, and facilities management personnel.

Tuition - None

Prerequisites - None

Length - 2 hours

Instructors - R. C. Petersen

Schedule - Upon request by groups of 10 or more

R202: RF/Microwave Hazards - Fundamentals

Description - This course provides a basic understanding of potential hazards associated with exposure to electromagnetic energy at radio and microwave frequencies. Included in this course are discussions of the following: interaction mechanisms (thermal and athermal); dosimetry; reported biological effects based on the results of animal and epidemiological studies; rationale for exposure standards; a discussion of differences among international standards; important sources in the workplace (rf dielectric heaters and induction heaters); important sources in the environment (broadcast, microwave point-to-point, and SATCOM earth station antennas); controversial sources in the workplace (VDT's); and measurement (near-field and far-field).

Who should attend - Area safety representatives, those interested in environmental problems, those working with sources of rf/microwave energy or involved with the design of rf/microwave heating equipment or radio transmission equipment.

Tuition - None

Prerequisites - None

Length - 1-1/2 - 2 hrs.

Instructors - R. C. Petersen

Schedule - Upon request for groups of 10 or more

R208: RF/Microwave Measurements

Description - This course provides a basic understanding of the rf/microwave exposure measurement problem. Included in this course are discussions of: measurement parameters; instrumentation basics; broadband instruments; narrowband instruments; far-field measurements; the near-field measurement problem; and determining exposure levels. Special topics such as body current measurements and measurements at ELF, i.e., fields associated with VDT's will be included.

Who should attend - This course is intended for those working with radio transmission equipment or designing rf/microwave equipment that must meet federal emission standards.

Tuition - None

Prerequisites - Some understanding of the basics of EM theory

Length - 2 hrs.

Instructors - R. C. Petersen

Schedule - Upon request by groups of 10 or more

R204: Laser Safety

Description - This course serves as a basic course in laser safety. Included are discussions of the following: types of lasers, modes of operation; output characteristics; interaction mechanisms; biological effects including effects to the eye and skin; injury thresholds; safety standards and maximum permissible exposure levels; laser classification; controls, (engineering and administrative); protective devices; and medical surveillance protocols and rationale. The course will also define the responsibilities of laser users, supervision, the RPD, and the responsibilities of laser manufacturers with respect to the Federal Laser Product Performance Standard.

Who should attend - This course is intended for all laser users, personnel involved with Lightwave Systems, laboratory safety inspectors and facilities management personnel, and Laser Safety Officers.

Tuition - None
Prerequisites - None
Length - 2 hrs.
Instructors - R. C. Petersen
Schedule - Upon request by groups of 20 or more

R205: Lightwave Safety

Description - This course is designed for those persons working with Lightwave transmitters, both laser and LED type. The information presented stresses the unique characteristics of fiber optic systems compared with conventional lasers. Included are discussions of: beam divergence; hazards to the eye; Maximum Permissible Exposure (rationale); safe viewing distance; laser classification; and pertinent biological studies.

Who should attend - This course is intended for all personnel working with laser diodes, LED's and Lightwave systems and test sets.

Tuition - None

Prerequisites - None

Length - 1 hr.

Instructors - R. C. Petersen, P. A. Testagrossa

Schedule - Upon request by groups of 10 or more

9. Facilities and Equipment

The instrument calibration room is located within the underground radiation facility (Attachment 9A) which is completely surrounded by earth (4x shielding). Access to the radiochemistry laboratory (Door 1 in Attachment 9A) is key controlled; only people approved by the RPD to use the laboratory have keys.

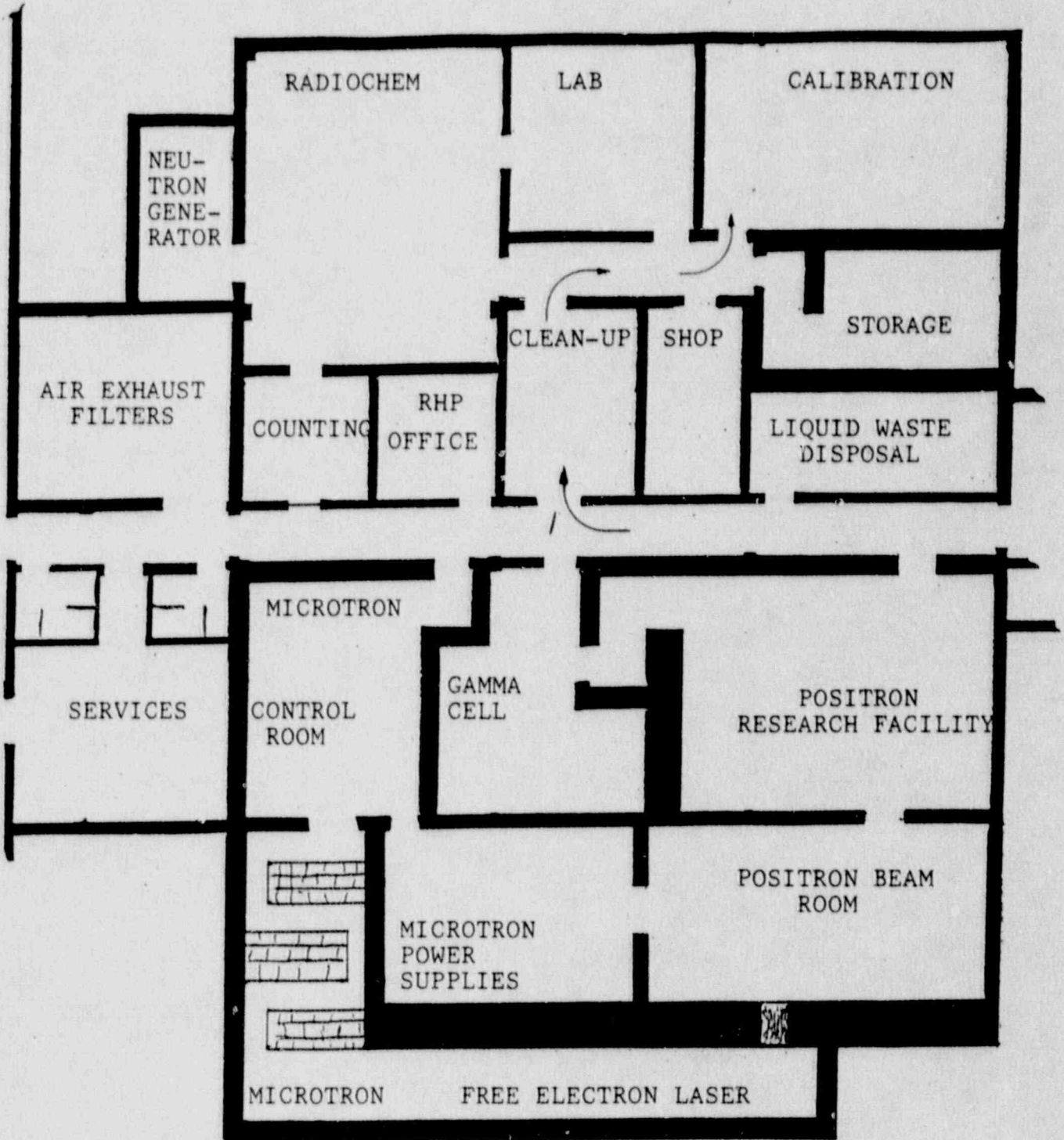
The calibration room (Attachment 9B) is dedicated to radiation protection instrument calibration. The calibration source/instrument jig assembly are constructed and aligned to minimize the effect of scattered radiation on instrument response. Additionally, the tight (20°) collimation of the 20 curie Cs-137 source should ensure that the side walls, floor and ceiling will not be scattering surfaces of the primary beam.

The safety features that will be available in the calibration room include:

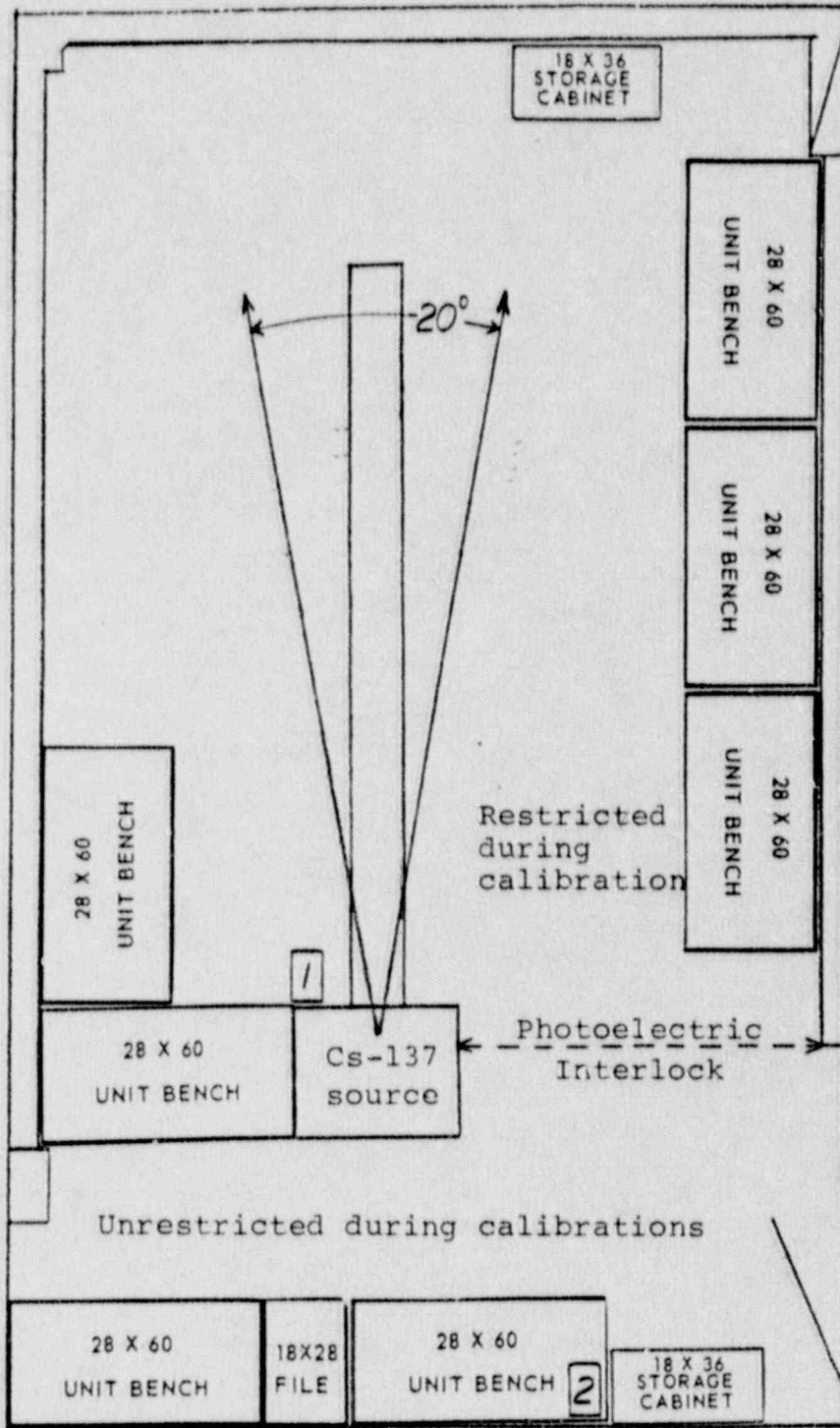
1. The multi-millicurie Cs-137 calibration source will be locked when not in use.
2. A photoelectric interlock system will be used to prevent entry into the calibration beam path. The source will be dropped into the closed position, when the photoelectric interlock is interrupted.
3. An area monitor (#1 on Attachment 9B) with local readout to indicate the presence of the calibration beam.
4. An area monitor (#2 on Attachment 9B) with local and remote readouts to indicate any unusually high radiation levels in the work area during calibrations. The remote readout feeds back to the Resident Health Physicist (RHP) office where it is set to "Alert" at 2 mR/h and "ALARM" at 10 mR/h.
5. Additional shielding will be provided around the calibrator, if indicated by a radiation survey after installation.

Source storage for the multi-millicurie calibration sources not routinely used will be provided in the storage room within the radiochemistry laboratory.

AT&T BELL LABS
MURRAY HILL
RADIATION FACILITY



PROPOSED CALIBRATION LABORATORY LAYOUT



Area Monitor 1 - local readout

Area Monitor 2 - local readout and remote readout to the Resident Health Physicist office

10. Radiation Safety Program

The scope of the Bell Laboratories Radiation Protection Program is described in Attachment 10A, "Regulations Concerning Radioactive Materials and Devices Producing Ionizing Radiation, Section I."

Personnel involved in instrument calibration will be wearing film badges and thermoluminescent dosimeter (TLD) rings which are exchanged on a monthly basis. The dosimeters are supplied by a commercial, NVLAP accredited vendor - R. S. Landauer, Jr. and Company. Direct reading pocket dosimeters are also supplied to personnel calibrating instruments.

The following radiation protection instruments will be available to the calibration facility and calibrated at intervals not to exceed one year:

| <u>Type</u> | <u>Number Available</u> | <u>Radiation Detected</u> | <u>Range</u> | <u>Use</u> |
|-----------------------------|-------------------------|---------------------------|---------------|-----------------------|
| Thin window GM survey meter | 2 | α, β, γ | 0-20 mR/h | Survey and monitoring |
| Ion Chamber | 1 | α, β, γ | 0-300000 mR/h | Survey and monitoring |
| GM Area Monitor | 1 | γ | 0-1000 mR/h | Work-place monitoring |
| GM Area Monitor | 1 | β, γ | 0-50000 cpm | Beam monitoring |

All personnel performing instrument calibration will be provided with Attachment 10B, "Instrument Calibration Program."

The 6-month leak-testing of calibration sources is done in-house by the Radiation Protection Department. A wipe test is taken at the closest accessible point on the source apparatus where contamination would be likely to accumulate. The wipe is then counted in a Tennelec low background α, β counter. The Tennelec is approximately 40% efficient for the Cs-137 beta and has a minimum detectable activity of less than 0.005 μCi .

The instrument calibration certificate is Attachment 10C.

C O N T E N T S

SECTION I

BTL Regulations Concerning Radioactive Materials
and Devices Producing Ionizing Radiation

| Par. | Page |
|---|------|
| 1. Standards for Protection Against Radiation | 1 |
| 2. Organization of Radiation Protection Program | 1 |
| 3. Responsibilities of the Radiation Protection Department ... | 2 |
| 4. Responsibilities of the Radiation Protection Committee | 3 |
| 5. Responsibilities of the Radiological Safety Officer | 4 |
| 6. Responsibilities of the Radiation Protection Representative | 6 |
| 7. Responsibilities of the Medical Department | 7 |
| 8. Responsibilities of Supervision | 8 |
| 9. Procurement of Radioactive Materials and Devices Producing Ionizing Radiation | 10 |
| 10. Receipt of Radioactive Materials and Ionizing Radiation Producing Devices | 10 |
| 11. Transportation and Shipping | 11 |
| 12. Disposal of Radioactive Waste | 11 |
| 13. Radioactive Materials Inventory | 11 |
| 14. Insurance for Employees Assigned to Work Involving Special Risk | 11 |

FORMS

| | | |
|--------------|---|----|
| AT&T BL-RF-A | Registration of Ionizing Radiation Producing Devices | 13 |
| AT&T BL-RF-B | Radioactive Material Authorization | 14 |
| AT&T BL-RF-E | Record of Radioactive Source | 15 |
| AT&T BL-RF-F | Off-Site Facility Visit to Work With Sources of Ionizing Radiation | 16 |
| AT&T BL-RF-G | Request for Personal Monitoring Service | 17 |
| E-7024 | Application for Authorization to participate under the plan for Insurance for Employees Assigned to Special Work Involving Special Risk | 18 |

SECTION I

AT&T Bell Laboratories Regulations Concerning Radioactive Materials and Ionizing Radiation Producing Devices

1. Standards for Protection Against Radiation

1.1 Bell Telephone Laboratories Incorporated as a licensee under the Atomic Energy Act of 1954, as amended, and under Title II of the Energy Reorganization Act of 1974 is subject to all provisions of the Acts and to all rules, regulations and orders of the Federal Nuclear Regulatory Commission (NRC). In particular, each licensee is required to conform to the "Standards for Protection Against Radiation" as published in Title 10, Chapter I, code of Federal Regulations (hereafter referred to as the "NRC Standards"). The applicable text of the NRC Standards is included in Section III (parts 19, 20, 21).

1.2 Bell Laboratories is subject to certain State and local regulations in addition to those of the NRC. In some states, the NRC has transferred licensing and regulatory authority to the state (Agreement States). Other states have licensing and regulatory requirements in addition to those of the NRC. A copy of the applicable state code is included in Section IV, for use at each Bell Laboratory located in that state.

1.3 All activities by Bell Laboratories personnel which involve radioactive materials or devices producing ionizing radiation shall be conducted safely and in such a manner as to conform to the requirements of the NRC Standards and the pertinent State and local regulations. The primary responsibility for radiation safety lies with the individuals engaged in these activities and with their supervision.

2. Organization of Radiation Protection Program

2.1 The Radiation Protection Department (RPD), with the approval of the Radiation Protection Committee, is responsible for the formulation of policies and procedures for protection against radiation hazards, and for insuring that employees whose work involves the use of radioactive materials and/or radiation producing equipment are properly advised as to their responsibilities with respect to NRC Standards, State and local regulations.

2.2 The Radiation Protection Committee (RPC) acts in an advisory capacity to the Radiation Protection Department on radiation protection objectives, policies and practices. The RPC is responsible for the approval of radiation protection policies and procedures developed by the RPD. It also is responsible for the approval of all uses of radiation sources. It exercises this responsibility through the RPD but will act directly on approval requests brought to its attention by the RPD.

2.3 The Radiological Safety Officer (RSO) at each location (where one is required) is an individual who, by training and experience, is competent to represent the Radiation Protection Department at that location and to assume the responsibility for compliance with these regulations. Each RSO is appointed by the Vice President, Administrative Systems, and is a member of the Radiation Protection Committee.

2.4 The Radiation Protection Representative (RPR) is an individual assigned and trained to act as a local liaison and contact for the Radiation Protection Department at locations where a Radiological Safety Officer is not required or where the RSO requires additional support. The RPR shall assist the RPD and the RSO where applicable in carrying out their responsibilities and shall keep locally whatever records are required by these regulations. The RPR shall be appointed by the Director of the Environmental Health, Environmental Management, and Safety Center with the consent of the RPR's supervision.

3. Responsibilities of the Radiation Protection Department

3.1 The RPD shall develop suitable regulations for radiation safety, keep necessary records, make surveys and perform such other functions as may be required by the NRC, State or local agencies concerned with radiation. The RPD will act in an advisory capacity to individuals or groups engaged in activities involving radioactive materials or devices producing ionizing radiation; e.g., x-ray generators, particle accelerators, high voltage electron tubes, microwave equipment, radar installations, electron microscopes and any other devices which may produce ionizing radiation either by intent or as a by-product.

3.2 The RPD with the assistance of the local RSO and RPR shall be responsible for maintaining the exposure history and records of all employees exposed to ionizing radiation.

3.3 The RPD shall submit to the appropriate Medical Director the names of employees for whom personal monitoring will be provided. This notification should be made prior to beginning work with sources of ionizing radiation or as soon as possible thereafter.

3.4 The RPD shall submit quarterly to the Medical Director at each location the summary of each individual's cumulative exposure for the period.

3.5 The RPD will provide for the calibration of all ionizing radiation survey instruments and insure that BL is in compliance with NRC and State instrument calibration requirements.

3.6 The RPD will provide for the establishment and operation of suitable radioactive materials handling facilities. Those facilities, which are under the direct control of the RPD, may be made available for use by any employee as determined by the RSO but such use will be under the direct supervision of the RPD.

3.7 The RPD shall assume the technical responsibilities of the RSO at BL locations where only an RPR has been designated and is present. The RPD shall work through the RPR as its local representative.

3.8 Upon receipt of a report of an accident or an incident involving a suspected overexposure of personnel to ionizing radiation, the RPD shall immediately investigate and inform the appropriate Medical Department and the appropriate Director of Facilities Management or Manager of Facilities and Services or Operations and Maintenance if the reported incident is substantiated. The RPD shall also inform the supervisor of the personnel involved in the incident.

3.9 Upon receipt of a report of an incident involving contamination by radioactive materials the RPD will, at its discretion, notify the appropriate Medical Department and the appropriate Director of Facilities Management, or Manager of Facilities and Services or Operations and Maintenance and the supervisor responsible for the facility involved in the incident.

4. Responsibilities of the Radiation Protection Committee

4.1 The Radiation Protection Committee (RPC) shall act in an advisory capacity to the Radiation Protection Department with respect to the safe use of radioactive materials and ionizing radiation producing devices.

4.2 The RPC shall recommend policies and practices designed to ensure compliance with NRC Standards, State and local regulations; and shall review and approve the radiation safety regulations developed by the RPD.

4.3 RPC members at the various locations shall assist the RPD in carrying out its responsibilities as detailed in Subsection 3 above.

4.4 The RPC shall hold a sufficient number of meetings each year to review the radiation protection program and address any current issues as per Federal and State requirements.

4.5 Any member of the RPC may request the Chairman of the Committee to call a meeting to discuss any relevant issues.

4.6 The RPC shall review the acquisition and installation of new major facilities.

4.7 The RPC shall be informed of all cases of personnel exposure exceeding permissible limits and shall advise the RPD on the appropriate action to be taken to prevent repetition of such occurrences.

4.8 All incidents involving contamination, loss or misuse of radioactive materials shall be brought to the attention of the RPC for review and consideration of remedial measures to be taken by the RPD.

4.9 Decisions of the Committee must be approved by a two thirds vote of members present. A majority of the committee members shall constitute a quorum necessary to hold a meeting and vote on any issue.

5. Responsibilities of the Radiological Safety Officer

5.1 The Radiological Safety Officer (RSO) shall review all new projects involving the use of radioactive materials and ionizing radiation producing devices. From such review, the RSO shall recommend appropriate routine and emergency procedures, surveys, and personnel monitoring procedures. If considered necessary the RSO will consult with the Medical Director during the review of new projects.

5.2 If the project review indicates the need for personnel monitoring, the supervisor of the personnel assigned to work with ionizing radiation producing sources shall submit a request for the necessary dosimeters on Form G "Request for Personnel Monitoring Service" to the local RSO.

5.3 The local RSO shall submit to the RPD the names of employees prior to their beginning work with sources of ionizing radiation.

5.4 The local RSO shall immediately report to the RPD all accidents involving overexposure, suspected overexposure of personnel, or contamination.

5.5 The local RSO shall review and the Manager of the Radiation Protection Department or his designated alternate shall approve all purchase orders for equipment producing ionizing radiation, radioactive materials or irradiation services.

5.6 The local RSO shall supervise the receipt, storage, and distribution of radioactive materials or equipment producing ionizing radiation.

5.7 The local RSO shall supervise decontamination of all areas and personnel in case of accidental spills of radioactive materials.

5.8 The local RSO is responsible for the disposal of radioactive waste and the maintenance of disposal records as per paragraph 12.1.

5.9 The local RSO shall investigate all unusual circumstances involving ionizing radiation, such as overexposure or contamination, and report findings to the RPD.

5.10 The local RSO shall survey radioactive materials storage facilities, working areas, and equipment as frequently as the RSO considers it to be necessary.

5.11 The local RSO shall insure that suitably calibrated survey instruments, dosimeters, signs, and labels are available for routine and emergency use.

5.12 The local RSO shall assure the performance of periodic leak tests on sealed sources as required in the NRC Standards and pertinent State and local regulations.

5.13 As deemed appropriate by the local RSO or the RPD, projects involving the use of radioactive materials and ionizing radiation producing devices may be reviewed at intervals to insure that adequate safety precautions are being exercised.

5.14 The local RSO shall maintain all required records as specified by the RPD. Copies of all such records shall be submitted to the RPD.

6. Responsibilities of the Radiation Protection Representative (RPR).

6.1 The RPR shall act as a local contact on all matters concerning the use of ionizing radiation sources. All new projects involving the use of ionizing radiation shall be referred to the RPD.

6.2 If the project review indicates the need for personnel monitoring, the supervisor of the personnel assigned to work with sources of ionizing radiation shall submit a request for the necessary dosimeters on Form G "Request for Personnel Monitoring Service" to the local RPR.

6.3 The local RPR shall submit to the RPD the names of employees prior to their beginning work with sources of ionizing radiation.

6.4 The local RPR shall immediately report to the RPD all accidents involving overexposure, suspected overexposure of personnel to ionizing radiation, or contamination.

6.5 The local RPR shall review and the Manager of the Radiation Protection Department or his designated alternate shall approve all purchase orders for equipment producing ionizing radiation, radioactive materials, or irradiation services.

6.6 The local RPR shall supervise the receipt, storage, and distribution of radioactive materials or equipment producing ionizing radiation.

6.7 Under the supervision and direction of the RPD, the local RPR shall oversee the decontamination of all contaminated areas and personnel.

6.8 Under the supervision and direction of the RPD, the local RPR shall arrange for the disposal of radioactive waste and keep appropriate records as per paragraph 12.1.

6.9 The local RPR shall investigate all unusual circumstances involving ionizing radiation, such as overexposure or contamination, and report the findings to the RPD.

6.10 The local RPR shall arrange for the survey of radioactive materials storage facilities, working areas, and equipment as frequently as considered necessary and report findings to the RPD.

6.11. The local RPR, at the direction of the RPD, shall arrange for the provision of calibrated survey instruments, dosimeters, signs, and labels for routine and emergency use.

6.12 The local RPR shall assure the performance of periodic leak tests on sealed sources, as directed by the RPD.

6.13 The local RPR shall maintain all required records, as specified by the RPD.

7. Responsibilities of the Medical Department

7.1 The Medical Director shall review projects new or already in process, referred to him or her by the RPD or the RSO in order to ascertain and implement appropriate medical surveillance procedures for the employees working with sources of ionizing radiation.

7.2 All employees who are being monitored for ionizing radiation (film badge or other type dosimeter) shall be included in the medical surveillance program for radiation workers.

7.2.1 Before or as soon as possible after undertaking such work, employees will complete a health questionnaire including a special radiation questionnaire and undergo a complete physical examination. Laboratory and other diagnostic procedures will be performed as deemed necessary by the examining physician but will include at least a complete blood count and urinalysis.

7.2.2 Full medical evaluations will be repeated at the following employee ages: 30, 35, 40, 44, 47, 50, 52, 54, 56, 58, 60 and annually over 60 years of age.

In the intervening years, an abbreviated assessment is performed. This consists of the completion of a health questionnaire including questions on environmental hazards and a complete blood count. The results will be reviewed by a physician in the medical department and discussed with the employee at a follow-up visit.

7.2.3 In cases of overexposure or suspected overexposure, the Medical Director in consultation with the RSO will determine the action required, if any, for each case.

7.2.4 In cases where internal exposure is suspected, e.g., by inhalation or ingestion of radioactive materials, appropriate laboratory tests and bioassays will be made by the RPD or the Medical Department as appropriate.

7.3 It shall be the responsibility of the Medical Department to maintain the records of all clinical evaluations.

8. Responsibilities of Supervision

8.1 For the purpose of these regulations "Immediate Supervisor" is defined as the person directly responsible for and involved in the activity which requires the use of ionizing radiation sources.

8.2 The immediate supervisor of each person or group using radioactive materials or devices producing ionizing radiation shall be responsible for the safe use of such materials or device by any person or persons in his group.

8.3 The immediate supervisor of each person or group shall notify the local RSO or RPR before said person or group begins work with radioactive materials, or equipment which generates ionizing radiation. He shall notify the local RSO or RPR when plans are made by any person or persons in his group to visit a facility outside BTL for the purpose of working with radioactive materials or devices producing ionizing radiation.

8.3.1 For registering devices producing ionizing radiation Form A "Registration of an Ionizing Radiation Producing Device" must be approved by the local RSO or RPR before work involving the use of such equipment is begun.

8.3.2 Before work is begun with radioactive materials, Form B "Radioactive Material Authorization" must be approved by the local RSO.

8.3.3 Before any individual or group visits an off-site radiation facility, Form F "Off-Site radiation Facility Visit" must be approved by the local RSO or the RPD for locations without an RSO.

Copies of Forms A, B, and F must be submitted to the RPD after approval by the local RSO. At Bell Laboratories locations where no RSO has been appointed, these forms shall be submitted to the local RPR who will then contact the RPD for approval.

8.3.4 If the project review indicates the need for personnel monitoring, the supervisor of the personnel assigned to work with sources producing ionizing radiation shall submit a request for the necessary dosimeters on Form G "Request for Personnel Monitoring Service" to the local RSO or RPR.

8.3.5 If the project review indicates the need for survey meters or area monitors, the supervisor shall acquire the equipment recommended by the RPD.

8.4 The immediate supervisor of each person or group engaged in work with radiation sources shall make a quarterly report to the RPD, giving personnel and inventory information as requested by the RPD. These reports are required for the quarterly periods ending March 31, June 30, September 30 and December 31, and must be submitted as instructed no later than the 15th of the month following the above dates for forwarding to the RPD. The RPD will assist in meeting these important deadlines by the following steps:

8.4.1 A computer printout (Form C) listing all radioactive materials in the possession of each employee of record will be sent to each such employee. These listings must be updated and returned by the above deadline.

8.4.2 A Form D "Quarterly Inventory Report of Radiation Producing Equipment" will be sent to each employee of record for updating and return as per above.

8.5 The immediate supervisor shall be responsible for all radioactive sources assigned to his group and shall insure that all such sources are properly accounted for, and are stored securely to prevent loss, unauthorized removal, or accidental dispersal. He shall be responsible for all ionizing radiation producing devices assigned to his group and shall insure that all such devices are properly accounted for.

8.6 After the RSO or RPR has been consulted, radiation areas and sources of ionizing radiation shall be posted and labeled in accordance with the NRC Standards and pertinent State and local regulations.

8.7 The immediate supervisor, in consultation with the RSO, shall prepare suitable operating and emergency procedures as considered necessary for the safe use of the radioactive materials or sources producing ionizing radiation assigned to his group. These procedures shall be prominently posted as directed by the RSO and discussed with the individuals involved. At locations where there is no RSO, the immediate supervisor shall consult the RPD.

8.8 The immediate supervisor shall immediately notify the RSO or RPR when radioactive materials or devices producing ionizing radiation arrive at a BL location by means other than the normal receiving department channels.

8.9 Each supervisor of employees whose work involves exposure to ionizing radiation shall insure that his employees have available to them, are familiar with, and follow the regulation prescribed in the Bell Laboratories manual "Regulations Concerning Radioactive Materials and Devices Producing Ionizing Radiation" and any supplementary instructions, oral or written, received from the local RSO or the RPD.

8.10 The immediate supervisor shall promptly report accidents involving overexposure of personnel, or contamination of personnel by radioactive materials to the RSO or RPR who shall immediately contact the RPD for further instructions.

9. Procurement of Radioactive Materials and Devices Producing Ionizing Radiation

9.1 All requisitions involving the purchase of any radioactive materials, equipment containing radioactive materials, or devices producing ionizing radiation must be approved by the Manager of the Radiation Protection Department or by a designated alternate.

9.2 The Purchasing Department, in accordance with PDI 2.63, shall accept only those purchase requisitions so approved.

9.3 The person initiating a requisition for the purchase of radioactive materials or ionizing radiation producing devices shall indicate clearly on the requisition that sources of ionizing radiation are involved, particularly where the manufacturer's designation does not make this readily apparent.

10. Receipt of Radioactive Materials and Devices Producing Ionizing Radiation

10.1 The Receiving Department shall notify the local RSO or RPR of the receipt of any radioactive materials or devices producing ionizing radiation.

10.2 When radioactive materials or devices producing ionizing radiation arrive at a BL location by means other than normal receiving department channels, the supervisor or person responsible for such radioactive materials or equipment shall immediately notify the RSO or RPR.

10.3 Upon notification of the receipt of radioactive materials, the RSO or RPR will record such material, using Form E "Record of Radioactive Source." A copy of Form E shall be submitted by the RSO or RPR to the user and to the RPD. The RSO or RPR will simultaneously conduct a survey to determine the dose rate and surface contamination from the source container for the purpose of determining the precautions to be taken in handling the source.

11. Transportation and Shipping

11.1 The procedures for shipping and transporting radioactive materials, whether by public or private conveyance, shall be determined by consultation with the RSO or RPR. All outgoing shipments of radioactive materials shall conform to the regulations of the Nuclear Regulatory Commission, the Department of Transportation (DOT), and other relevant federal, State, and local regulatory agencies.

12. Disposal of Radioactive Waste

12.1 Waste radioactive materials or nonreclaimable contaminated apparatus shall be disposed of in accordance with the NRC Standards and pertinent State and local regulations, after consultation with the RSO or RPR. Records must be kept of the disposal of all radioactive waste. Appropriate notations of such disposals shall be entered on Form E.

13. Radioactive Materials Inventory

13.1 The Radiation Protection Department shall maintain a current inventory of all radioactive materials possessed by BL. As indicated in Subsection 10 "Receipt of Radioactive Materials and Ionizing Radiation Producing Devices," the RSO or RPR shall be notified immediately of the receipt of radioactive materials. The RSO or RPR will record the receipt on Form E "Record of Radioactive Source" and will submit a copy to the approved user.

13.2 Disposal of radioactive materials by transfer to others, by waste disposal or by any other means, shall be as entered on Form E.

13.3 All receipts and disposals of radioactive materials shall be reported quarterly on the computer printout sent to each user for update and return as per paragraph 8.4.4.

14. Insurance for Employees Assigned to Work Involving Special Risk

14.1 In accordance with the provisions of G.E.I. 5-7-1 insurance is provided at AT&T Bell Laboratories expense to (1) guarantee payment, subject to specified limits and conditions of any personal insurance that may be invalidated by reason of an employee's assignment to work involving special risk; and (2) pay benefits in the event of death, total and permanent disability, dismemberment, or loss of sight resulting from an accident or other specified circumstances stated herein during such an assignment.

In this context "Work Involving Special Risk" is construed to mean an assignment of an employee for any duration by AT&T BL at other than AT&T BL locations requiring work or physical presence at or within any area where there may be exposure to ionizing radiation exceeding 25 millirems in any seven consecutive days. This does not include exposure to radiation from medical or dental devices.

Application for authorization to participate in this insurance can be made on form (E-7024).

Registration of an Ionizing Radiation Device

1. Supervisor Responsible for the Safe Operation of this Device

(a) Name (b) Location (c) Tel. No. (d) Home Address Home Tel. No.

2. Description of Device

Table with 8 columns: Type, Manufacturer, Year of Purchase, Name of Machine, Model No., Serial No., Voltage KVP, Current MA.

3. Major Uses of Device

4. Location of Device

(a) If Stationary Room (b) If Portable—Specify locations where used

5. Names of persons who will be using this equipment (use additional sheets if necessary)

Name Dept. Location

Approved by Radiological Safety Officer

Date

AT&T BL-RF-A

INSTRUCTIONS

This form shall be completed in triplicate and submitted to the local RSO for approval. Where there is no local RSO, this form shall be submitted to the RPG through the local RPR for approval. After approval, copy 1 shall be returned to the originator; copy 2 shall be filed with the RPG; and copy 3 shall be retained by the RSO or RPR.

1. Supervisor Responsible
Self-explanatory.

2. Description of Device

Under Type: If x-ray machine, indicate whether radiographic, fluoroscopic, medical, diffraction, spectrometer, etc. For other types of ionization radiation devices, indicate whether particle accelerator, high voltage electron tubes, high power microwave equipment, radar installation, etc.

Other items under 2 are self explanatory.

3. Major Uses of Device

State major uses of device, e.g., crystal research, diffraction studies of crystals, radiographic inspection of piece-parts, chemical analysis, etc.

4. Location of Device

A stationary machine is one that is ordinarily never moved after installation.

A portable machine is one that may be used in more than one specific location.

5. Names of Persons who will be using this equipment
Self-explanatory.

AT&T BL-RF-B

INSTRUCTIONS

This form shall be completed *in triplicate* and submitted to the local RSO for approval. Where there is no local RSO, this form shall be submitted to the RPC through the local RPR for approval. After approval, copy 1 shall be returned to the originator; copy 2 shall be filed with the RPC; and copy 3 shall be retained by the RSO or RPR.

1. Applicant

Name of person who will be responsible for the use of the radioactive material.

2. Department

Self-explanatory

3. Description of radioactive material and proposed use

If radioisotope, list isotope (e.g. Cobalt⁶⁰), quantity in millicuries, physical form (gas, liquid, solid) and proposed use. If irradiated materials or devices state nature of materials or devices and estimated quantity (in millicuries) of radioisotopes formed, and proposed use.

4. Location of use

Self-explanatory

Location of storage

Self-explanatory

5. Names of persons who will be using the above material

Self-explanatory

AT&T BL-RP-E

See instructions on back
before filling out this form

FORM E Record of Radioactive Source

1. Source No.

2. Assigned to

P/A# _____

3. Location of use

4. Received from

Date

5. Condition of Shipment:

6. Description of source

Irradiated components or materials

Sealed source

Unsealed source

7. Names of persons using this source (use additional sheets if necessary)

| Name | Dept. | P/A# | Location |
|-------|-------|-------|----------|
| _____ | _____ | _____ | _____ |
| _____ | _____ | _____ | _____ |
| _____ | _____ | _____ | _____ |
| _____ | _____ | _____ | _____ |
| _____ | _____ | _____ | _____ |
| _____ | _____ | _____ | _____ |

8. Record of initial leak or wipe test on source

9. Record of radiation level of source

10. Record of transfer to others

11. Record of waste disposal

Submitted by: _____

Date: _____

INSTRUCTIONS

This form shall be completed by the RSO or RPR upon receipt of radioactive materials, in accordance with paragraph 9.3 of Section I.

1. Source No.

List Source No. assigned by Radiological Safety Officer

2. Assigned to

List name of person to whom source was assigned by Radiological Safety Officer.

3. Location of use

Self-explanatory

4. Received from-Date

List name of person or organization from whom source was received and date of receipt.

5. Condition of Shipment

State whether shipping container was intact. State whether there was any detectible contamination on or inside the package.

6. Description of source

Indicate in box nature of source. If irradiated component or materials, indicate type of component or material, the approximate amount of radioactive material in millicuries and the radioisotopes present. If sealed source, indicate manufacturer, model number, radioisotope and quantity in millicuries. If unsealed source, indicate radioisotope quantity in millicuries and physical form (gas, liquid, solid).

7. Names of persons using this source

Self-explanatory

8. Record of initial leak or wipe test on source.

Indicate date of test and results in microcuries.

9. Record of radiation level of source

Record the radiation level of unsealed sources when measured at 2" from the source. For irradiated devices record radiation level when measured at contact.

10. Record of transfer to others

No transfers shall be made prior to notification of the radiological Safety Officer.

If entire source is transferred, list date of transfer and name and location of person to whom transferred. Send copy of Form-E to Radiological Safety Officer and transfer original Form-E to transferee. If only part of source is transferred, the Radiological Safety Officer will assign a new source number to the portion transferred, and a new Form-E shall be completed and issued to the transferee.

11. Record of waste disposal

List date of disposal and how disposed. Any waste material showing radiation levels above background must be considered radioactive waste and must not be treated as regular waste. Consult Radiological Safety Officer for disposal instructions.

AT&T BL-RF-F

INSTRUCTIONS

This form shall be submitted, in triplicate, to the local RSO or RPR for approval, in accordance with paragraph 4.2.3 of Section I. Copy 1 shall be returned to the originator; copy 2 shall be filed with the RPG; and copy 3 shall be retained by the RSO or RPR.

1. Applicant

List name of immediate supervisor of personnel going on trip or person in charge of group going on visit.

2. Department

Self-explanatory

3. Location

Self-explanatory

4. Facility to be visited

Self-explanatory

5. Date of visit

List of anticipated date and duration of visit

6. Names of all persons who will visit facility

Self-explanatory

7. Brief description of purpose of visit and radiation sources to be used

Self-explanatory

8. Radiation or activated material to be returned to Bell Labs

List all items which it is anticipated will become radioactive and which is intended to be returned to BTL. Also indicate the method to be used for returning said items: e.g., air freight, brought back by applicant, etc.

9. Name, address and phone number of RSO or equivalent at facility to be visited

Submit the name of the person at this facility who can be contacted to obtain radiation exposure records and information on their personnel monitoring procedures.

AT&T BL-RF-G

FORM G
Request for Personnel Monitoring Service

In accordance with "Bell Telephone Laboratories Regulations Concerning Radioactive Material and Ionizing Radiation Producing Devices", it is requested that supervisors fill out the following form and return to:

RADIATION PROTECTION Department
HEALTH PHYSICS OFFICE
MH 1F-101D

| | Name | Dept. | Work Location | Payroll A/C No. | SS. No. |
|----|-------|-------|---------------|-----------------|---------|
| 1. | _____ | _____ | _____ | _____ | _____ |
| 2. | _____ | _____ | _____ | _____ | _____ |
| 3. | _____ | _____ | _____ | _____ | _____ |
| 4. | _____ | _____ | _____ | _____ | _____ |
| 5. | _____ | _____ | _____ | _____ | _____ |
| 6. | _____ | _____ | _____ | _____ | _____ |

(use additional sheets if necessary)

1. What source of radiation will the individual be using?

2. How long will film badge service be required?

Supervisor's Signature

Date _____

Dept No. _____

Bell Laboratories

Application for Authorization to participate under the Plan for Insurance for employees assigned to Special Work involving Special Risk

(Print)

NAME _____

ORG. _____

BASE LOC. _____

PAYROLL ACCT. _____

EXTENSION _____

ROOM NO. _____

DATE _____

- NEW APPLICATION

REVISED APPLICATION

LOCATION OF RISK _____

DURATION OF RISK _____

I hereby apply for authorization to participate under the "Plan for Insurance for Employees Assigned to Special Work involving Special Risk" effective March 31, 1966. I have read the plan, and understand and accept the conditions therein.

I submit herewith the following information pertaining to all of my life, accident and health insurance policies, including those instituted by BTL (Basic Group Life Insurance, Supplementary Group Life Insurance and INA Voluntary Accident Insurance) which are now in good standing and hereby certify that I have no other such insurance. This information is submitted with the understanding, as indicated in the Plan, that the Bell Laboratories, during my assignment by such Company, to special work involving special risk, will provide insurance up to a maximum of \$150,000 to replace any amount invalidated or rendered uncollectible, as a result of such assignment, under the terms of my policies in the event of death, injury, or illness.

| Policy Number | Insurance Company | Effective Date | Beneficiary | Face Amount of Policy | Type of Policy |
|---------------|-------------------|----------------|-------------|-----------------------|----------------|
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

Please indicate with an asterisk (*) any policy above which contains double indemnity provisions in the event of accidental death.

I further understand and accept the condition that, with respect to guaranteed insurance, any payment by the insurance company providing the coverage under this Plan will be made direct to me or to the beneficiaries named in my voided or uncollectible policies, that as a prerequisite to such payment said policies shall be assigned for collection, and that coverage under the Plan will terminate under the circumstances outlined in Paragraph 7 of the Plan.

I further understand and agree that if at any time during a flight I experience difficulty, such as, but not limited to, localized pain, shortness of breath, or cramps, I shall consult, before engaging in further flights, with a Bell Laboratories physician to determine the advisability of my accepting special risk assignments involving flying.

Approved as to applicant's being assigned to "Special Work involving Special Risk" as defined in Sub-paragraph b of Paragraph 3.1 in G. E. I. S. S.-I Supplement.

(Please ensure that the appropriate subparagraph has been indicated above before signing)

Signed: _____
(Employee)

Accepted: _____
-Treasurer

Director

DATA FOR ACCIDENT INSURANCE PROVIDED BY BELL LABORATORIES
(G. E. I. 5.8-1, Supplement, Paragraph 5)

In addition to the guarantee of personal life, accident, and health insurance policies applied for on the obverse of this form, I understand that Bell Laboratories provides accident insurance subject to terms and conditions of the policy of insurance issued by the insuring company covering death, total and permanent disability, dismemberment, and loss of sight during assignment to special work involving special risk. For Bell Laboratories records with respect to my marital status, my dependents, and my beneficiaries under this insurance, I am furnishing the information below:

Check (X) One Married Widower (Widow) Legally Separated
 Single Divorced

Date of Birth _____ Date of Marriage _____

INFORMATION ABOUT DEPENDENT(S) (as defined in the Plan)

| Names, in order of age, oldest first | Check (X) Relationship | | | If other than Spouse, Son, or Daughter, state relationship | Date of Birth | | |
|--------------------------------------|------------------------|-----|----------|--|---------------|-----|------|
| | Spouse | Son | Daughter | | Month | Day | Year |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

Beneficiary to whom accident insurance should be paid in the event of my death:

Name _____ Relationship _____

Address _____

Contingent beneficiary to whom accident insurance should be paid if above beneficiary is not living at the time of my death:

Name _____ Relationship _____

Address _____

I understand and accept the condition that, with respect to accident insurance provided by Bell Laboratories, any payment by the insurance company will be made, as appropriate, to the beneficiaries named above, and that coverage under this Plan will terminate under the circumstances outlined in Paragraph 7 of the Plan.

Date _____

Employee's signature _____

Instrument Calibration Program

I. The Calibration Field

A. The Radiation Source

All instrument calibrations will be performed using a radionuclide source which approximates a point source. To minimize geometry effects, no instrument should be calibrated within 3 feet of the source.

B. The Radiation Field Intensity

The exposure rates at specified distances from the radionuclide source is determined using an ion chamber with an NBS traceable calibration. The exposure rates will be decay corrected annually.

II. Portable Instrument Calibration Procedure

A. Pre-calibration

1. Battery check
2. Warm up instrument (if required)
3. Zero instrument (if required)

B. Calibration

1. Expose the instrument in a radiation field of known intensity and adjust the instrument response according to manufacturer's instruction. This should be done at approximately $1/3$ and $2/3$ full scale for each range on a linear scale instrument. Log scale instruments should be calibrated at the midpoint of each decade, plus an additional point in the most critical decade.
2. Record the known and measured radiation field intensities on the calibration certificate.
3. Calculate the correction factor (actual intensity/measured intensity) for each reading and record the result on the calibration certificate. Make every effort to maintain the correction factor between 0.9 and 1.1.
4. Send the completed calibration certificate to the instrument owner and place a copy in the calibration case file.

III. Pocket Dosimeter Calibration

1. Zero the pocket dosimeter (PD).
2. Irradiate the PD in the dosimeter calibrator for 2-4 hours.
3. Zero the PD and record the "zeroed" value.
4. Irradiate the PD in the calibrator to approximately $\frac{3}{4}$ full scale.
5. Record the post-irradiation value.
6. Calculate the correction factor (Δ mR/actual exposure).
7. Place the PD in a low background area for 24 hours to check for charge leakage.

IV. Radiation Surveys

The calibration sources are placed on the sealed source inventory. All non-exempt sealed sources are leak tested twice a year and records of the results are maintained. The radiation level in the calibration work area is continuously monitored (see 9. Facilities and Equipment), with an alert indicator set at 0.2 mR/h.

V. Source Handling

The calibration sealed source will not be handled by anyone after installation. The source handle will be lifted and dropped during routine use, however, this will be done from behind the source (and any additional shielding required). All personnel doing instrument calibrations will be issued a whole body film badge, a ring dosimeter, and a direct reading pocket dosimeter. *OK*

VI. Emergency Procedure

1. Lower the source. If not possible, lock the calibration room door and post the "irradiation in progress" sign. *OK*
2. In case of medical emergency, press the medical response button on the lab wall. *OK*
3. In case of plant emergency (fire, electrical), notify the control room.
4. In case of calibration source malfunction, notify a health physicist. *OK*

AT&T BELL LABORATORIES
RADIATION PROTECTION DEPARTMENT

CERTIFICATE OF CALIBRATION

Model Number _____ Serial/Plant Number _____

Manufacturer _____ Instrument Type _____

Calibration Date _____ Calibration Interval _____

Calibration Source(s) _____

Detector Orientation [] Parallel [] Perpendicular to Field

Owner _____ PAN _____

Location _____ Phone _____

Actual
Exposure Rate
mR/h

Measured
Exposure Rate
mR/h

Meter
Range

Correction
Factor

The instrument reading should be multiplied by the correction factor to determine the actual exposure rate and care must be taken in interpolation or extrapolation of correction factors.

11. Waste Management

AT&T Bell Laboratories uses a commercial, NRC licensed waste disposal firm for the disposal of licensed material. Our current vendor is Radiac Research Corporation of Brooklyn, N.Y.

OK ✓

