Atomic Energy Control Board | Commission de contrôle de l'énergie atomique

R-52
Revision 1

Regulatory Document

Design Guide for Basic and Intermediate Level Radioisotope Laboratories

A Regulatory Guide

Effective date: June 7, 1991

Canada

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Design Guide for Basic and Intermediate Level Radioisotope Laboratories

1. INTRODUCTION AND SCOPE

This document sets out the requirements of the Atomic Energy Control Board (AECB) for the design and construction of adequate radioisotope laboratories. While the document is specifically concerned with new laboratories (either in new buildings or renovated facilities), the requirements it outlines can also be used by licensees to assess the adequacy of existing laboratories. Evidence of compliance with this guideline will facilitate the processing of an application for such a laboratory.

This document deals solely with laboratory features required to ensure radiological safety. Other occupational health and safety considerations, such as control of biotoxic material or reduction of fire hazards, may dictate adherence to other guidelines. Factors such as aesthetics, comfort and general layout are not covered, as these are outside the purview of the Atomic Energy Control Board (AECB).

For any Basic level or Intermediate level laboratory (see Table 1) that is to be constructed, a Design Compliance Form (DCF) (Appendix B) must be submitted to the AECB or, if AECB authorization has been given, to the radiation safety committee of the licensee. DCFs should be submitted to the Radioisotopes and Transportation Division of the AECB as early as possible in the design stages of a radioisotope laboratory. In the case of identically constructed laboratories only one form need be submitted. The AECB's decision to approve or not approve a laboratory will be based upon the factors described in this document and upon other information that may be requested. Responsibility for obtaining approval for a new radioisotope laboratory rests with the applicant for a licence; normally a responsible representative of the applicant will complete the DCF and will act as the AECB's contact person, if further information is required. However, for large projects involving several laboratories, it may be appropriate that the licensee designates the architect or project manager as his agent.

For the purposes of this document, radioisotope laboratories have been classified into three levels: Basic, Intermediate and High, depending on the nature and amount of radioactive material being handled within the facility (See Table 1). The classification of a radioisotope laboratory does not involve the amount of radioactive material stored in the laboratory. Since design requirements are linked to the likelihood of the spread of radioactive material, laboratory classification is based on the amount of material handled, rather than the amount in storage. The requirements for Basic level and Intermediate level radioisotope laboratories are detailed in section 3. Since High level radioisotope laboratories are likely to require special design, their requirements are beyond the scope of this document. The AECB must be consulted about specific design requirements of such facilities.

Conformance to this guide will be sought from any applicant for a licence to manipulate unsealed radioactive material. Exceptions to this guide must be justified. Alternatives which give an equivalent degree of safety may be acceptable, but must be approved by the AECB.

Throughout this document, "shall" is used to designate features which are essential, while "should" is used to designate features which are recommended but which are not pre-requisites to obtaining approval of a laboratory by the AECB.

2. LABORATORY PLANNING — GENERAL

When a radioisotope laboratory is being planned, there are two broad areas that should be considered: protection of the general public and protection of the worker.

2.1 Protection of the General Public

The likelihood of unnecessary exposure of the general public to radioactive material will be reduced if certain features are incorporated into the design:

(a) movement of radioactive material should be minimized. This is achieved by locating in proximity areas between which radioactive material must be moved:

example 1: in a nuclear medicine department, the dose administration area and dispensing laboratory should be adjacent and connected by a pass through;

example 2: in a research facility, provision should be made for the scintillation counter to be close to the laboratory where radioactive material is used;

(b) areas where radioactive material is used or stored should be shielded. Consideration shall be given to shielding the areas where significant quantities of radioisotopes which emit penetrating radiation will be stored (cf. paragraphs 2.1(c) and 2.2(b));

(c) areas where radioactive material is used or stored should have restricted access. Members of the general public shall not be permitted access to areas where radiation levels in excess of 2.5 microsieverts per hour (see Appendix A) are regularly encountered:

example 3: it is recommended that there be a separate waiting area (or areas) for patients who have had radioactive material administered and are awaiting imaging;

example 4: people other than laboratory staff should not be allowed in the laboratory when radioactive material is being handled;

(d) all areas in which radioactive material is used or stored and are deemed to require restricted acces shall be furnished with security provisions adequate to prevent unauthorized access to the radioactive material (cf. subsection 3.5), and

(e) waste contaminated with radioactive material (solid, liquid or gas) should be handled in an appropriate fashion (cf. subsections 3.1, 3.3, and 3.4).

2.2 Protection of the Worker

In addition to the points covered in subsection 2.1, several other general principles shall be adhered to in the design of a radioisotope laboratory. Adherence to these principles will help protect the worker from unnecessary exposure to radioactive material:

(a) radioisotope laboratories must have sufficient floor and counter top space to allow people to work safely. Space requirements will depend on the type of work, traffic patterns and equipment needs. In a well-organized laboratory, at least 3 square metres (30 square feet) of free floor area per person should be provided;

(b) shielding should be provided to ensure that workers are not subjected to radiation levels in excess of 25 microsieverts per hour. In most cases, it will be practicable and advisable to shield radioactive material such that radiation levels to which workers are exposed are less than 2.5 microsieverts per hour; and

(c) all surfaces in the laboratory shall be capable of being readily decontaminated (cf. subsection 3.2).

3. LABORATORY PLANNING — SPECIFIC FEATURES

3.1 Ventilation

3.1.1 Laboratory

The ventilation system should be designed such that the laboratory is at negative pressure relative to surrounding areas. The airflow should be from areas of minimal likelihood of airborne radioactive contamination to areas where such contamination is more likely. For areas in nuclear medicine departments where radioactive gases or aerosols are administered to patients, the ventilation requirements are deemed to be the same as those for a radioisotope laboratory, unless provision is made for the radioactive material to be trapped or directly vented. Laboratories in which radioactive aerosols or gases may be produced or handled shall have an appropriate ventilation system which shall include a fume hood, or glove box. All air from the laboratory should be vented through the fume hood and shall not be recirculated either directly, in combination with incoming fresh air in a mixing system, or indirectly, as a result of proximity of the exhaust to a fresh air intake.

3.1.2 Fume Hood

For the purposes of this document "fume hood" is defined as a ventilated enclosed work space intended to capture, contain and exhaust fumes, vapours and particulate matter generated inside the enclosure. A Class II, Type B2 biohazard cabinet as defined in Standard 49 of the National Sanitation Foundation is included in this definition.

(a) The fume hood shall be constructed of smooth, impervious, washable and chemical-resistant material;

(b) the working surface of the fume hood should be strong enough to bear the weight of any shielding material that may be required;

(c) the working surface of the fume hood should have slightly raised edges to contain any spills;

(d) the type of work to be carried out in the fume hood will dictate whether it is more appropriate to have the controls for fume hood services, such as water and gas, inside or outside the fume hood;

(e) the linear face velocity shall be between 0.5 and 1.0 metre per second (100–200 linear feet/minute) with the sash in the normal working position. There shall be a balanced air feature such that the fume hood is vented even if the sash is closed. The airflow pattern shall be such that there are no counter-currents when the fume hood is operating, i.e. air from within the fume hood shall not flow back into the laboratory. The fume hood shall be tested for the flow rate and absence of counter-currents before being used for radioactive material;

(f) the fume hood should not be located near any entrance to the laboratory. Since traffic patterns near the fume hood may produce counter-currents, work with radioactive material in the fume hood should be in remote areas of the laboratory;

(g) a readily visible flow-measuring device should be included on the face of the fume hood. An alarm, either visual or audible, to indicate reduced air flow is recommended;

(h) if an automatic after-hours shut down system is in place, provision must be made to keep specific fume hoods running if necessary; for example, when someone is working after hours or volatile radioactive material is being stored in the fume hood;

(i) in most operations, filtration of fume hood exhaust is not necessary because particulates are not generated. If other considerations, such as biohazards dictate that filters be used, they shall be monitored for radioactive contamination before disposal and handled accordingly.

(j) the fume hood exhaust duct shall be constructed of corrosion-resistant material. If galvanized steel is used, care must be taken to ensure that the zinc coating is not damaged during installation. All joints shall be smoothly finished and sealed;

(k) the fume hood exhaust duct from a radioisotope laboratory shall only connect with exhaust systems from other areas where radioactive materials are used. If fume hood exhaust systems are to interconnect, provision must be made to ensure that the exhaust from one area cannot flow into another area;

(l) the fume hood exhaust duct from a radioisotope laboratory should be marked at 3-metre intervals with radiation warning symbols;

(m) the fume hood exhaust duct should proceed to the discharge point with as few horizontal sections, as is practicable. This is to minimize areas in which condensates or liquids coming in from the discharge point can collect. Every attempt shall be made to prevent rain from entering the ducting;

(n) the fume hood exhaust fan shall be placed close to the exhaust duct discharge point in order to maintain negative pressure in the ductwork. The fan motor should be mounted outside the exhaust duct for easy access and to avoid contamination;

(o) provision should be made for emergency power to the fume hood exhaust fan;

(p) the exhaust shall be located on the roof, with the discharge point at such a height as to ensure acceptable dilution, dispersion and elimination of unacceptable re-entry through building openings. More information may be found in Reference 11. Care shall be taken not to vent into areas of disturbed airflow or into dead air pockets. This consideration is especially important in multi-storey and multi-level buildings. In certain situations, it may be possible to vent fume hoods to the side of the building but, if this is being considered, it should be discussed with AECB staff; and

(q) final plans of the building ventilation system which are supplied to maintenance personnel shall show which exhaust ducts are from fume hoods in radioisotope laboratories.

3.2 Finishing and Fixtures

(a) Flooring shall be an impervious material which is washable and chemical-resistant, e.g., waxable vinyl linoleum. Carpet shall not be used. Junctions between the floor and vertical surfaces shall be smooth and coved. Care shall be taken to seal all joints to minimize the likelihood of radioactive material being trapped. A strippable coating on the floor will reduce the chances of radioactive material being ground into the flooring and will simplify any decontamination required;

(b) walls and ceilings should be finished in a smooth and washable surface with joints being sealed, wherever practicable. It is unlikely that shielding in the walls will be necessary in either Basic or Intermediate laboratories, since localized shielding is usually adequate;

(c) counter surfaces shall be finished in a smooth, washable and chemical-resistant surface with all joints sealed. Care should be taken to ensure that arborite-type laminates are actually impervious to water and chemicals. Joints between counters and vertical surfaces should be smooth, coved and sealed. It should be borne in mind that reinforcement may be necessary, since considerable amounts of lead may be placed on counter tops;

(d) cupboards and shelving, including hardware, should have smooth, chemical-resistant and washable finishes. Exposed shelves shall be kept to a minimum to prevent dust accumulation;

(e) light fixtures should be easy to clean and be of an enclosed type in order to minimize dust accumulation;

(f) sinks shall be made of a material that is readily decontaminated. A method to prevent overflow should be provided. Provisions should be made for a handwashing sink in addition to the wash-up sink. The handwashing sink should be located near the laboratory entrance to encourage hand washing by people leaving the laboratory. The wash-up sink should be located in a low traffic area adjacent to the work area. Taps should be operable by means not requiring direct hand contact. An emergency eye-wash shall be installed near the entrance to an Intermediate level laboratory and should be similarly installed in a Basic level laboratory. An emergency shower should be provided in or near the laboratory; and

(g) in a nuclear medicine department, washrooms that will be used by patients shall be finished in materials that are easily decontaminated.

3.3 Plumbing

(a) The use of back-flow prevention devices on faucets with vacuum or cooling line attachments is recommended.

(b) Drains from the radioisotope laboratory should go directly to the main building sewer. Within the building, these drains should be connected only to other drains that may carry radioactive material;

(c) drain lines from the radioisotope laboratory should be marked at 3-metre (10 feet) intervals with radiation warning symbols;

(d) sink drain traps should be accessible for monitoring;

(e) the need for drains to be made of chemical-resistant material shall be considered; and

(f) final plans of the drainage system which are supplied to maintenance personnel shall show which drains are from radioisotope laboratories.

3.4 Storage

(a) Although small amounts of radioactive wastes may be stored in the radioisotope laboratory, provision shall be made for a separate storage area if significant quantities of radioactive wastes are to be generated.

(b) access to areas where radioactive materials are to be stored shall be restricted by locks;

(c) appropriate shielding shall be provided for all radioactive storage locations such that radiation levels outside that area shall not exceed 2.5 microsieverts per hour;

(d) if there is a likelihood that radioactive aerosols or gases will be generated by stored materials, ventilation will be necessary. Vented air shall not be discharged into occupied areas or recirculated within the building (cf. subsection 3.1); and

(e) all surfaces of the radioactive storage area shall be finished with materials that are readily decontaminated.

3.5 Security

(a) basic level radioisotope laboratories shall have a lockable cupboard or lockable refrigerator in the laboratory or a good lock on the door(s);

(b) intermediate level radioisotope laboratories shall have a good lock on the door(s) and may also be provided with lockable storage areas within the laboratory; and

(c) laboratory windows on ground level shall prevent unrestricted access.

3.6 Miscellaneous

(a) Coat hooks should be provided within the laboratory close to the exit, in order to encourage laboratory personnel to remove potentially contaminated laboratory clothing prior to leaving the laboratory;

(b) provision should be made for an appropriate radiation monitoring device to be installed in an intermediate level laboratory;

(c) under no circumstances shall provision be made for food or beverage preparation or storage in the laboratory;

(d) desks and study facilities should not be located in an area where radioactive materials are to be handled; and

(e) provision should be made for emergency lighting in the laboratory.

4. SUMMARY OF REQUIREMENTS

4.1 The minimal requirements for both Basic level radioisotope and Intermediate level radioisotope laboratories are denoted on the Design Compliance Form (DCF) as are certain items that are either recommended (R) or not recommended (NR) [See Appendix B].

4.2 A Basic level radioisotope laboratory shall meet all requirements designated with a "B" but it is not necessary that all recommendations ("R") be complied with.

4.3 An Intermediate level radioisotope laboratory shall meet all requirements designated with an "I" and should comply with all recommendations ("R"). Reasons for not complying with any of the recommendations should be stated in writing when the DCF for the Intermediate level radioisotope laboratory is submitted to the AECB.

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11. American Society of Heating, Refrigerating and Air Conditioning Engineers Inc., "Heating, Ventilating and Air Conditioning Systems and Applications", Chapters 30 and 43, 1987.
12. National Fire Protection Association, *Standard on Fire Protection for Laboratories Using Chemicals*, NFPA45, Boston, 1982.
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TABLE 1: LABORATORY CLASSIFICATION

Level of Radioisotope Laboratory*	Permissible Quantity of Radioactivity [Scheduled Quantities (SQ)]**	
	to be handled on the open bench	to be handled in containment***
Basic	1–100 SQ	1–1,000 SQ
Intermediate	100-1,000 SQ	1,000–10,000 SQ
High	> 1,000 SQ	> 10,000 SQ

* The "hot lab" of a nuclear medicine department will, in all cases, be classified as an Intermediate radioisotope laboratory. Other areas of a nuclear medicine department in which open sources of radioactive material are handled shall conform to subsection 3.2.

** Cf. Table 2.

*** Containment refers to a fume hood as defined in subsection 3.1.2. or to a glove box.

TABLE 2: SCHEDULED QUANTITIES

Part 1: Scheduled Quantities of Radioactive Prescribed Substances

Single Isotopes	Microcuries	Single Isotopes	Microcuries
Actinium 227	0.1	Mercury 197	100
Antimony 124	10	Mercury 203	10
Arsenic 74	10	Molybdenum 99	10
Barium 140	10	Nickel 63	10
Beryllium 7	100	Phosphorus 32	10
Bismuth 207	10	Polonium 210	0.1
Bismuth 210	1	Potassium 42	10
Bromine 82	10	Promethium 147	10
Cadmium 109	10	Radium 226	0.1
Calcium 45	10	Rubidium 86	10
Carbon 14	100	Scandium 46	10
Cerium 144	1	Selenium 75	10
Cesium 134	10	Silver 110	10
Cesium 137	10	Sodium 22	10
Chlorine 36	10	Sodium 24	10
Chromium 51	100	Strontium 85	10
Cobalt 57	10	Strontium 89	10
Cobalt 58	10	Strontium 90	0.1
Cobalt 60	10	Sulphur 35	10
Copper 64	100	Technetium 99m	100
Copper 67	100	Technetium 99	10
Gold 198	10	Thallium 204	10
Hydrogen 3	1000	Tin 113	10
Iodine 123	100	Xenon 133	100
Iodine 125	1	Xenon 135	100
Iodine 131	1	Yttrium 87	10
Iodine 132	10	Yttrium 90	10
Indium 113	100	Zinc 65	10
Indium 114	10		
Iridium 192	10	Except as otherwise specified by the Board:	
Iron 55	100		
Iron 59	10		
Krypton 85	100	Isotopes of elements of atomic number greater than 89	0.1
Lanthanum 140	10		
Lead 210	0.1		
Manganese 54	10	Other isotopes not referred to above	1
Manganese 56	10		

Part II: Two or More Isotopes

The scheduled quantity shall be determined by the equation: $\frac{A_1}{M_1} + \frac{A_2}{M_2} + \frac{A_3}{M_3} + \ldots = 1$

where A_1, A_2, A_3, etc. are the quantities of the isotopes involved and M_1, M_2, M_3, etc. are the scheduled quantities of such isotopes.

Appendix A

SYSTÈME INTERNATIONAL (SI) UNITS

The *rad* (rad) is replaced by the *gray* (Gy)

1 kilorad (krad)	=	10 grays (Gy)
1 rad (rad)	=	10 milligrays (mGy)
1 millirad (mrad)	=	10 micrograys (μGy)
1 microrad (μrad)	=	10 nanograys (nGy)

The *gray* (Gy) replaces the *rad* (rad)

1 gray (Gy)	=	100 rad (rad)
1 milligray (mGy)	=	100 millirad (mrad)
1 microgray (μGy)	=	100 microrad (μrad)
1 nanogray (nGy)	=	100 nanorad (nrad)

The *rem* (rem) is replaced by the *sievert* (Sv)

1 kilorem (krem)	=	10 sieverts (Sv)
1 rem (rem)	=	10 millisieverts (mSv)
1 millirem (mrem)	=	10 microsieverts (μSv)
1 microrem (μrem)	=	10 nanosieverts (nSv)

The *sievert* (Sv) replaces the *rem* (rem)

1 sievert (Sv)	=	100 rem (rem)
1 millisievert (mSv)	=	100 millirem (mrem)
1 microsievert (μSv)	=	100 microrem (μrem)
1 nanosievert (nSv)	=	100 nanorem (nrem)

The *curie* (Ci) is replaced by the *becquerel* (Bq)*

1 kilocurie (kCi)	=	37 terabecquerels (TBq)
1 curie (Ci)	=	37 gigabecquerels (GBq)
1 millicurie (mCi)	=	37 megabecquerels (MBq)
1 microcurie (μCi)	=	37 kilobecquerels (kBq)
1 nanocurie (nCi)	=	37 becquerels (Bq)

The *becquerel* (Bq)* replaces the *curie* (Ci)

1 terabecquerel (TBq)	=	27 curies (Ci)
1 gigabecquerel (GBq)	=	27 millicuries (mCi)
1 megabecquerel (MBq)	=	27 microcuries (μCi)
1 kilobecquerel (kBq)	=	27 nanocuries (nCi)
1 becquerel (Bq)	=	27 picocuries (pCi)

*1 Bq = 1 disintegration/second = 1 s^{-1}

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Appendix B

DESIGN COMPLIANCE FORM (DCF)*

AECB File _____

Your File _____

Project Name _____ Estimated Date of Completion _____

Organization _____

Identification of Laboratory or Laboratories _____

Number of Laboratories _____

(Note: a separate form shall be completed for each laboratory for which approval is being sought. In the case of identically constructed laboratories only one form need be submitted.)

Number of scheduled quantities to be used: on open bench _____

in containment _____

Laboratory Designation: Basic ☐ Intermediate ☐

Description of Building _____

_____

Floor on Which Laboratory is Located _____

Description of Work to be Carried out in the Laboratory _____

_____

_____

* This form should be used in conjunction with AECB Regulatory Guide R–52 (Revision 1), "Design Guide for Basic and Intermediate Level Radioisotope Laboratories."

Notes

1. Designations in the DCF:

   "B" denotes an essential requirement for a Basic level radioisotope laboratory;

   "I" denotes an essential requirement for an Intermediate level radioisotope laboratory;

   "R" is used to designate a recommendation. However, the nature of use proposed for a laboratory may dictate that a recommendation becomes an essential requirement for that laboratory;

   "NR" denotes an action that is not recommended and may be contrary to good radiation safety practice. The action may be accepted depending on the use proposed for the laboratory; and

   "will" is used only to indicate intent on the part of the licensee whether items are AECB's requirements or not.

2. Every attempt shall be made to comply with all recommendations in the DCF, especially in the design of an Intermediate level radioisotope laboratory.

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	Designation	Yes	No
1. Ventilation			
(a) Radioactive aerosols or gases are likely to be produced in the laboratory.*	—	❐	❐
(b) Laboratory will be at negative pressure with respect to surrounding areas.	R	❐	❐
(c) A glove box will be installed. (If yes, please submit details.)	—	❐	❐
(d) A fume hood will be installed.**	—	❐	❐
1.1 Fume Hood			
(a) All air from the laboratory will be vented through the fume hood.	R	❐	❐
(b) Air vented through the fume hood will be vented without recirculation.	B, I	❐	❐
(c) The fume hood will be constructed of smooth, impervious, washable and chemical-resistant material.	B, I	❐	❐
(d) Consideration has been given to the weight of shielding that must be supported by the working surface of the fume hood.	R	❐	❐
(e) The working surface of the fume hood will have slightly raised edges.	R	❐	❐
(f) The linear face velocity of the fume hood will be between 0.5 and 1.0 metre/second.	B, I	❐	❐
(g) Before radioactive material is used in the fume hood, the fume hood will be tested to verify the flow rate and the absence of counter-currents.	B, I	❐	❐
(h) The fume hood will be located near any entrance to the laboratory.	NR	❐	❐
(i) A readily visible flow-measuring device will be included on the face of the fume hood.	R	❐	❐
(j) There will be an automatic after-hours shutdown system. (If yes, is there to be an override provision?)	—	❐	❐
(k) The fume hood exhaust will be filtered. (If yes, please submit details of filtration.)	—	❐	❐
(l) Fume hood filters will be monitored for radioactive contamination before disposal.	B, I	❐	❐
(m) The fume hood exhaust duct will be constructed of corrosion-resistant material.	B, I	❐	❐
(n) All joints in the exhaust duct will be smoothly finished and sealed.	B, I	❐	❐
(o) The fume hood exhaust duct will connect with other exhaust systems. (If yes, please submit details.)	NR	❐	❐
(p) The fume hood exhaust duct will be marked at 3-metre intervals with radiation warning symbols.	R	❐	❐

* If the answer to 1(a) is no, and if there is no intention to install a fume hood, or glove box, the rest of section 1 need not be answered.

** If the answer to paragraph 1(d) is no, subsection 1.1 need not be answered.

	Designation	Yes	No
(q) The fume hood exhaust duct will have horizontal sections. (If yes, please submit details.)	NR	☐	☐
(r) The fume hood exhaust fan will be placed close to the discharge point	B, I	☐	☐
(s) The fume hood fan motor will be mounted outside the exhaust duct.	R	☐	☐
(t) Exhaust stack height will ensure acceptable dilution, dispersion and elimination of unacceptable re-entry through building openings.	B, I	☐	☐
(u) Exhaust ducts from fume hoods in radioisotope laboratories will be identified on plans supplied to maintenance personnel.	B, I	☐	☐
2. Finishing and Fixtures			
(a) Flooring will have an impervious surface with a strippable coating	B, I	☐	☐
(b) All joints in the flooring material will be sealed.	B, I	☐	☐
(c) Walls and ceilings will have smooth, impervious and washable finishes.	R	☐	☐
(d) Counter surfaces will have a smooth, impervious, washable and chemical-resistant finish.	B, I	☐	☐
(e) All joints on counters will be sealed.	B, I	☐	☐
(f) Cupboards and shelving will have smooth, impervious, chemical-resistant and washable finishes.	R	☐	☐
(g) Light fixtures will be easy to clean.	R	☐	☐
(h) Light fixtures will be enclosed.	R	☐	☐
(i) Sinks will be made of a material that is readily decontaminated.	B, I	☐	☐
(j) Sinks will have overflow outlets.	R	☐	☐
(k) Taps will be operable by means not requiring direct hand contact.	R	☐	☐
(l) An emergency eye-wash will be installed.	I	☐	☐
(m) An emergency shower will be provided.	R	☐	☐
(n) Patient washrooms will be finished in materials that are easily decontaminated.	B, I	☐	☐
3. Plumbing			
(a) Faucets with vacuum or cooling line attachments will have back-flow protection devices.	R	☐	☐
(b) The drain from the laboratory will go directly to the main building sewer.	R	☐	☐
(c) The drain will connect with drains other than the main building sewer. (If yes, please submit details.)	—	☐	☐
(d) The drain line will be marked at 3-metre intervals with radiation warning symbols.	R	☐	☐
(e) Sink drain traps will be accessible for monitoring.	R	☐	☐
(f) Chemical resistance of the drains has been considered.	B, I	☐	☐
(g) Drains from radioisotope laboratories will be identified on plans supplied to maintenance personnel.	B, I	☐	☐

	Designation	Yes	No
4. Storage			
(a) Wastes will be stored in the laboratory.	NR	☐	☐
(b) An area to store waste outside the laboratory will be provided.	R	☐	☐
(c) Materials that may give rise to radioactive aerosols or gases will be stored in an appropriately vented area.	B, I	☐	☐
(d) Appropriate shielding will be provided for storage locations.	B, I	☐	☐
5. Security			
(a) The basic laboratory will be provided with a lockable storage area or lockable doors.	B	☐	☐
(b) The intermediate laboratory will be provided with a good lock on each door.	I	☐	☐
(c) A lockable storage area will be provided in the intermediate laboratory.	R	☐	☐
(d) The laboratory windows on the ground floor will prevent access.	B, I	☐	☐
6. Miscellaneous			
(a) Provision will be made for hanging up potentially contaminated laboratory clothing within the laboratory.	R	☐	☐
(b) Provision will be made for an appropriate radiation monitoring device to be installed in the laboratory.	R	☐	☐
(c) Food or beverage preparation facilities will be excluded from the laboratory.	B, I	☐	☐
(d) Desks and/or study facilities will be located in the laboratory.	NR	☐	☐
(e) Provision will be made for emergency lighting in the laboratory.	R	☐	☐

Name of individual to be contacted if more information concerning the form is required:

Representing _____

Address _____

City _____ Province _____

Postal Code _____ Telephone _____

This form shall be approved by an individual authorized to act for the organization that holds (or will hold) a licence to use radioactive material in the facility described herein.

Name _____

Title _____

Signature _____ Date _____

Any changes to the project that will alter the information supplied on this form must be reported to the AECB before radioactive material is used in the laboratory.

For Office Use Only

AECB File No. _____

Project Name _____

Date of First Review _____ Reviewing Officer _____

Action/Further information obtained

Date of Approval _____ Reviewing Officer _____

Approved as:	With Fume Hood	Without Fume Hood
Basic Laboratory	☐	☐
Intermediate Laboratory	☐	☐