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15400 Calhoun Dr., Suite 100
Rockville, MD 20855
Tel: (301) 738-2005
Telex: 303442
Fax: (301) 738-2246
1-800-USA-AECL

November 14, 1989

Proj 679

Mr. Drew Persinko
CANDU 3 Project Manager
Project No. 679, OWFN 12E4
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Ref: Transmittal of CANDU Documents

Dear Mr. Persinko:

Our letter to you dated November 13, 1989 stated that the four documents would be sent to you under separate cover. As promised, this letter accompanies the following four documents:

1. CANDU 3 Conceptual Probabilistic Safety Assessment
2. CANDU 3 Technical Description, Volumes 1 and 2
3. Atomic Energy Control Board Regulations and supporting documents applicable to CANDU 3
4. Operating Policies and Principals the CANDU 6 at Point Lepearu (Unit 1)

Very truly yours,

D.R. Shiflett

D.R. Shiflett
Vice President/General Manager

DRS:pmp

cc: w/o enclosures
R.W. Durante
L.N. Rib

1/1 w Prop Encls D. Persinko - Original 4cr Encl
Reg FILES 1 1
2222 DRC PDR 1 1 w out Prop
Per D. Persinko

THE NEW BRUNSWICK ELECTRIC POWER COMMISSION

INTERNAL CORRESPONDENCE

1987 March 5

File No. TU-06491
TU-06374
87-01367

MEMO TO: Distribution for RD-01364-L3

FROM: D. F. Weeks

SUBJECT: RD-01364-L3 Rev.5 - Operating Policies and Principles

****

The AECB have recently approved Rev.5 of Operating Policies and Principles as noted on Attachment 1. This revision incorporates a number of changes and the affected sections are listed in the revision record - page ii of RD-01364-L3.

In order to assist you in reviewing the changes, attachment II lists the affected section together with a brief explanation of the change. Superintendents and Supervisors are further requested to review the changes with relevant system engineers to determine the effect of these changes on work plans, outage plans and other documents - particularly Section 3 of Operating Manuals. Note that RD-01364-P2 specifies that, in Section 3 of an Operating Manual,

> "the licensing requirement will be repeated verbatim from the original document. Even if the requirement in the original document is not specific to this system, it shall not be modified".

Note that Rev.5 of RD-01364-L3 is to be considered to take effect immediately and a copy is attached. Consequently you should remove and discard your current copy of Rev.4 and replace it with Rev.5. The copy of the current Reactor Operating Licence #10/85 should not be removed but retained with the new Rev.5 of OP & P.

D. F. Weeks
Licensing Supervisor

DFW/ms

ATTACHMENT 1 - MEMO WEEKS TO DISTRIBUTION

TU 06274
TU 06491
87-01-07

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

P.O. Box 1046
Ottawa, Canada
K1P 5S9

C.P. 1046
Ottawa, Canada
K1P 5S9

DIRECTORATE OF REACTOR REGULATION

Your file / Votre référence

Our file / Notre référence
26-1-12-1-6

6 February, 1987

Mr. A.R. McKenzie
Station Manager
Point Lepreau G.S.
P.O. Box 10
LEPREAU, N.B.
E0G 2H0

87 mar 4

Dear Mr. McKenzie:

Subject: Point Lepreau NGS Operating Policies and Principles

AECB staff has reviewed the proposed revisions to the Operating Policies and Principles submitted under cover of your 14 July, 1986 letter to B.M. Ewing and the additional revisions to section 3.03.7 contained in the attachment to the letter from Mr. D.F. Weeks to J. Detorakis of 22 January, 1987.

The proposed revisions have been found acceptable and are hereby approved. This approval is given pursuant to condition A.A1 of Attachment A.A. to Reactor Operating Licence 10/85.

Yours sincerely,

P. Marchildon
Manager
Power Reactor Division "A"

/ar

c.c. B.M. Ewing.

Canada

ATTACHMENT II

RATIONALE FOR CHANGES

TO

OPERATING POLICIES AND PRINCIPLES,

RD-01364-L3 Rev. 5

D#DFW1

Section Changed	Comment
0.11	Shutdown System descriptions modified slightly to include Shut Off Rods and LISS. Containment description modified to highlight the fact that only Class III powered LAC's are considered as part of the containment subsystems.
0.13.3	"Shutdown" was replaced with "Shut down" in action required following containment being found unavailable.
0.19	Editorial Change - "Activated" replaced with "Radioactive"
0.20	The requirement for reporting modifications was corrected to reflect the mechanism by which the reporting requirements are met (Quarterly Report).
0.20, 2.03.1, 3.18, 6.06, 6.14, 6.15, 6.15.3, 7.05	Editorial Change - "Paragraph" replaced with "Section".
0.21	Editorial Change - "Activity" replaced with "Radioactive".
2.01	Editorial change - "Section" added in reference to 0.06.
2.04	Radiation Work Plan was replaced with Safety Work Plan.
2.05	Section was expanded to more clearly reflect the concern regarding R/B basement flooding.
3.03.1 3.03 2	References to SI-01365-P3 deleted since this SI has been cancelled. Reference to IR-78200-05 remains since it has been issued as an operating instruction and thus serves as the Plant Chemistry Control Manual. Eventually IR-78200-05 will be issued formally as OM-78210 and the reference to the Plant Chemistry manual will be revised accordingly.
3.03.3	Gauge pressure notation (g) was added to primary pressure limitation.

Section Changed	Comment
3.03.7	A statement of intent has been added regarding action to be taken should leakage from the Heat Transport System exceed limits specified in the Small LOCA APOP (APOP 09) the Steam Generator Tube Failure APOP (APOP 09) on the Annulus Gas Operating Manual (OM 34980).
3.04.5	Excess reactivity restriction was revised to indicate that limit of 5 mk applies to steady state condition. Transient poison concentration in excess of the limit is permissible where power manoeuvres are in progress and the moderator poison is compensating for excess reactivity resulting from a non steady state fission product inventory. (ie. startups after long outage)
3.04.8 3.04.9	New section added and previous one revised to clarify ECC requirements for fuel handling operations to be carried out with the reactor shutdown.
3.07.4	The fuel handling log is specified as the location for noting authorization of F/M operation in other than the fully automatic mode. Previously the log "location" had been unspecified.
3.10	Editorial Change - "97.15 atom percent" relocated.
3.11	Editorial Change - "Meters" abbreviated.
3.12.6	Section revised to ensure consistency with section 3.04.8 and 3.04.9. In particular fuel handling operations are now permitted with the reactor shutdown and ECC blocked as long as the requirement for ECC availability, or steps and time period required to make it available, are specified in approved procedures.
3.13	D_2O storage tank level specification abbreviated to 1.81m from 1.81 meters.
3.17	This section has been rewritten to recognize the existence of the steam driven auxiliary feedwater pump P109.

Section Changed	Comment
5.04	Section has been extensively rewritten. Cooldown of the HTS is now specified if both SG's become unavailable. Although thermosyphoning with a hot HTS provides an adequate method of fuel cooling under LOCL IV/III conditions, no cooling is available to the end shields and moderator. As a result the temperatures of both the moderator heavy water and light water inventory at the end shields gradually increases which lead to unacceptable end shield stresses. Analysis shows that the HTS temperature can be at a normal value for a period of at least one and one-half hours without causing unacceptable stresses. Therefore, under LOCL IV/III conditions, operator action would be required in less than 1½ hours to establish Class IV power and necessary systems in the plant, or to depressurize the secondary side of the steam generators, in order to reduce the heat transport system temperature. The need to carry out a cooldown under these conditions, with control power solely supplied from batteries and instrument air not available, would be a less desirable option. Consequently the requirement to cool down after reactor shutdown has been added.
5.05	English unit value for minimum tank level has been dropped.
5.07	Section has been rewritten to allow maintenance on Class I batteries as long as the maintenance is completed using procedure approved by the Station Manager and the corresponding Standby Generator is in service.

Section Changed	Comment
6.20	Third paragraph: "or" changed to "and". Section regarding the alteration of guaranteed conditions was revised to include modifications to guaranteed conditions or devices as is allowed in SI-01365-P1.
7.02	The removal from service of the fire water supply, and detection systems (or portions thereof) has been modified to reflect the existence of detailed procedures in Operating Manuals (and hence approved by the Station Manager). This increases the flexibility of operating the system within existing approved guidelines (O.M.) and yet further ensures that procedures are developed and approved should situations develop which are not covered by the O.M.

POINT LEPREAU GENERATING STATION

REFERENCE DOCUMENT

OPERATING POLICIES AND PRINCIPLES

(2)

REVISED BY:	D. F. Weeks	DATE:	86-06-03
AUTHOR:	M. K. Gay	DATE:	
REVIEW:	J. D. Sommerville	DATE:	87 03 09
APPROVAL:	A. R. McKenzie	DATE:	87.03.10

Issued 87-03-10

RD-01364-L3
Rev. 5

D#DFW1

POINT LEPREAU

OPERATING POLICIES AND PRINCIPLES

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Station Health Physicist
Analytical Chemist
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POINT LEPREAU

OPERATING POLICIES AND PRINCIPLES

REVISION RECORD

Revision & Date	Comments	Pages Revised
Rev. 4/1 86-03-17	Correction to index, Section 2.02(ii), and Section 2.05	1, 2, 3, 17, 18
Rev. 5 86-06	Revisions to Background, Sections 0.11, 0.13.3, 0.19, 0.20, 0.21, 2.01, 2.03.1, 2.04, 2.05, 3.03, 3.04, 3.07, 3.10, 3.11, 3.12, 3.13, 3.17, 3.18, 5.04, 5.05, 5.07, 6.06, 6.14, 6.15, 6.18, 6.20, 7.02, 7.05.	5, 9, 11, 13, 14, 15, 17, 18, 20, 21, 22, 23, 25, 27, 28, 29, 32, 33, 37, 38, 39, 40, 41, 43, 44

AECB Approval (Rev. 4/1):

Letter P. Marchildon to A.R. McKenzie, 85-12-19, "Point Lepreau N.G.S., Revision to the Operating Policies and Principles".

AECB Approval (Rev. 5):

Letter P. Marchildon to A.R. McKenzie, 1987 Feb. 6, "Point Lepreau N.G.S. Operating Policies and Principles".

POINT LEPREAU

OPERATING POLICIES AND PRINCIPLES

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CONTENTS (Cont'd)

POINT LEPREAU

OPERATING POLICIES AND PRINCIPLES

INTRODUCTION

1 Background

The Atomic Energy Control Board (AECB) was created by the Atomic Energy Control Act and is empowered by the Act to make and enforce regulations governing the construction and operation of nuclear facilities in Canada. Approval to operate a nuclear facility is granted by the AECB through the issue of an Operating Licence.

In the process of acquiring an Operating Licence, the licensee is obliged to provide the AECB with a comprehensive description of the plant design with particular emphasis on its safety-related features. The licensee must also demonstrate, by analysis or otherwise, that the safety features provided will adequately protect the general public from the consequences of certain postulated accidents, including accidents involving the concurrent failure of whichever system would otherwise provide the primary defence. The principle description of the plant design and the performance of its safety features is the Safety Report.

In addition the licensee must demonstrate, using various analytical techniques including reliability evaluations, that emergencies of the type discussed in the Safety Report and elsewhere, have a probability of occurrence commensurate with the severity of the event under consideration, and consistent also with such mandatory targets as the AECB may designate.

Further, the licensee must provide the AECB with the operating procedures intended to prevent undesirable events and to control such events as may nevertheless occur.

All of these documents collectively support the Application for an Operating Licence submitted by the utility to the AECB. In granting an Operating Licence, the AECB insists that the station be operated and maintained in conformity with the documentary basis for the granting of a licence. Design changes, and changes in operating procedures, are permissible, provided that the proposed change would have no appreciable impact on the validity of documents supporting the current licence.

Background (Cont'd)

Alternatively the documentary basis for the granting of the licence may be changed with the approval of the AECB. In the latter case, the revised documentation then becomes the new basis for continued tenure of an Operating Licence.

The principle function of this Reference Document (Operating Policies and Principles) is to establish boundaries within which the plant is to be maintained and operated, under both normal and abnormal conditions, so as to comply with documents currently supporting the tenure of an Operating Licence. These submissions include licence basis documents listed in the current Reactor Operating Licence Renewal Application and subsequently submitted documents as referenced in the active Register of Licensing Documentation (RD-01364-L28). These will be referred to here as "current licensing submissions".

Within these boundaries, detailed operating procedures are prepared for clearly defined operating requirements. Procedures are also written for abnormal or emergency conditions which may be precisely defined. It may from time to time be necessary to revise the detailed operating procedures. Such revisions may only be carried out within the boundaries established in the Operating Policies and Principles.

The Operating Policies and Principles also define the authorities of the station staff and thus act as an interface between the shift authorities and the station management. This permits the operating staff to make decisions within the defined boundaries and indicates when a higher authority must be involved.

2 Changes to Operating Policies and Principles

Changes to the Operating Policies and Principles will be submitted to the Atomic Energy Control Board for approval prior to implementation.

3 Changes to Documents Referenced in Operating Policies and Principles

Certain sections of other documents are referenced herein, with a view to avoiding inappropriate detail. Such detailed procedures have the same force as the Operating Policies and Principles and changes to such procedures therefore require the approval of the AECB prior to implementation.

4 Shutdown of Reactor within Prescribed Period

Following the detection of certain faults, a shutdown of the reactor within a specified period may be prescribed. The length of this interval is intended to reflect the severity of the impairment and the priority of repair efforts.

Such a guideline shall not be taken as authority to remain at power up to the limit of the prescribed period if early correction of the deficiency is evidently unlikely, nor shall it be taken to limit the authority of qualified staff to initiate an earlier shutdown. Continued operation beyond a specified time limit shall be the subject of a written report to the AECB, unless the prior approval of the AECB has been obtained.

Where no immediate hazard exists, the reactor shall always be shut down in an orderly manner using the Reactor Regulating System, at a normal rate, having regard for any special circumstances which might tend to interfere with the retention of electrical service to the unit from the remainder of the power distribution system.

POINT LEPREAU
OPERATING POLICIES AND PRINCIPLES
0 - GENERAL

0.01 Operating Licence Issued by the AECB

An up-to-date copy of the Point Lepreau Nuclear Generating Station Operating Licence is to be enclosed herewith. Any restriction specified shall be automatically incorporated as the policy of this station.

0.02 Authorization of Operating Personnel

Only persons authorized by the AECB shall act as Station Manager, Production Manager, Technical Manager, Station Health Physicist, Shift Supervisor or Control Room Operator.

0.03 Delegation of Authority of Station Manager

In all sections of this document in which authorization by the Station Manager is prescribed, this shall be understood to mean the Station Manager or a designated alternate who shall be either the Production Manager or the Technical Manager.

0.04 Authority of Shift Supervisor

The duty Shift Supervisor has the responsibility and authority for the operation of the station, and the safety of all persons on site, unless, on the direction of the Station Manager, he is formally relieved of all or part of this responsibility and authority.

0.05 Station to be Adequately Staffed

There shall be sufficient personnel present at the generating station at all times to ensure its safe operation. Specifically, there shall be at least seven persons present. These shall include one Shift Supervisor and one Control Room Operator authorized by the AECB.

0.05 Station to be Adequately Staffed (Cont'd)

An authorized Shift Supervisor or Control Room Operator shall be in the control room at all times when there is fuel in the reactor unless, in the opinion of the Shift Supervisor, an unwarranted hazard exists. It is then the responsibility of the Shift Supervisor to authorize and supervise the immediate shutdown of the reactor if it is at power, and to ensure the orderly transfer of control to the Secondary Control Area.

0.06 AECB Approval for Modifications to Systems and Procedures

Prior approval of the AECB is required for any change to any Special Safety System or for any other change in equipment or procedure that, in the judgement of the Station Manager or an AECB Site Representative, would significantly affect the validity of current licensing submissions.

0.07 Observance of Federal and Provincial Regulations

The generating station will be operated in accordance with all applicable provincial and federal regulations.

0.08 Frequency of Tests on Systems

Special Safety Systems and other Safety-related systems shall be submitted to regular testing where the reliability or effectiveness of equipment can not be inferred from normal operating experience. The intervals between these tests will be consistent with reliability evaluations, explicitly or implicitly contained in current licensing submissions.

0.09 Operational Quality Assurance Program

All aspects of the operation of Point Lepreau Generating Station shall be in accordance with Q.A. procedures documented in the Operational Quality Assurance Manual and the associated Quality Reference Documents.

0.10 Maintenance Standards

All repairs to, and modifications of, station equipment shall be of a high quality and shall comply with applicable Codes and Standards.

0.11 Special Safety Systems

The term "special safety systems" describes the following four systems:

1. Shutdown System 1, which is comprised of SDS1 (BSI-68200/63733) and SOR's (BSI-31733)

2. Shutdown System 2, which is comprised of SDS2 (BSI-68300) and LISS (BSI-34700)

3. Emergency Core Cooling (ECC), which is comprised of:

   i) High pressure injection.

   ii) Medium pressure injection.

   iii) Low pressure injection.

   iv) Heat transport loop isolation.

   v) Boiler crash cooling.

4. Containment, which is comprised of:

   i) The concrete containment structure and all penetrations including 2 airlocks, the spent fuel discharge bay and the containment door.

   ii) Two dousing subsystems each composed of 3 dousing downcomers and associated logic.

   iii) The containment isolation system.

   iv) Reactor Building local air coolers supplied by Class III Power (16)

0.12 Unavailability of Special Safety Systems

The AECB prescribes a mandatory unavailability target of 10^{-3} year/year for each of the four Special Safety Systems.

The occurrence of random failures, and the unavailability of components due to testing or maintenance, are anticipated in the design. Sufficient redundant components are provided such that each Special Safety System would still be capable of performing in accordance with the design intent even with significant component failures present.

The Special Safety System impairments assumed to be present for the purposes of ensuring adequate availability are summarized in this document and represent the limiting conditions which may be tolerated during normal operation. Any further degree of impairment, while not necessarily being unsafe, would not be tolerable since the adequacy of the special safety system, in that state of impairment, may not have been demonstrated.

The failure of a component in a Special Safety System does not contribute to the unavailability or impairment of the system, after the component is placed in a "safe state", or if conditions are formally established under which the system is not required to be available.

0.13 Action Required on Discovery of Safety System Unavailability

If a special safety system is suspected of being unavailable, then the reactor shall be shut down in accordance with the actions specified on the following page, unless the prior approval of the AECB has been obtained for continued operation:

0.13.1 SDS1 or SDS2 Unavailable

The conditions which must be satisfied in order for SDS1 and SDS2 to be considered available are specified in section 6.18 of this document.

If either Shutdown System is found to be unavailable then an orderly shutdown shall commence immediately. Reactor power is to be at or below 10^{-4} F.P. within 30 minutes of discovery of the fault, with the primary circuit cooling at a normal rate.
The reactor is to be placed in a Guaranteed Shutdown State as soon as possible unless the repair time is estimated to be less than 8 hours from the discovery of the fault and the reactor will clearly remain poisoned out during this interval.
An acceptable assurance that the reactor will remain poisoned out for this 8 hour period is that the reactor has been operated continuously at greater than 75 percent full power during the 36 hours prior to the shutdown and power was then reduced rapidly in accordance with the above.

0.13.2 ECC Unavailable

The conditions which must be satisfied in order for ECC to be considered available with the reactor at power are specified in section 3.12 of this document.

If ECC is found to be unavailable then the reactor is to be shut down in an orderly manner within 4 hours unless repairs and testing may reasonably be expected to be complete within 8 hours of the discovery of the fault. Following the reactor shutdown, the primary circuit is to be cooled below 100°C and depressurized, except for the pressurizer, which need only be isolated.

0.13.3 Containment Unavailable

The conditions which must be satisfied in order for containment to be considered available with the reactor at power are specified in section 2.02 of this document.

If Containment is found to be unavailable then the reactor is to be shut down in an orderly manner within 4 hours unless repairs and testing may reasonably be expected to be complete within 8 hours of the discovery of the fault. Following the reactor shutdown, the primary circuit is to be cooled below 100°C and depressurized, except for the pressurizer, which need only be isolated.

0.14 "Safe State" for Special Safety System Components

For channelized components of the Shutdown Systems, the "safe state" shall be understood to refer to a condition in which the presence of any trip signal in another channel of that Shutdown System would result in the insertion of all available negative reactivity associated with that Shutdown System. This will normally be achieved by tripping the channel containing a suspect component.

For components of the Containment and Emergency Core Cooling systems, the "safe state" shall be understood to be the state or position that the component would assume in the performance of its function.

It is not possible to define a safe state for all Special Safety System components (especially those whose position would be required to change more than once during an accident sequence). Similarly, certain components may not be placed in a Safe State for reasons related to an increased risk of personal injury or equipment damage. Therefore although, in general, it is required that defective Special Safety System components be placed in the Safe State, deviations from this requirement may be permitted, subject to the condition that the continuing unavailability of any Special Safety System component not placed in a Safe State shall be assessed with respect to its probable effect on the overall unavailability of the system (having regard for the mandatory unavailability target).

0.15 Maintenance of Special Safety Systems

Components of Special Safety Systems shall be placed in a Safe State, where such a state exists, prior to performing planned maintenance, unless:

i) the Station Manager and the AECB have approved an alternative state, or
ii) the entire channel is placed in a Safe State (if applicable), or
iii) conditions have been established under which the system is not required to be available.

0.15 Maintenance of Special Safety Systems (Cont'd)

The method of performing planned maintenance on channelized systems shall be to put in Safe State, repair, test and return one channel to service prior to working on another channel of the same system, unless:

i) the Station Manager and the AECB have approved an alternative state, or
ii) conditions have been established under which the system is not required to be available.

0.16 Authorization for Maintenance

All maintenance of process and safety-related equipment must be approved beforehand by the Shift Supervisor. In addition, the approval of the Station Manager is also required whenever a significant deviation from a prescribed procedure is envisaged.

0.17 Radiation Protection

Protection of the public and operating personnel from radiation hazards shall be in accordance with the Radiation Protection Regulations (RD-01364-L2), issued by the Health Physics Department and approved by the AECB.

0.18 Gaseous and Liquid Emissions

Radioactive emissions in airborne and liquid effluents shall be controlled such that the dose to the public due to the combined effects of all emissions shall not exceed the limits prescribed by the AECB.

It is a design and operating target that 1 percent of the annual DEL's for each effluent pathway should not be exceeded. Any failure to comply with this target shall be investigated and prompt corrective action shall be taken as required.

Derived emission limits (DEL's) for each radionuclide are tabulated in Health Physics Document RD-01364-L1 (Derived Emission Limits for Radionuclides in Gaseous and Liquid Effluents), revisions to which are subject to the approval of the AECB.

0.19 Control of Radioactive Material

Handling and transportation of radioactive materials shall conform to the regulations specified in the Radiation Protection Regulations (RD-01364-L2).

0.20 Reporting Modifications to the AECB

The following shall be reported in the Quarterly Report to the AECB regardless of whether prior approval has been granted in accordance with section 0.06 (AECB approval for modifications to systems and procedures):

0.20.1 Any modification to the fuel.

0.20.2 Any significant modification to a safety-related system (including all modifications to Special Safety Systems).

0.20.3 Any significant modification to an operating procedure or to the responsibilities of authorized operating personnel.

0.21 Reporting of Incidents

The AECB shall be informed of the following within 24 hours:

0.21.1 Any breakdown of equipment or procedures which, but for the action of one or more special safety systems, would have resulted in significant fuel failures, or the release of radioactive material outside the generating station, or both.

0.21.2 Any sequence of events leading to the failure of a significant quantity of fuel.

0.21.3 Any breakdown of equipment or procedures which would prevent any special safety system from operating at least as effectively as is claimed in current licensing submissions.

0.21.4 Any coincident failure of two or more components in the same special safety system, whether causally-related or otherwise.

0.21.5 Any causally-related or common-cause failure of components in a process system and a special safety system.

0.21 Reporting of Incidents (Cont'd)

In general, the reporting of radioactive releases, lost sources, and significant radiation events, emergencies and transportation accidents, shall be in accordance with the summary given in section 8.0.3 of the Radiation Protection Regulations (RD-01364-L2). The reporting of incidents to agencies and jurisdictions other than the AECB shall be in accordance with contingency plans documented under RD-01364-L17.

0.22 Annual Report to the AECB

A review of station performance, including a summary of records and reports produced in accordance with sections 0.20 and 0.21, shall be sent to the AECB at least annually.

0.23 Overpressure Protection

Overpressure relief devices shall be set at or below the respective system design pressure and shall be tested in accordance with the requirements of the New Brunswick Department of Labour (NBDOL).

Vessels and pipe sections having no overpressure protection when isolated shall only be isolated if assurances exist that no source of energy input can arise during the period the vessel or pipe is not connected to a relief device.

POINT LEPREAU

OPERATING POLICIES AND PRINCIPLES

1 - SITE

1.01 Exclusion Area

There shall be no permanent habitation within the Exclusion Zone. Use of the land within the Exclusion Zone for other than licensed activities shall require AECB approval.

The Exclusion Zone, which extends to a radius of 914 metres from the reactor building, shall be posted in a manner acceptable to the AECB.

1.02 Contingency Plans

In order to ensure that no radiological or conventional contingency poses a threat to the general public or to operating personnel, contingency plans will be developed in cooperation with Provincial and Federal jurisdictions in accordance with RD-01364-L17.

POINT LEPREAU

OPERATING POLICIES AND PRINCIPLES

2 - BUILDING & STRUCTURES

2.01 Reactor Building - Containment System

Operation of the generating station shall be conducted so as to maintain the integrity of the containment structure and all other containment sub-systems. Any modification to the structure or to any subsystem which could change its containment or shielding properties must be approved by the Station Manager who shall obtain prior authorization of the AECB in accordance with section 0.06 (AECB approval for modifications to systems and procedures).

The integrity of the containment structure will be maintained in order to maintain a leakage rate no higher than 0.5% of the contained volume per day under a differential pressure of 123 kPa. A pressure test shall be performed periodically to confirm the leakage rate of the building. Such leakage tests shall be supplemented by periodic visual inspection of the containment boundary.

2.02 Minimum Conditions for Containment Availability

The following conditions are necessary in order for Containment to be considered available:

i) Containment boundary intact.

ii) At least 4 dousing downcomers with respective initiating logic available; water temperature 28°C or less; water level greater than 2.21 m above the entrance to the dousing downcomers.

iii) At least 1 isolation device either closed or available in each of the 16 automatically isolable penetrations; initiating logic available.

iv) At least 12 reactor building local air coolers available on Class III, with RCW available.

2.03 Containment Unavailability

2.03.1 All containment subsystems shall be available whenever the reactor is critical or whenever the primary temperature is at or above 100°C.

In the event that Containment becomes unavailable during normal operation, then the provisions of section 0.13.3 shall apply.

The reactor shall be shut down in an orderly manner within 4 hours unless repairs and testing are expected to be completed within 8 hours of the discovery of the fault. Following the reactor shutdown, the primary circuit shall be cooled at a normal rate and depressurized if repairs have still not been completed. The pressurizer may be excluded from this requirement.

2.03.2 The containment envelope shall not be deliberately breached unless the reactor is in a Guaranteed Shutdown State, the coolant temperature is below 100°C, and the prior approval of the AECB has been granted.

2.03.3 Containment subsystems shall be tested at defined intervals, in order to demonstrate that the total containment unavailability is no higher than 10^{-3} year/year.

2.04 Reactor Building Access Control

All regulations concerning access to specified areas of the Reactor Building shall be observed. No attempt shall be made to bypass or defeat the intent of any automatic interlock unless a greater hazard would be posed by failure to take such action, or an approved Safety Work Plan is in effect.

Normal entry to access-controlled areas shall be in accordance with the Radiation Protection Regulations, RD-01364-L2.

2.05 Reactor Building Flood Level

The dousing tank water level shall not exceed a height 2.64 m above the entrance to the dousing downcomers so that the depth of water in the reactor building basement would be acceptable in the event dousing is initiated.

POINT LEPREAU

OPERATING POLICIES AND PRINCIPLES

3 - REACTOR, BOILERS & AUXILIARIES

3.01 Primary Coolant

Operating and maintenance procedures shall ensure that every fuel bundle in the reactor is adequately cooled at all times.

From this general requirement the following specific limitations arise:

3.01.1 The reactor shall not be operated at greater than 0.2 percent of full power unless at least one primary pump is running in each loop and the running pumps form a permitted symmetrical combination.

The reactor power shall be limited to 2 percent of full power unless all four primary pumps are running. This shall be in effect until such time as it ceases to be a condition of the Operating License.

Process and neutronic trip setpoints shall be adjusted accordingly.

3.01.2 An appropriate flow rate shall be maintained in each fuel channel at all times. During the startup following any prolonged outage, a systematic check of channel exit temperatures is to be made at a power level of approximately 10 percent, prior to raising power. Power shall not be raised further until all channel flows have been so confirmed.

During all on-power refuelling operations, the respective channel exit temperature shall be monitored continuously. No attempt shall be made to refuel a channel having a defective temperature detector except where the channel is instrumented so as to provide a direct indication of flow.

A record shall be made of the differential pressure across the channel before and after fuelling.

If indications of low flow arise, during refuelling or otherwise, the reactor power shall be reduced until all channel exit temperatures are sub-cooled by a margin of not less than 5C°, and power shall not be raised until it has been confirmed that all channel flows are normal.

3.01 Primary Coolant (Cont'd)

3.01.3 A heat sink capable of rejecting the heat liberated in the primary coolant is to be available at all times. In addition, operating and maintenance procedures shall ensure that an alternative means of cooling the core is also available at all times. The preferred alternative heat sink under normal operating conditions is the Shutdown Cooling System.

3.02 Failed Fuel Detection

When the reactor is operating at greater than 80 percent of full power, then either the Gaseous Fission Product Monitor shall be available and in service, or alternatively manual sampling and analysis of the activity in each heat transport loop shall be conducted at least once per shift.

3.03 Primary Heat Transport System

The plant is to be operated and maintained in such a manner as to minimize the risk of loss of primary inventory through equipment failure or through openings in the primary pressure boundary created during maintenance. From this general requirement the following specific limitations arise:

3.03.1 Chemical impurities in the primary coolant are to be maintained within the limits prescribed by the Plant Chemistry Control Manual (IR-78200-05).

3.03.2 Chemical impurities in the steam generators and the remainder of the secondary cycle are to be maintained within the limits prescribed by the Plant Chemistry Control Manual (IR-78200-05).

3.03.3 Relief valve setpoints, reactor trip setpoints and operating procedures shall ensure that the primary coolant pressure is limited to 11.75 MPa(g) (1705 psig) under upset conditions, as measured at the outlet headers.

3.03.4 Maintenance procedures shall minimize the size and duration of unavoidable breaches of the primary pressure boundary.

3.03.5 All repairs to, or modifications of, the primary pressure boundary shall be of a high quality and shall conform to all applicable codes and standards.

3.03.6 Heating and cooling rates of primary and secondary components shall be controlled within limits in accordance with the design intent.

3.03 Primary Heat Transport System (Cont'd)

3.03.7 The integrity of the heat transport pressure boundary shall be monitored through surveillance, for example, of beetle alarms, dryer recovery rates, boiler blowdown and steam analysis, the annulus gas system, and the D_2O storage tank level. Any indication of an abnormal condition shall be promptly investigated and appropriate corrective action taken as necessary. An apparent rate of D_2O discharge exceeding 10 kg/h shall be the subject of immediate investigation. Furthermore, upon indication of leak rates exceeding limits specified in the Small LOCA APOP (APOP 08), The Steam Generator Tube Failure APOP (APOP 09), or the Annulus Gas System Operating Manual (OM 34980), the reactor will be shut down. Following the reactor shutdown the primary circuit will be cooled below 100 deg. C and depressurized as specified in the appropriate procedure.

3.04 Fuelling Limitations

The reactor shall be operated so as to reduce the anticipated incidence of fuel sheath defects to an acceptable minimum. No fuel bundle shall be operated with centre-line melting of the fuel. In addition, no fuelling strategy shall be adopted which would tend to invalidate the Accident Analysis detailed in current licensing submissions.

From these general requirements the following specific limitations arise:

3.04.1 The fuel management scheme shall ensure that the total heat transferred to the coolant from the highest powered bundle in any channel is subject to a nominal steady-state limit of 935 kW, as computed by the code RFSP. (The bundle power limit applicable to short term transients under normal thermohydraulic conditions is 1400 kW, based on centre-line melting of the fuel, however the channel power limit enforced by Regional Overpower Protection will be more restrictive in practice).

3.04.2 The fuel management scheme shall ensure that the total heat transferred from the fuel to the primary coolant in any given channel shall not exceed 7.3 MW under steady-state conditions, as computed by the code RFSP.

3.04.3 The net heat transferred from the fuel to the primary coolant shall not exceed the nominal rated thermal capacity of the reactor under steady state conditions, i.e. 2061.4 MW.

3.04.4 The fuel shall consist of only natural or depleted uranium dioxide assembled in bundles of approved design. The prior approval of the AECB shall be obtained for any specified change in composition or design.

3.04 Fuelling Limitations (Cont'd)

3.04.5 The rate of fuelling shall be limited such that the concentration of soluble poison in the moderator is restricted to the equivalent of 5 mk excess reactivity when operating in steady state conditions.

3.04.6 In order to limit the number of irradiated fuel bundles at risk in the event of an end fitting failure while refuelling, irradiated fuel bundles shall not be transferred from one channel to another in the course of routine fuelling.

3.04.7 Fuelling shall normally be performed with the reactor critical. Subcritical refuelling requires the approval of the Station Manager. If the reactor is refuelled while subcritical, a reactivity balance shall be performed before the reactor is next brought critical.

3.04.8 At power fuelling shall not be started if ECC is unavailable.

If fuelling is in progress when ECC is found to be unavailable, then the fuelling of that channel may be completed.

3.04.9 On reactor fuelling machine operations performed while the unit is shut down shall be in accordance with procedures approved by the Station Manager. These procedures shall specify the conditions necessary for ensuring that the ECC system is available or capable of being made available within the time period specified for ECC to act as an alternate heat sink.

3.05 Reactivity Control

The reactor shall be operated such that the Reactor Regulating System, acting alone, is capable of introducing sufficient negative reactivity to shut it down.

3.06 Heat Transport Iodine Limit

The plant is to be operated in such a manner as to minimize the release of radioactivity in the event of a loss of coolant accident. The quantity of radio-iodine in the heat transport system is to be monitored by routine sampling and will normally be maintained at as low a level as is readily achievable. Immediate corrective action shall be taken if the concentration of Iodine-131 in the coolant approaches 125 MBq/kg and the reactor shall be shut down if this specific activity exceeds, or seems likely to exceed, 500 MBq/kg.

3.07 Fuelling Machines

The fuelling machines may contain radioactive material and may also constitute part of the primary pressure boundary. The general considerations applicable to the heat transport system therefore apply, together with the following specific requirements:

3.07.1 All refuelling operations must have the prior authorization of the Shift Supervisor.

3.07.2 There shall be no operations involving the transfer of irradiated fuel inside the reactor building while Containment is unavailable, except for those necessary to safely dispose of any irradiated fuel which is being transferred when a containment deficiency is discovered.

3.07.3 In order to limit the number of irradiated fuel bundles at risk in the event of an end fitting failure while refuelling, irradiated fuel shall not be placed in adjacent chambers of a fuelling machine magazine. This does not apply in the event that a channel must be defuelled.

3.07.4 The use of the fuelling machines on the reactor under any mode of control other than fully automatic must be specifically authorized by the Shift Supervisor except when prompt manual intervention is required in response to indications of an unsafe failure. This authorization may be given verbally but should be noted in the Fuel Handling log.

3.07.5 The fuelling machine interlock bypass switches are to be left in the "not bypassed" position. The use of these switches must be authorized by the Shift Supervisor. If the switch is to remain bypassed beyond the change of shift, then a jumper record is required. Any use of the switches must be recorded in the Fuel Handling log. Whenever practicable, the jumpering of one specific set of permissive contacts should be considered preferable.

3.07.6 Following maintenance of a fuelling machine it is to be thoroughly tested and accepted by the Fuel Handling Supervisor or his delegate prior to use on the reactor.

3.07.7 No modification to the fuelling machines or to their controls shall be undertaken without the prior approval of the Station Manager.

3.08 Moderator System

The moderator is responsible for the cooling, integrity and operational readiness of various reactor systems including a number of reactivity control devices. In addition the moderator may contain hazardous impurities including activation products. The following specific requirements therefore arise:

3.08.1 In order to eliminate the risk of an explosive recombination of radiolytic gases, the concentration of hydrogen and deuterium in the moderator cover gas will be maintained at as low a level as is readily achievable and shall be continually monitored. Corrective action will be taken if the on-line analyzer indicates a concentration of 2 percent by volume or more. If the concentration reaches 4 percent a sample is to be taken for laboratory analysis as soon as possible. If this analysis confirms a deuterium concentration in excess of 4 percent then an orderly shutdown is to commence. If the concentration either reaches 6 percent or is indicated to be in excess of 4 percent and seems likely to exceed 6 percent before results of laboratory analysis are available, then the assumption should be made that the on-line analyser is correct and an orderly shutdown must commence immediately. The reactor shall not be operated for more than 1 hour with the deuterium concentration suspected to be in excess of 4 percent by volume.

3.08.2 The moderator temperature, level, and flow shall be maintained at values sufficient to ensure adequate cooling of calandria structures and reactivity control mechanisms.

Specifically, during normal operation, the calandria outlet temperature shall not exceed 80°C; calandria level shall not be less than 7550 mm; moderator pump differential pressure shall not be less than 280 kPa. (These limits are enforced by Reactor Regulating System action).

3.09 Moderator Purification

Except during a planned approach to criticality, the moderator purification system shall not be operated while the reactor is sub-critical unless the prior approval of the Station Manager has been obtained.

3.10 Void Coefficient of Heat Transport D_2O

The void coefficient (void reactivity) shall not be modified by adding poison to the primary coolant without the authorization of the Station Manager. The isotopic concentration of the coolant shall at all times exceed 97.43 percent D_2O by mass (97.15 atom percent) when the reactor is in operation.

3.11 Shield System

The end shields and shield tank shall be maintained at levels and temperatures adequate to prevent thermal distortion of calandria components, and to ensure acceptable attenuation of radiation from the core.

Reactor Regulating System action shall occur at an end shield cooling system level not more than 0.3 m below the top of the End Shield Tank. This corresponds to a measured static head of 128 kPa(g).

3.12 Emergency Core Cooling System

3.12.1 Minimum conditions for ECC availability

All of the following conditions are necessary in order for ECC to be considered available when the reactor is at power:

i) Initiating logic available.

ii) High pressure ECC gas pressure not less than 4.04 MPa(g)

iii) Level in HP water storage tanks not lower than 9.45m.

iv) At least one gas and water flow path from HP accumulators available to every heat transport header via valves which are either available or in the safe state.

v) At least one ECC pump available, together with associated recirculation and high pressure to medium pressure transfer valving and logic.

vi) Reserved ECC water supply in dousing tank available.

vii) Flow path available to the above pump from reactor building basement floor, together with a sump level instrument loop for either of the sumps and a dousing tank level instrument loop.

viii) ECC heat exchanger and RCW available.

ix) At least one loop isolation valve either closed or available in all lines connecting heat transport loops.

x) At least 10 main steam safety valves and associated pneumatic controls available.

3.12 Emergency Core Cooling System (Cont'd)

3.12.2 ECC Unavailability

If ECC becomes unavailable during normal operation then the provisions of paragraph 0.13.2 shall apply.

The reactor shall be shut down in an orderly manner within 4 hours unless repairs and testing are expected to be completed within 8 hours of the discovery of the fault. Following the reactor shutdown, the primary circuit shall be cooled at a normal rate and depressurized if repairs have still not been completed. The pressurizer may be excluded from this requirement.

3.12.3 Planned Unavailability of ECCS

The ECC system should always be available whenever the primary coolant temperature exceeds 100°C. It shall only be blocked in accordance with operating procedures approved by the Station Manager and the AECB.

Maintenance on the ECC System which requires that it be removed from service shall be subject to the approval of the Station Manager and shall not be undertaken until the heat transport system has been cooled to below 100°C.

3.12.4 Testing of ECCS

ECC Components and sub-systems shall be tested at a frequency consistent with the mandatory unavailability target of 10^{-3} year/year.

3.12.5 Modifications to ECCS

Modifications to the logic circuits or other hardware of the ECC system shall only be made with the approval of the Station Manager and the AECB.

3.12.6 ECC to be Available During Fuelling

At power fuelling shall not be started if ECC is unavailable. If fuelling is in progress when ECC is found unavailable, then the fuelling of that channel may be completed. ECC shall not be made unavailable when fuelling is in progress.

On reactor fuelling machine operations performed while the unit is shut down shall be in accordance with procedures approved by the Station Manager. These procedures shall specify the conditions necessary for ensuring that the ECC system is available or capable of being made available within the time period specified for ECC to act as an alternate heat sink.

3.12.7 Re-poising ECC

Paragraphs 0.13.2 and 3.12.2 shall not preclude pressurizing the heat transport system as a necessary step in repoising the ECC system.

3.13 D_2O Storage Tank Inventory

The quantity of heavy water in the heat transport D_2O storage tank shall be maintained, for all reactor power levels, at a value consistent with analysis documented in current licensing submissions. The tank shall normally be maintained at a level of 1.81 m (or higher). Continued operation with the level below 1.81 m shall be in accordance with procedures approved by the Station Manager and the AECB.

3.14 Cooling and Shielding of Irradiated Fuel

Irradiated fuel shall be adequately cooled and shielded at all times.

3.15 Irradiated Fuel Storage Capacity

Sufficient spare capacity shall be maintained in the irradiated fuel storage bay to permit the removal of all 4560 fuel bundles from the reactor at any time.

3.16 Main Steam Safety Valves

3.16.1 The main steam safety valves (MSSV's) shall be routinely tested in accordance with the requirements of the New Brunswick Department of Labour.

3.16.2 The MSSV's shall be capable of limiting boiler pressure to 5.57 MPa(g) (110 percent of the design pressure) during a postulated loss of regulation during which no other steam discharge path is available. Accordingly, reactor trip setpoints shall be consistent with a limitation on bulk reactor power of not more than 7.75 percent of full power for each MSSV which is available for overpressure protection. (The unavailability of any single valve would thus have no effect on normal full power operation).

3.16.3 The ability to pneumatically open the MSSV's shall be demonstrated by routine testing of these valves and circuits at a frequency consistent with the reliability claimed in current licensing submissions.

3.17 Auxiliary Feedwater System

3.17.1 The auxiliary feedwater system shall be available whenever the heat transport temperature exceeds 100°C.

3.17.2 If the system becomes unavailable and cannot be returned to service within 24 hours then the reactor shall be shut down and the heat transport system cooled.

3.17.3 Planned maintenance of either the electrically driven pump or the steam driven pump may be performed at any time with the heat transport system hot provided the other pumpset is available. Any maintenance should be planned and executed so as to minimize the period of time that the pump is unavailable.

3.17.4 The availability of the system, including the starting logic of both pumps, shall be demonstrated by routine testing at a frequency consistent with the availability claimed in current licensing submissions.

3.18 Boiler Make-up Water

The boiler make-up water system (BMW) should normally be available and is to be routinely tested at a frequency consistent with the reliability claimed in licensing submissions. (Further restrictions on BMW unavailability appear under section 7.04 - Emergency Water System).

3.19 Control of Prescribed Substances

Heavy water, sources containing radioactive material in excess of scheduled quantities, and the fuel, are all substances prescribed by the regulations made pursuant to the Atomic Energy Control Act. These substances shall be acquired, stored, used, and accounted for in accordance with the requirements of the AECB.

POINT LEPREAU

OPERATING POLICIES AND PRINCIPLES

4 - TURBINE, GENERATOR AND AUXILIARIES

4.01 Emergency Stop, Reheat Stop and Release Valve Testing

The emergency stop, reheat stop and release valves shall be trip tested periodically. These tests shall be performed in such a manner as to minimize the effect on reactor and turbine operation.

4.02 Governor Valve and Intercept Valve Testing

The governor valves and intercept valves shall be tested periodically for freedom of movement and for trip capability when the turbine generator is operating for prolonged periods at steady conditions.

4.03 Overspeed Trip Mechanism Testing

During operation of the turbine generator, the overspeed bolts shall be tested periodically for freedom of movement. The overspeed trip mechanism shall be tested periodically by actually overspeeding the turbine generator. Whenever the overspeed trip setting is adjusted, or maintenance work could have disturbed the overspeed trip mechanism, an overspeed test shall be performed on startup.

4.04 Turbine to be Shut Down if Trip Gear is Suspect

On any indication that the turbine tripping system is incapable of safely shutting down the unit on overspeed, the turbine generator shall be shut down. Unloading shall be controlled to reduce the risk of a load rejection.

4.05 Turbine Loading Rate

The loading rate should be limited in order not to exceed the prescribed thermal stress limits.

4.06 Operating Limits of Turbine

Heating and cooling of the turbine shall be controlled in order to maintain vibration, eccentricity, differential expansion and the difference between the internal and external temperature of the metal within the limits recommended by the manufacturer.

4.07 Quality of Turbine Regulating Oil

Operating and maintenance procedures shall maintain the quality of the regulating oil within prescribed limits.

4.08 Generator Load

The alternator load shall be such that the temperature of the windings does not exceed the prescribed limits.

4.09 Generator Hydrogen Pressure and Purity

The purity and the pressure of the hydrogen used to cool the generator shall be maintained within prescribed limits during normal operation.

POINT LEPREAU

OPERATING POLICIES AND PRINCIPLES

5 - ELECTRICAL SYSTEMS

5.01 Changes in Output Relay Settings to be Limited

Station output relay settings shall not be adjusted, except for calibration purposes, without the approval of the System Protection Engineer.

5.02 Protective Relaying to be Poised

Normally, both primary and backup protective systems shall be poised while the protected apparatus is energized. Either, but not both systems, may be removed from service for maintenance while the apparatus is energized.

If both protective schemes fail while the apparatus is energized, every effort shall be made to restore protection, or the apparatus shall be de-energized without delay.

5.03 Normal Status of Standby Diesel Generators

The normal status of the standby generators is when both generators are available, shutdown and selected to start automatically in the event of a Class IV power failure or LOCA signal, to supply power to the respective 4.16 kV Class III buses. Class III buses shall only be paralleled in accordance with procedures approved by the Station Manager.

5.04 Standby Generator Unavailability

If one standby generator becomes unavailable, the other shall be started, synchronized and partly loaded within 1/2 hour.

If both standby generators become unavailable then the reactor shall be shut down within 8 hours and the primary circuit cooled.

During the period when both standby generators are unavailable:

i) no maintenance will be carried out which would increase the probability of a loss of Class IV power.

ii) no operation or maintenance will be carried out which would impair the ability to provide for effective fuel cooling by natural circulation should a total loss of Class IV and Class III power occur.

5.05 Standby Generator Diesel Fuel Inventory

The standby generator fuel oil reserve shall be sufficient to permit continuous full load operation of one standby generator for at least 5 days.

This requirement will normally be satisfied by maintaining a 5-day reserve in each of the supply tanks. This corresponds to a minimum level of 3 m.

5.06 Testing of Diesel Standby Generator Units

Standby diesel generators and the associated starting logic are to be tested regularly at a frequency consistent with the availability claimed in current licensing submissions.

5.07 Class I Power Supply

The full capability to supply Class I power to non-interruptable station loads shall normally be maintained.

Class I batteries shall be kept fully charged.

All maintenance which results in reduced capability or reliability of the Class I supply system shall be carried out using procedures approved by the Station Manager. If a battery bank is to be made unavailable for maintenance then the corresponding diesel generator shall be started up to ensure continuity of supply to the Class I rectifiers.

If circumstances arise in which it is not practicable to comply with the previous requirement due, for example, to a failure of a standby generator, then Class I power may remain solely dependent on Class IV for an interval not exceeding 8 hours with the reactor at power if a restoration of Class I reliability may reasonably be anticipated within this interval.

5.08 Class II Power Supply

During normal operation, power will be supplied to the 600 V Class II bus bars through the three-phase inverters and to the 120 V bus bars through the single-phase inverters. If an inverter is unavailable because of a breakdown or for maintenance, then a diesel unit shall be started up within 1/2 hour in order to ensure continuity of supply to the corresponding Class II bus.

If circumstances arise in which it is not practicable to comply with the previous requirement due, for example, to a failure of a standby generator, then Class II power may remain solely dependent on Class IV for an interval not exceeding 8 hours with the reactor at power if a restoration of Class II reliability may reasonably be anticipated within this interval.

The method which shall be used for maintenance and/or testing is to work on one inverter at a time unless the Station Manager has approved an alternative course of action.

5.09 Emergency Power Supply

The normal state will be with both emergency power diesels available, shut down and ready to be started (manually) when necessary.

5.10 Emergency Power Supply Diesel Fuel Inventory

The emergency power supply diesel fuel reserve shall normally be sufficient to permit continuous operation of either diesel for at least 5 days under worst-case loading conditions. This requirement may be satisfied by keeping the supply tank at least 55 percent full.

5.11 Testing of the Emergency Power Supply Diesels

Both emergency power units shall be tested regularly at a frequency consistent with the availability claimed in current licensing submissions.

5.12 Planned Maintenance of Emergency Power Supply Diesels

Planned maintenance of an emergency power unit may be performed at any time, provided the other unit is available.

5.13 Unavailability of an Emergency Power Diesel Generator

If an emergency generator becomes unavailable, the necessary repairs shall be completed as soon as possible, and the frequency of testing shall be increased on the usable unit until both units are available. If both units become unavailable, and cannot be repaired within 2 days, the reactor shall be shut down in an orderly manner, and the primary circuit cooled to below 100°C.

5.14 Electrical System Maintenance

In performing electrical system maintenance, the method which shall be used, unless the approval of the Station Manager has been given for an alternative, is to confine maintenance to either the "odd" or the "even" sections of the system at any one time.

5.15 Class IV Power Supply

5.15.1 With the unit on line, the normal status of the 13.8 kV Class IV distribution buses is when the "even" bus is supplied by the Unit Service Transformer (UST) and the "odd" bus is supplied by the System Service Transformer (SST).

5.15.2 If circumstances arise in which it is necessary to supply both 13.8 kV buses from the UST for more than 2 hours with the unit on line then a standby diesel generator shall be started and loaded, and an assessment of the repair time shall be given to the Station Manager as soon as possible. Reactor power shall not be increased.

If the estimated repair time is less than 48 hours then, with the approval of the Station Manager, the reactor may continue to be operated. The AECB shall be informed of this decision within 24 hours.

If the repair time is likely to exceed 48 hours, then, at the discretion of the Station Manager, the reactor shall either be shut down, or an alternative proposal shall be submitted to the AECB, seeking approval to operate for a further specified period of time.

5.16 Testing of Transfer Logic

Periodic testing shall be conducted in order to demonstrate the ability to retain Class IV power on both 13.8kV buses should either of the normal power supplies be lost, and to demonstrate also the capability for providing standby Class III power should a loss of Class IV power occur.

The associated functions of the automatic transfer scheme shall be tested periodically by de-energizing the respective buses, under carefully controlled conditions, such that the correct functioning of this equipment is demonstrated at intervals not exceeding 2 years. This shall not be taken to require that all such testing be completed at one time.
In addition, satisfactory evidence of the correct functioning of equipment during an unplanned event may be accepted in lieu of a planned test of such specific equipment.

POINT LEPREAU

OPERATING POLICIES AND PRINCIPLES

6 - INSTRUMENTATION AND CONTROL

6.01 Control Room Operation

Controls in the main and secondary control rooms, and the associated Control Equipment Rooms, shall only be operated by, or under the direction of, authorized personnel.

6.02 Secondary Control Room

Maintenance and surveillance procedures shall ensure that monitoring and control functions provided in the Secondary Control Room are available at all times.

6.03 Manual Control of Reactivity Mechanisms

Manual control of any reactivity mechanism shall be conducted in accordance with procedures approved by the Station Manager and by the AECB.

6.04 Authorization for Increase in Power

The reactor shall be started up, or its power increased, only by, or with the approval of, the Shift Supervisor.

6.05 Control Computer Software Changes

No program change shall be implemented in either operating control computer if such a change would tend to invalidate any current licensing submission, or which would be contrary to the intent of Operating Policies and Principles.

Program changes shall only be implemented in accordance with procedures approved by the Station Manager (Station Instruction SI-01365-P13).

6.06 Access to Computer Memory

Access to core and to protected areas of disk memory of the control computers must be authorized by the Shift Supervisor. Changes shall be in accordance with the previous section (6.05) and SI-01365-P13.

6.07 Modifications to the Regulating System

Equipment associated with the Reactor Regulating System which is not under the direct control of the Control Room Operator shall not be adjusted without the authorization of the Shift Supervisor.

6.08 Sequence for Withdrawal of Absorber and Adjuster Rods

Rods shall normally be inserted and withdrawn in a sequence in accordance with the design intent.

6.09 Reactor Regulating System Maintenance

The method of performing maintenance, which shall be used unless the Station Manager has approved an alternative, shall be to isolate, repair, check, and return one channel to service prior to working on other channel.

Reactor power during such maintenance shall be sufficient to produce reliable signals from instrumentation, so that proper functioning may be demonstrated. A reactor power level of 10^{-5} full power or higher will be considered adequate for testing ion chambers; 5% full power or higher for in-core detectors.

The preferred state for maintenance on the liquid zone control system is with the reactor shut down.

All regulating system protective functions shall be subject to testing at defined intervals.

6.10 Availability of the Regulating System

The regulating system shall be available at all times unless conditions are established under which all or part of the system may be unavailable according to procedures approved by the Station Manager and by the AECB.

6.11 Independence of Regulating and Protective Functions

The existing degree of independence of both shutdown systems and the regulating system and of each channel of the shutdown systems must always be maintained.

6.12 Modifications to Shutdown Systems

Modifications to either shutdown system (including modifications to the associated Programmable Digital Comparators) shall only be made with the approval of the Station Manager and the AECB.

6.13 Changes to Shutdown System Trip Setpoints

Any changes to the trip setpoints of the shutdown systems must be authorized by the Station Manager and approved by the AECB. This requirement is automatically fulfilled if the change is preselected by a handswitch provided for this purpose.

6.14 Neutron Overpower Trip Effectiveness

Notwithstanding the provisions of section 6.08 (Sequence for withdrawal of Absorber and Adjuster Rods), the reactor power shall be limited, and overpower trip setpoints shall be set, such that the neutron overpower trips on SDS1 and SDS2 are as effective as is claimed in current licensing submissions, for all configurations of the mechanical reactivity control devices.

6.15 Maintenance of Shutdown Systems

6.15.1 The reactor power during maintenance of the neutron power instrumentation, including linear and rate log power instruments (of either shutdown system) shall be sufficient to produce reliable signals from instrumentation, and to permit testing, unless the Station Manager and the AECB have approved an alternative. 10^{-5} FP and 5% FP are adequate power levels for ion chamber and in-core detector maintenance respectively.

6.15.2 Planned maintenance on a shutdown system channel shall be performed with that channel rejected (i.e. tripped) unless the Station Manager and the AECB have approved an alternative procedure, or unless conditions have been established under which the shutdown system is not required to be available.

6.15.3 Maintenance on shutdown systems should normally be arranged such that only one shutdown system is undergoing maintenance at any given time, however the Shift Supervisor has the authority to approve work on both shutdown systems simultaneously, at his discretion. Whenever practicable, different workmen shall be employed on each of the two systems.

6.15 Maintenance of Shutdown Systems (Cont'd)

6.15.4 Maintenance on a given shutdown system shall be confined to one channel at a time during normal operation unless an alternative course of action would be in accordance with section 6.15.2 or 6.15.5.

6.15.5 If maintenance is in progress on one channel of a shutdown system and an unsafe failure is detected in another channel of the same system, then operation may continue, and there shall be no requirement to place the faulted channel in a safe state, provided that the channel undergoing maintenance is in the safe state. The procedure which shall be used to recover from this abnormal condition is to test and return the first channel to service as quickly as practicable and then reject the faulted channel. No action should be taken which might give rise to a process upset.

6.15.6 Continued operation with one channel in a safe state (for any reason) is permissible for a period of up to 1 week, provided that the inability to test the other channels does not lead to an earlier conflict with the requirement to demonstrate compliance with the mandatory unavailability target.

6.16 Shutdown System Trip Channel to be Rejected if Trip Inoperable

If any trip function is known to be inoperable, the respective channel shall be tripped.

This does not immediately apply if another channel is already tripped. In this case every effort shall be made to test and return this channel to service and the faulted channel shall then be tripped.

The trip logic of one shutdown system may remain dependent on the functioning of a single trip chain for an interval not exceeding 8 hours if it is reasonable to anticipate that at least one other channel will be tested and returned to service within this interval. Otherwise the reactor shall be shut down.

6.17 Testing of Shutdown Systems

Testing of SDS1 and SDS2 shall be performed at regular intervals, in order to demonstrate an unavailability no higher than 10^{-3} year/year for each shutdown system. Such testing shall include routine sampling of the liquid poison tanks associated with SDS2. The poison concentration shall also be checked after any action or event which could have modified the concentration.

6.18 Shutdown System Availability

6.18.1 A Shutdown System shall only be considered available if, on demand, it is capable of inserting negative reactivty at the rate and to the depth assumed in safety analysis documented in current licensing submissions and if it would be capable thereafter of maintaining an adequate shutdown margin.

6.18.2 For SDS1, compliance with the previous paragraph is not assured if less than 26 shutoff rods are poised and available, regardless of the position of the other rods.

For SDS2, compliance with the previous paragraph is not assured if more than one poison tank is isolated, or if the helium storage tank pressure is less than 7.38 MPa(g) or if the poison concentration in more than one tank is less than 8000 ppm of Gadolinium.

6.18.3 If a Shutdown System becomes unavailable, then the provisions of section 0.13.1 shall apply. The reactor shall be shut down in an orderly manner within 30 minutes, and the primary circuit then cooled to below 100°C. The reactor shall then be placed in a Guaranteed Shutdown State unless the fault can be corrected within 8 hours of its discovery during a period in which the reactor is certain to have poisoned out.

This does not apply if the unavailability is due to a trip and if action is being taken to repoise the respective system.

6.18.4 The reactor shall not be made critical unless both shutdown systems are available.

6.18.5 If, during normal operation, a trip occurs, the shutdown system involved shall be re-poised as soon as possible consistent with overall plant safety. When SDS1 is re-poised after being tripped, reactivity shall be controlled so as to ensure the reactor does not go critical on withdrawal of the shut-off rods.

6.19 Action to be taken if Injection Valve Unavailable

If a liquid injection shutdown system gas injection valve is known to be defective and cannot be guaranteed open, then the two gas valves associated with the channel which is common to the other two parallel flow paths shall be guaranteed open, and normal operation may continue for a period not exceeding 1 week with the valves in this state.

6.20 Guaranteed Shutdown States

The following conditions define the guaranteed shutdown states:

The calandria shall be kept at its rated level (100% full) but the moderator shall be poisoned with a poison concentration equivalent to 21 ppm of Boron if the heat transport system is guaranteed depressurized, or 37 ppm if not.

Appropriate administrative procedures shall guarantee that the purification system remains isolated in order to prevent any removal of poison from the moderator, and shall ensure that all sources for adding D_2O to the moderator system are guaranteed isolated. In addition a spool piece provided for the purpose of guaranteeing the status of purification flow is to be removed.

The concentration of poison in the moderator is to be checked periodically throughout the guaranteed shutdown period. When Gadolinium is used as the moderator poison, administrative procedures shall ensure that the poison remains properly dispersed in the moderator throughout the interval in which the guaranteed shutdown state is in effect. The prior approval of the Station Manager and the AECB is required for any procedure having any potential to cause contamination of the moderator and hence precipitation of Gadolinium.

Temporary reinstatement of purification flow (for the purpose of moderator chemistry control), or modification to guaranteed conditions or devices, shall be subject to the specific approval of the Station Manager, and the AECB, on each occasion that guaranteed conditions must be altered.

6.21 Preferred Guaranteed Shutdown State

The method for keeping the reactor in a Guaranteed Shutdown State which shall be used, unless an alternative has been approved by the Station Manager, is the overpoisoning method, with the heat transport system not guaranteed depressurized (i.e. with the feed pumps available).

At least one shutdown system shall remain available whenever a Guaranteed Shutdown State is in effect unless the Station Manager and the AECB have approved an alternative set of conditions.

If, for any reason, it is necessary to drain the moderator to the extent that one or both shutdown systems will become unpoised, then the reactor shall be guaranteed shutdown in accordance with procedures and work plans approved by the Station Manager and by the AECB.

6.22 Isotopic Concentration of Neutron Poisons to be Checked Prior to Use

The isotopic concentration of Boron and Gadolinium salts intended for use as neutron poisons shall be verified prior to their introduction into any reactor system.

6.23 Indication of Neutron Flux to be Available

A continuous indication of the neutron flux and its log rate shall be displayed in the main control room at all times.

During a prolonged shutdown period, if the neutron flux is likely to fall below the operating range of the regulating system, then special start-up instrumentation shall be installed before the flux reaches such a low level.

POINT LEPREAU

OPERATING POLICIES AND PRINCIPLES

7 - MISCELLANEOUS PLANT SYSTEMS

7.01 Raw Service Water and Recirculated Cooling Water

The RSW and RCW systems shall normally be available on demand.

Components of these systems shall be subject to routine testing where claims as to their availability cannot be supported by reference to routine operating experience.

Neither system shall be taken out of service if such action would conflict with the requirements of 3.01.3 (Alternative heat sink), 2.02 (Containment Availability), or 3.12.1 (ECC Availability).

The RCW temperature shall be limited to a safe value and the reactor is to be shut down immediately in the event that an unsafe temperature excursion is detected or appears to be imminent.

7.02 Firewater System

The availability of the firewater system shall be demonstrated by routine testing of pumps and components.

The removal from service of the fire water supply system, the fire detection system, or of portions of these systems, shall be in accordance with procedures approved by the Station Manager.

7.03 Ventilation System

The ventilation system and D_2O vapour recovery system shall be operated so as to maintain the flow of air from zones with a low probability of contamination toward zones with a higher probability of contamination.

7.04 Emergency Water System

The emergency water system, including the emergency boiler make-up water sub-system, shall normally be available on demand and shall not be taken out of service if such action would conflict with the requirements of 3.01.3 (Alternative heat sink). If the Emergency Water System becomes unavailable, and cannot be repaired within two days, then the reactor shall be shut down and the primary circuit cooled to below 100°C.

7.05 On-site Freshwater Reservoir

An adequate level shall be maintained in the on-site reservoir at all times, consistent with sections 3.01.3 (Alternative heat sink), 7.02 (Firewater system), and 7.04 (Emergency Water System).

Consultative Document

Document de consultation

Atomic Energy Control Board

Commission de contrôle de l'énergie atomique

DOCUMENT DE CONSULTATION C-45

Projet de guide de réglementation

GUIDE DE PLANIFICATION D'URGENCE À L'EXTÉRIEUR DES INSTALLATIONS NUCLÉAIRES

Publié pour commentaires,

le 11 avril 1984

Canada

Ce document de consultation est publié dans le but de fournir au public l'occasion d'examiner le projet de réglementation avant qu'il soit adopté dans sa forme définitive. Vous êtes invités à faire parvenir vos commentaires à l'adresse ci-dessous avant le 11 JUILLET 1984.

Sauf avis contraire de la part de l'envoyeur, une copie de tous les commentaires reçus sera placée dans la salle des documents officiels aux bureaux de la CCEA.

Prière d'adresser vos commentaires à:

Section, Effets sur la santé et documents
de réglementation
Commission de contrôle de l'énergie atomique
C.P. 1046
Ottawa (Ontario)
CANADA
K1P 5S9

TEXTES DE RÉGLEMENTATION DE LA CCEA

1. Le choix d'emplacement, la conception, la fabrication, la construction, la mise en service, l'exploitation et le déclassement d'installations nucléaires ou la production, la possession, l'utilisation et l'élimination de substances prescrites, au Canada ou sous contrôle canadien, sont assujettis aux dispositions de la Loi sur le contrôle de l'énergie atomique et de son Règlement d'application, dont l'administration relève de la Commission de contrôle de l'énergie atomique (CCEA).

2. En plus du Règlement susmentionné, la CCEA utilise trois catégories de textes de réglementation. En voici une courte description.

   Conditions générales d'autorisation de permis - ensemble de conditions types figurant dans tous les permis similaires délivrés par la CCEA, à moins de circonstances exceptionnelles;

   Déclarations de principe en matière de réglementation - déclarations laissant clairement entendre que certaines "exigences" qui ne figurent ni dans le Règlement ni dans les conditions des permis sont obligatoires ou que certaines exigences doivent être respectées d'une façon déterminée laissant également entendre que la CCEA se réserve le droit de permettre des écarts ou d'envisager d'autres façons d'en arriver aux mêmes fins, lorsque ces façons semblent convenir; et

   Guides de réglementation - directives ou conseils donnés sur tout aspect de la réglementation assurée par la CCEA mais formulés de façon moins rigoureuse que dans les déclarations de principe.

3. Lors de l'élaboration de ses textes de réglementation, la CCEA en publie d'abord le projet à titre de Document de consultation, afin de connaître les commentaires du secteur nucléaire et du grand public, avant que le projet de texte de réglementation paraisse sous sa forme définitive. Dans certains cas, après l'achèvement de la période réservée aux commentaires, la Commission peut faire mettre le document de consultation à l'essai pratique pour un temps limité. Après cette période d'essai, on demande encore une fois l'opinion du public, avant que le document révisé soit publié sous sa forme définitive.

4. Tout commentaire sur les documents de consultation et toute suggestion à l'égard des nouveaux textes de réglementation ou ceux déjà en vigueur sont les bienvenus; il suffit de les transmettre à la section des Effets sur la santé et documents de réglementation de la CCEA.

5. On peut se procurer des exemplaires des documents de consultation et des textes de réglementation, dans les deux langues officielles, en s'adressant au Bureau d'information publique. Toute demande de renseignements techniques ou d'interprétation des textes devrait être acheminée au Bureau susmentionné.

6. L'adresse de la CCEA est la suivante:

   Commission de contrôle de l'énergie atomique
   C.P. 1046
   Succursale "B"
   OTTAWA (Ontario)
   CANADA K1P 5S9

   Renseignements: (613) 995-5894

BUT ET PORTÉE

Ce guide a pour but d'aider les autorités provinciales et municipales à établir, de concert avec les exploitants d'installations nucléaires, des plans d'urgence en cas d'incidents qui auraient des effets dangereux hors du site. Le guide s'applique aux réacteurs nucléaires, aux usines d'eau lourde, aux raffineries et aux usines de fabrication de combustible nucléaire autorisés en vertu du Règlement sur le contrôle de l'énergie atomique.

TABLE DES MATIÈRES

GUIDE DE PLANIFICATION D'URGENCE À L'EXTÉRIEUR DES INSTALLATIONS NUCLÉAIRES

INTRODUCTION

Aux termes du Règlement sur le contrôle de l'énergie atomique, les installations nucléaires au Canada sont autorisées à exercer leurs activités en vertu d'un permis délivré par un organisme fédéral, la Commission de contrôle de l'énergie atomique (CCEA). Avant de délivrer un permis d'exploitation, la CCEA s'assure que l'emplacement, la conception et la construction de l'usine, de même que la compétence du personnel d'exploitation, sont tels que les risques d'émission de matières dangereuses en quantité suffisante pour constituer un danger pour la santé publique sont extrêmement minimes. Néanmoins, il est prudent de prévoir que de telles émissions peuvent se produire et de mettre au point des plans d'urgence dont les objectifs sont de minimiser tout danger immédiat grâce à une action rapide et de réduire les répercussions ultérieures en assurant un contrôle adéquat.

Parmi les conditions de délivrance du permis, la CCEA exige que le titulaire de permis mette au point un plan visant à répondre aux situations d'urgence à l'intérieur de l'installation. Ce plan vise surtout les situations qui ne toucheront pas la population. En outre, il faut tenir compte du fait que le titulaire de permis est tenu d'aider à répondre à des situations beaucoup moins susceptibles de se produire lorsque l'émission de matières dangereuses dépasse les limites du site. Pour répondre de façon appropriée à une telle situation, il peut être nécessaire d'obtenir la participation des administrations municipales, des gouvernements provinciaux et des ministères et organismes fédéraux.

Pour ce qui est des situations d'urgence où la santé et la sécurité de la population sont mises en danger, le rôle des autorités fédérales est triple:

1. répondre à toute demande d'aide des autorités provinciales responsables;

2. rassembler et diffuser, suivant les besoins, des renseignements ayant trait à la santé et à la sécurité;

3. assurer les communications avec les États-Unis.

La CCEA n'aura habituellement aucune responsabilité directe au titre de la préparation et de l'exécution des plans d'urgence, mais on s'attend qu'elle offre sa collaboration et ses services de consultation dans le cadre de l'initiative fédérale. (Cependant, la CCEA peut déclarer l'état d'urgence si la sécurité des matières ou des installations nucléaires était menacée par des terroristes.)

Par conséquent, la CCEA prendra en charge les activités suivantes:

1. définir l'ampleur de l'émission de matières qui constituerait une situation d'urgence à l'extérieur de l'installation autorisée;

2. exiger du titulaire de permis qu'il collabore avec des autorités publiques pour mettre au point et assurer l'exécution coordonnée d'un plan d'urgence;

3. aider, sur demande, à la mise au point d'un plan d'urgence à l'extérieur d'une installation nucléaire en collaboration avec les autorités publiques et le titulaire de permis;

4. évaluer le plan et donner des conseils sur l'acceptabilité de ce plan d'urgence à l'extérieur d'une installation nucléaire.

1. NATURE DU DANGER

1.1 Caractéristiques générales et effets des émissions

Toute émission dans l'atmosphère découlant d'un accident à une installation nucléaire formerait un "nuage" ou un "panache"; toutefois, ce dernier peut ne pas nécessairement être visible. La concentration des matières présentes dans ce panache dépend de la quantité initiale émise et de la dispersion qui s'est produite. Cette dispersion dépend à son tour des caractéristiques initiales de l'émission, des effets produits par les structures environnantes, de la distance que le panache a parcouru à partir de l'installation et des conditions météorologiques locales. La libération d'un panache au-delà des limites d'une installation peut constituer un danger pour la population de diverses façons:

1. une exposition interne aux matières dangereuses absorbées par la peau ou inhalées;

2. une exposition externe aux rayonnements de matières radioactives comprises dans le panache pendant le passage de celui-ci;

3. une exposition externe aux rayonnements des matières radioactives déposées sur le sol par des retombées locales;

4. une exposition interne aux matières radioactives résultant de l'ingestion d'aliments ou d'eau contaminés par des matières radioactives, qui se sont déposées sur le sol ou dans l'eau.

D'autres émissions dans l'environnement, se déposant soit sur le sol soit dans l'eau, seraient également dispersées dans les rivières, dans les lacs, à la surface des océans ou dans les eaux souterraines en question. Ces émissions pourraient constituer un danger dans les cas, notamment de:

1. l'exposition externe des personnes sur l'eau ou dans l'eau;

2. l'exposition interne des personnes se trouvant dans l'eau à ce moment-là, à la suite de l'absorption par la peau ou de l'ingestion d'eau;

3. l'exposition interne résultant de l'ingestion d'aliments et d'eau qui sont contaminés par le système d'approvisionnement en eau ou par l'incorporation de matières radioactives dans la chaîne alimentaire;

4. l'évaporation de matières radioactives gazeuses ou volatiles provenant des eaux ou des sols contaminés. (Ceci pourrait produire un panache radioactif semblable à celui décrit plus haut.)

1.2 Réacteurs nucléaires

Dans des conditions normales d'exploitation, les produits de fission que le réacteur nucléaire produit sont contenus dans le combustible. Au moins quatre barrières sont prévues pour empêcher la libération des produits de fission, soit:

1. le combustible lui-même;

2. la gaine de combustible;

3. les conduites du circuit primaire de caloportage du réacteur; et

4. l'enceinte de béton ou de béton et d'acier du bâtiment du réacteur (y compris le bâtiment de décompression dans plusieurs installations).

Si un accident grave du réacteur se produisait, comprenant une défaillance des conduites du circuit de caloportage et la rupture des gaines de combustible, certains produits de fission pourraient être libérés dans le bâtiment du réacteur. Il existe une très faible possibilité, soit à la suite de l'accident initial ou d'un autre accident simultané, qu'une fuite se produise dans l'enceinte, ce qui pourrait entraîner l'émission de matières radioactives. Les quantités et les types de produits de fission qui pourraient être ainsi libérés sont fonction de la nature de la fuite. Des gaz pourraient passer librement, alors que la plupart, sinon la totalité, des produits de fission solides ou liquides demeureraient à l'intérieur.

1.3 Usines d'eau lourde

La préoccupation porte ici sur la possibilité d'émission de quantités dangereuses d'hydrogène sulfuré hors des usines d'eau lourde utilisant le procédé GS. Ce gaz utilisé sans être brûlé pour l'extraction de l'eau lourde à partir de l'eau ordinaire est conservé dans les tours et les canalisations de l'installation. Si de l'hydrogène sulfuré est libéré, il se mêle immédiatement à l'air et se disperse. Une concentration élevée d'hydrogène sulfuré dans l'atmosphère entraîne des risques d'invalidité ou même de décès par inhalation. C'est pour cette raison que des mesures telles que le contrôle de la circulation et des alertes recommandant à la population de demeurer à l'abri s'imposent dans une situation d'urgence. Le gaz peut causer quelques dommages à l'environnement, mais il ne se dépose pas sur le sol et ne peut créer de problèmes d'ingestion à long terme. Ainsi, une fois que le gaz s'est dispersé et que la source de contamination est contrôlée, la situation d'urgence prend fin.

1.4 Autres installations nucléaires

Dans les raffineries de combustible nucléaire, les produits chimiques hautement toxiques qu'on utilise dans le procédé doivent être considérés en plus de tout risque potentiel de rayonnements. Aux usines de conversion, de grandes quantités d'ammoniac anhydre liquide et d'acide fluorhydrique sont utilisées, de

même que de l'hexafluorure d'uranium qui se transforme en fluorure d'hydrogène par hydrolyse au contact de l'air humide. La libération de ces gaz dans l'atmosphère pourrait donc mettre sérieusement en danger la santé de la population.

Dans les raffineries de combustible ou les usines de fabrication où se trouvent des quantités importantes de combustible enrichi à l'uranium 235, un incident de criticité pourrait entraîner rapidement des risques de rayonnements. Un accident pourrait, en outre, donner lieu à l'émission de produits de fission à l'extérieur de l'équipement et de l'installation.

1.5 Transport

Le chargement et le déchargement de produits chimiques toxiques et de matières radioactives, de même que leur transport entre les installations nucléaires, pourraient également constituer un danger pour la population. Les camions-citernes destinés au transport des gaz liquéfiés sont conçus de manière à pouvoir supporter de graves accidents, et les conteneurs utilisés pour le transport des matières nucléaires doivent répondre à des critères d'essais extrêmement rigoureux élaborés par la Commission à partir des recommandations de l'Agence internationale de l'énergie atomique. Néanmoins, les possibilités d'émission au cours du transport doivent être envisagées et des mesures doivent être élaborées pour protéger la population contre la libération de ces matières dangereuses.

Il faut établir une distinction entre les expéditions, relativement peu nombreuses, à destination et en provenance des installations nucléaires, et les multiples expéditions très diversifiées de radio-isotopes qui surviennent partout au Canada. Les lignes directrices générales énoncées dans les sections suivantes s'appliquent uniquement aux accidents mettant en cause des matières dangereuses utilisées dans les installations nucléaires lorsqu'on transporte les dites matières entre les principaux établissements nucléaires. Le plan d'urgence de l'installation, de même que le plan des situations d'urgence à l'extérieur des installations nucléaires, soumis à l'examen de la CCEA, devraient tous deux exposer les formalités concernant les accidents susceptibles de se produire au cours du chargement ou du déchargement dans les installations nucléaires; toutefois, Transports Canada est l'organisme responsable de la planification et de l'exécution des mesures d'urgence pour ce qui a trait aux accidents qui se produisent au cours du transport. La CCEA, pour sa part, demeure responsable de la sécurité matérielle des matières nucléaires.

1.6 Criticité

Les précautions nécessaires concernant le traitement, la manipulation ou le stockage des matières fissiles dans les usines sont assurées pour empêcher qu'un système nucléaire atteigne l'état critique (c'est-à-dire susceptible de provoquer la fission nucléaire). Ni une protection biologique spéciale, ni des barrières de confinement ne sont habituellement prévues autour de l'équipment de traitement ou des installations d'entreposage étant donné que la probabilité d'un accident de criticité est considérée comme étant très faible en raison des précautions rigoureuses qui sont prises. Néanmoins, en guise de mesure préventive, le titulaire de permis de la CCEA qui possède ou qui transporte des matières fissiles est tenu:

1. d'examiner attentivement les conditions qui permettraient d'atteindre l'état critique;

2. de déterminer les emplacements où cet état critique pourrait se produire;

3. de déterminer l'ampleur et la durée éventuelle d'un accident de criticité;

4. de déterminer les effets directs des rayonnements et l'importance de l'émission éventuelle de produits de fission;

5. de bien documenter les résultats des quatre premiers éléments; et

6. de préparer un plan d'urgence pour protéger les travailleurs contre les risques d'un potentiel accident de criticité.

2. LIGNES DIRECTRICES POUR LA PRÉPARATION DU PLAN

2.1 Responsabilités et pouvoirs

Afin de pouvoir répondre de manière appropriée à une situation d'urgence qui pourrait se manifester par suite de l'émission de matières dangereuses ou d'une éventuelle action terroriste, il peut être nécessaire de pouvoir compter sur la collaboration de différents organismes. En plus de la coopération de l'exploitant de l'installation, on pourra compter sur les autorités régionales, les ministères et organismes provinciaux et fédéraux de même que différents groupes, qui pourraient aider à répondre à une telle situation d'urgence ou qui pourraient être visés.

Des ententes officielles ou officieuses entre les différents paliers de gouvernement ou de compétence seront nécessaires pour minimiser les risques de confusion et de conflit d'autorité. Les responsabilités et les pouvoirs confiés aux différents groupes participants doivent être définis dans le plan d'urgence.

2.2 Organisation

Dans le cas d'une situation d'urgence qui se produit dans une installation nucléaire, le personnel de l'installation devrait normalement s'en rendre compte en premier. La première alerte et les premiers renseignements sur l'ampleur probable du danger viendront donc de ces employés. L'exploitant de l'installation devrait mettre au point, en collaboration avec les autorités municipales, provinciales et fédérales appropriées, la marche à suivre voulue en vue d'aviser rapidement les représentants de la population qui mettront sur pied un groupe de contrôle. Le directeur de ce groupe de contrôle doit être clairement identifié.

Un réseau d'organisation et un système de communication doivent être établis pour veiller à ce que tous les renseignements ayant trait à la nature et à l'importance des dangers à l'extérieur de l'installation nucléaire soient transmis au groupe de contrôle pour assurer la coordination des activités de tous les membres du groupe d'intervention.

La nécessité de mesurer la radioactivité à l'extérieur de l'installation nucléaire sera déterminée par le personnel de l'installation et les autorités publiques compétentes.

2.3 Communications

Afin de permettre une évaluation rapide du danger et d'assurer l'application de toutes les mesures de protection jugées nécessaires, il est essentiel qu'un système de communication soit disponible et qu'il relie le groupe de contrôle aux équipes sur place et peut-être aussi aux spécialistes qui pourraient contribuer à évaluer la situation. Il faut également tenir compte du fait que l'incident peut se produire en même temps qu'un événement extérieur, ou découler d'un événement qui peut également perturber les communications normales. Au cours de l'élaboration du plan d'urgence, il faut donc s'assurer que tous les participants peuvent compter sur un matériel de communication fiable, uniquement destiné à un tel usage, et alimenté par une source indépendante, par exemple des radios à piles.

2.4 Intervention

Dans bon nombre de cas, il sera possible de minimiser l'exposition de la population grâce à une exécution rapide des mesures de protection appropriées. L'application de ces mesures dépendra de la nature et de l'ampleur du danger et de la durée prévue de l'état d'urgence. Il est donc recommandé d'établir des plans et des marches à suivre pour l'application de différentes mesures et d'envisager les mesures à prendre si les renseignements concernant la nature et l'importance du danger pour la santé de la population sont incomplets. En pareil cas, au cours de l'élaboration du plan d'urgence, la prise en considération de scénarios de situations possibles propres à l'installation faciliterait les décisions concernant les mesures à prendre. L'annexe B expose les bases concernant l'établissement des critères pour la protection de la population en cas de situation d'urgence dans un établissement nucléaire. Les niveaux de référence en cas d'urgence correspondent à ceux que le Comité consultatif de la radioprotection de la CCEA a recommandés.

Les conditions propres à l'usage de l'hydrogène sulfuré et de l'anhydride sulfureux associés à l'exploitation des usines d'eau lourde sont examinées à l'annexe C.

Quelques exemples de mesures de protection qui s'imposent pour protéger la population comprennent de demander à la population de demeurer à l'intérieur ou de trouver refuge quelque part, d'évacuer les résidents des régions les plus gravement touchées, ou d'empêcher la distribution et l'utilisation d'eau ou d'aliments contaminés.

2.5 Ressources

L'aptitude à réagir rapidement dans une situation d'urgence dépend de la disponibilité du personnel et de l'équipement nécessaires. Dans l'élaboration d'un plan d'urgence, des mesures doivent être prises pour veiller à ce que la liste des ressources nécessaires et les procédures pour se procurer ces ressources soient communiquées de la manière la plus utile aux responsables de l'intervention.

2.6 Surveillance de la radioactivité

Il est essentiel qu'une évaluation de la dose initiale ainsi que des niveaux et doses prévus de rayonnements soient communiqués au groupe de contrôle responsable aussi rapidement que possible pour qu'il puisse être en mesure de décider de la stratégie d'intervention appropriée. Cette évaluation peut être obtenue grâce à l'envoi d'équipes d'inspection sur les lieux et à la comparaison de leurs constatations afin d'obtenir une idée générale de l'ampleur du danger. Étant donné qu'il faut un certain temps pour réunir les équipes d'inspection, il est recommandé de faire appel au personnel de l'installation, du moins au tout début. Les prévisions de l'exploitant sur les émissions possibles seront également nécessaires pour que puisse être évaluée la nécessité d'avoir recours à d'autres mesures.

La majeure partie des matières radioactives émises, surtout au cours d'un accident dans un réacteur, seront vraisemblablement de courte période, de sorte que les problèmes découlant de la dispersion de nucléides de longue période peuvent très bien ne pas se poser. Toutefois, il est fortement recommandé de continuer à vérifier si les nucléides de longue période sont présents pendant une certaine période de temps après l'émission, si on retrouve ces nucléides dans la région touchée et à divers niveaux des chaînes alimentaires.

Les régions gravement contaminées après que l'émission de matières a pris fin devront peut-être faire l'objet d'une décontamination, ou du moins d'un contrôle continu jusqu'à ce que les rayonnements soient revenus à un niveau normal.

2.7 Information de la population

Il est également nécessaire de communiquer à la population des renseignements exacts et dignes de foi au cours de la situation d'urgence, à la fin de celle-ci et même après. Il serait préférable de désigner une seule source d'information pour éviter toute confusion. Dans la planification d'un programme d'information publique, il faut porter une attention spéciale aux phases initiales de la situation d'urgence, c'est-à-dire lorsqu'il faut communiquer immédiatement aux personnes directement touchées des renseignements concernant leur sécurité et celle de leurs parents ou amis. Lorsqu'il y a de grands établissements publics, par exemple des écoles, des hôpitaux ou des salles de spectacles, qui pourraient être touchés par l'accident, des mesures spéciales pourront être prises afin que la population soit informée des précautions prises en vue d'assurer la sécurité des personnes se trouvant dans ces établissements.

2.8 Exercices pratiques

Après avoir établi le plan des situations d'urgence à l'extérieur des installations nucléaires, on recommande aux autorités compétentes qu'elles organisent des exercices périodiques au cours desquels les différentes mesures d'urgence et les communications seront vérifiées dans des conditions aussi réalistes que possible, afin de découvrir toute faiblesse éventuelle du plan et de faire en sorte que le personnel acquière une certaine expérience au cours de la simulation d'une situation d'urgence.

2.9 Documentation

Afin de veiller à ce que le plan soit parfaitement compris et puisse être appliqué avec efficacité, il est important de diffuser la documentation appropriée et de faire en sorte qu'elle soit mise à jour périodiquement.

Cette documentation doit comprendre une description du plan où sont exposés les fonctions et pouvoirs de chaque groupe concerné, de façon suffisamment claire pour éviter toute confusion ou tout conflit d'autorité. Toute entente, officielle ou non, entre les différents organismes ou paliers de gouvernement doit également figurer dans les documents voulus pour veiller à ce que qu'il ne se produise pas de situations où les personnes compétentes hésiteraient à prendre les mesures nécessaires en raison de certaines incertitudes découlant du chevauchement des pouvoirs.

La documentation doit également présenter de manière simple et pratique tous les renseignements qui pourront être nécessaires au cours de la situation d'urgence. Ces renseignements devraient comprendre des listes de numéros de téléphone des personnes ou des organismes qui peuvent être concernés, les lignes directrices et les instructions concernant l'application des différentes mesures, de même qu'un inventaire de l'équipement et des ressources humaines disponibles pour faire face à la situation d'urgence.

Pour réaliser ces deux objectifs, il est suggéré de répartir la documentation en deux parties: (i) la description du plan et (ii) le mode d'exécution. La première partie devrait comprendre suffisamment de renseignements de façon que le lecteur puisse comprendre parfaitement les éléments du plan et puisse, en consultant le mode d'exécution, en évaluer la pertinence. Le mode d'exécution devrait présenter tous les renseignements dont on pourrait avoir besoin dans une situation d'urgence, de manière aussi concise et pratique que possible. Les dossiers des exercices d'urgence devraient également être conservés pour aider à la planification future et pour faire des comparaisons d'une année à l'autre.

2.10 Renseignements généraux

L'annexe A du présent guide donne une liste des sujets à considérer pour l'élaboration d'un plan d'urgence. Cette liste a pour objet d'aider à la préparation et à la révision des plans. La liste n'est pas exhaustive, et tous les sujets qui y sont énumérés ne doivent pas être couverts absolument dans tous les cas. Chaque plan d'urgence variera suivant le type d'installations nucléaires et les conditions locales, telles que la géographie des lieux, les variations météorologiques et la distribution de la population.

L'Agence internationale de l'énergie atomique vient de publier un document (voir 1. ci-dessous) qui est le fruit des réunions d'un groupe consultatif sur la planification en vue de la protection de la population en cas d'accidents dans les installations nucléaires. Ce document donne des conseils aux personnes chargées de la protection de la population et traite en détail des principes fondamentaux des mesures de protection. Ces mesures s'appliquent de manière générale aux émissions de produits chimiques et de matières radioactives, étant donné que l'organisation et les mesures à prendre dans les deux cas sont semblables. Les documents préparés par la U.S. Nuclear Regulatory Commission et la U.S. Federal Emergency Management Agency sont également recommandés comme lectures supplémentaires. Toutefois, il devrait être tout à fait clair que tous les principes ne s'appliquent pas directement à la situation canadienne.

2.11 Lectures recommandées

1. "Planning for Off-Site Responses to Radiation Accidents in Nuclear Facilities", Safety Series 55, Vienna, International Atomic Energy Agency, 1981 (version anglaise seulement).

2. "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants", USNRC, NUREG-0654/FEMA-REP-1 Rev. 1.

3. "Planning Basis for the Development of State and Local Government Radiological Emergency Response Plans in Support of Light Water Nuclear Power Plants", USNRC, NUREG-0396/EPA 520/1-78-016 (renvois contenus dans le NUREG-0654, pp. 4, 5, 11).

On peut se procurer les publications de la U.S. Nuclear Regulatory Commission et de la U.S. Federal Emergency Management Agency à l'une des adresses suivantes:

GPO Sales Program,
Division of Technical Information and Document Control,
U.S. Nuclear Regulatory Commission,
Washington, D.C., 20555.

National Technical Information Service,
Springfield, Virginia, 22161.

Les publications de l'Agence internationale de l'énergie atomique sont disponibles à l'une des adresses suivantes:

Agence internationale de l'énergie atomique
Division des publications
5, Wagramerstrasse
Case postale 100
A-1400, Vienne, Autriche

UNIPUB,
45 Park Avenue South,
New York, N.Y., 10010.

ANNEXE A

LISTE DE CONTRÔLE DES SUJETS À TRAITER DANS UN PLAN D'URGENCE

Le plan d'urgence devrait faire référence à divers scénarios propres à l'installation concernée. Chaque scénario devrait également faire état de l'évaluation de la portée des effets éventuels à l'extérieur de l'installation. La liste de contrôle suivante doit être prise en considération en fonction des documents de l'AIEA et des autres ouvrages de référence mentionnés (voir 2.11).

1. Responsabilité

1.1 Répartition des responsabilités générales de planification et d'exécution du plan.

1.2 Ententes entre les différents paliers de gouvernement qui peuvent être concernés. (Des ententes interprovinciales ou internationales seront peut-être nécessaires si l'installation est située à proximité des frontières provinciales ou internationales.)

1.3 Ententes entre les organismes dont la compétence peut se chevaucher ou qui pourraient s'entraider dans une situation d'urgence (par exemple, la sûreté provinciale et la police municipale, ou encore les services de santé).

1.4 Définition des responsabilités de l'exploitant de l'installation nucléaire quant à la planification et l'exécution des mesures d'urgences à l'extérieur de l'installation.

1.5 Entente sur les responsabilités relatives à des mesures précises qui pourront s'imposer, notamment:

a) communications;
b) activités concernant la santé de la population;
c) dosimétrie et décontamination personnelles;
d) surveillance de la radioactivité;
e) information de la population;
f) contrôle de la circulation;
g) transport d'urgence; et
h) services sociaux.

2. Organisation

2.1 Établissement d'un groupe de contrôle des situations d'urgence dont le directeur est clairement identifié.

2.2 Définition des relations entre les organismes participant au plan d'urgence, traitant spécifiquement du contrôle et de la coordination des activités.

2.3 Mise sur pied d'un centre de contrôle des situations d'urgence. Les dispositions devraient être prévues pour utiliser un autre centre de contrôle, si cela était nécessaire.

2.4 Liste des organisations publiques et privées qui pourraient offrir leur aide en cas d'urgence. Cette liste doit indiquer les compétences particulières de chaque organisation et la façon de communiquer avec elles. Les responsabilités et compétences doivent être exposées en détail dans les annexes accompagnant le plan général.

2.5 Liste des responsables des groupes de contrôle des situations d'urgence, y compris leur numéro de téléphone, mis à jour régulièrement.

3. Avis et communication

3.1 Description de la procédure visant à avertir les autorités publiques des situations d'urgence réelles ou éventuelles.

3.2 Dispositions concernant l'avertissement direct de la population.

3.3 Dispositions pour assurer des communications efficaces entre les gouvernements et les organismes concernés.

3.4 Moyens de communication avec les équipes sur place.

3.5 Dispositions à prendre pour assurer des communications efficaces au centre permanent ou mobile de contrôle de la situation d'urgence.

4. Intervention en cas d'urgence

4.1 Directives pour l'exécution de toute mesure d'intervention visant à assurer la protection de la population, telles que:

a) demander à la population de rester à l'intérieur;
b) distribuer des comprimés d'iode stable;
c) évacuer la population.

L'annexe B expose les critères en fonction des niveaux de référence proposés en cas d'urgence, et l'annexe C, les critères actuellement utilisés pour les usines d'eau lourde.

4.2 Dispositions pour empêcher la distribution et l'ingestion des eaux et des aliments contaminés.

4.3 Dispositions pour mesurer l'exposition du personnel d'intervention d'urgence.

4.4 Dispositions pour mesurer ou évaluer l'exposition de la population.

4.5 Disponibilité de la documentation qui pourrait être nécessaire (par exemple, cartes indiquant la densité de la population et l'usage des terres, renseignements détaillés sur les systèmes de distribution des eaux et des aliments).

4.6 Mesures à prendre pour la décontamination des personnes exposées.

5. Ressources en cas d'urgence

5.1 Disponibilité des services publics de santé, par exemple:

a) de l'emplacement des hôpitaux, avec indication des hôpitaux en mesure de traiter des personnes contaminées par des matières radioactives;

b) des véhicules pour assurer le transport des victimes (y compris tous les véhicules, autres que les ambulances, qui pourraient se prêter à ce transport);

c) du personnel médical à l'hôpital et pour donner les premiers soins aux victimes.

5.2 Disponibilité des ressources pour mesurer la radioactivité, par exemple:

a) des appareils pour la surveillance de l'environnement ou la dosimétrie personnelle;

b) du personnel qualifié;

c) des laboratoires pour l'analyse des échantillons.

5.3 Disponibilité de toute autre ressource qui pourrait être utile, par exemple:

a) du matériel de transport ou de communication,

b) d'un poste de décontamination pour le personnel d'intervention d'urgence et pour la population exposée.

6. Surveillance de la radioactivité

6.1 Disponibilité du personnel qualifié en vue de constituer des équipes d'inspection.

6.2 Dispositions pour assurer le transport des équipes d'inspection et la communication avec elles.

6.3 Mesures pour consigner et comparer les résultats des inspections.

6.4 Mesures pour assurer la communication avec les centres météorologiques locaux.

6.5 Dispositions à prendre pour la tenue et la conservation des dossiers pour l'analyse postérieure à l'accident.

6.6 Dispositions pour l'inspection du personnel ou des véhicules qui quittent l'aire restreinte.

7. Information de la population

7.1 Attribution des responsabilités pour le contrôle et la communication de l'information. Il faut avoir recours dans toute la mesure possible aux organes

d'information en place pour communiquer les renseignements voulus à la population.

7.2 Information à communiquer, par exemple:

a) la nature et la gravité de l'accident;

b) les collectivités ou la région géographique touchées;

c) la nature du danger pour l'individu;

d) les mesures prises pour assurer la protection de la population;

e) les mesures que les membres du public peuvent prendre pour assurer leur propre protection; et

f) des instructions imprimées d'avance concernant l'absorption de comprimés d'iode stable.

8. Formation

8.1 Mesures à prendre pour la formation du personnel d'intervention d'urgence.

8.2 Calendrier des exercices et renseignements détaillés sur le programme.

8.3 Types de situations d'urgence à simuler.

8.4 Dispositions concernant l'évaluation de l'intervention par des observateurs extérieurs.

8.5 Tenue des dossiers où sont signalés les principales caractéristiques et les résultats de tous les exercices effectués.

9. Documentation

9.1 Dispositions visant à assurer l'amélioration du plan à la suite des exercices.

9.2 Mesures à prendre pour la mise à jour périodique du plan et de ses annexes.

CRITÈRES POUR LA PROTECTION DE LA POPULATION EN CAS DE SITUATION D'URGENCE DANS UNE INSTALLATION NUCLÉAIRE

Introduction

Lorsqu'un accident se produit dans une installation nucléaire au cours duquel des matières radioactives sont libérées dans l'environnement, des contre-mesures peuvent s'imposer pour réduire les effets néfastes que cet accident pourrait avoir sur la population locale. Ces contre-mesures peuvent être appliquées par l'exploitant dans les toutes premières phases de la situation d'urgence ou par un groupe provincial ou municipal de contrôle au cours des phases ultérieures. Ces mesures peuvent comprendre, entre autres, des avertissements enjoignant à la population de rester à l'abri, la distribution de comprimés d'iode comme inhibiteurs thyroïdiens, des restrictions sur l'utilisation ou la distribution d'eau, de produits laitiers de la région ou autres denrées alimentaires, des restrictions sur l'utilisation des installations récréatives, par exemple, les plages ou les parcs, et dans des cas extrêmes, l'évacuation de la population locale.

Étant donné que bon nombre des facteurs qui servent à déterminer l'importance des contre-mesures varient suivant l'emplacement ou le temps (par exemple, la densité de la population, l'heure du jour, les conditions météorologiques), il n'est pas possible d'exposer des marches à suivre générales s'appliquant en cas d'urgence. Il est préférable que l'exploitant de chaque installation détermine ces mesures en collaboration avec l'organisme provincial compétent chargé de la planification d'urgence. Par ailleurs, les niveaux de référence en cas d'urgence des doses, applicables à toutes les installations exploitées en vertu d'un permis de la CCEA, sont indiqués. Ces niveaux de référence établissent une distinction générale entre les situations où des contre-mesures ne pourront vraisemblablement pas être justifiées et les situations où ces mesures sont souhaitables en autant qu'elles peuvent être appliquées, de manière raisonnable, avec efficacité et sécurité. Ces niveaux de référence servent par la suite de point de départ pour l'élaboration des mesures d'urgence.

L'application des contre-mesures peut être difficile ou onéreuse, sans compter qu'elle peut présenter des risques pour la population ou le personnel d'intervention. Il est donc important que ces risques ou ces coûts ne dépassent pas les avantages qui pourraient résulter de l'application de ces contre-mesures.

Objectifs des critères

La détermination des niveaux de référence a pour objet de guider les personnes chargées de l'élaboration des procédures et des plans d'urgence, et de fournir aux spécialistes de la CCEA des critères au regard desquels ces plans peuvent être évalués.

Niveaux de référence en cas d'urgence

Conformément aux recommandations de l'AIEA, un double niveau est recommandé. Le niveau inférieur indique le niveau en deça duquel des contre-mesures ne pourront vraisemblablement pas être justifiées, du moins pour des raisons de santé. Le

niveau supérieur représente le niveau au delà duquel des contre-mesures seraient très certainement justifiées. Cette façon de procéder donnera aux planificateurs des situations d'urgence ou aux exploitants des installations une assez grande latitude pour faire preuve de jugement en se fondant sur les situations et les priorités locales.

Les niveaux de référence en cas d'urgence ont été établis en regard des considérations suivantes:

a) la dose et, partant, le risque pour la population; et

b) la difficulté d'appliquer les contre-mesures et les effets négatifs éventuels de ces mêmes contre-mesures.

La dose indiquée représente celle qu'un individu pourrait recevoir si aucune mesure d'urgence n'était appliquée et qu'il pourrait éviter si ces mesures étaient en vigueur.

Niveaux de référence en cas d'urgence

Contre-mesure	Niveau inférieur		Niveau supérieur	
	Tout le corps	Thyroïde	Tout le corps	Thyroïde
Avertissement de demeurer à l'abri	0,5 mSv	5 mSv	5 mSv	50 mSv
Restrictions concernant l'eau, les aliments et les produits laitiers locaux	0,05 mSv	0,5 mSv	5 mSv	50 mSv
Restrictions concernant les installations récréatives (parcs et plages)	0,05 mSv	0,5 mSv	5 mSv	50 mSv
Distribution de comprimés d'iode stable	-	50 mSv	-	1 Sv
Évacuation	50 mSv	1 Sv	500 mSv	10 Sv

Consultative Document / Document de consultation

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

CONSULTATIVE DOCUMENT C-45

Proposed Regulatory Guide

GUIDELINES FOR OFF-SITE CONTINGENCY PLANNING

Issued for comment:

April 11, 1984

Canada

This Consultative Document is issued in order to provide an opportunity for public review of the proposal it contains before formal issue as a Regulatory Document. Comments are encouraged and should be directed to the address below before JULY 11, 1984.

Unless otherwise requested by the submittor, a copy of all comments received will be placed in the AECB public documents room.

Direct comments to:

Health Effects and Regulatory Documents Section
Atomic Energy Control Board
P.O. Box 1046
Ottawa, Ontario
CANADA
K1P 5S9

THE AECB REGULATORY DOCUMENTS SYSTEM

1. Siting, design, manufacture, construction, commissioning, operation, and decommissioning of nuclear facilities, or the production, possession, use and disposal of prescribed substances, in Canada or under Canadian control, are subject to the provisions of the Atomic Energy Control Act and Regulations administered by the Atomic Energy Control Board (AECB).

2. In addition to the Atomic Energy Control Regulations, three other categories of Regulatory Document are employed by the AECB. These are:

   Generic Licence Conditions - standard sets of conditions that are included in particular AECB licences of a common type, unless specific circumstances indicate otherwise;

   Regulatory Policy Statements - firm expressions that particular "requirements" not expressed as Regulations or Licence Conditions be complied with or that any requirements be met in a particular manner but where the AECB retains the discretion to allow deviations or to consider alternative means of attaining the same objectives where a satisfactory case is made; and

   Regulatory Guides - guidance or advice on any aspect of the AECB's regulatory process that is given in a manner less rigid than that intended by Policy Statements.

3. In developing Regulatory Documents, the AECB publishes its proposals as Consultative Documents in order to solicit comments both from the nuclear industry and from the public. This is done prior to releasing any Regulatory Document in final form. In certain cases, after the period for public comment, a Consultative Document may be issued for "trial use". This is done for a limited period of time to gain practical experience. Following the period of trial use, the revised document is re-issued for further public comment prior to release in final form.

4. Comments on Consultative Documents and suggestions for new Regulatory Documents and for improvement to those that exist are encouraged and should be directed to the Health Effects and Regulatory Documents Section of the AECB.

5. Copies of Consultative Documents, Regulatory Documents and related index lists are available in both English and French on request from the Office of Public Information. Requests for technical information on and interpretation of documents should be addressed to this office.

6. The Atomic Energy Control Board may be contacted as follows:

Postal address: Atomic Energy Control Board
P.O. Box 1046
Ottawa, Ontario
CANADA
K1P 5S9

Telephone
General Inquiries: (613) 995-5894

PURPOSE AND SCOPE

This guide is intended to assist provincial and municipal authorities to develop plans, in cooperation with nuclear facility operators, for coping with emergencies having off-site effects. The facilities addressed include nuclear reactors, heavy water plants, nuclear fuel refineries and fabrication plants that are licensed under the Atomic Energy Control Regulations.

TABLE OF CONTENTS

GUIDELINES FOR OFF-SITE
CONTINGENCY PLANNING

INTRODUCTION

Under the Atomic Energy Control Regulations, nuclear facilities in Canada are licensed by a federal agency, the Atomic Energy Control Board (AECB). Prior to issuing a licence to operate, the AECB ensures that the siting, design and construction of the plant and the competence of the operating staff are such that the possibility of release of a quantity of hazardous material sufficient to constitute a danger to public health is extremely remote. Nevertheless, it is prudent to anticipate that such a release could occur and to develop contingency plans whose objectives would be to minimize any immediate hazard by prompt action and to mitigate the after-effects by ensuring adequate control.

As part of the licensing process, the AECB requires the licensee to develop a plan for coping with emergencies within the facility. This plan is concerned primarily with events which will not affect the public. In addition, the licensee's obligation to help cope with the far less likely event, in which the release is not confined to the limits of the site, must be considered. To cope adequately with such an event, the involvement of municipal, provincial and federal government departments and agencies may be required.

With respect to emergencies involving health and safety, the role of federal authorities would fall into three categories:

1. response to any request for assistance from the responsible provincial authorities;

2. collection and dissemination, as appropriate, of information related to health and safety;

3. communications with the U.S.A.

The AECB will normally have no direct responsibility for preparing and implementing contingency plans, but is expected to co-operate and advise as part of the federal initiative. (However, the AECB may declare a state of emergency should the security of either nuclear materials or nuclear facilities be considered threatened by terrorist action.)

As a result, the specific activities of the AECB will include the following:

1. defining the magnitude of release of materials from the licensed facility that would constitute an off-site emergency;

2. requiring the licensee to co-operate with public authorities to develop and maintain a co-ordinated Contingency Plan;

3. assisting, if requested, in the development of an Off-Site Contingency Plan in collaboration with the public authorities and the licensee;

4. assessing and advising on the acceptability of the Off-Site Contingency Plan.

1. THE NATURE OF THE HAZARD

1.1 General Release Characteristics and Effects

Any airborne release resulting from an accident condition at a nuclear facility would form a "cloud" or "plume". It should not be inferred, however, that this would necessarily be visible. The concentration of released material at any point in this plume will depend upon the initial amount released and the dispersion that has taken place. This dispersion will depend upon the initial release characteristics, the effects produced by surrounding structures, the distance the plume has travelled from the facility, and the local meteorological conditions. The passage of the plume beyond the facility site could pose a hazard to the public in the following ways:

1. internal exposure to hazardous material absorbed through the skin or inhaled;

2. external exposure to radiation from radioactive material in the plume during the plume passage;

3. external exposure to radiation from radioactive material that is deposited upon the ground by local fallout;

4. internal exposure to radioactive material due to ingestion of food or water contaminated with radioactive material that has settled on land or water.

Other releases to the environment, either to soil or to water, would likewise be dispersed in the river, lake, ocean surface or ground water in question. These releases could produce a hazard through

1. external exposure of those persons on or in the water;

2. internal exposure of persons in the water at the time, due to absorption through the skin or ingestion of the water;

3. internal exposure from ingestion of food and water contaminated by the water supply system or through incorporation of radioactive material into the food chain;

4. the evaporation of gaseous or volatile radioactive materials from the contaminated ground or water. (This could create a radioactive plume similar to that described previously.)

1.2 Nuclear Reactors

Under normal operating conditions, the fission products created in a nuclear reactor are contained within the fuel. At least four barriers prevent the escape of such fission products, namely

1. the fuel material itself;

2. the fuel cladding;

3. the piping of the reactor primary coolant circuit;

4. the concrete or concrete and steel containment of the reactor building (including the vacuum building at several facilities).

If a serious reactor accident involving failure of the coolant system piping and rupture of the fuel cladding were to occur, some fission products would be released into the reactor building. It is remotely possible that, either as a result of the original accident or due to some coincident failure, a leak path through the containment might develop, in which case a release of radioactive material might occur. The quantities and types of fission products that could be released would depend upon the nature of this leak path. Gaseous fission products might pass freely along the leak path, whereas most or all of the solid or liquid fission products would be retained.

1.3 Heavy Water Plants

The concern here is centered upon the potential for release of hazardous quantities of hydrogen sulphide gas from heavy water plants using the Girdler-Sulphide process. Hydrogen sulphide gas, which is used but not consumed in the extraction of heavy water from ordinary water, is contained in the towers and pipework of the facility. Should hydrogen sulphide be released, it mixes readily with the air and disperses. Should the concentration of hydrogen sulphide be high, its inhalation could cause disabling injuries or fatalities. Because of this, actions such as traffic control and stay-in alerts are required in an emergency situation. The gas may cause some environmental damage, but it does not deposit on the ground and cannot create long-term ingestion problems. Thus, once the gas has dispersed and the source is under control, the emergency is over.

1.4 Other Nuclear Facilities

In nuclear fuel refineries, highly toxic chemicals used in the process must be considered in addition to any potential radiation hazard. At conversion plants, large quantities of liquid anhydrous ammonia and hydrofluoric acid are present on site as is uranium hexafluoride which will form hydrogen fluoride by hydrolysis in moist air. In the event of a release to the atmosphere, a serious health hazard may result.

In fuel refineries or fabrication plants handling significant quantities of fuel enriched with U-235, a prompt radiation hazard could result from a criticality incident. An accident could also result in a release of fission products outside the equipment and facility.

1.5 Transportation

The loading and unloading of toxic chemicals and radioactive materials and their transportation between nuclear facilities may also pose a hazard to the public. Tank cars for liquefied process gases are designed to withstand severe accident conditions, and containers for nuclear material transport must satisfy stringent testing requirements set out by the Board based on recommendations of the International Atomic Energy Agency. Nevertheless, the possibility for release during transportation must be considered and procedures developed to protect the public should a release occur.

A distinction should be made between the relatively few shipments to and from nuclear facilities, and the many and diverse shipments of radioisotopes which take place throughout Canada. The general guidelines set down in the following sections are applicable only to transportation accidents involving nuclear facility-related hazardous materials being transported between major nuclear facilities. Whereas accidental conditions during loading or unloading of shipments at nuclear facilities should be covered in the contingency plan of the facility and also in the off-site plan, subject to review by the AECB, Transport Canada would be the organization responsible for emergency planning and execution thereof with regard to accidents during transport. For aspects related to the physical security of the nuclear materials, the AECB is the responsible organization.

1.6 Criticality Considerations

In plants processing, handling or storing fissile materials, precautions are taken to prevent the critical arrangement of a nuclear system (an arrangement which could produce fission). Special biological shielding or containment barriers are not usually provided around the processing equipment or storage facility since the probability of a criticality accident is considered very low as a result of the strict precautions taken. Nevertheless, as a precautionary measure, an AECB licensee possessing (or transporting) fissionable material is required to

1. examine the potential conditions for criticality to occur;

2. determine the locations where criticality could occur;

3. determine the potential magnitude and duration of a criticality event;

4. determine the direct radiation effects and the extent of possible release of fission products;

5. document the above findings; and

6. prepare a contingency plan to protect workers from the hazards of a potential criticality accident.

2. GUIDELINES FOR PLAN PREPARATION

2.1 Responsibility and Authority

In order to respond adequately to an emergency situation which could exist following a release of material or potential terrorist action, the cooperation of various organizations and agencies will be required. In addition to the facility operator, these may include regional, provincial and federal departments, agencies and groups, which could assist in dealing with such an emergency or which could be affected by it.

Formal or informal agreements between different levels of governments or jurisdictions will be required to minimize the possibility of confusion and of conflicts of authority. The responsibilities and authority of the various participating groups should be defined in the Contingency Plan.

2.2 Organization

The first group to notice an emergency situation at a nuclear facility would normally be the facility staff. The first notification and all initial information on the probable extent of the hazard will therefore come from the facility staff. In collaboration with the appropriate municipal, provincial and federal authorities, the facility operator should arrange a procedure for promptly notifying the public officials who will make up a control group. The director of this control group must be clearly identified.

An organizational network and communication system must be set up to ensure that all information relating to the nature and extent of the off-site hazard is transmitted to the control group so that the activities of all those involved in the response can be co-ordinated.

The requirement for off-site monitoring will be determined by the facility staff and appropriate public authorities.

2.3 Communications

To permit a rapid assessment of the hazard which may exist and to ensure implementation of any protective measures deemed necessary, it is essential that there be available a communications system linking the control group with teams in the field and possibly with expert advisors who could assist in assessing the situation. It should also be recognized that the incident may occur coincident with or because of some outside event which may also disrupt normal communication. In setting up the contingency plan, therefore, consideration should be given to the use of reliable, dedicated and secure communication equipment operated from an independent power source, such as battery-powered radios.

2.4 Response

In many cases it will be possible to reduce public exposures by prompt application of the appropriate protective measures. The use of any of these measures will depend on the nature and extent of the hazard and on its expected duration. It is recommended that plans and procedures be established for the implementation of the various measures and that these consider the actions to be taken if information on the nature and extent of the public health hazard is incomplete. In this case, during the development of the contingency plan, consideration of scenarios for possible situations specific to the facility concerned would aid in establishing the appropriate level of action. The basis for setting criteria for the protection of the public in the event of a nuclear emergency is discussed in Appendix B. The Emergency Reference Levels are those recommended by the AECB's Advisory Committee on Radiological Protection.

The situation with respect to hydrogen sulphide and sulphur dioxide, which are associated with the operation of heavy water plants, is considered in Appendix C.

Examples of required protective measures to be taken include having people take cover or remain indoors, evacuating residents from seriously affected areas, or preventing the distribution and use of contaminated food or water supplies.

2.5 Resources

The ability to react quickly in an emergency depends on the availability of the necessary personnel and equipment. When an emergency plan is set up, arrangements should be made to ensure that the necessary resources and the procedures for obtaining them are listed in a format that will be most useful to those responsible for the response.

2.6 Monitoring Surveys

It is essential that an assessment of the initial dose and projected levels and doses be communicated to a responsible control group as quickly as possible so that a decision on an appropriate response can be made. Such an assessment can be obtained by sending out survey teams and correlating the findings to give a composite picture of the extent of any hazard. Since it will take some time to assemble survey teams, it is recommended that personnel from the facility be used, at least initially. The facility operator's forecast of possible further releases will be required in order to adequately assess the need for future action.

Much of the radioactive material released, particularly in a reactor incident, is likely to be short-lived so that problems due to the longer-lived nuclides may not be encountered. However, it is strongly recommended that surveys for the longer-lived nuclides be continued for some time after any release, if these nuclides are present in the affected area and in various levels of food chains.

Areas found to be seriously contaminated after termination of the release condition may require clean-up operations, or at least continuous monitoring until radiation has decayed to normal background levels.

2.7 Public Information

There will be a need to make accurate, authoritative information available to the public during, at the termination of, and after the emergency. To avoid confusion, preferably one source should be provided for this purpose. In planning a public information program, particular attention should be paid to the early phases of the emergency when people directly involved will require immediate information concerning their own safety and that of relatives or friends. Where there are major public facilities which could be at risk, such as schools, hospitals or theatres, special arrangements may be necessary to inform the public of the precautions made for the safety of persons within such facilities.

2.8 Practice Drills

It is recommended that the responsible authorities, having established an off-site contingency plan, arrange for periodic exercises and practice drills in which the various emergency procedures and communications links are tested under conditions which are as realistic as possible, in order to uncover any possible weaknesses in the plan and provide personnel with experience in working together under the simulated conditions.

2.9 Documentation

In order to ensure that the plan is fully understood and can be implemented effectively, it is important that adequate documentation be produced and that provisions be made for regular up-dating.

This documentation would include a description of the plan itself, which should set out the duties and authorities of each group involved with sufficient clarity that confusion or conflicts of authority should not occur. Any agreements, formal or informal, between different agencies or levels of government should also be documented to ensure that situations will not arise where people are unwilling to act because of uncertainty due to overlapping jurisdiction.

An equally important part of the documentation requirement is to have available in a convenient format all information which may be required during the emergency. This may include lists of telephone numbers of individuals or agencies which may be involved, guidelines and instructions for implementing various activities, and an inventory of equipment and human resources which are available to help in coping with the emergency.

To achieve both objectives, it is suggested that the documentation be divided into two sections: (i) Plan Description and (ii) Implementation Procedures. The former should contain sufficient information on the overall workings of the plan for the reader to fully understand it and, in conjunction with the Implementation Procedures, to evaluate its adequacy. The Implementation Procedures should include all the information that could be required in an emergency in a form which is as brief and as easy to use as practicable. Records of practice drills should also be kept for future planning and for comparison purposes from year to year.

2.10 General

Appendix A to this guide contains a list of topics which need to be considered in the preparation of a contingency plan. The purpose of the list is to assist those involved in preparing plans as well as those involved in reviewing them. It is not intended to be an exhaustive list, nor is it intended to suggest that all of these topics must be covered in every case. The contents of any plan will vary depending on the type of nuclear facility involved and conditions such as geography, weather patterns, and population distribution.

The International Atomic Energy Agency has recently published a document (see 1. below) derived from advisory group meetings on planning for the protection of the public in the event of an accident at a nuclear facility. This document gives guidance to those responsible for public protection in this regard and discusses in detail the basic principles of protective measures. These measures are generally applicable to chemical and radioactive releases since the required organization and actions are similar in scope. Documents prepared by the U.S. Nuclear Regulatory Commission and the U.S. Federal Emergency Management Agency are also suggested for further reading. It should be quite clear, however, that not all concepts are directly relevant to the Canadian situation.

2.11 Further Reading

1. "Planning for Off-Site Response to Radiation Accidents in Nuclear Facilities" Safety Series 55, International Atomic Energy Agency, Vienna, 1981.

2. "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants," USNRC, NUREG-0654/FEMA-REP-1 Rev. 1.

3. "Planning Basis for the Development of State and Local Government Radiological Emergency Response Plans in Support of Light Water Nuclear Power Plants," USNRC, NUREG-0396/EPA 520/1-78-016 - referenced in NUREG-0654 on pages 4, 5, 11.

U.S. Nuclear Regulatory Commission and U.S. Federal Emergency Management Agency publications are available from:

GPO Sales Program,
Division of Technical Information and Document Control,
U.S. Nuclear Regulatory Commission,
Washington, D.C. 20555.

and from:
National Technical Information Service,
Springfield, Virginia 22161.

International Atomic Energy Agency publications are directly available from:

Division of Publications,
International Atomic Energy Agency,
Wagramerstrasse 5,
P.O. Box 100,
A-1400, Vienna, Austria.

and also through:

UNIPUB,
45 Park Avenue South,
New York, New York 10010.

CHECKLIST OF TOPICS FOR INCLUSION IN A CONTINGENCY PLAN

The contingency plan should refer to examples of scenarios for possible situations specific to the facility concerned. An assessment should be made of the scope of possible off-site effects for each scenario. The following checklist should be considered in conjunction with IAEA documents and other referenced material (see Section 2.11).

1. Responsibility

1.1 Assignment of overall responsibility for planning and for implementation of the plan.

1.2 Agreements between the various levels of government which may be involved. (Interprovincial or international agreements may be needed if the facility is close to a provincial or international boundary.)

1.3 Agreements between agencies whose jurisdiction may overlap or who could assist one another in an emergency (e.g., provincial and local police forces or health authorities).

1.4 Definition of the responsibility of the nuclear facility operator for off-site emergency planning and response.

1.5 Agreement on responsibilities for specific actions which may be required, for example:

(a) communication;
(b) public health activities;
(c) personal dosimetry and decontamination;
(d) radiation monitoring;
(e) public information;
(f) traffic control;
(g) emergency transportation;
(h) social services.

2. Organization

2.1 Establishment of an emergency control group having an identified director.

2.2 Definition of inter-relationship of organizations participating in the plan with particular reference to control and co-ordination of activities.

2.3 Setting up of an emergency control centre. Provision should be made for use of an alternative control centre location, should this be required.

2.4 Listing of organizations (both public and private) which could be of assistance in an emergency. The list should indicate the specific capabilities of each organization and the means of contacting them. Responsibilities and capabilities should be detailed in appendices to the general plan.

2.5 Listing of officials of the emergency control groups including up-to-date telephone numbers.

3. Notification and Communication

3.1 Procedure for warning public officials of any actual or potential emergency.

3.2 Provisions for direct warning of the public.

3.3 Provisions for ensuring adequate inter-government and interagency communications.

3.4 Method to be used to communicate with teams in the field.

3.5 Provisions to be made to maintain adequate communication facilities at the emergency control centre (fixed or mobile).

4. Emergency Response

4.1 Instructions for the implementation of any protective response which may be required. Such emergency responses may include:

(a) having people take cover indoors;
(b) distributing stable iodine tablets;
(c) evacuating the population.

Criteria in terms of proposed emergency reference levels for a nuclear emergency are given in Appendix B. For heavy water plants, the criteria currently used are given in Appendix C.

4.2 Provisions for preventing distribution and use of contaminated food and water.

4.3 Arrangements for measuring the exposures of emergency action personnel.

4.4 Arrangements for measuring or estimating exposures of the public.

4.5 Availability of reference documentation which may be required (such as maps showing population and land use, details of food and water distribution systems).

4.6 Arrangements for decontamination of affected individuals.

5. Emergency resources

5.1 Availability of public health resources, for example:

(a) location of hospitals, specifying those equipped to handle patients contaminated with radioactive material;

(b) vehicles for transporting victims (including vehicles other than ambulances suitable for such service);

(c) medical personnel for both in-hospital and first-aid treatment of victims.

5.2 Availability of radiation monitoring resources, for example:

(a) instrumentation for environmental monitoring or for personal dosimetry;

(b) trained personnel;

(c) laboratory facilities for analysis of samples.

5.3 Availability of any other potentially useful resources, for example:

(a) transportation or communication equipment;

(b) decontamination facility for emergency personnel and members of the public.

6. Monitoring Surveys

6.1 Availability of trained personnel to form survey teams.

6.2 Arrangements for transportation and communication facilities for survey teams.

6.3 Provision for recording and correlating survey results.

6.4 Provision for communication with local meteorological stations.

6.5 Provision for and preservation of records for post-accident analysis.

6.6 Provision for monitoring personnel or vehicles leaving any restricted area.

7. Public Information

7.1 Assignment of responsibility for control and release of information. The maximum use should be made of available media for providing information to the public.

7.2 The information to be released, for example:

(a) nature and severity of accident;

(b) communities or geographical area affected;

(c) nature of the hazard to the individual;

(d) steps being taken to protect the public;

(e) steps members of the public may take for their own protection;

(f) pre-printed instruction sheets concerning the taking of stable iodine tablets.

8. Training

8.1 Arrangements for training of emergency personnel.

8.2 Schedule of practice exercises and practice drills, and program details.

8.3 Types of emergency to be simulated.

8.4 Provision for evaluation of response by outside observers.

8.5 Maintenance of records of main features and results of all exercises and practice drills.

9. Documentation

9.1 Provisions for ensuring improvements to the plan as a result of exercises and practice drills.

9.2 Arrangements for regular updating of the plan and its references.

CRITERIA FOR THE PROTECTION OF THE PUBLIC IN THE EVENT OF A NUCLEAR EMERGENCY

Introduction

In the event of an accident at a nuclear facility involving the release of radioactive material to the environment, countermeasures may be required in order to reduce the potential adverse effects on members of the public. These countermeasures may be implemented by the operator of the facility in the early stages of the event or by a provincially or municipally organized group at a later stage. Countermeasures may include "stay in" warnings, distribution of stable iodine compounds for thyroid blocking, restrictions on the use or distribution of water or locally produced milk or foodstuffs, restrictions on the use of recreational facilities such as beaches or parks, and, in extreme situations, evacuation of the local population.

Since many of the factors that determine the difficulty of countermeasures are very site-or time-specific, e.g., population density, time of day, weather conditions, it is inappropriate to set generic emergency action procedures. These can best be derived on a site-specific basis by the operator of each facility in conjunction with the appropriate provincial agency responsible for emergency planning. Instead, Emergency Reference Levels of dose, (ERL), applicable to all AECB licensed facilities, are derived. The ERLs roughly divide situations in which countermeasures are unlikely to be justified from those in which countermeasures are desirable if they can be instituted with reasonable effectiveness and safety. These ERLs then become the starting point from which emergency action procedures are generated.

Countermeasures may be difficult or costly to carry out and may themselves impose risks upon the population or on those involved in carrying out the countermeasures. It is therefore important that these risks or costs do not exceed the expected benefit resulting from the countermeasures.

Objectives of the Criteria

The purpose of defining ERLs is to provide guidance to those preparing emergency procedures and contingency plans, and to provide the AECB staff with a means of judging these plans.

Emergency Reference Levels

In line with the recommendations of the IAEA, two-tier ERLs are recommended. The lower ERL indicates a level below which countermeasures are unlikely to be justified, at least on health grounds. The upper ERL represents a point above which countermeasures would almost certainly be justified. This will give emergency planners or facility operators broad scope for individual judgement based on local situations and priorities.

The emergency reference levels were determined by consideration of the following:

(a) the dose and hence the risk to members of the public;

(b) the difficulty of carrying out countermeasures and the possible adverse effects of the countermeasures themselves.

The dose indicated is that which might be received by an individual if no emergency measures were taken and which might be avoided if those measures were taken.

Emergency Reference Levels

Countermeasure	Lower ERL		Upper ERL	
	Whole Body	Thyroid	Whole Body	Thyroid
Stay in Warning	0.5 mSv	5 mSv	5 mSv	50 mSv
Restrictions on Water Supply and Locally Produced Food & Milk	0.05 mSv	0.5 mSv	5 mSv	50 mSv
Restrictions on Recreational Facilities (Beaches and Parks)	0.05 mSv	0.5 mSv	5 mSv	50 mSv
Distribution of Stable Iodine Compounds	-	50 mSv	-	1 Sv
Evacuation	50 mSv	1 Sv	500 mSv	10 Sv

CRITERIA FOR THE PROTECTION OF THE PUBLIC IN THE EVENT OF AN EMERGENCY SITUATION AT A HEAVY WATER PLANT

Emergency procedures shall be initiated in the event of any occurrence in the plant that is judged likely to result in harmful effects on the general population. The decision to initiate emergency procedures shall be based on the following criteria:

1. Release of a quantity of hydrogen sulphide gas sufficient to cause the concentration at ground level to be 50 ppm, or greater, outside the plant boundary.

2. Emission of a similarly large quantity of sulphur dioxide.

3. Indication of a plant condition which, in the judgement of the shift supervisor, could result in a release likely to reach or exceed 50 ppm at ground level, measured at the plant boundary.

CRITÈRES POUR LA PROTECTION DE LA POPULATION
EN CAS DE SITUATION D'URGENCE DANS UNE USINE D'EAU LOURDE

Des mesures d'urgence doivent être prises dans le cas de tout incident dans l'usine qui est susceptible d'avoir des effets négatifs sur la population. La décision d'appliquer ces mesures d'urgence doit se fonder sur les critères suivants:

1. l'émission d'hydrogène sulfuré en quantité suffisante pour donner lieu à une concentration au niveau du sol de 50 ppm ou plus à l'extérieur des limites de l'usine;

2. l'émission d'une quantité semblable d'anhydride sulfureux; ou

3. l'indication d'une situation à l'usine qui, selon le jugement du chef de quart, pourrait donner lieu à une émission d'au moins 50 ppm au niveau du sol, mesurée aux limites de l'usine.

Consultative Document / Document de consultation

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

CONSULTATIVE DOCUMENT C-22

Proposed Regulatory Policy Statement

QUALITY ASSURANCE PROGRAMS FOR NUCLEAR FACILITIES

Issued for comment:

November 10, 1982

Canada

This Consultative Document is issued in order to provide an opportunity for public review of the proposal it contains before formal issue as a Regulatory Document. Comments are encouraged and should be directed to the address below before February 10, 1983.

Unless otherwise requested by the submittor, a copy of all comments received will be placed in the AECB public documents room.

Direct comments to:

Regulations Development Section
Atomic Energy Control Board
P.O. Box 1046
Ottawa, Ontario
CANADA
K1P 5S9

QUALITY ASSURANCE PROGRAMS FOR NUCLEAR FACILITIES

A. INTRODUCTION

The Atomic Energy Control Board (the Board) is authorized by the Atomic Energy Control Act, originally promulgated in 1946, and amended in 1954, to make provision for the control of atomic energy materials and equipment in the interests of health, safety and physical security. The Board exercises its mandate through the regulations made pursuant to the Act.

Implicit in Section 10, Subsection 4, Part III of the Atomic Energy Control Regulations is the requirement that each applicant for a nuclear facility approval or license establish and implement an effective quality assurance program: "The approval may be subject to such conditions as the Board deems necessary in the interests of health, safety and security respecting the site, design and construction of the nuclear facility." The maintenance of an effective quality assurance program forms the basis for ensuring that all relevant specifications, codes and standards for components, systems, structures and activities are being adhered to. The Board's concern is with health and safety, and so the quality assurance program is to be applied to the safety-related items and activities associated with the facility.

B. POLICY STATEMENT

The Atomic Energy Control Board requires that an effective quality assurance program be established and implemented for each nuclear facility in accordance with the requirements contained in Annex A of this document.

LICENSING REQUIREMENTS

A. PROGRAM SCOPE AND DOCUMENT SUBMISSION

1. Each applicant for site acceptance, a construction license or an operating license for certain identified nuclear facilities shall establish and implement an effective overall quality assurance program for the safety-related components, systems, structures and activities associated with the facility. This overall program shall cover the site evaluation, design, procurement, manufacture, construction and installation, commissioning, operation, and decommissioning phases of the nuclear facility's life-cycle.

2. Within the overall program, a detailed constituent quality assurance program for each of the individual phases of the facility's life-cycle shall be established and implemented in accordance with the schedule for planning, commencing and accomplishing each of the phases concerned. Also, the overall program shall make particular provision for effective interfacing between the phases, and the individuals and organizations who are participating in the project.

3. The applicant may delegate to other organizations the work of establishing and implementing part or all of the quality assurance programs noted in sub-sections A.1 and A.2 above but the responsibility for the establishment, implementation, and effectiveness of each of the programs shall lie with the applicant.

4. A manual, together with copies of the principal quality assurance programmatic procedures, shall be submitted for the overall quality assurance program for Board staff review and approval at the time application is made for a construction license. The manual shall cross-reference each of the detailed constituent quality assurance programs.

5. A separate manual, together with copies of the principal quality assurance programmatic procedures, shall be submitted for each of the detailed constituent quality assurance programs for Board staff review and approval. Each of these document packages shall contain sufficient detailed information to permit an assessment to be made of the probable effectiveness of the program being addressed.

6. In accordance with the definitions referred to in sub-sections B.3 and B.4 of this Annex, the applicant shall identify clearly in each quality assurance program manual associated with the facility, the safety-related systems, components, structures and activities to which the program is to be applied.

7. The extent of quality assurance to be obtained for each applicable system, component, structure and activity shall, as a minimum, be commensurate with the importance to safety of the item and activity. Where a graded approach to quality assurance is to be taken, the methodology to be used shall be described, or cross-referenced, in the applicable quality assurance program manual.

8. No activity having a bearing on safety-related systems, components, and structures associated with the nuclear facility shall be undertaken prior to the approval of the Board staff of the manual and principal quality assurance programmatic procedures covering the detailed constituent quality assurance program for the life-cycle phase of the facility during which the activity is to take place. This requirement applies to activities connected with site evaluation and to procurement as well as to activities connected with eachof the other phases in the facility life-cycle.

9. For nuclear reactors, the quality assurance manuals and quality assurance programmatic procedures describing the detailed individual constituent quality assurance programs for the facility shall be submitted to the Board staff for review and approval in accordance with the following schedule:

(a) Two copies of a site evaluation quality assurance program manual and programmatic procedures shall be submitted not later than twelve months in advance of the commencement of site-evaluation.

(b) Two copies of a design quality assurance program manual and programmatic procedures shall be submitted for review and approval twelve months in advance of the commencement of design.

(c) Two copies of a procurement quality assurance program manual and programmatic procedures shall be submitted twelve months in advance of the commencement of procurement.

(d) Two copies of a construction and installation quality assurance program manual and programmatic procedures shall be submitted at the time application is made for a construction license.

(e) Two copies of a commissioning quality assurance program manual and programmatic procedures shall be submitted not later than twelve months in advance of the scheduled commencement of commissioning.

(f) Two copies of an operations quality assurance program manual and programmatic procedures shall be submitted not later than twelve months in advance of the scheduled commencement of operation.

(g) Two copies of a decommissioning quality assurance program manual and programmatic procedures shall be submitted not later than twelve months in advance of the scheduled commencement of decommissioning.

The Board should be contacted directly (see Preface) for information regarding the schedule to be followed for submission of documents related to the other nuclear facilities listed in sub-section B.1 of this Annex.

B. USE AND APPLICATION

1. This document is for use and application by persons and organizations applying, or intending to apply, for site approval, a construction license, or an operating license for one or more of the following types of nuclear facility:

(a) nuclear reactors

(b) plants for the production of deuterium or deuterium compounds

(c) uranium hexafluoride conversion facilities

(d) certain facilities for the storage or disposal of radioactive waste material; the Board should be contacted directly for further information regarding these facilities.

Included with each facility and subject to the policy is all land, buildings, equipment and activities that are connected or associated with the facility.

2. Application of the document to nuclear facilities which are already licensed will be pursued by Board staff on an individual facility basis.

3. For nuclear reactors the term "safety-related" is applied to those systems, components, structures, design features and activities which by virtue of failure to perform in accordance with the design intent, contribute to radiological risk to the public or plant personnel. Examples are systems, components, structures, design features and activities connected with:

(a) the regulation, shut-down and cooling of the reactor core under normal, anticipated transient, and accident conditions and the maintenance of the reactor core in a safe, shut-down state for an extended period following such conditions; and

(b) limiting the release of radioactive materials and the exposure of plant personnel or the public to meet the criteria established by the licensing authority with respect to radiation exposure during and following normal, anticipated transient and accident conditons.

NOTE: The term "safety-related" is applied to a broad range of items from those having very important functions to those with a less direct effect on safety. In general, the larger the risk contribution due to the item failure, the stronger the "safety-related" connotation to be considered in the treatment of that item.

4. The Board should be contacted directly for information regarding the definition to be used for "safety-related" for the other nuclear facilities listed in sub-section B.1 above.

Consultative Document / Document de consultation

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

DOCUMENT DE CONSULTATION C-22

Projet de déclaration de principe en matière de réglementation

PROGRAMMES D'ASSURANCE-QUALITÉ DES INSTALLATIONS NUCLÉAIRES

Publié pour commentaires:

le 10 novembre 1982

Canada

Ce document de consultation est publié dans le but de fournir au public l'occasion d'examiner le projet de réglementation avant qu'il soit adopté dans sa forme définitive. Vous êtes invités à faire parvenir vos commentaires à l'adresse ci-dessous avant le 10 février 1983.

Sauf avis contraire de la part de l'envoyeur, une copie de tous les commentaires reçus sera placée dans la salle des documents officiels aux bureaux de la CCEA.

Prière d'adresser vos commentaires à:

Section, Développement des règlements
Commission de contrôle de l'énergie atomique
C.P. 1046
Ottawa (Ontario)
CANADA
K1P 5S9

PROGRAMMES D'ASSURANCE-QUALITÉ DES INSTALLATIONS NUCLÉAIRES

A. INTRODUCTION

En vertu de la Loi sur le contrôle de l'énergie atomique, promulguée à l'origine en 1946 et modifiée en 1954, la Commission de contrôle de l'énergie atomique (appelée ci-après la «Commission») est chargée d'assurer le contrôle des matières et de l'équipement relatifs à l'énergie nucléaire dans l'intérêt de la santé, de la sûreté et de la sécurité. La Commission remplit son mandat en vertu du Règlement d'application de la Loi.

Le paragraphe 10(4) de la Partie III du Règlement sur le contrôle de l'énergie atomique stipule implicitement que chaque personne faisant une demande d'approbation ou de permis d'une installation nucléaire doit établir et mettre en vigueur un programme efficace d'assurance-qualité: «L'approbation [...] peut être assujettie aux conditions que la Commission juge nécessaires dans l'intérêt de la santé, de la sûreté et de la sécurité quant à l'emplacement, à la conception et à la construction de l'établissement nucléaire.» La réalisation d'un programme efficace d'assurance-qualité permet de garantir que toutes les caractéristiques, tous les codes et toutes les normes se rattachant aux composants, aux systèmes, aux structures et aux activités sont respectés. En raison de l'importance particulière qu'accorde la Commission à la santé et à la sûreté, le programme d'assurance-qualité doit s'appliquer aux articles et aux activités liés à la sûreté.

B. ÉNONCÉ DE POLITIQUE

La Commission de contrôle de l'énergie atomique exige qu'un programme efficace d'assurance-qualité soit établi et mis en vigueur dans chaque installation nucléaire, conformément aux prescriptions de l'annexe A du présent document.

ANNEXE A

EXIGENCES DE DÉLIVRANCE DE PERMIS

A. PORTÉE DU PROGRAMME ET
PRÉSENTATION DES DOCUMENTS

1. Toute personne qui présente une demande d'approbation de site, de permis de construction ou de permis d'exploitation pour certaines installations nucléaires déterminées devra établir et mettre en vigueur un programme d'assurance-qualité global et efficace des composants, des systèmes, des structures et des activités liés à la sûreté. Ce programme d'ensemble englobera toutes les étapes du cycle de la vie de l'installation nucléaire: de l'évaluation du site à la conception, l'approvisionnement, la fabrication, la construction et l'installation, la mise en service, jusqu'au déclassement.

2. Dans le cadre du programme global, un programme d'assurance-qualité constitutif détaillé portant sur chacune des étapes du cycle de vie de l'installation sera élaboré et mis en vigueur conformément au calendrier de planification, de début et de réalisation de chacune des étapes en question. En outre, le programme global prévoira des dispositions particulières en vue d'une articulation efficace entre les étapes et entre les personnes et les organismes participant au projet.

3. Le demandeur peut déléguer à d'autres organismes le soin d'établir et de mettre en vigueur, en partie ou en totalité, les programmes d'assurance-qualité stipulés aux paragraphes A.1 et A.2 ci-dessus. Toutefois, la responsabilité de l'établissement, de la mise en vigueur et de l'efficacité de chacun des programmes continuera d'incomber au demandeur.

4. Au moment de la présentation de la demande de permis de construction, un manuel portant sur le programme global d'assurance-qualité, accompagné d'exemplaires des principales procédures relatives aux fonctions du programme sera soumis aux spécialistes de la Commission pour étude et approbation. Le manuel présentera des renvois à chacun des programmes d'assurance-qualité constitutifs détaillés.

5. Un manuel distinct portant sur chacun des programmes d'assurance-qualité constitutifs détaillés, accompagné d'exemplaires des principales procédures relatives aux fonctions du programme, sera soumis aux spécialistes de la Commission pour étude et approbation. Chacun de ces documents contiendra suffisamment de renseignements détaillés pour permettre l'évaluation de l'efficacité probable du programme à l'étude.

6. Conformément aux définitions mentionnées aux paragraphes B.3 et B.4 de la présente annexe, le demandeur devra préciser clairement dans chaque manuel d'assurance-qualité, les systèmes, les composants, les structures et les activités liés à la sûreté et touchés par le programme.

7. Le niveau d'assurance pour chaque système, composant, structure et activité en question devra être au moins proportionnel à l'importance de l'article et de l'activité par rapport à la sûreté. Si l'on retient une approche progressive à l'assurance-qualité, la méthodologie utilisée sera décrite, ou mentionnée avec les renvois utiles, dans le manuel approprié du programme d'assurance-qualité.

8. Aucune activité ayant une incidence sur les systèmes, composants et structures liés à la sûreté ne sera entreprise sans que les spécialistes de la Commission aient approuvé le manuel et les procédures relatives aux fonctions du programme d'assurance-qualité touchant le programme constitutif détaillé d'assurance-qualité pour l'étape du cycle de vie de l'installation au cours de laquelle l'activité doit avoir lieu. Cette exigence s'applique aux activités liées à l'évaluation du site et à l'approvisionnement, ainsi qu'aux activités se rattachant à chacune des autres étapes du cycle de vie de l'installation.

9. En ce qui concerne les réacteurs nucléaires, les manuels d'assurance-qualité et les procédures relatives aux fonctions de chacun des programmes constitutifs détaillés d'assurance-qualité pour l'installation seront soumis aux spécialistes de la Commission pour étude et approbation, conformément aux modalités suivantes:

a) deux exemplaires d'un manuel sur le programme d'assurance-qualité de l'évaluation du site et des procédures relatives aux fonctions du programme seront soumis au plus tard douze mois avant le début de l'évaluation du site;

b) deux exemplaires d'un manuel sur le programme d'assurance-qualité de la conception et des procédures relatives aux fonctions du programme seront soumis pour étude et approbation douze mois avant le début de la conception;

c) deux exemplaires d'un manuel sur le programme d'assurance-qualité de l'approvisionnement et des procédures relatives aux fonctions du programme seront soumis douze mois avant le début de l'approvisionnement;

d) deux exemplaires d'un manuel sur le programme d'assurance-qualité de la construction et de l'installation, ainsi que des procédures relatives aux fonctions du programme, seront soumis au moment de présenter la demande de permis de construction;

e) deux exemplaires d'un manuel sur le programme d'assurance-qualité de la mise en service et des procédures relatives aux fonctions du programme seront soumis douze mois avant la date prévue du début de la mise en service;

f) deux exemplaires d'un manuel sur le programme d'assurance-qualité de l'exploitation et des procédures relatives aux fonctions du programme seront soumis douze mois avant la date prévue d'exploitation;

g) deux exemplaires d'un manuel sur le programme d'assurance-qualité du déclassement et des procédures relatives aux fonctions du programme seront soumis douze mois avant la date prévue des travaux de déclassement.

Il convient de se mettre directement en rapport avec la Commission (voir la préface) pour tout renseignement concernant le calendrier de présentation des documents reliés aux autres installations nucléaires énumérées au paragraphe B.1 de la présente annexe.

B. USAGE ET APPLICATION

1. Le présent document est destiné aux personnes et aux organismes qui présentent ou qui ont l'intention de présenter une demande d'approbation de site, de permis de construction ou de permis d'exploitation pour un ou plusieurs des types suivants d'installations nucléaires:

a) réacteurs nucléaires;

b) usines de fabrication de deutérium ou de composés de deutérium;

c) usines de conversion d'hexafluorure d'uranium;

d) certaines installations de stockage ou d'évacuation de déchets radioactifs; il convient d'entrer directement en contact avec la Commission pour tout renseignement supplémentaire sur ces installations.

Les terres, les bâtiments, l'équipement et les activités liés ou associés à l'installation dépendent de chaque installation et sont assujettis à la présente politique.

2. Les spécialistes de la Commission appliqueront le présent document à chaque installation nucléaire déjà détentrice d'un permis, en examinant chaque cas individuellement.

3. En ce qui concerne les réacteurs nucléaires, l'expression «lié à la sûreté» s'applique aux systèmes, composants, structures, caractéristiques de conception et aux activités qui, si leur rendement n'est pas conforme, pour une raison ou pour une autre, aux normes établies lors de la conception, contribuent à accroître le risque radiologique du public et des employés de la centrale. Les systèmes, composants, structures, caractéristiques de conception et activités liés aux points suivants constituent des exemples:

a) la régulation, l'arrêt et le refroidissement du coeur d'un réacteur dans des conditions normales, dans des périodes transitoires prévues et lors d'accidents, et la conservation du coeur du réacteur dans un état sûr et à l'arrêt pour une période prolongée, à la suite de ces conditions; et

b) la limitation du dégagement de matières radioactives et de l'exposition du personnel de la centrale ou du public en vue de répondre aux critères d'irradiation établis par la Commission pendant et après des conditions normales, des périodes transitoires prévues et des accidents.

NOTE: L'expression «lié à la sûreté» s'applique à une vaste gamme d'articles dont les fonctions peuvent être très importantes ou n'avoir qu'une incidence indirecte sur la sûreté. En général, plus les risques se rattachant aux articles sont élevés, plus la connotation de l'expression «lié à la sûreté» prend de l'importance quand on considère l'article en question.

4. Il convient de se mettre directement en rapport avec la Commission pour tout renseignement concernant la définition de l'expression «lié à la sûreté» en ce qui concerne les installations nucléaires énumérées au paragraphe B.1 ci-dessus.

PHYSICAL SECURITY REGULATIONS

RÈGLEMENT SUR LA SÉCURITÉ MATÉRIELLE

Amendments:

SOR/84-81 25 January, 1984

SOR/85-1016 13 November, 1985

SOR/83-77

Modifications:

DORS/84-81 25 janvier 1984

DORS/85-1016 11 novembre 1985

Not consolidated

Non consolidées.

Registration
SOR/85-1016 25 October, 1985

ATOMIC ENERGY CONTROL ACT

Physical Security Regulations, amendment

P.C. 1985-3186 24 October, 1985

Her Excellency the Governor General in Council, on the recommendation of the Minister of Energy, Mines and Resources, pursuant to section 9 of the Atomic Energy Control Act, is pleased hereby to approve the amendments made on September 19th, 1985 by the Atomic Energy Control Board to the Physical Security Regulations, made on November 29, 1982 by the Atomic Energy Control Board and approved by Order in Council P.C. 1983-12 of 13th January, 1983*, in accordance with the schedule hereto.

SCHEDULE

1. The definition "response force" in subsection 2(1) of the *Physical Security Regulations* is revoked and the following substituted therefor:

" "response force" means a local, provincial or federal police force detachment, Canadian Armed Forces unit or any force trained in the use of arms that is authorized under any Act or regulation to carry arms and is qualified to use them, (*équipe d'intervention*)"

2. (1) Paragraph 10(*a*) of the said Regulations is revoked and the following substituted therefor:

"(*a*) equipped with a device that

(i) detects the intrusion of any person or thing into, the passage of any person or thing out of, and the movement of any person or thing within the inner area,

(ii) detects any tampering with the device that may cause it to malfunction or to cease to function, and

(iii) when it detects an event referred to in subparagraph (i) or (ii) provides a continuous audible and visible alarm signal to a security monitoring room and to at least one other manned location outside the inner area where the alarm signal can only be stopped by a security guard or other authorized person, or"

(2) Paragraph 10(*b*) of the French version of the said Regulations is revoked and the following substituted therefor:

"*b*) être sous la surveillance visuelle d'un garde de sécurité muni d'un dispositif qui peut déclencher le signal d'alarme visé au sous-alinéa *a*)(iii)."

* SOR/83-77, 1983 *Canada Gazette* Part II, p. 411

Enregistrement
DORS/85-1016 25 octobre 1985

LOI SUR LE CONTRÔLE DE L'ÉNERGIE ATOMIQUE

Règlement sur la sécurité matérielle— Modification

C.P. 1985-3186 24 octobre 1985

Sur avis conforme du ministre de l'Énergie, des Mines et des Ressources et en vertu de l'article 9 de la Loi sur le contrôle de l'énergie atomique, il plaît à Son Excellence le Gouverneur général en conseil d'approuver, conformément à l'annexe ci-après, les modifications que la Commission de contrôle de l'énergie atomique a apportées le 19 septembre 1985 au Règlement sur la sécurité matérielle, pris par la Commission de contrôle de l'énergie atomique le 29 novembre 1982 et approuvé par le décret C.P. 1983-12 du 13 janvier 1983*.

ANNEXE

1. La définition de «équipe d'intervention», au paragraphe 2(1) du *Règlement sur la sécurité matérielle*, est abrogée et remplacée par ce qui suit:

« «équipe d'intervention» désigne un détachement de la police municipale, de la sûreté provinciale ou de la police fédérale, une unité des Forces armées canadiennes ou tout autre groupe autorisé en vertu d'une loi ou d'un règlement à porter des armes et qualifiée pour les utiliser. (*response force*)»

2. (1) L'alinéa 10*a*) du même règlement est abrogé et remplacé par ce qui suit:

«*a*) être équipée d'un dispositif

(i) qui permet de détecter l'intrusion d'une personne ou d'un objet, le passage d'une personne entrant ou sortant, de même que les déplacements d'une personne à l'intérieur de l'aire intérieure,

(ii) qui permet de détecter toute tentative d'altération qui pourrait causer le dérèglement ou l'arrêt du dispositif, et

(iii) qui, dans une situation visée au sous-alinéa (i) ou (ii), déclenche un signal continu, sonore et visible, dans un local de surveillance et dans au moins un autre local, occupé par un garde de sécurité à l'extérieur de l'aire intérieure, où le signal d'alarme ne peut être arrêté que par un garde de sécurité ou une autre personne autorisée; ou»

(2) L'alinéa 10*b*) de la version française du même règlement est abrogé et remplacé par ce qui suit:

«*b*) être sous la surveillance visuelle d'un garde de sécurité muni d'un dispositif qui peut déclencher le signal d'alarme visé au sous-alinéa *a*)(iii).»

* DORS/83-77, *Gazette du Canada* Partie II, 1983, p. 411

3. Subsection 11(1) of the French version of the said Regulations is revoked and the following substituted therefor:

"11. (1) La structure ou l'enceinte visée au paragraphe 9(1) doit être construite de manière que chaque grille, porte, fenêtre ou autre entrée ou sortie qui y est pratiquée puisse être gardée fermée et verrouillée au moyen d'un dispositif qui ne peut être déverrouillé de l'extérieur, à moins qu'il ne soit actionné à la fois par un garde de sécurité et une personne autorisée aux termes du paragraphe 18(2) à pénétrer dans l'aire intérieure."

4. Subsection 13(2) of the said Regulations is revoked and the following substituted therefor:

"(2) Subject to section 14, a licensee may issue an authorization referred to in subsection (1) to any person for such term and subject to such conditions as he considers necessary in the interests of the security of the facility."

5. Paragraph 14(1)(*a*) of the French version of the said Regulations is revoked and the following substituted therefor:

"*a*) l'inspecteur présente au détenteur de permis un certificat ou une autre preuve de sa nomination ou de sa désignation, et"

6. (1) Subsection 18(1) of the said Regulations is revoked and the following substituted therefor:

"18. (1) The Board or a designated officer may issue an authorization to enter an inner area to an inspector appointed under the *Atomic Energy Control Regulations* or an inspector designated under an agreement between the Government of Canada and the International Atomic Energy Agency if the Board or designated officer is satisfied that such entry is necessary for the inspector to properly carry out his duties and that the entry of that inspector is not a risk and will not give rise to a risk to the security of the facility."

(2) Subparagraph 18(2)(*a*)(v) of the said Regulations is revoked and the following substituted therefor:

"(v) the written consent of that person to the disclosure of any information contained in the documents referred to in subparagraphs (i) to (iv) to or by the Board to the extent necessary for the Board to properly investigate and determine whether the entry of that person into the inner area is a risk or may give rise to a risk to the security of the facility; and"

(3) Paragraph 18(2)(*b*) of the said Regulations is revoked and the following substituted therefor:

"(*b*) the Board or designated officer is satisfied that the documents submitted by the licensee and any investigation carried out by or on behalf of the Board establish that the entry of that person is not a risk and will not give rise to a risk to the security of the facility."

(4) Subsection 18(3) of the said Regulations is revoked and the following substituted therefor:

"(3) The Board or a designated officer may issue the authorization referred to in subsection (1) or (2) for such term and subject to such conditions as the Board or designated officer considers necessary in the interests of the security of the facility."

3. Le paragraphe 11(1) de la version française du même règlement est abrogé et remplacé par ce qui suit:

«11. (1) La structure ou l'enceinte visée au paragraphe 9(1) doit être construite de manière que chaque grille, porte, fenêtre ou autre entrée ou sortie qui y est pratiquée puisse être gardée fermée et verrouillée au moyen d'un dispositif qui ne peut être déverrouillé de l'extérieur, à moins qu'il ne soit actionné à la fois par un garde de sécurité et une personne autorisée aux termes du paragraphe 18(2) à pénétrer dans l'aire intérieure.»

4. Le paragraphe 13(2) du même règlement est abrogé et remplacé par ce qui suit:

«(2) Sous réserve de l'article 14, le détenteur de permis peut accorder à quiconque l'autorisation visée au paragraphe (1), pour la période et aux conditions qu'il juge nécessaires pour assurer la sécurité de l'établissement.»

5. L'alinéa 14(1)*a*) de la version française du même règlement est abrogé et remplacé par ce qui suit:

«*a*) l'inspecteur présente au détenteur de permis un certificat ou une autre preuve de sa nomination ou de sa désignation, et»

6. (1) Le paragraphe 18(1) du même règlement est abrogé et remplacé par ce qui suit:

«18. (1) La Commission ou un fonctionnaire désigné peut accorder l'autorisation d'entrer dans une aire intérieure à un inspecteur nommé aux termes du *Règlement sur le contrôle de l'énergie atomique* ou à un inspecteur désigné en vertu d'une entente conclue entre le gouvernement du Canada et l'Agence internationale de l'énergie atomique, si la Commission ou le fonctionnaire désigné est convaincu que l'entrée de l'inspecteur dans l'aire intérieure est nécessaire à l'accomplissement de ses fonctions et ne présente pas de risque pour la sécurité de l'établissement.»

(2) Le sous-alinéa 18(2)*a*)(v) du même règlement est abrogé et remplacé par ce qui suit:

«(v) le consentement écrit de cette personne autorisant la divulgation des renseignements contenus dans les documents visés aux sous-alinéas (i) à (iv) à la Commission ou par celle-ci, dans la mesure où ils lui sont nécessaires pour mener une enquête appropriée et déterminer si l'entrée de cette personne dans l'aire intérieure présente ou pourrait présenter un risque pour la sécurité de l'établissement, et»

(3) L'alinéa 18(2)*b*) du même règlement est abrogé et remplacé par ce qui suit:

«*b*) si la Commission ou le fonctionnaire désigné est convaincu que les documents fournis par le détenteur de permis et les résultats de toute enquête menée par la Commission ou en son nom établissent que l'entrée de cette personne ne présente pas de risque pour la sécurité de l'établissement.»

(4) Le paragraphe 18(3) du même règlement est abrogé et remplacé par ce qui suit:

«(3) La Commission ou un fonctionnaire désigné peut délivrer l'autorisation visée au paragraphe (1) ou (2) pour la durée et aux conditions que l'un ou l'autre juge nécessaires pour assurer la sécurité de l'établissement.»

(5) Subsection 18(4) of the French version of the said Regulations is revoked and the following substituted therefor:

"(4) Le détenteur de permis doit, lorsqu'il soumet à la Commission les documents visés aux sous-alinéas (2)*a*)(i) à (v) au sujet d'une personne pour laquelle l'autorisation d'entrer dans une aire intérieure est sollicitée, en remettre une copie à la personne concernée si cette personne le demande avant la date d'expiration de l'autorisation prévue à l'article 20."

7. (1) Paragraph 19(*a*) of the said Regulations is revoked and the following substituted therefor:

"(*a*) the full name, date and place of birth of that person;"

(2) Paragraph 19(*m*) of the said Regulations is revoked and the following substituted therefor:

"(*m*) full details of any military or police service, including the dates of employment in and release or retirement from that service and the rank that person attained during such service, and"

8. (1) Subsection 20(2) of the said Regulations is revoked and the following substituted therefor:

"(2) An authorization to enter an inner area that has been issued to an inspector appointed under the *Atomic Energy Control Regulations* or an inspector designated under an agreement between the Government of Canada and the International Atomic Energy Agency may be renewed by the Board or a designated officer for additional terms not exceeding five years each if the Board or designated officer is satisfied that such entry is necessary for the inspector to properly carry out his duties and that the entry of the inspector is not a risk and will not give rise to a risk to the security of the facility."

(2) Paragraph 20(3)(*b*) of the said Regulations is revoked and the following substituted therefor:

"(*b*) the Board or designated officer is satisfied that the documents submitted by the licensee and any investigation carried out by or on behalf of the Board establish that the entry of that person into the inner area is not a risk and will not give rise to a risk to the security of the facility."

9. (1) Subsection 22(3) of the said Regulations is revoked and the following substituted therefor:

"(3) The Board may revoke an authorization to enter an inner area or a protected area issued by the Board or a licensee if it has, at any time, reasonable grounds to believe that the entry of the authorized person into the inner area or protected area is a risk or may give rise to a risk to the security of the facility."

(2) Subsection 22(5) of the said Regulations is revoked and the following substituted therefor:

"(5) Where the licensee or the person whose authorization has been revoked is heard by the Board pursuant to paragraph (4)(*b*) and the Board is satisfied that the entry of that person into the inner area or protected area is not a risk and will not give rise to a risk to the security of the facility, the Board may issue that person a new authorization for such

(5) Le paragraphe 18(4) de la version française du même règlement est abrogé et remplacé par ce qui suit:

«(4) Le détenteur de permis doit, lorsqu'il soumet à la Commission les documents visés aux sous-alinéas (2)*a*)(i) à (v) au sujet d'une personne pour laquelle l'autorisation d'entrer dans une aire intérieure est sollicitée, en remettre une copie à la personne concernée si cette personne le demande avant la date d'expiration de l'autorisation prévue à l'article 20.»

7. (1) L'alinéa 19*a*) du même règlement est abrogé et remplacé par ce qui suit:

«*a*) les nom, prénom, date et lieu de naissance de cette personne;»

(2) L'alinéa 19*m*) du même règlement est abrogé et remplacé par ce qui suit:

«*m*) le détail de toute période de service militaire ou de service dans un corps policier, y compris les dates de début et de fin de service ou de mise à la retraite, et le plus haut grade obtenu; et»

8. (1) Le paragraphe 20(2) du même règlement est abrogé et remplacé par ce qui suit:

«(2) L'autorisation d'entrer dans une aire intérieure qui a été délivrée à un inspecteur nommé en vertu du *Règlement sur le contrôle de l'énergie atomique* ou à un inspecteur désigné aux termes d'une entente conclue entre le gouvernement du Canada et l'Agence internationale de l'énergie atomique peut être renouvelée par la Commission ou par un fonctionnaire désigné pour des périodes ne dépassant pas cinq années chacune, si la Commission ou le fonctionnaire désigné est convaincu que la présence de l'inspecteur sur les lieux est nécessaire à l'exercice de ses fonctions et ne présente pas de risque pour la sécurité de l'établissement.»

(2) L'alinéa 20(3)*b*) du même règlement est abrogé et remplacé par ce qui suit:

«*b*) la Commission ou le fonctionnaire désigné est convaincu que les documents produits par le détenteur de permis et les résultats de toute enquête effectuée par la Commission ou en son nom établissent que la présence de cette personne dans l'aire intérieure ne présente pas de risque pour la sécurité de l'établissement.»

9. (1) Le paragraphe 22(3) du même règlement est abrogé et remplacé par ce qui suit:

«(3) La Commission peut révoquer une autorisation d'entrer dans une aire intérieure ou dans une aire protégée délivrée par elle ou par un détenteur de permis, si elle a des raisons valables de croire que l'entrée de la personne autorisée dans l'aire intérieure ou l'aire protégée présente ou pourrait présenter un risque pour la sécurité de l'établissement.»

(2) Le paragraphe 22(5) du même règlement est abrogé et remplacé par ce qui suit:

«(5) Lorsque le détenteur de permis ou la personne dont l'autorisation a été révoquée comparaît devant la Commission pour se faire entendre selon l'alinéa (4)*b*) et que la Commission est convaincue que l'entrée de cette personne dans l'aire intérieure ou l'aire protégée ne présente pas de risque pour la sécurité de l'établissement, la Commission

term and subject to such conditions as the Board considers necessary in the interests of the security of the facility."

10. (1) Paragraphs 28(1)(*e*) of the French version of the said Regulations is revoked and the following substituted therefor:

"*e*) une photographie montrant un portrait de face de cette personne, et"

(2) Paragraph 28(1)(*f*) of the said Regulations is revoked and the following substituted therefor:

"(*f*) the written consent of that person to the disclosure of any of the information contained in the documents referred to in paragraphs (*a*) to (*e*) to or by the Board to the extent necessary for the Board to properly investigate and determine whether there could be a risk or would be a risk to the security of the facility if that person were authorized to act as a security guard at that facility."

(3) Subsections 28(2) to (4) of the said Regulations are revoked and the following substituted therefor:

"(2) The Board or a designated officer shall, following receipt of the documents referred to in subsection (1) and any investigation carried out by or on behalf of the Board, determine whether or not there may be reasonable grounds to believe that there could be a risk or would be a risk to the security of the facility if the person with respect to whom the documents were submitted were authorized to act as a security guard at that facility.

(3) Where, pursuant to subsection (2), the Board or designated officer determines that there may be reasonable grounds to believe that there could be a risk or would be a risk to the security of the facility if the person with respect to whom the documents were submitted were authorized to act as a security guard at that facility, the Board or designated officer shall notify that person and give that person a reasonable opportunity to be heard.

(4) The Board or a designated officer shall, following the determination of the Board or designated officer pursuant to subsection (2) and any hearing held pursuant to subsection (3), notify the licensee and the person with respect to whom the documents were submitted whether or not the Board or designated officer has reasonable grounds to believe that there could be a risk or would be a risk to the security of the facility if that person were authorized to act as a security guard at that facility."

11. Paragraph 29(*b*) of the said Regulations is revoked and the following substituted therefor:

"(*b*) the Board or a designated officer notifies the licensee pursuant to subsection 28(4) that the Board or designated officer has no reasonable grounds to believe that there could be a risk or would be a risk to the security of the facility if that person were authorized to act as a security guard at that facility."

12. (1) Paragraph 34(1)(*b*) of the French version of the said Regulations is revoked and the following substituted therefor:

peut délivrer à cette personne une nouvelle autorisation pour la période et aux conditions que la Commission estime nécessaires pour assurer la sécurité de l'établissement.»

10. (1) L'alinéa 28(1)*e*) de la version française du même règlement est abrogé et remplacé par ce qui suit:

«*e*) une photographie montrant un portrait de face de cette personne, et»

(2) L'alinéa 28(1)*f*) du même règlement est abrogé et remplacé par ce qui suit:

«*f*) son consentement écrit, autorisant la divulgation de la totalité ou d'une partie des renseignements contenus dans les documents visés aux alinéas *a*) à *e*) à la Commission ou par celle-ci, dans la mesure où ils sont nécessaires à la Commission pour effectuer une enquête appropriée et déterminer si l'emploi de cette personne à titre de garde de sécurité dans l'établissement présente ou pourrait présenter un risque pour la sécurité de l'établissement.»

(3) Les paragraphes 28(2) à (4) du même règlement sont abrogés et remplacés par ce qui suit:

«(2) La Commission ou un fonctionnaire désigné doit, après avoir reçu les documents visés au paragraphe (1) et à la fin de l'enquête effectuée par la Commission ou au nom de celle-ci, déterminer s'il existe des raisons valables de croire que l'emploi de la personne concernée à titre de garde de sécurité dans l'établissement présente ou pourrait présenter un risque pour la sécurité de l'établissement.

(3) Si la Commission ou un fonctionnaire désigné détermine, selon le paragraphe (2), qu'il peut exister des raisons valables de croire que l'emploi de la personne à titre de garde de sécurité dans l'établissement présente ou pourrait présenter un risque pour la sécurité de l'établissement, la Commission ou le fonctionnaire désigné doit en informer la personne et lui donner la possibilité de se faire entendre.

(4) La Commission ou un fonctionnaire désigné doit, après avoir pris la décision visée au paragraphe (2) et après avoir entendu la personne concernée selon le paragraphe (3), informer le détenteur de permis et la personne concernée par les documents soumis que la Commission ou le fonctionnaire désigné a ou non des raisons valables de croire que l'emploi de la personne à titre de garde de sécurité dans l'établissement présente ou pourrait présenter un risque pour la sécurité de l'établissement.»

11. L'alinéa 29*b*) du même règlement est abrogé et remplacé par ce qui suit:

«*b*) si la Commission ou un fonctionnaire désigné informe le détenteur de permis, aux termes du paragraphe 28(4), que l'un ou l'autre n'a aucune raison valable de croire que l'emploi de cette personne à titre de garde de sécurité dans l'établissement présente ou pourrait présenter un risque pour la sécurité de l'établissement.»

12. (1) L'alinéa 34(1)*b*) de la version française du même règlement est abrogé et remplacé par ce qui suit:

"*b*) les mesures, le matériel et les systèmes de communication à l'intérieur et à l'extérieur des lieux;"

(2) Paragraph 34(1)(*d*) of the French version of the said Regulations is revoked and the following substituted therefor

"*d*) les mesures établies par le détenteur de permis pour évaluer des manquements à la sécurité et les corriger."

13 Subparagraph 36(*b*)(iii) of the French version of the said Regulations is revoked and the following substituted therefor

"(iii) aux représentants ou aux membres d'une équipe d'intervention avec laquelle le détenteur de permis a pris des arrangements conformément à l'article 32, dans la mesure où ces renseignements leur sont nécessaires pour s'acquitter convenablement des fonctions ou des responsabilités prévues dans ces arrangements."

EXPLANATORY NOTE

(This note is not part of the Regulations.)

This amendment

(*a*) revises the definition "response force"; and

(*b*) revises sections for clarification.

«*b*) les mesures, le matériel et les systèmes de communication à l'intérieur et à l'extérieur des lieux;»

(2) L'alinéa 34(1)*d*) de la version française du même règlement est abrogé et remplacé par ce qui suit

«*d*) les mesures établies par le détenteur de permis pour évaluer les manquements à la sécurité et les corriger.»

13 Le sous-alinéa 36*b*)(iii) de la version française du même règlement est abrogé et remplacé par ce qui suit

«(iii) aux représentants ou aux membres d'une équipe d'intervention avec laquelle le détenteur de permis a pris des arrangements conformément à l'article 32, dans la mesure où ces renseignements leur sont nécessaires pour s'acquitter convenablement des fonctions ou des responsabilités prévues dans ces arrangements,»

NOTE EXPLICATIVE

(La présente note ne fait pas partie du règlement.)

Les modifications visent à redéfinir le terme «équipe d'intervention» et à clarifier le sens de certaines dispositions.

QUEEN'S PRINTER FOR CANADA, OTTAWA, 1985 IMPRIMEUR DE LA REINE POUR LE CANADA, OTTAWA, 1985

4320

Registration
SOR/84-81 12 January, 1984

ATOMIC ENERGY CONTROL ACT

Physical Security Regulations, amendment

P.C. 1984-16 11 January, 1984

His Excellency the Governor General in Council, on the recommendation of the Minister of Energy, Mines and Resources, pursuant to section 9 of the Atomic Energy Control Act, is pleased hereby to approve the amendments made on November 28, 1983 by the Atomic Energy Control Board to the Physical Security Regulations, made on November 29, 1982 by the Atomic Energy Control Board and approved by Order in Council P.C. 1983-12 of 13th January, 1983*, in accordance with the schedule hereto.

SCHEDULE

1. Paragraph (*a*) of the definition «établissement» in subsection 2(1) of the French version of the *Physical Security Regulations* is revoked and the following substituted therefor:

"*a*) un lieu où est utilisée, traitée, stockée ou autrement conservée toute quantité de substance indiquée à la colonne II d'un article de l'annexe,"

2. Paragraph 28(1)(*d*) of the said Regulations is revoked and the following substituted therefor:

"(*d*) documentary evidence that that person is a Canadian citizen or a permanent resident within the meaning of the *Immigration Act, 1976*;"

3. The said Regulations are further amended by adding thereto the following section:

"37. Notwithstanding any duty or obligation imposed on the Board by these Regulations to give to any person the reasons for a decision made by the Board, the Board shall take all precautions that are necessary

(*a*) to prevent the disclosure to that person of any information on which the decision may be based in whole or in part that in the opinion of the Board should not, in the interests of the security of any facility, be so disclosed, and

(*b*) to protect the secrecy of any source of information on which the decision may be based in whole or in part,

but the Board shall, in giving reasons for the decision, provide that person with sufficient information to disclose the basis on which the decision was made."

* SOR/83-77, 1983 *Canada Gazette* Part II, p. 411

Enregistrement
DORS/84-81 12 janvier 1984

LOI SUR LE CONTRÔLE DE L'ÉNERGIE ATOMIQUE

Règlement sur la sécurité matérielle—Modification

C.P. 1984-16 11 janvier 1984

Sur avis conforme du ministre de l'Énergie, des Mines et des Ressources et en vertu de l'article 9 de la Loi sur le contrôle de l'énergie atomique, il plaît à Son Excellence le Gouverneur général en conseil d'approuver, conformément à l'annexe ci-après, les modifications que la Commission de contrôle de l'énergie atomique a apportées le 28 novembre 1983 au Règlement sur la sécurité matérielle, pris par la Commission de contrôle de l'énergie atomique le 29 novembre 1982 et approuvé par le décret C.P. 1983-12 du 13 janvier 1983*.

ANNEXE

1. L'alinéa *a*) de la définition d'«établissement» au paragraphe 2(1) de la version française du *Règlement sur la sécurité matérielle* est abrogé et remplacé par ce qui suit:

«*a*) un lieu où est utilisée, traitée, stockée ou autrement conservée toute quantité de substance indiquée à la colonne II d'un article de l'annexe,»

2. L'alinéa 28(1)*d*) dudit règlement est abrogé et remplacé par ce qui suit:

«*d*) une preuve documentaire établissant que cette personne est un citoyen canadien ou un résident permanent au sens de la *Loi sur l'immigration de 1976*;»

3. Ledit règlement est modifié par insertion, après l'article 36, de ce qui suit:

«37. Dans le cas où la Commission est, en vertu du présent règlement, tenue de faire connaître à certaines personnes les motifs de l'une de ses décisions, elle doit divulguer à ces personnes suffisamment de renseignements pour leur faire connaître le fondement de sa décision tout en prenant les précautions nécessaires pour

a) empêcher la divulgation de tout renseignement qui, à son avis, doit être gardé secret dans l'intérêt de la sécurité d'un établissement donné, et

b) protéger le caractère secret de toute source de renseignement sur laquelle la décision est fondée en tout ou en partie.»

* DORS/83-77, *Gazette du Canada* Partie II, 1983, p. 411

EXPLANATORY NOTE

(This note is not part of the Regulation, but is intended only for information purposes.)

This amendment

(*a*) revises the definition "établissement";

(*b*) revises paragraph 28(1)(*d*); and

(*c*) adds a provision concerning the disclosure of information by the Board.

NOTE EXPLICATIVE

(La présente note ne fait pas partie du règlement et n'est publiée qu'à titre d'information.)

Ces modifications visent:

a) à réviser la définition d'établissements;

b) à réviser l'alinéa 28(1)*d*); et

c) à ajouter des dispositions concernant la divulgation de renseignements par la Commission.

QUEEN'S PRINTER FOR CANADA, OTTAWA, 1984 IMPRIMEUR DE LA REINE POUR LE CANADA, OTTAWA, 1984

Registration
SOR/83-77 14 January, 1983

ATOMIC ENERGY CONTROL ACT

Physical Security Regulations

P.C. 1983-12 13 January, 1983

His Excellency the Governor General in Council, on the recommendation of the Minister of Energy, Mines and Resources, pursuant to section 9 of the Atomic Energy Control Act, is pleased hereby to approve the annexed Regulations respecting physical security at certain nuclear facilities.

REGULATIONS RESPECTING PHYSICAL SECURITY AT CERTAIN NUCLEAR FACILITIES

Short Title

1. These Regulations may be cited as the *Physical Security Regulations*.

Interpretation

2. (1) In these Regulations,

"Act" means the *Atomic Energy Control Act*; (*Loi*)

"facility" means a place where

(*a*) any substance in a quantity set out in column II of an item of the schedule is used, processed, stored or otherwise possessed,

(*b*) a nuclear reactor, the thermal power of which may exceed 10 megawatts during normal operation, is located and includes all buildings and other structures containing, forming part of or connected to the nuclear reactor, or

(*c*) any substance in a quantity set out in column III of an item of the schedule is used, processed, stored or otherwise possessed,

(*établissement*)

"designated officer" means

(*a*) the President or Secretary of the Board, or

(*b*) any other officer or employee of the Board who is designated by the Board pursuant to subsection (2);

(*fonctionnaire désigné*)

"inner area" means an area enclosed by a structure or barrier described in subsection 9(1); (*aire intérieure*)

"licence" means a licence issued by the Board under any regulations made pursuant to the Act; (*permis*)

"licensee" means any person to whom a licence has been issued to operate a facility or to use, process, store or otherwise possess a substance in a quantity set out in the schedule; (*détenteur de permis*)

"protected area" means an area circumscribed by a barrier referred to in section 5; (*aire protégée*)

Enregistrement
DORS/83-77 14 janvier 1983

LOI SUR LE CONTRÔLE DE L'ÉNERGIE ATOMIQUE

Règlement sur la sécurité matérielle

C.P. 1983-12 13 janvier 1983

Sur avis conforme du ministre de l'Énergie, des Mines et des Ressources et en vertu de l'article 9 de la Loi sur le contrôle de l'énergie atomique, il plaît à Son Excellence le Gouverneur général en conseil d'approuver le Règlement concernant la sécurité matérielle dans certains établissements nucléaires, ci-après.

RÈGLEMENT CONCERNANT LA SÉCURITÉ MATÉRIELLE DANS CERTAINS ÉTABLISSEMENTS NUCLÉAIRES

Titre abrégé

1. Le présent règlement peut être cité sous le titre *Règlement sur la sécurité matérielle*.

Définitions

2. (1) Dans le présent règlement,

«aire intérieure» désigne une aire entourée d'une structure ou d'une enceinte visée au paragraphe 9(1); (*inner area*)

«aire libre» désigne une aire visée à l'article 8; (*unobstructed area*)

«aire protégée» désigne une aire circonscrite par une enceinte visée à l'article 5; (*protected area*)

«détenteur de permis» désigne toute personne à qui un permis a été délivré, l'autorisant à exploiter un établissement ou à utiliser, à traiter, à stocker ou à conserver de toute autre manière une substance dont la quantité est indiquée à l'annexe; (*licensee*)

«équipe d'intervention» désigne un détachement de la police municipale, de la sûreté provinciale ou de la police fédérale, ou une unité des Forces armées canadiennes ou tout autre groupe semblable capable de venir en aide sur demande à un établissement; (*response force*)

«établissement» désigne

a) un lieu où est utilisée, traitée, stockée ou autrement conservée toute quantité de substance indiquée à la colonne II d'un article de l'annexe,

b) un lieu où est situé un réacteur nucléaire dont la puissance thermique en fonctionnement normal peut dépasser 10 mégawatts, et comprend tous les bâtiments et autres structures qui abritent le réacteur nucléaire, qui en font partie ou qui y sont reliés, ou

c) un lieu où est utilisée, traitée, stockée ou autrement conservée toute quantité de substance indiquée à la colonne III d'un article de l'annexe;

(*facility*)

"response force" means a local, provincial or federal police force detachment, Canadian Armed Forces unit or other similar force that is capable of responding to a request for assistance at a facility; (*équipe d'intervention*)

"security guard" means a person who is authorized by a licensee to act as a security guard at a facility; (*garde de sécurité*)

"security monitoring room" means a security monitoring room described in section 31; (*local de surveillance*)

"substance" means any prescribed substance set out in column I of an item of the schedule; (*substance*)

"unobstructed area" means an area described in section 8. (*aire libre*)

«fonctionnaire désigné» désigne

a) le président ou le secrétaire de la Commission, ou

b) tout autre fonctionnaire ou employé de la Commission qui est désigné par la Commission conformément au paragraphe (2);

(*designated officer*)

«garde de sécurité» désigne une personne autorisée par un détenteur de permis à occuper le poste de garde de sécurité dans un établissement; (*security guard*)

«local de surveillance» désigne un local de surveillance visé à l'article 31; (*security monitoring room*)

«Loi» désigne la *Loi sur le contrôle de l'énergie atomique*; (*Act*)

«permis» désigne un permis délivré par la Commission en vertu d'un règlement établi en vertu de la Loi; (*licence*)

«substance» désigne toute substance prescrite prévue à la colonne I d'un article de l'annexe. (*substance*)

(2) The Board may, with the approval of the Minister, designate an officer or employee of the Board to act on its behalf in the administration of these Regulations.

(2) La Commission peut, avec l'approbation du Ministre, désigné un fonctionnaire ou un employé de la Commission pour agir en son nom aux fins de l'application du présent règlement.

Application

3. (1) These Regulations apply

(*a*) on and after December 1, 1983, in respect of a place described in paragraph (*a*) of the definition "facility" in section 2; and

(*b*) on and after December 1, 1984, in respect of a place described in paragraph (*b*) or (*c*) of the definition "facility" in section 2.

Application

3. (1) Le présent règlement s'applique

a) à compter du 1er décembre 1983, dans le cas des lieux visés à l'alinéa *a*) de la définition d'«établissement» à l'article 2; et

b) à compter du 1er décembre 1984, dans le cas des lieux visés aux alinéas *b*) ou *c*) de la définition d'«établissement» à l'article 2.

(2) These Regulations do not apply to a nuclear-powered ship

(2) Le présent règlement ne s'applique pas aux navires à propulsion nucléaire.

Responsibility

4. (1) Every licensee shall

(*a*) construct and maintain every room, structure or barrier,

(*b*) install, maintain and operate all devices and equipment, and

(*c*) prepare, provide and maintain every document

required by these Regulations in respect of each facility referred to in his licence.

Responsabilités

4. (1) Un détenteur de permis doit

a) construire et entretenir les locaux, structures ou enceintes,

b) installer, entretenir et exploiter tous les dispositifs et le matériel, et

c) préparer, fournir et conserver les documents

exigés par le présent règlement au sujet de chaque établissement spécifié dans son permis.

(2) Every licensee shall maintain and operate every unobstructed area, protected area and inner area in respect of each facility referred to in his licence in accordance with these Regulations.

(2) Le détenteur de permis doit entretenir et exploiter, conformément au présent règlement, toute aire libre, aire protégée et aire intérieure de chaque établissement spécifié dans son permis.

Protected Areas

5. Every facility shall be circumscribed at the perimeter of the area occupied by the facility, or at such distance outside the perimeter as may be determined by the licensee, by a barrier

Aires protégées

5. Un établissement doit être entouré, au périmètre de l'aire qu'il occupe ou à toute autre distance extérieure au périmètre, selon les indications du détenteur de permis, d'une enceinte

(*a*) that consists of

(i) a fence constructed of wire chain link with openings not larger than 6 cm square and with a wire gauge not smaller than gauge number 11, of a height not less than 2.4 m, and topped by not less than three strands of barbed wire or barbed tape,

(ii) a fence constructed of coiled barbed wire or barbed tape and of a height not less than 2.4 m,

(iii) a wall, including any wall that forms part of a building, constructed of steel, wood, concrete, masonry or other substantial material or composites of such materials, of a height not less than 2.4 m, and topped, where it does not form part of a building, by not less than three strands of barbed wire or barbed tape, or

(iv) a combination of any of the barriers described in subparagraphs (i), (ii) and (iii); or

(*b*) that can be demonstrated by the licensee to adequately inhibit and aid in the detection of any unauthorized entry into the area circumscribed by the barrier.

6. The barrier referred to in section 5 shall be

(*a*) equipped with a device that

(i) detects any intrusion into the protected area resulting from crossing, climbing or damaging the barrier,

(ii) detects any tampering with the device that may cause it to malfunction or to cease to function, and

(iii) when it detects an event referred to in subparagraph (i) or (ii), provides a continuous audible and visible alarm signal to a security monitoring room where the alarm signal can only be stopped by a security guard or other authorized person, or

(*b*) under the visual observation of a security guard who is equipped with a device that can activate the alarm signal referred to in subparagraph (*a*)(iii).

7. (1) The barrier referred to in section 5 shall be

(*a*) constructed in such a manner that each gate, door, window or other means of entry or exit in the barrier may be kept closed and locked, and

(*b*) continuously illuminated at an intensity sufficient to permit clear observation of the barrier.

(2) Each gate, door, window or other means of entry or exit in the barrier referred to in section 5 shall be kept closed and locked unless the gate, door, window or other means of entry or exit is under the visual observation of a security guard.

Unobstructed Areas

8. Every facility shall be circumscribed by an area adjacent to and outside the barrier referred to in section 5 that is, for a distance of at least 5 m from each point of the barrier, measured horizontally,

(*a*) free of any structure, equipment or other obstruction that may be used to penetrate or surmount the barrier or to unduly restrict the visual observation of persons within the area; and

a) constituée

(i) d'une clôture d'au moins 2,4 m de hauteur, faite de treillis métallique de fil d'au moins numéro 11, comportant des mailles carrées d'au plus 6 cm, et surmontée d'au moins trois rangs de fils barbelés,

(ii) d'une clôture de frises en fils barbelés d'au moins 2,4 m de hauteur,

(iii) d'un mur, y compris un mur faisant partie d'un bâtiment, d'au moins 2,4 m de hauteur, fait d'acier, de bois, de béton, de maçonnerie ou de tout autre matériau résistant ou de toute combinaison des matériaux précités et surmonté, lorsqu'il ne fait pas partie d'un bâtiment, d'au moins trois rangs de fils barbelés, ou

(iv) d'une combinaison des enceintes décrites aux sous-alinéas (i), (ii) et (iii); ou

b) conçue de façon que le détenteur de permis puisse démontrer qu'elle peut empêcher les entrées interdites dans l'aire qu'elle entoure ou aider à la détection de celles-ci.

6. L'enceinte visée à l'article 5 doit

a) être équipée d'un dispositif

(i) qui permet de détecter l'intrusion dans l'aire protégée de toute personne ayant traversé ou escaladé l'enceinte ou y ayant pratiqué une brèche,

(ii) qui permet de détecter toute tentative d'altération qui pourrait en causer le dérèglement ou l'arrêt, et

(iii) qui dans les situations décrites aux sous-alinéas (i) ou (ii), déclenche un signal d'alarme continu, sonore et visible, dans un local de surveillance où ce signal ne peut être arrêté que par un garde de sécurité ou toute autre personne autorisée, ou

b) être sous la surveillance visuelle d'un garde de sécurité muni d'un dispositif pouvant déclencher le signal d'alarme visé au sous-alinéa *a*)(iii).

7. (1) L'enceinte visée à l'article 5 doit

a) être construite de telle manière que chaque grille, porte, fenêtre ou autre entrée ou sortie pratiquée dans l'enceinte puisse être gardée fermée et verrouillée, et

b) être continuellement éclairée à une intensité suffisante pour en permettre d'observer clairement l'enceinte.

(2) Chaque grille, porte, fenêtre ou autre entrée ou sortie pratiquée dans l'enceinte visée à l'article 5 doit être gardée fermée et verrouillée, à moins qu'elle ne soit sous la surveillance visuelle d'un garde de sécurité.

Aires libres

8. Un établissement doit être circonscrit par une aire adjacente et extérieure à l'enceinte visée à l'article 5, qui, sur une distance d'au moins 5 m mesurée horizontalement à partir de tous les points de l'enceinte,

a) est libre de toute structure, matériel ou autre obstacle qui pourrait être utilisé pour pénétrer à l'intérieur de l'enceinte ou l'escalader, ou encore restreindre indûment le champ visuel des personnes qui se trouvent à l'intérieur de l'aire, et

(*b*) continuously illuminated at an intensity sufficient to permit clear observation of any person within the area.

Inner Areas

9. (1) Every place described in paragraph (*a*) of the definition "facility" shall be

(*a*) totally enclosed by a structure or barrier that is constructed in such a manner that the structure or barrier alone, or in combination with other structures or barriers, can be demonstrated by the licensee to delay the forced penetration thereof and the removal of a substance in a quantity set out in column II of an item of the schedule from the area thereby enclosed by a person using an explosive, a firearm or a hand-held power tool; and

(*b*) located within a protected area in such a manner that the structure or barrier referred to in paragraph (*a*) is not contiguous to the barrier referred to in section 5.

(2) For the purposes of paragraph (1)(*a*), "delay" means to delay for a period of time not less than the time estimated by the Board or a designated officer to be required before the response force with which an arrangement has been made pursuant to subsection 32(1) can provide assistance at that place.

10. Every inner area shall be

(*a*) provided with a device that

(i) detects the intrusion of any person or thing into, the passage of any person into and out of, and the movement of any person within the inner area,

(ii) detects any tampering with the device that may cause it to malfunction or to cease to function, and

(iii) when it detects an event referred to in subparagraph (i) or (ii), provides a continuous audible and visible alarm signal to a security monitoring room and to at least one other manned location outside the inner area where the alarm signal can only be stopped by a security guard or other authorized person; or

(*b*) under the visual observation of a security guard who is equipped with a device that can activate the alarm signal referred to in subparagraph (*a*)(iii).

11. (1) The structure or barrier described in subsection 9(1) shall be constructed in such a manner that each gate, door, window or other means of entry or exit in the structure or barrier may be kept closed and locked with a locking device that cannot be unlocked from outside the structure or barrier unless the locking device is operated by both a security guard and a person who is authorized pursuant to subsection 18(2) to enter the inner area.

(2) Subject to subsection (3), every gate, door, window or other means of entry or exit in the structure or barrier described in subsection 9(1) shall be kept closed and locked except during the time required for the passage of authorized

b) est constamment éclairée à une intensité suffisante pour permettre d'observer clairement toute personne se trouvant à l'intérieur de l'aire.

Aires intérieures

9. (1) Le lieu visé à l'alinéa *a*) de la définition d'«établissement» doit

a) être complètement entouré d'une structure ou d'une enceinte construite de manière que le détenteur de permis puisse démontrer qu'elle peut, seule ou combinée à d'autres structures ou enceintes, retarder l'introduction par effraction dans les lieux et l'enlèvement d'une quantité de substance visée à la colonne II de l'annexe par une personne se servant d'un explosif, d'une arme à feu ou d'un autre outil mécanique portatif; et

b) être situé à l'intérieur d'une aire protégée de manière que la structure ou l'enceinte visée à l'alinéa *a*) ne soit pas contigue à l'enceinte décrite à l'article 5.

(2) Aux fins de l'alinéa (1)*a*), «retarder» signifie retarder pour une période de temps qui ne peut être inférieure aux prévisions, établies par la Commission ou un fonctionnaire désigné, du temps qu'il faut à l'équipe d'intervention, dont les services ont été retenus aux termes du paragraphe 32(1), pour se rendre sur les lieux.

10. Chaque aire intérieure doit

a) être munie d'un dispositif

(i) qui permet de détecter l'intrusion d'une personne ou d'un objet, le passage d'une personne entrant ou sortant, de même que les déplacements d'une personne à l'intérieur de l'aire intérieure,

(ii) qui permet de détecter toute tentative d'altérer le dispositif qui pourrait en causer le dérèglement ou l'arrêt, et

(iii) qui, dans une situation visée au sous-alinéa (i) ou (ii), déclenche un signal continu, sonore et visible, dans un local de surveillance et dans au moins un autre local, occupé par un garde de sécurité, à l'extérieur de l'aire intérieure, où le signal d'alarme ne peut être arrêté que par un garde de sécurité ou une autre personne autorisée, ou

b) être surveillée par un garde de sécurité muni d'un appareil qui peut déclencher le signal d'alarme visé au sous-alinéa *a*)(iii).

11. (1) La structure ou l'enceinte visée au paragraphe 9(1) doit être construite de manière que chaque grille, porte, fenêtre ou autre entrée ou sortie qui y est pratiquée puisse être gardée fermée et verrouillée au moyen d'un dispositif qui ne peut être déverrouillé de l'extérieur, en dehors de la présence à la fois d'un garde de sécurité et d'une personne autorisée aux termes du paragraphe 18(2) à pénétrer dans l'aire intérieure.

(2) Sous réserve du paragraphe (3), toute grille, porte, fenêtre ou autre entrée ou sortie pratiquée dans la structure ou dans l'enceinte visée au paragraphe 9(1) doit être gardée fermée et verrouillée, sauf pendant le passage des personnes

persons and the authorized movement of things into or out of the inner area.

(3) Any unlocked gate, door, window or other means of entry or exit in the structure or barrier described in subsection 9(1) shall be kept under the continuous visual observation of a security guard.

Site Plans

12. (1) A licensee shall prepare and maintain a site plan of each facility that he operates that indicates the location of

(*a*) the perimeter of the facility;

(*b*) the barrier referred to in section 5;

(*c*) the protected area;

(*d*) the unobstructed area;

(*e*) any structure or barrier described in subsection 9(1); and

(*f*) any inner area.

(2) The licensee shall keep the site plan described in subsection (1) available at all times at the facility for inspection by the Board or a designated officer or by an inspector appointed under the *Atomic Energy Control Regulations*.

Entry to a Protected Area

13. (1) No person shall enter a protected area unless he has an authorization in writing from the licensee who operates the protected area.

(2) Subject to section 14, a licensee may issue an authorization referred to in subsection (1) to any person for such term and subject to such conditions as he considers necessary in the interests of the security of any facility.

14. (1) A licensee shall, upon application, issue an authorization to enter a protected area operated by the licensee to an inspector appointed under the *Atomic Energy Control Regulations* or an inspector designated under an agreement between the Government of Canada and the International Atomic Energy Agency if

(*a*) the inspector produces his certificate or other evidence of appointment or designation for inspection by the licensee; and

(*b*) the certificate or other evidence of appointment or designation discloses the inspector's duty to inspect in the protected area or in an inner area within that protected area.

(2) A licensee shall, before issuing an authorization to enter a protected area to any person other than an inspector referred to in subsection (1), prepare an identification report with respect to that person.

(3) An identification report referred to in subsection (2) shall, with respect to the person identified in the report, include the following documents and information:

(*a*) the full name, date and place of birth of that person;

autorisées et pendant le transport autorisé d'articles entrant ou sortant de l'aire intérieure.

(3) Toute grille, porte, fenêtre ou autre entrée ou sortie pratiquée dans la structure ou l'enceinte visée au paragraphe 9(1) doit, lorsqu'elle n'est pas verrouillée, être gardée sous la surveillance visuelle constante d'un garde de sécurité.

Plan des lieux

12. (1) Le détenteur de permis doit dresser et conserver un plan de chaque établissement qu'il exploite, indiquant l'emplacement

a) du périmètre de l'établissement;

b) de l'enceinte visée à l'article 5;

c) de l'aire protégée;

d) de l'aire libre;

e) de toute structure ou enceinte décrite au paragraphe 9(1); et

f) de toute aire intérieure.

(2) Le détenteur de permis doit conserver le plan visé au paragraphe (1) à l'intérieur de l'établissement et le tenir, aux fins d'inspection, à la disposition de la Commission ou d'un fonctionnaire désigné, ou d'un inspecteur nommé en vertu du *Règlement sur le contrôle de l'énergie atomique*.

Entrée dans une aire protégée

13. (1) Il est interdit d'entrer dans une aire protégée à moins d'avoir obtenu une autorisation écrite du détenteur de permis qui exploite cette aire.

(2) Sous réserve de l'article 14, le détenteur de permis peut accorder à quiconque l'autorisation visée au paragraphe (1), pour la période et aux conditions qu'il juge nécessaires pour assurer la sécurité de tout établissement.

14. (1) Un détenteur de permis doit, sur demande, accorder l'autorisation d'entrer dans une aire protégée qu'il exploite, à un inspecteur nommé aux termes du *Règlement sur le contrôle de l'énergie atomique* ou à un inspecteur désigné en vertu d'une entente conclue entre le gouvernement du Canada et l'Agence internationale de l'énergie atomique, si

a) l'inspecteur produit un certificat ou une autre preuve établissant qu'il a été nommé ou désigné par le détenteur de permis à des fins d'inspection; et

b) le certificat ou toute autre preuve de nomination ou de désignation indique les responsabilités de l'inspecteur quant à l'inspection de l'aire protégée ou de l'aire intérieure située dans les limites de l'aire protégée.

(2) Un détenteur de permis doit, avant d'accorder l'autorisation d'entrer dans une aire protégée à une personne autre qu'un inspecteur visé au paragraphe (1), préparer un rapport d'identification concernant cette personne.

(3) Le rapport d'identification visé au paragraphe (2) doit comprendre les documents et les renseignements suivants au sujet de la personne concernée:

a) ses nom et prénom, sa date et son lieu de naissance.

(*b*) documentary evidence that that person's presence in Canada is lawful;

(*c*) the address of that person's principal residence in Canada;

(*d*) a photograph depicting the frontal view of the face of that person; and

(*e*) the occupation of that person.

(4) A licensee who prepares an identification report with respect to a person pursuant to subsection (2) shall

(*a*) on the request of that person, make a copy of the report available to that person; and

(*b*) on the request of the Board or a designated officer, submit a copy of the report to the Board or designated officer.

15. (1) A licensee shall prepare and maintain a list of the names of all persons who are authorized to enter a protected area operated by the licensee and shall make available a copy of the list to the security guards who are responsible for security in the protected area.

(2) A licensee shall, on the request of the Board or a designated officer, submit to the Board or designated officer a list of the names of all persons who, at the time of the request, are authorized to enter a protected area operated by the licensee.

16. Notwithstanding subsection 14(2), a licensee may issue an authorization to a person to enter a protected area operated by the licensee, without preparing an identification report with respect to that person, if that person gives his name and address to the licensee and is accompanied at all times while he is in the protected area by a person who is authorized to enter the protected area pursuant to section 13 and whose name appears on the list of names referred to in section 15.

Entry to an Inner Area

17. Subject to section 21, no person shall enter an inner area unless he has authorization in writing from the Board or a designated officer and is authorized pursuant to section 13 or 16 to enter the protected area that surrounds that inner area.

18. (1) The Board or a designated officer may issue an authorization to enter an inner area to an inspector appointed under the *Atomic Energy Control Regulations* or an inspector designated under an agreement between the Government of Canada and the International Atomic Energy Agency if the Board or designated officer is satisfied that such entry is necessary for the inspector to properly carry out his duties and that the entry of that inspector is not a risk and will not give rise to a risk to the security of any facility.

(2) The Board or a designated officer shall issue an authorization to a person to enter an inner area if

(*a*) the licensee who operates the inner area submits to the Board

(i) a copy of an identification report referred to in section 14 with respect to that person,

b) des preuves documentaires établissant la légalité de sa présence au Canada;

c) l'adresse de sa résidence principale au Canada;

d) une photographie montrant un portrait de face de cette personne; et

e) sa profession.

(4) Le détenteur de permis qui dresse un rapport d'identification au sujet d'une personne conformément au paragraphe (2) doit,

a) à la demande de cette personne, lui en remettre une copie; et

b) à la demande de la Commission ou d'un fonctionnaire désigné, leur en remettre une copie.

15. (1) Le détenteur de permis doit établir et conserver une liste des noms de toutes les personnes qui sont autorisées à entrer dans une aire protégée qu'il exploite et doit en remettre une copie au garde de sécurité chargé de la surveillance de l'aire protégée.

(2) Le détenteur de permis doit, à la demande de la Commission ou d'un fonctionnaire désigné, leur remettre une liste des noms de toutes les personnes qui, au moment de la demande, sont autorisées à entrer dans l'aire protégée exploitée par lui.

16. Nonobstant le paragraphe 14(2), le détenteur de permis peut accorder à une personne l'autorisation d'entrer dans une aire protégée qu'il exploite, sans dresser de rapport d'identification à son sujet, si cette personne lui donne son nom et son adresse et est accompagnée pendant tout le temps où elle se trouve à l'intérieur de l'aire protégée par une personne autorisée à y entrer aux termes de l'article 13 et dont le nom figure sur la liste visée à l'article 15.

Entrée dans une aire intérieure

17. Sous réserve de l'article 21, il est interdit d'entrer dans une aire intérieure, à moins d'avoir obtenu une autorisation écrite de la Commission ou d'un fonctionnaire désigné et d'être autorisé aux termes de l'article 13 ou 16 à pénétrer dans l'aire protégée qui entoure cette aire intérieure.

18. (1) La Commission ou un fonctionnaire désigné peut accorder l'autorisation d'entrer dans une aire intérieure à un inspecteur nommé aux termes du *Règlement sur le contrôle de l'énergie atomique* ou à un inspecteur désigné en vertu d'une entente conclue entre le gouvernement du Canada et l'Agence internationale de l'énergie atomique, si la Commission ou le fonctionnaire désigné est convaincu que l'entrée de l'inspecteur dans l'aire intérieure est nécessaire à l'accomplissement de ses fonctions et ne présente pas de risque pour la sécurité de tout établissement.

(2) La Commission ou un fonctionnaire désigné doit accorder à une personne l'autorisation d'entrer dans une aire intérieure

a) si le détenteur de permis qui exploite l'aire intérieure remet à la Commission

(ii) an application, signed by the licensee and that person, that contains the information required under section 19 and sets out the purpose for which entry into the inner area is required,

(iii) a copy of the fingerprints of that person,

(iv) a copy of any medical report on that person required pursuant to subsection 28(1), and

(v) the written consent of that person to the disclosure of any of the information contained in the documents referred to in subparagraphs (i) to (iv) to or by the Board to the extent necessary for the Board to properly investigate and determine whether the entry of that person into the inner area is a risk or may give rise to a risk to the security of any facility; and

(*b*) the Board or designated officer is satisfied that the documents submitted by the licensee and any investigation carried out by or on behalf of the Board establish that the entry of that person is not a risk and will not give rise to a risk to the security of any facility.

(3) The Board or a designated officer may issue the authorization referred to in subsection (1) or (2) for such term and subject to such conditions as the Board or designated officer considers necessary in the interests of the security of any facility.

(4) Where a licensee submits to the Board the documents referred to in subparagraphs (2)(*a*)(i) to (v) with respect to a person for whom an authorization to enter an inner area is sought, the licensee shall make a copy of the documents available to that person if that person requests a copy before the date of expiry of the authorization as established in accordance with section 20.

19. An application for an authorization to enter an inner area shall contain the following information with respect to the person for whom the authorization is sought:

(*a*) the Social Insurance Number of that person;

(*b*) full particulars of any change of name of that person;

(*c*) the marital status of that person including the date and place of any marriage, divorce or annulment;

(*d*) where applicable, the name, nationality, date and place of birth of the spouse of that person;

(*e*) the occupation of that person and the name and address of the present employer of that person;

(*f*) the name and address of each employer of that person during the previous 10 years and the dates of employment with each such employer;

(*g*) the address of the principal residence of that person during each of the previous 10 years;

(*h*) where applicable, the name, address, date and place of birth of that person's

(i) parents,

(ii) step-parents,

(iii) brothers and sisters,

(iv) step-brothers and step-sisters,

(v) children,

(i) une copie du rapport d'identification visé à l'article 14 au sujet de cette personne,

(ii) une demande, signée par le détenteur de permis et cette personne, contenant les renseignements exigés à l'article 19 et exposant la raison pour laquelle l'entrée dans l'aire intérieure est demandée,

(iii) une copie des empreintes digitales de cette personne,

(iv) une copie de tout rapport médical au sujet de cette personne exigé aux termes du paragraphe 28(1), et

(v) le consentement écrit de cette personne autorisant la divulgation des renseignements contenus dans les documents visés aux sous-alinéas (i) à (iv) à la Commission ou par celle-ci, dans la mesure où ils lui sont nécessaires pour mener une enquête appropriée et déterminer si l'entrée de cette personne dans l'aire intérieure présente ou pourrait présenter un risque pour la sécurité de tout établissement, et

b) si la Commission ou le fonctionnaire désigné est convaincu que les documents fournis par le détenteur de permis et les résultats de toute enquête menée par la Commission ou en son nom établissent que l'entrée de cette personne ne présente pas de risque pour la sécurité de tout établissement.

(3) La Commission ou un fonctionnaire désigné peut délivrer l'autorisation visée au paragraphe (1) ou (2) pour la durée et aux conditions que l'un ou l'autre juge nécessaires pour assurer la sécurité de tout établissement.

(4) Le détenteur de permis doit, lorsqu'il soumet à la Commission les documents visés aux sous-alinéas (2)*a*)(i) à (v) au sujet d'une personne pour laquelle l'autorisation d'entrer dans une aire intérieure est sollicitée, en remettre une copie à la personne concernée si cette personne le demande avant la date d'expiration de l'autorisation délivrée conformément à l'article 20.

19. Une demande d'autorisation d'entrer dans une aire intérieure doit contenir les renseignements suivants au sujet de la personne pour laquelle l'autorisation est demandée:

a) son numéro d'assurance sociale;

b) le détail de tout changement de nom de cette personne;

c) son état civil, y compris la date et le lieu de tout mariage, divorce ou annulation;

d) s'il y a lieu, le nom, la nationalité, la date et le lieu de naissance de son conjoint;

e) sa profession ainsi que le nom et l'adresse de son employeur actuel;

f) le nom et l'adresse de chacun de ses employeurs au cours des 10 années antérieures, de même que les dates de début et de fin d'emploi auprès de chacun d'eux;

g) l'adresse de sa résidence principale au cours de chacune des 10 années antérieures;

h) s'il y a lieu, le nom, l'adresse, la date et le lieu de naissance

(i) de ses parents,

(ii) de son beau-père ou de sa belle-mère,

(iii) de ses frères et sœurs,

(iv) de ses demi-frères et demis-sœurs,

(v) de ses enfants,

(vi) step-children,

(vii) spouse's parents, and

(viii) spouse's step-parents;

(*i*) where applicable, the names and addresses of the present employers of the persons referred to in paragraph (*h*);

(*j*) the name and address of the last school or university at which that person was in full-time attendance;

(*k*) full particulars of any conviction of that person for an offence, other than a conviction for a minor traffic offence or for an offence in respect of which that person has been granted a pardon that is not revoked;

(*l*) the names and addresses of three persons who can provide a character reference for that person;

(*m*) full details of any military or police service in which that person has engaged, including the dates of employment in and release or retirement from that service and the rank that person attained during such service; and

(*n*) any other information that the Board may require for the purpose of clarifying any matter mentioned in the application.

20. (1) Subject to subsections (2) and (3) and section 22, an authorization to enter an inner area shall expire on the fifth anniversary of the date of issue of the authorization or on such earlier date as may be specified in the authorization.

(2) An authorization to enter an inner area that has been issued to an inspector appointed under the *Atomic Energy Control Regulations* or an inspector designated under an agreement between the Government of Canada and the International Atomic Energy Agency may be renewed by the Board or a designated officer for additional terms not exceeding five years each if the Board or designated officer is satisfied that such entry is necessary for the inspector to properly carry out his duties and that the entry of the inspector is not a risk and will not give rise to a risk to the security of any facility.

(3) An authorization to enter an inner area that has been issued to any person other than an inspector referred to in subsection (2) may be renewed by the Board or a designated officer for additional terms not exceeding five years each if

(*a*) the licensee who operates the inner area in respect of which the authorization refers submits to the Board or designated officer the documents referred to in subparagraphs 18(2)(*a*)(i) to (v) that contain current information in respect of the person who was granted the authorization; and

(*b*) the Board or designated officer is satisfied that the documents submitted by the licensee and any investigation carried out by or on behalf of the Board establish that the entry of that person into the inner area is not a risk and will not give rise to a risk to the security of any facility.

21. (1) A licensee may issue an authorization, in writing, to a person to enter an inner area operated by the licensee for the purpose of performing duties that are required by the licensee, the Board or a designated officer if that person

(vi) des enfants de son conjoint,

(vii) des parents de son conjoint, et

(viii) du beau-père ou de la belle-mère de son conjoint;

i) s'il y a lieu, les noms et adresses des employeurs actuels des personnes visées à l'alinéa *h*);

j) le nom et l'adresse de la dernière école ou université qu'elle a fréquentée à plein temps;

k) le détail de toute condamnation qu'elle a subie à la suite d'un délit, autre qu'une condamnation pour une infraction mineure aux règles de circulation ou une infraction pour laquelle elle a obtenu un pardon qui n'a pas été révoqué;

l) les noms et adresses de trois personnes qui peuvent donner des références à son sujet;

m) le détail de toute période de service militaire ou de service dans un corps policier qu'elle a exercé, y compris les dates de début et de fin de service ou de mise à la retraite, et le plus haut grade obtenu; et

n) tout autre renseignement que la Commission peut exiger à l'appui des questions mentionnées dans la demande.

20. (1) Sous réserve des paragraphes (2) et (3) et de l'article 22, l'autorisation d'entrer dans une aire intérieure doit expirer ou à la date du cinquième anniversaire de la délivrance de l'autorisation ou à une date antérieure précisée dans l'autorisation.

(2) L'autorisation d'entrer dans une aire intérieure qui a été délivrée à un inspecteur nommé en vertu du *Règlement sur le contrôle de l'énergie atomique* ou à un inspecteur désigné en vertu d'une entente conclue entre le gouvernement du Canada et l'Agence internationale de l'énergie atomique peut être renouvelée par la Commission ou par un fonctionnaire désigné pour des périodes ne dépassant pas cinq années chacune, si la Commission ou le fonctionnaire désigné est convaincu que la présence de l'inspecteur sur les lieux est nécessaire à l'exercice de ses fonctions et ne présente pas de risque pour la sécurité de tout établissement.

(3) L'autorisation d'entrer dans une aire intérieure qui a été délivrée à une personne autre qu'un inspecteur visé au paragraphe (2) peut être renouvelée par la Commission ou un fonctionnaire désigné pour des périodes ne dépassant pas cinq années chacune, si

a) le détenteur de permis qui exploite l'aire intérieure visée dans l'autorisation présente à la Commission ou au fonctionnaire désigné les documents mentionnés aux sous-alinéas 18(2)*a*)(i) à (v) qui renferment les renseignements à jour au sujet de la personne qui a obtenu l'autorisation; et

b) la Commission ou le fonctionnaire désigné est convaincu que les documents produits par le détenteur de permis et les résultats de toute enquête effectuée par la Commission ou en son nom établissent que la présence de cette personne dans l'aire intérieure ne présente pas de risque pour la sécurité de tout établissement.

21. (1) Le détenteur de permis peut délivrer une autorisation écrite à une personne, lui permettant de pénétrer dans une aire intérieure qu'il exploite afin de s'acquitter des fonctions exigées par le détenteur de permis, la Commission ou un fonctionnaire désigné, si cette personne

(*a*) gives his name and address and the name and business address of his employer to the licensee,

(*b*) consents to be searched, before entry into the inner area, for weapons and explosives, and

(*c*) consents to be accompanied at all times while he is in the inner area by a person who is authorized to enter the inner area pursuant to subsection 18(2).

(2) Where a person is authorized pursuant to subsection (1) to enter an inner area operated by a licensee, the licensee shall not permit that person to enter that inner area unless that person

(*a*) is searched for weapons and explosives, and

(*b*) is accompanied by a person who is authorized pursuant to subsection 18(2) to enter that inner area.

Revocation

22. (1) Subject to subsection (2), a licensee may revoke an authorization to enter an inner area or a protected area issued by the licensee.

(2) A licensee shall not, without the approval of the Board, revoke an authorization to enter a protected area issued by the licensee pursuant to subsection 14(1) to an inspector appointed under the *Atomic Energy Control Regulations* or an inspector designated under an agreement between the Government of Canada and the International Atomic Energy Agency.

(3) The Board may revoke an authorization to enter an inner area or a protected area issued by the Board or a licensee if it has, at any time, reasonable and probable grounds to believe that the entry of the authorized person into the inner area or protected area is a risk or may give rise to a risk to the security of any facility.

(4) Where the Board revokes an authorization pursuant to subsection (3), it shall

(*a*) forthwith notify the licensee and the person whose authorization has been revoked of the revocation and the reasons therefor, and

(*b*) give the licensee and the person whose authorization has been revoked a reasonable opportunity to be heard by the Board.

(5) Where the licensee or the person whose authorization has been revoked is heard by the Board pursuant to paragraph (4)(*b*) and the Board is satisfied that the entry of that person into the inner area or protected area is not a risk and will not give rise to a risk to the security of any facility, the Board may issue that person a new authorization for such term and subject to such conditions as the Board considers necessary in the interests of the security of any facility.

a) donne au détenteur de permis son nom et son adresse, de même que le nom et l'adresse commerciale de son employeur,

b) consent à être fouillée, avant d'entrer dans l'aire intérieure, pour que l'on s'assure qu'elle ne porte ni arme ni explosif, et

c) consent à être accompagnée pendant tout le temps où elle se trouve dans l'aire intérieure par une personne autorisée à entrer dans l'aire intérieure aux termes du paragraphe 18(2).

(2) Lorsqu'une personne est autorisée, aux termes du paragraphe (1), à entrer dans une aire intérieure exploitée par un détenteur de permis, ce dernier ne doit pas autoriser cette personne à entrer dans l'aire intérieure à moins

a) qu'elle n'ait été fouillée pour que l'on s'assure qu'elle ne porte ni arme ni explosif, et

b) qu'elle ne soit accompagnée d'une personne autorisée à entrer dans l'aire intérieure aux termes du paragraphe 18(2).

Révocation

22. (1) Sous réserve du paragraphe (2), le détenteur de permis peut révoquer une autorisation d'entrer dans une aire intérieure ou dans une aire protégée délivrée par lui.

(2) Le détenteur de permis ne peut, sans l'approbation de la Commission, révoquer une autorisation d'entrer dans une aire protégée qu'il a délivrée, aux termes du paragraphe 14(1), à un inspecteur nommé en vertu du *Règlement sur le contrôle de l'énergie atomique* ou à un inspecteur désigné en vertu d'une entente conclue entre le gouvernement du Canada et l'Agence internationale de l'énergie atomique.

(3) La Commission peut révoquer une autorisation d'entrer dans une aire intérieure ou dans une aire protégée délivrée par elle ou par un détenteur de permis si elle a des raisons valables de croire que l'entrée de la personne autorisée dans l'aire intérieure ou l'aire protégée présente ou pourrait présenter un risque pour la sécurité de tout établissement.

(4) Lorsque la Commission révoque une autorisation aux termes du paragraphe (3), elle doit

a) aviser immédiatement le détenteur de permis et la personne visée de la révocation de son autorisation, de même que des raisons qui l'ont motivée, et

b) donner au détenteur de permis et à la personne dont l'autorisation a été révoquée une occasion raisonnable de se faire entendre.

(5) Lorsque le détenteur de permis ou la personne dont l'autorisation a été révoquée comparaît devant la Commission pour se faire entendre selon l'alinéa (4)*b*) et que la Commission est convaincue que l'entrée de cette personne dans l'aire intérieure ou l'aire protégée ne présente pas de risque et ne donnera pas ouverture à un risque que pose la sécurité de tout établissement, la Commission peut délivrer à cette personne une nouvelle autorisation pour la période et aux conditions que la Commission estime nécessaires pour assurer la sécurité de tout établissement.

Entry and Exit

23. (1) Where any person at a facility sees a person in an inner area or a protected area whom, on reasonable and probable grounds, he believes to be an unauthorized person, that person shall report that fact to the nearest security guard.

(2) No licensee or security guard employed at a facility operated by the licensee shall permit an unauthorized person to enter or remain in an inner area or a protected area in respect of that facility.

24. Except as provided in sections 13 to 16 and section 21, no licensee shall authorize a person to enter an inner area or a protected area.

25. No person shall remove a substance in a quantity set out in column II of an item of the schedule from an inner area or a protected area or remove a substance in a quantity set out in column III of an item of the schedule from a protected area except in accordance with a written authorization issued by the Board or a designated officer.

26. Every licensee shall ensure that

(*a*) all packages and containers brought into an inner area operated by the licensee and all vehicles that enter the inner area do not carry or contain unauthorized weapons or explosives; and

(*b*) all packages and containers taken out of a facility operated by the licensee in which a substance is located and all persons and vehicles that leave the facility are monitored by appropriate devices or by security guards to ensure that no substance is removed from that facility without authority.

Security Guard Service

27. Every licensee shall have available at all times at each facility operated by him a number of security guards sufficient to enable the licensee to comply with these Regulations.

28. (1) Every licensee shall submit to the Board, with respect to each person whom the licensee intends to authorize to act as a security guard at a facility operated by the licensee, the following documents:

(*a*) an identification report with respect to that person, signed by the licensee and that person, that contains the following information:

(i) the full name of that person,

(ii) the date and place of birth of that person,

(iii) the address of the principal residence of that person, and

(iv) the information required by section 19 in respect of an application for an authorization to enter an inner area;

(*b*) a copy of the fingerprints of that person;

(*c*) a medical report that certifies that that person is in good physical and mental health, prepared by a doctor who is

Entrée et sortie

23. (1) Quiconque dans un établissement voit une personne se trouvant dans une aire intérieure ou une aire protégée et a de bonnes raisons de croire qu'il s'agit d'une personne non autorisée doit en signaler la présence au garde de sécurité le plus proche.

(2) Le détenteur de permis ou un garde de sécurité travaillant dans un établissement exploité par le détenteur de permis ne doit permettre à aucune personne non autorisée d'entrer ou de demeurer dans une aire intérieure ou une aire protégée de cet établissement.

24. Sous réserve des articles 13 à 16 et de l'article 21, le détenteur de permis ne peut autoriser une personne à entrer dans une aire intérieure ou dans une aire protégée.

25. Il est interdit d'enlever, d'une aire intérieure ou d'une aire protégée, une substance dont la quantité est indiquée à la colonne II d'un article de l'annexe, ou d'enlever d'une aire protégée une substance dont la quantité est indiquée à la colonne III d'un article de l'annexe, à moins d'avoir obtenu une autorisation écrite de la Commission ou d'un fonctionnaire désigné.

26. Le détenteur de permis doit s'assurer

a) que tous les emballages et conteneurs transportés dans l'aire intérieure exploitée par lui, ainsi que tous les véhicules qui pénètrent dans l'aire intérieure, ne transportent ni ne renferment des armes ou des explosifs non autorisés; et

b) que tous les emballages et conteneurs sortant d'un établissement exploité par lui dans lequel se trouve une substance, ainsi que toutes les personnes et véhicules qui quittent l'établissement, sont surveillés au moyen des dispositifs appropriés ou par des gardes de sécurité afin qu'aucune substance ne soit, sans autorisation, enlevée de cet établissement.

Service de sécurité

27. Le détenteur de permis doit assurer un service permanent de sécurité dans tous les établissements qu'il exploite, et prévoir un nombre suffisant de gardes de sécurité pour lui permettre de se conformer au présent règlement.

28. (1) Le détenteur de permis doit remettre à la Commission, quant à chaque personne qu'il a l'intention d'autoriser à occuper le poste de garde de sécurité dans un établissement qu'il exploite, les documents suivants:

a) un rapport d'identification concernant cette personne, signé par le détenteur de permis et par cette personne et contenant les renseignements suivants:

(i) les nom et prénom de cette personne,

(ii) sa date et son lieu de naissance,

(iii) son adresse principale, et

(iv) les renseignements exigés à l'article 19 aux fins de la demande d'autorisation d'entrer dans une aire intérieure;

b) une copie de ses empreintes digitales;

c) un rapport médical attestant que cette personne est en bonne condition physique et mentale, préparé par un méde-

licensed to practise medicine in the province in which the person is to act as a security guard,

(*d*) documentary evidence that that person is a Canadian citizen,

(*e*) a photograph depicting the frontal view of the face of that person, and

(*f*) the written consent of that person to the disclosure of any of the information contained in the documents referred to in paragraphs (*a*) to (*e*) to or by the Board to the extent necessary for the Board to properly investigate and determine whether there could be a risk or would be a risk to the security of any facility if that person were authorized to act as a security guard at a facility.

(2) The Board or a designated officer shall, following receipt of the documents referred to in subsection (1) and any investigation carried out by or on behalf of the Board, determine whether or not there may be reasonable and probable grounds to believe that there could be a risk or would be a risk to the security of any facility if the person with respect to whom the documents were submitted were authorized to act as a security guard at a facility.

(3) Where, pursuant to subsection (2), the Board or designated officer determines that there may be reasonable and probable grounds to believe that there could be a risk or would be a risk to the security of any facility if the person with respect to whom the documents were submitted were authorized to act as a security guard at a facility, the Board or designated officer shall notify that person and give that person a reasonable opportunity to be heard.

(4) The Board or a designated officer shall, following the determination of the Board or designated officer pursuant to subsection (2) and any hearing held pursuant to subsection (3), notify the licensee and the person with respect to whom the documents were submitted whether or not the Board or designated officer has reasonable and probable grounds to believe that there could be a risk or would be a risk to the security of any facility if that person were authorized to act as a security guard at a facility.

29. No licensee shall authorize a person to act as a security guard at a facility operated by the licensee unless

(*a*) the documents referred to in paragraphs 28(1)(*a*) to (*f*) with respect to that person have been submitted to the Board, and

(*b*) the Board or a designated officer notifies the licensee pursuant to subsection 28(4) that the Board or designated officer has no reasonable and probable grounds to believe that there could be a risk or would be a risk to the security of any facility if that person were authorized to act as a security guard at a facility.

30. (1) A licensee shall set out in writing the duties and responsibilities of a security guard and shall make a copy thereof available to each person who is authorized to act as a security guard at a facility operated by the licensee.

(2) A licensee shall familiarize and instruct each person who is authorized to act as a security guard at a facility operated by the licensee in respect of the duties and responsibilities of a

cin autorisé à pratiquer dans la province où la personne occupera le poste de garde de sécurité,

d) des preuves documentaires établissant que cette personne est citoyen canadien,

e) une photo montrant un portrait de face de cette personne, et

f) son consentement écrit, autorisant la divulgation de la totalité ou d'une partie des renseignements contenus dans les documents visés aux alinéas *a*) à *e*) à la Commission ou par celle-ci, dans la mesure où ils lui sont nécessaires pour effectuer une enquête appropriée et déterminer si l'emploi de cette personne à titre de garde de sécurité dans un établissement présente ou pourrait présenter un risque pour la sécurité de tout établissement.

(2) La Commission ou un fonctionnaire désigné doit, après avoir reçu les documents visés au paragraphe (1) et à la fin de l'enquête effectuée par la Commission ou au nom de celle-ci, déterminer s'il existe des raisons valables de croire que l'emploi de la personne concernée à titre de garde de sécurité dans un établissement présente ou pourrait présenter un risque pour la sécurité de tout établissement.

(3) Si la Commission ou un fonctionnaire désigné détermine, selon le paragraphe (2), qu'il peut exister des raisons valables de croire que l'emploi de la personne à titre de garde de sécurité dans un établissement présente ou pourrait présenter un risque pour la sécurité de tout établissement, la Commission ou le fonctionnaire désigné doit en informer la personne et lui donner l'occasion de se faire entendre.

(4) La Commission ou un fonctionnaire désigné doit, après avoir pris la décision visée au paragraphe (2) et après avoir entendu la personne concernée selon le paragraphe (3), informer le détenteur de permis et la personne concernée par les documents soumis que la Commission ou le fonctionnaire désigné a ou non des raisons valables de croire que l'emploi de la personne à titre de garde de sécurité dans un établissement présente ou pourrait présenter un risque pour la sécurité de tout établissement.

29. Le détenteur de permis ne peut autoriser une personne à occuper le poste de garde de sécurité dans un établissement qu'il exploite que

a) si les documents visés aux alinéas 28(1)*a*) à *f*) au sujet de cette personne ont été soumis à la Commission, et

b) si la Commission ou un fonctionnaire désigné informe le détenteur de permis, aux termes du paragraphe 28(4), que l'un ou l'autre n'a aucune raison valable de croire que l'emploi de cette personne à titre de garde de sécurité dans un établissement présente ou pourrait présenter un risque pour la sécurité de tout établissement.

30. (1) Le détenteur de permis doit exposer par écrit les fonctions et les responsabilités d'un garde de sécurité et en remettre une copie à chaque personne autorisée à occuper le poste de garde de sécurité dans un établissement qu'il exploite.

(2) Le détenteur de permis doit familiariser chaque personne autorisée à occuper le poste d'agent de sécurité dans un établissement qu'il exploite avec les fonctions et les responsabi-

security guard and shall require each such person on assuming his duties as a security guard to demonstrate his familiarity with those duties and responsibilities.

Security Monitoring Room

31. (1) Every facility shall be monitored from a security monitoring room on the site or near the site of the facility.

(2) The security monitoring room referred to in subsection (1) shall be

(*a*) located outside any inner area;

(*b*) so designed and constructed as to resist forced entry into the room by a person using a hand-held tool or light firearms;

(*c*) equipped with

(i) a two-way radio that can be used to communicate with a response force,

(ii) a telephone,

(iii) an alarm device that can be used at any time to alert a response force, and

(iv) equipment that permits communication directly with security guards who are stationed elsewhere than in the room;

(*d*) so equipped and located as to enable a security guard in the room to receive and acknowledge the audible and visible alarm signals referred to in subparagraphs 6(*a*)(iii) and 10(*a*)(iii); and

(*e*) manned at all times by at least one security guard.

Arrangements with Response Forces

32. (1) Every licensee shall, in respect of each facility that is operated by him, make arrangements for a response force to provide assistance at the facility when it is required.

(2) The arrangements referred to subsection (1) shall include provisions

(*a*) to ensure that at any time immediate communication can be established between the facility and the response force;

(*b*) to ensure that assistance at the facility can be provided by the response force forthwith after it is requested;

(*c*) in respect of the installation of a two-way radio and alarm system of communication between the security monitoring room and the response force;

(*d*) in respect of the arrangement of annual visits to the facility by officers of the response force; and

(*e*) to provide for consultation among the licensee, the response force and the Board regarding the arrangements referred to in this section and the resources and equipment available to the licensee and the response force with respect to the security of the facility.

lités de son poste et exiger que chaque personne qui accepte un tel poste prouve qu'elle connaît bien ses fonctions et responsabilités.

Local de surveillance

31. (1) Chaque établissement doit être surveillée à partir d'un local de surveillance situé à l'intérieur ou à proximité des lieux de l'établissement.

(2) Le local de surveillance visé au paragraphe (1) doit

a) être situé à l'extérieur de toute aire intérieure;

b) être conçu et construit de manière à résister à toute introduction par effraction dans le local d'une personne utilisant un outil à main ou une arme à feu légère;

c) être muni

(i) d'un poste émetteur-récepteur qui peut être utilisé pour communiquer avec l'équipe d'intervention,

(ii) d'un téléphone,

(iii) d'un dispositif d'alarme qui peut être déclenché à n'importe quel moment pour donner l'alerte à l'équipe d'intervention, et

(iv) de matériel qui permet de communiquer directement avec les gardes de sécurité postés à l'extérieur du local;

d) être équipé et situé de manière à permettre à un garde de sécurité qui s'y trouve de recevoir et de reconnaître les signaux d'alarmes, sonores et visibles, visés aux sous-alinéas 6*a*)(iii) et 10*a*)(iii); et

e) être occupé en permanence par au moins un garde de sécurité.

Entente avec les équipes d'intervention

32. (1) Le détenteur de permis doit, pour chaque établissement qu'il exploite, prendre des arrangements pour obtenir les services d'une équipe d'intervention qui assurera la protection de l'établissement en cas de besoin.

(2) Les arrangements visés au paragraphe (1) doivent comprendre des dispositions

a) visant à assurer la possibilité d'établir à n'importe quel moment une communication immédiate entre l'établissement et l'équipe d'intervention;

b) visant à assurer la défense immédiate de l'établissement par l'équipe d'intervention;

c) concernant l'installation d'un poste émetteur-récepteur et d'un système d'alarme reliant le local de surveillance à l'équipe d'intervention;

d) concernant l'organisation de visites annuelles à l'établissement des représentants de l'équipe d'intervention, et

e) visant à assurer la consultation entre le détenteur de permis, l'équipe d'intervention et la Commission au sujet des arrangements visés dans le présent article, de même que des ressources et du matériel mis à la disposition du détenteur de permis et de l'équipe d'intervention pour assurer la sécurité de l'établissement.

Verification of Security Systems and Procedures

33. Every licensee shall conduct an alarm drill at least once every six months to test the proper operation of the security equipment, systems and procedures established pursuant to these Regulations.

Security Report

34. (1) Subject to subsection (2), every licensee shall, in respect of each facility operated by him, submit to the Board, within 30 days after the issuing of his licence, a copy of the arrangements referred to in section 32, a copy of the site plan referred to in section 12 and a security report in respect of each protected area and inner area including complete information in respect of

(*a*) all security equipment, systems and procedures;

(*b*) communications equipment, systems and procedures both on-site and off-site;

(*c*) the structure of the security guard service and the administration, duties, responsibilities, and training of the security guard service, and

(*d*) the procedures established by the licensee for the assessment of and response to breaches of security.

(2) Every licensee whose licence in respect of a facility was issued on or before the day that these Regulations apply in respect of the facility shall submit the material referred to in subsection (1) to the Board within 30 days after that day.

Smaller Quantities of Plutonium, U-233 and U-235

35. Where a person is in possession of a substance in a quantity set out in column IV of an item of the schedule under a licence issued to that person and the substance is located outside of a protected area and is not under the continuous visual observation of that person or an authorized agent of that person, that person shall, subject to any conditions set out in the licence, store such substance in such a manner so as to prevent its unauthorized removal by a person using a hand-held tool.

Security of Information

36. Except with the approval of the Board, no person shall knowingly disclose to any other person information relating to the security equipment, systems or procedures established by a licensee pursuant to these Regulations unless

(*a*) he is required to disclose such information by or under a law of Canada including these Regulations; or

(*b*) he discloses such information to

(i) a Minister of the Crown or an employee of the Government of Canada or its agencies to the extent necessary to assist the Minister or the employee to exercise a power or perform a duty or function lawfully conferred or imposed upon him,

(ii) an official of a foreign government or an international agency to the extent necessary to enable the Government of Canada to perform the obligations imposed by any

Vérification des systèmes et des mesures de sécurité

33. Le détenteur de permis doit effectuer un exercice d'alerte au moins une fois tous les six mois pour vérifier le bon fonctionnement du matériel, des systèmes et des mesures établis aux termes du présent règlement.

Rapport de sécurité

34. (1) Sous réserve du paragraphe (2), le détenteur de permis doit, pour chaque établissement qu'il exploite, présenter à la Commission, dans les 30 jours suivant la délivrance de son permis, une copie des arrangements visés à l'article 32, une copie du plan prévu à l'article 12, de même qu'un rapport de sécurité concernant chaque aire protégée et aire intérieure, y compris des renseignements complets sur

a) le matériel, les systèmes et les mesures de sécurité,

b) le matériel, les systèmes et les instructions de communication à l'intérieur et à l'extérieur des lieux,

c) l'organisation du service de sécurité et l'administration, les fonctions et responsabilités et la formation du personnel de sécurité, et

d) les dispositions établies par le détenteur de permis pour l'évaluation des manquements à la sécurité et les mesures correctives à prendre.

(2) Le détenteur d'un permis ayant été délivré au plus tard à la date d'entrée en vigueur du présent règlement doit présenter les documents prévus au paragraphe (1) à la Commission dans les 30 jours qui suivent cette date.

Quantités minimes de plutonium, de U-233 et de U-235

35. Lorsqu'une personne a en sa possession, aux termes d'un permis qui lui a été délivré, une quantité de substance indiquée à la colonne IV d'un article de l'annexe, et que la substance se trouve à l'extérieur d'une aire protégée et n'est pas constamment sous la surveillance visuelle de cette personne ou de son agent autorisé, cette personne doit, sous réserve de toute condition énoncée dans son permis, ranger cette substance de manière à ce que personne ne puisse s'en emparer, sans autorisation, au moyen d'un outil à main.

Protection des renseignements

36. Sauf autorisation contraire de la Commission, il est interdit de divulguer sciemment à quiconque des renseignements ayant trait au matériel, aux systèmes ou aux mesures de sécurité établis par un détenteur de permis conformément au présent règlement, à moins

a) d'y être tenu aux termes d'une loi du Canada, y compris le présent règlement; ou

b) de divulguer ces renseignements

(i) à un ministre de la Couronne ou à un employé du gouvernement du Canada ou de ses organismes, dans la mesure où ces renseignements leur sont nécessaires pour s'acquitter des fonctions qui leur ont été légalement confiées ou imposées,

(ii) à un représentant d'un gouvernement étranger à d'un organisme international, dans la mesure où ces renseigne-

arrangement between the Government of Canada and that foreign government or international agency,

(iii) officers or members of a response force with which the licensee has made an arrangement pursuant to section 32 to the extent necessary to enable the officers or members to properly perform their duties or functions under the arrangement,

(iv) officers or employees of the licensee to the extent necessary to enable the officers or employees to properly perform their duties of office or employment,

(v) officers or employees of a contractor under contract with the licensee to the extent necessary to enable the officers or employees to properly perform their duties or functions under the contract, or

(vi) a person who is required or authorized by or under a law of Canada to obtain or receive such information.

ments sont nécessaires pour permettre au gouvernement du Canada de respecter les obligations qu'il a contractées aux termes d'une entente qu'il a conclue avec ce gouvernement étranger ou cet organisme international,

aux agents ou aux membres d'une équipe d'intervention avec laquelle le détenteur de permis a pris des arrangements conformément à l'article 32, dans la mesure où ces renseignements leur sont nécessaires pour s'acquitter convenablement des fonctions ou des responsabilités prévues dans ces arrangements,

(iv) aux agents ou aux employés du détenteur de permis, dans la mesure où ces renseignements leur sont nécessaires pour exercer convenablement leurs fonctions ou leur emploi,

(v) à des agents ou à des employés d'un entrepreneur avec lequel le détenteur de permis a passé un contrat, dans la mesure où ces renseignements leur sont nécessaires pour s'acquitter convenablement des fonctions ou des responsabilités précisées dans le contrat, ou

(vi) à une personne qui, aux termes d'une loi du Canada, est tenue d'obtenir ou de recevoir ces renseignements ou y est autorisée.

SCHEDULE

Control of Prescribed Substances

Item	Column I Prescribed Substances	Quantities Column II	Column III	Column IV
1.	Unirradiated Plutonium or U-233	2 kg or more	less than 2 kg but more than 500 g	500 g or less but more than 15 g
2.	Unirradiated U-235, in uranium enriched in U-235 to			
	(a) 20% or more	5 kg or more	less than 5 kg but more than 1 kg	1 kg or less but more than 15 g
	(b) 10% or more but less than 20%	not applicable	10 kg or more	less than 10 kg but more than 1 kg

ANNEXE

Contrôle des substances prescrites

Article	Colonne I Substances prescrites	Quantités Colonne II	Colonne III	Colonne IV
1.	Plutonium non irradié ou U-233	2 kg ou plus	Moins de 2 kg mais plus de 500 g	500 g ou moins mais plus de 15 g
2.	U-235 non irradié, uranium enrichi de U-235 à			
	a) 20% ou plus	5 kg ou plus	Moins de 5 kg mais plus de 1 kg	1 kg ou moins mais plus de 15 g
	b) 10% ou plus, mais moins de 20%	sans objet	10 kg ou plus	Moins de 10 kg mais plus de 1 kg

NOTES TO SCHEDULE

1. For the purposes of this schedule, an unirradiated substance is a substance that has not been irradiated in a nuclear reactor or a substance that has been irradiated in a nuclear reactor but which has a radiation level equal to or less than 100 rad (one gray) per hour measured at a distance of 1 m from the substance.

2. The aggregate of the quantities of substances of each kind listed in column 1 in the possession of a licensee shall be the quantity considered for the purposes of this schedule, except that a quantity of such substance that is

(*a*) located more than 1 000 m from any other quantity of a substance of the same kind, or

(*b*) located in a locked building or a structure of similar resistance to unauthorized entry,

shall be deemed to be a separate quantity of the substance.

3. For the purpose of this schedule, plutonium means all plutonium except that having an isotopic concentration of plutonium 238 which exceeds 80%.

REMARQUES

1. Aux fins de la présente annexe, une substance non irradiée est une substance qui n'a pas été irradiée dans un réacteur nucléaire, ou une substance qui a été irradiée dans un réacteur nucléaire mais dont le niveau de rayonnement est égal ou inférieur à 100 rad (un gray) par heure, mesuré à une distance de 1 m de la substance.

2. L'ensemble des quantités de substances de chaque type énumérées à la colonne 1, que possède un détenteur de permis est la quantité permise aux termes de la présente annexe, à l'exception de toute quantité d'une telle substance qui est

a) située à plus de 1 000 m de toute autre quantité de la même substance, ou

b) située dans un bâtiment fermé à clé ou dans une structure dont l'accès interdit de quelque façon aux personnes non autorisées,

laquelle est réputée être une quantité distincte de cette substance.

3. Aux fins de la présente annexe, plutonium s'entend de tout plutonium sauf celui ayant une concentration isotopique de plutonium 238 de plus de 80%.

EXPLANATORY NOTE

(This note is not part of the Regulation, but is intended only for information purposes.)

These Regulations establish and require the maintenance of security systems, equipment and procedures at certain nuclear facilities to implement Canada's international obligations in respect of security at those facilities.

NOTE EXPLICATIVE

(La présente note ne fait pas partie du règlement et n'est publiée qu'à titre d'information.)

Ce règlement prévoit la mise en place de systèmes, de matériel et de mesures de sécurité dans certains établissements nucléaires, à la suite des engagements pris par le Canada à l'échelle internationale pour assurer la sécurité de ces établissements.

Regulatory Document

Texte de réglementation

Atomic Energy Control Board

Commission de contrôle de l'énergie atomique

REGULATORY DOCUMENT R-90

Regulatory Policy Statement

POLICY ON THE DECOMMISSIONING OF NUCLEAR FACILITIES

Effective date:

August 22, 1988

Canada

R-90, POLICY ON THE DECOMMISSIONING OF NUCLEAR FACILITIES

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Inquiries, or requests for copies should be addressed to:

Office of Public Information
Atomic Energy Control Board
P.O. Box 1046
Ottawa, Ontario
CANADA
K1P 5S9

Telephone: (613) 995-5894

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POLICY ON THE DECOMMISSIONING OF NUCLEAR FACILITIES

1. PURPOSE AND SCOPE

This Regulatory Policy Statement describes the policy of the Atomic Energy Control Board (AECB) on the decommissioning of those facilities defined as nuclear facilities in the Atomic Energy Control (AEC) Regulations.

It is intended as a formal statement, primarily for the information of licensees, or potential licensees, of the regulatory process and requirements generally applicable to the decommissioning of nuclear facilities licensed and regulated by the AECB pursuant to the authority of the AEC Act and Regulations.

2. INTRODUCTION

The Atomic Energy Control (AEC) Regulations prohibit the holder of a licence issued pursuant to the AEC Act and Regulations from abandoning prescribed substances except in accordance with conditions of a licence issued by the AECB, or in accordance with the written instructions of the AECB. Therefore, prior to the granting of an approval to abandon a nuclear facility licensed pursuant to the AEC Act and Regulations, the AECB requires that the licensee decommission the facility satisfactorily.

Within the context of this Regulatory Policy Statement the "decommissioning" of a nuclear facility means those actions taken by the licensee, in the interests of health, safety, security and protection of the environment, to retire that facility permanently from service. Related activities may therefore include dismantling of the facility, decontamination of components, surface or site reclamation activities and work performed to render any residues safe. The decommissioning programs appropriate to specific nuclear facilities may vary greatly with facility type and, to a lesser extent, amongst facilities of similar type. Decommissioning of individual facilities may be accomplished in continuous programs or over discrete progressive or intermittent phases. It may thus include, with valid justification, periods of "storage with surveillance". Consequently, the time periods required to complete individual decommissioning programs will be facility specific, and may range from shortly after cessation of operations to several decades. Despite any differences in these decommissioning programs and the associated schedules of implementation, similar regulatory requirements, process, and objectives are generically applicable.

3. AECB POLICY ON DECOMMISSIONING

The AECB policy on the decommissioning of nuclear facilities is summarized by the following statement:

The AECB requires that all nuclear facilities be decommissioned satisfactorily in the interests of health, safety, security and protection of the environment, according to plans approved by the AECB. Such plans shall be developed during the early stages of design of the nuclear facility and refined during the operating life of the facility, and the associated decommissioning actions assured by adequate financial planning.

The implementation of this policy is discussed in ensuing sections.

4. REGULATORY REQUIREMENTS

In the application and enforcement of its policy on the decommissioning of nuclear facilities, the AECB relies on its comprehensive licensing system currently in place. This system is administered with the cooperation of other federal and provincial government departments in such areas as health, environment, transport and labour. Through this cooperation and interaction, the concerns and responsibilities of these agencies are taken into account before licences or approvals, including those for decommissioning and abandonment, are issued by the AECB.

The AECB requires that licensees address decommissioning of their facilities at various stages of facility licensing. Initial considerations of decommissioning requirements normally occur at the facility design stage with progressive refinement of decommissioning plans occurring over the operational life of the facility, and culminating with the successful implementation of a decommissioning plan approved by the AECB. When the decommissioning of a nuclear facility has been completed, and its effectiveness confirmed to the satisfaction of the AECB, the licensee will be permitted to abandon the site and will be absolved of further responsibility for it under the AEC Act and Regulations. The requirements at the various stages of a facility's lifetime are further discussed below.

4.1 Pre-Operational

For new facilities, the AECB requires, before the issuance of a construction approval, a conceptual description of the decommissioning approach envisaged by the applicant. The detail and design of this conceptual plan must be such as to assure that the proposed approach is, in the light of existing knowledge, technically feasible and appropriate in the interests of health, safety, security and protection of the environment. The plan shall also indicate how the proponent will assure that sufficient financial resources are available to complete the required decommissioning work in the event of scheduled or unscheduled closure of the facility.

Acceptance by the AECB of a conceptual decommissioning plan does not preclude the likelihood that the plan may need to be subsequently updated or modified to reflect changed circumstances, operations, or factors affecting financial assurances.

4.2 Operational

Licensees who do not currently have conceptual decommissioning plans in place will be required, subsequent to publication of this Regulatory Policy Statement, to develop such plans and submit them to the AECB. These plans

(i) a description of the predicted impact of the decommissioning operations and of any residual hazardous substances on the environment and on the health and safety of members of the public, together with an estimate of the residual radiation levels and the quantities and types of residual hazardous substances;

(j) details of any controls that may be required to keep the impact within predicted limits;

(k) any other information that the Board or a designated officer may require to evaluate the application with respect to health, safety, security, any applicable safeguards and protection of the environment.

4.3 Post-Operational

4.3.1 Deferment of Decommissioning

Any deferment of the decommissioning of a nuclear facility must be planned and justified, and must not be indeterminate. Acceptable reasons for deferment would include a lack of suitable waste disposal facilities, or a significant reduction in hazard to workers involved with the decommissioning work.

Decommissioning plans involving deferment of action must include a schedule of activities intended to lead to eventual completion of decommissioning. AECB approval of such plans will be issued for a specified term, and any extension will be contingent upon satisfactory performance of the facility and demonstration by the licensee that the requested extension would not be deleterious to the environment, security, or the health and safety of workers or members of the public.

At least five years before the end of a prolonged deferment period, the licensee shall demonstrate that planning is sufficiently advanced that outstanding decommissioning actions are likely to be performed on schedule. At least one year before the end of the deferment period, the licensee must also submit to the AECB a detailed plan for completion of decommissioning.

4.4 Post-Decommissioning

4.4.1 Reliance on Institutional Controls

In general, reliance on institutional control mechanisms which involve active on-going human intervention (such as effluent treatment systems) to control the impacts from decommissioned facilities is not acceptable. However, more static institutional control mechanisms, such as land use controls subsequent to completion of decommissioning activities, may be acceptable. In all instances where a licensee proposes a decommissioning plan which requires the establishment of long-term institutional controls subsequent to completion of decommissioning actions, the AECB requires that the licensee consider the feasibility of implementing alternative decommissioning actions to avoid the need for continuing institutional controls. This evaluation should consider the nature and costs of the controls envisaged and the capability of the institutions concerned to implement and maintain the proposed controls.

should be similar in scope and content to the conceptual plans required for new facilities. Periodic updates of conceptual decommissioning plans may be required over the operational life-time of nuclear facilities, as warranted by changing circumstances or operations.

A detailed decommissioning proposal must be submitted to the AECB at least one year before the scheduled end of operations, or within six months of the announcement of an unscheduled permanent shutdown of a nuclear facility. The required decommissioning proposal should be submitted in support of the application for a licence to decommission the nuclear facility, and must include such of the following information as may be applicable:

(a) the proposed date of the start of the decommissioning;

(b) a description and time schedule of the actions proposed to be taken to decommission the facility;

(c) a justification of the time schedule;

(d) the results of any survey carried out by the applicant to estimate

(i) the radiation levels and the quantities and types of radioactive prescribed substances that are present in the facility, and

(ii) the concentrations of radioactive prescribed substances that are present on surfaces and in air,

or where it is not possible or reasonable to carry out such a survey, a projection of

(iii) the radiation levels and the quantities and types of radioactive prescribed substances that may be expected to be present in the facility, and

(iv) the concentrations of radioactive prescribed substances that may be expected to be present on surfaces and in air

at the time when operations will cease;

(e) a description of the anticipated inventory of radioactive waste and toxic wastes arising from the decommissioning of the facility and the place and manner in which it is proposed to dispose of such wastes;

(f) full particulars of a quality assurance program for the decommissioning of the facility as it relates to health, safety and the protection of the environment;

(g) a description of the hazards that might result from the decommissioning of the nuclear facility and of the measures to be taken, to prevent or control those hazards;

(h) a description of the measures to be taken to limit radiological and other hazards in the event of an accident;

4.4.2 Abandonment

If "prescribed substances", as defined in the AEC Regulations, have been removed from a nuclear facility, and the facility has been decommissioned to the satisfaction of the AECB, approval to abandon the site will be granted.

If prescribed substances remain on site subsequent to the decommissioning of a nuclear facility, the AECB may require a period of monitoring (to be known as the "transition phase") before it will approve an application from the licensee to abandon the site. During such a transition phase, the licensee would be required to conduct a monitoring program to evaluate the impacts of the decommissioned site relative to the predicted performance. The AECB would review the results of the monitoring programs conducted, and any other relevant information, in order to determine the adequacy of the work undertaken to decommission the facility. The transition phase might span five years or more depending on the circumstances. Should the results obtained during the initial monitoring period cast doubt upon the validity of the licensee's predictions concerning the long-term safety of the site, the transition phase might be extended to allow for additional monitoring and assessment.

The granting of AECB approval to abandon a decommissioned nuclear facility establishes that the licensee has fulfilled his obligations under the AEC Regulations with respect to that facility, and is therefore absolved of further responsibility for the site under the AEC Regulations. The issuance of such approval pursuant to the AEC Regulations does not absolve the licensee of responsibility to comply with the requirements of other federal, provincial, or municipal agencies.

Regulatory Document

Texte de réglementation

Atomic Energy Control Board

Commission de contrôle de l'énergie atomique

TEXTE DE RÉGLEMENTATION R-90

Déclaration de principe en matière de réglementation

DÉCLASSEMENT DES INSTALLATIONS NUCLÉAIRES

Date d'entrée en vigueur :

le 22 août 1988

Canada

R-90, DÉCLASSEMENT DES INSTALLATIONS NUCLÉAIRES

L'ébauche du présent document a déjà été publiée comme document de consultation C-90, le 15 octobre 1985, afin d'obtenir les commentaires du public. À la fin du processus d'examen des commentaires et de révision du texte, le contenu final du document a été approuvé et est entré en vigueur le 22 août 1988.

Veuillez adresser toute demande de renseignements ou de copies au :

Bureau d'information publique
Commission de contrôle de l'énergie atomique
C.P. 1046
Ottawa (Ontario)
CANADA
K1P 5S9

Téléphone : (613) 995-5894

TABLE DES MATIÈRES

DÉCLASSEMENT DES INSTALLATIONS NUCLÉAIRES

1. BUT ET PORTÉE

La présente déclaration de principe explique la politique de la Commission de contrôle de l'énergie atomique (CCEA) sur le déclassement des installations qui sont désignées comme «établissements nucléaires» dans le Règlement sur le contrôle de l'énergie atomique.

Elle s'adresse avant tout aux titulaires de permis actuels ou éventuels pour leur faire connaître le point de vue officiel de la CCEA au sujet du processus et des exigences de réglementation qui s'appliquent généralement au déclassement des installations nucléaires qu'elle autorise et réglemente en vertu de la Loi sur le contrôle de l'énergie atomique et de son règlement d'application.

2. INTRODUCTION

Le Règlement sur le contrôle de l'énergie atomique défend aux titulaires de permis délivrés en vertu de la Loi sur le contrôle de l'énergie atomique et de son règlement d'application, d'abandonner des substances prescrites, à moins de se conformer aux conditions d'un permis délivré par la CCEA ou aux instructions écrites de la CCEA. La CCEA, par conséquent, avant d'autoriser l'abandon de toute installation autorisée en vertu de la Loi sur le contrôle de l'énergie atomique et de son règlement d'application, exige que le titulaire de permis déclasse son installation de façon satisfaisante.

Dans le présent document, «déclassement» d'installations nucléaires désigne toutes les mesures prises par le titulaire de permis dans l'intérêt de la santé, de la sécurité, de la sécurité matérielle et de la protection de l'environnement pour mettre fin définitivement à l'exploitation. Le déclassement peut donc comprendre le démantèlement de l'installation, la décontamination des composants, les travaux effectués pour assurer l'innocuité des résidus, ainsi que le rétablissement du terrain de surface ou du site. La méthode de déclassement varie en général selon le type d'installation et, à un degré moindre, entre installations semblables. Le déclassement d'installations particulières peut s'accomplir selon des programmes continus ou passer par des étapes progressives ou intermittentes discrètes. Il peut donc comprendre, si les motifs sont valables, des périodes de «stockage sous surveillance». Il s'ensuit que le temps nécessaire pour mener tout programme de déclassement individuel à son terme dépend de chaque installation; chaque programme peut rapidement toucher à sa fin après la cessation des activités ou s'étendre sur plusieurs décennies. Bien que chaque programme de déclassement et son calendrier connexe diffèrent les uns des autres, les mêmes exigences, le même processus et les mêmes objectifs de réglementation s'appliquent en général.

3. POLITIQUE DE DÉCLASSEMENT DE LA CCEA

La politique de déclassement de la CCEA au sujet des installations nucléaires se résume ainsi :

La CCEA exige que toutes les installations nucléaires soient déclassées de façon satisfaisante selon des plans qu'elle a approuvés, dans l'intérêt de la

santé, de la sécurité, de la sécurité matérielle et de la protection de l'environnement. Ces plans doivent être mis au point durant les premières étapes de la conception de l'installation nucléaire et mis à jour tout au long de la vie utile de l'installation. Le financement prévu des mesures de déclassement connexes doit aussi être assuré.

Les sections qui suivent traitent de l'application de la politique.

4. EXIGENCES RÉGLEMENTAIRES

La CCEA s'appuie sur son régime de permis actuel pour appliquer et mettre en vigueur sa politique de déclassement des installations nucléaires. Le régime est administré en collaboration avec d'autres ministères fédéraux et provinciaux dans des domaines comme la santé, l'environnement, les transports et le travail. Grâce à cette entraide et à cette interaction, les préoccupations et les responsabilités de chaque organisme sont prises en considération avant que la CCEA délivre tout permis ou approbation, y compris pour déclasser ou abandonner toute installation.

La CCEA exige que les titulaires de permis examinent le déclassement de leurs installations à diverses étapes du processus d'autorisation. Les premières considérations se produisent normalement au moment de la conception de l'installation; puis les plans de déclassement sont mis à jour tout au long de l'exploitation; vient enfin le moment ultime de la mise en vigueur du plan de déclassement approuvé par la CCEA. Lorsque le déclassement de l'installation est terminée et que la CCEA en confirme l'efficacité, elle peut autoriser le titulaire de permis à abandonner le site et le relever de toute autre obligation prévue par la Loi sur le contrôle de l'énergie atomique et son règlement d'application. Les exigences à respecter au cours de chaque étape de la vie utile de l'installation est traitée dans les paragraphes qui suivent.

4.1 Avant l'exploitation

Dans le cas des nouvelles installations, la CCEA exige que l'auteur de la demande lui soumette le plan conceptuel de déclassement qu'il envisage, avant d'autoriser la construction de l'installation. Les détails et la conception de ce plan descriptif doivent être tels que le type de déclassement prévu, selon les connaissances existantes, est techniquement faisable et approprié dans l'intérêt de la santé, de la sécurité, de la sécurité matérielle et de la protection de l'environnement. Le plan doit également indiquer comment l'auteur de la demande compte assurer que les ressources financières nécessaires seront disponibles pour terminer les travaux de déclassement requis en cas de fermeture prévue ou imprévue de l'installation.

Même si la CCEA accepte un plan de déclassement, cela n'empêche pas que le plan soit mis à jour ou modifié en fonction des circonstances, des activités ou des facteurs qui changent et qui touchent les assurances financières.

4.2 Durant l'exploitation

Dès la publication du présent document, la CCEA exigera des titulaires de permis qui n'ont toujours pas établi de plan conceptuel de déclassement, qu'ils en rédigent un et qu'ils le soumettent à l'approbation de la CCEA. La portée et le contenu du plan devraient être semblables à ceux du plan

conceptuel requis pour les nouvelles installations. Des mises à jour périodiques du plan conceptuel de déclassement peuvent être nécessaires tout au long de la vie utile de l'installation nucléaire en fonction des circonstances ou des activités qui changent.

La CCEA exige un plan de déclassement détaillé au moins une année avant la fin prévue des activités ou dans les six mois suivant l'annonce de toute fermeture définitive imprévue de l'installation nucléaire. Le projet exigé devrait être soumis à l'appui de la demande de permis de déclassement et doit comprendre les renseignements suivants, selon le cas :

a) la date prévue pour le début du déclassement;

b) les mesures et le calendrier prévus pour déclasser l'installation;

c) la justification du calendrier visé par l'alinéa b);

d) les résultats de toute enquête que l'auteur de la demande a effectuée pour évaluer :

(i) l'intensité de rayonnement, ainsi que la quantité et le type de substances radioactives prescrites qui se trouvent dans l'installation,

(ii) la concentration de substances radioactives prescrites qui sont présentes sur les surfaces et dans l'air,

ou, s'il est impossible ou peu indiqué de mener l'enquête, l'estimation, au moment où l'exploitation prendra fin :

(iii) de l'intensité de rayonnement, ainsi que de la quantité et du type de substances radioactives prescrites qui pourraient se trouver dans l'installation,

(iv) de la concentration de substrances radioactives prescrites qui pourraient se trouver sur les surfaces et dans l'air;

e) le stock prévu de déchets radioactifs et de déchets toxiques en raison du déclassement de l'installation, ainsi que le lieu et la manière proposés pour s'en défaire;

f) toutes les caractéristiques pertinentes du programme d'assurance-qualité pour le déclassement de l'installation, du point de vue de la santé, de la sécurité et de la protection de l'environnement;

g) les dangers qui pourraient découler du déclassement de l'installation et les mesures à prendre pour les prévenir ou les maîtriser;

h) les mesures à prendre pour limiter les dangers radiologiques et autres en cas d'accident;

i) toute répercussion prévue du déclassement et des substances dangereuses résiduelles sur l'environnement, ainsi que sur la santé et la sécurité du public, y compris l'évaluation de l'intensité de rayonnement résiduel, ainsi que la quantité et le type de substances dangereuses résiduelles;

j) le détail des contrôles qui pourraient être nécessaires pour maintenir à l'intérieur des prévisions toute répercussion visée par l'alinéa i);

k) tout autre renseignement que la Commission ou le fonctionnaire désigné peut exiger pour évaluer la demande du point de vue de la santé et de la sécurité, de la sécurité matérielle, des garanties applicables et de la protection de l'environnement.

4.3 Après l'exploitation

4.3.1 Délais

Tout délai dans le déclassement de l'installation nucléaire doit être prévu et justifié, et ne peut se prolonger indéfiniment. Par exemple, le manque immédiat d'installations de gestion de déchets appropriées ou une importante diminution future du risque pour les travailleurs s'occupant du déclassement peuvent représenter des motifs acceptables pour retarder le déclassement.

Tout plan de déclassement prévoyant un délai doit comporter un calendrier des activités jusqu'à la fin projetée du déclassement. La CCEA n'autorise de tels plans que pour une période déterminée et ne prolonge son autorisation qu'à condition d'être satisfaite du rendement de l'installation et de recevoir la preuve du titulaire de permis que le délai ne nuira pas à l'environnement, à la sécurité matérielle ou à la santé et à la sécurité des travailleurs et du public.

Au moins cinq ans avant la fin de la période de délai prolongé, le titulaire de permis doit montrer que son plan est suffisamment avancé pour laisser supposer que toute mesure de déclassement en suspens puisse être accomplie comme prévu. Au moins une an avant la fin du délai, il doit aussi soumettre à la CCEA un plan détaillé pour l'achèvement du déclassement.

4.4. Après le déclassement

4.4.1 Contrôles institutionnels

En général, les contrôles institutionnels qui comprennent une intervention humaine continue, comme le traitement des effluents, pour limiter les répercussions des installations déclassées, ne sont pas acceptables. Toutefois, des mécanismes de contrôle institutionnel plus statiques, comme la réglementation de l'utilisation du sol après la fin du déclassement, peuvent être acceptables. Toutes les fois qu'un titulaire de permis propose un plan de déclassement qui nécessite l'établissement de contrôles institutionnels à long terme après la fin du déclassement, la CCEA exige qu'il examine d'autres mesures de déclassement qui éviteraient des contrôles institutionnels continus. L'examen devrait considérer la nature et les coûts des contrôles envisagés, ainsi que la capacité des institutions visées à les établir et à les maintenir.

4.4.2 Abandon

Toutes les «substances prescrites», au sens du Règlement sur le contrôle de l'énergie atomique, doivent être enlevées de toute installation nucléaire qui a été déclassée à la satisfaction de la CCEA, avant que l'abandon du site soit autorisé.

Si des substances prescrites demeurent sur le site de l'installation nucléaire après le déclassement, il se peut que la CCEA impose une période de contrôle, connue comme «étape de transition», avant d'approuver toute demande d'abandon du site. Durant cette étape, le titulaire de permis devra appliquer un programme de contrôle pour évaluer les répercussions du site déclassé par rapport au rendement prévu. La CCEA vérifiera les résultats des programmes de contrôle et tout autre renseignement pertinent pour déterminer si les travaux de déclassement sont appropriés ou non. L'étape de transition peut s'étaler sur une période de cinq années ou plus, selon le cas, et peut être prolongée pour effectuer des contrôles et des évaluations supplémentaires, si les résultats obtenus durant la période initiale font douter du bien-fondé des prévisions du titulaire de permis au sujet de la sûreté du site à long terme.

En approuvant l'abandon de toute installation nucléaire, la CCEA reconnaît que le titulaire de permis a rempli toutes ses obligations en vertu du Règlement sur le contrôle de l'énergie atomique et qu'il est relevé par le fait même de toute autre responsabilité à propos du site en vertu du même règlement. En revanche, l'autorisation de la CCEA, délivrée conformément au Règlement sur le contrôle de l'énergie atomique ne relève pas le titulaire de permis de sa responsabilité de satisfaire aux exigences des autres organismes fédéraux, provinciaux ou municipaux.

Consultative Document / Document de consultation

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

CONSULTATIVE DOCUMENT C-6

Proposed Regulatory Guide

REQUIREMENTS FOR THE SAFETY ANALYSIS OF CANDU NUCLEAR POWER PLANTS

Issued for comment:

June, 1980

Canada

PREFACE

1. Siting, design, manufacture, construction, commissioning, operation, and decommissioning of nuclear facilities, or the production, possession, use and disposal of prescribed substances, in Canada or under Canadian control, are subject to the provisions of the Atomic Energy Control Act and Regulations administered by the Atomic Energy Control Board (AECB).

2. In addition to the Atomic Energy Control Regulations, three other categories of Regulatory Document are employed by the AECB. These are:

   Generic Licence Conditions - standard sets of conditions that are included in particular AECB licences of a common type, unless specific circumstances indicate otherwise;

   Regulatory Policy Statements - firm expressions that particular "requirements" not expressed as Regulations or Licence Conditions be complied with or that any requirements be met in a particular manner but where the AECB retains the discretion to allow deviations or to consider alternative means of attaining the same objectives where a satisfactory case is made; and

   Regulatory Guides - guidance or advice on any aspect of the AECB's regulatory process that is given in a manner less rigid than that intended by Policy Statements.

3. In developing Regulatory Documents, the AECB publishes its proposals as Consultative Documents in order to solicit comments both from the nuclear industry and from the public. This is done prior to releasing any Regulatory Document in final form. In certain cases, after the period for public comment, a Consultative Document may be issued for "trial use". This is done for a limited period of time to gain practical experience. Following the period of trial use, the revised document is re-issued for further public comment prior to release in final form.

4. Comments on Consultative Documents and suggestions for new Regulatory Documents and for improvement to those that exist are encouraged and should be directed to the Regulations Development Section of the AECB.

5. Copies of Consultative Documents, Regulatory Documents and related index lists are available in both English and French on request from the Office of Public Information. Requests for technical information on and interpretation of documents should be addressed to this office.

6. The Atomic Energy Control Board may be contacted as follows:

   Postal address: Atomic Energy Control Board
   P.O. Box 1046
   Ottawa, Ontario
   K1P 5S9
   CANADA

   Telephone
   General Inquiries: (613) 995-5894

ATOMIC ENERGY CONTROL BOARD

REQUIREMENTS FOR THE SAFETY ANALYSIS OF CANDU NUCLEAR POWER PLANTS

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REQUIREMENTS FOR THE SAFETY ANALYSIS OF CANDU NUCLEAR POWER PLANTS

1.0 INTRODUCTION

This document is intended to cover all CANDU designs of the type currently undergoing licensing in Canada. Since its degree of applicability to other designs will vary, the AECB should be consulted prior to an application to construct being made for any other type of reactor.

The effective date of this document shall be July 1, 1980 for all nuclear power plants not holding a Construction Licence at that time.

2.0 DEFINITIONS

2.1 Serious Process Failure

A serious process failure is any failure of process equipment or procedure which, in the absence of Special Safety System action, could lead to significant fuel failures in the reactor or a significant release of radioactive material from the station.

For the purpose of this definition:

(a) significant fuel failures means fuel failures to the extent that the Iodine-131 content of the reactor coolant is increased by 500 curies or more.

(b) significant release of radioactive material is one which would result in a whole body dose to the most exposed member of the public at or beyond the site boundary in excess of 0.0005 SV (50 mrem) or 0.005 SV (500 mrem) to the thyroid assuming Pasquill F weather conditions.

2.2 Special Safety Systems

The Special Safety Systems shall include:

Reactor Shutdown Systems

Emergency Core Cooling System

Containment System.

2.3 Process Protective Actions

Process protective actions are actions performed by process equipment which can reduce the frequency of serious process failures or reduce the demands placed on the special safety systems.

2.4 Safety Support Actions

Safety support actions are actions performed by equipment or structures which assist or support the Special Safety Systems in limiting the consequences of serious process failures.

2.5 Common Cause Effects

Common cause effects are effects manifested in more than one piece of equipment or structure by the same cause. Examples of such causes are aircraft crashes; earthquakes; tornadoes; fires; a common hostile environment; common design weaknesses; and common fabrication, installation, operation, or maintenance errors.

2.6 Cross-Link Effects

Cross-link effects are those effects resulting from a lack of independence or separation, either physical or functional, between systems or components or operating actions.

2.7 Normal Electrical Power

Normal electrical power is the electrical power supplied from the station turbine-generator(s) or the electrical power grid to which the station is connected.

2.8 Fire Zone

A fire zone is that portion of the plant which is separated from other zones by fire-resistant boundaries.

2.9 Design Basis Fire

The most severe fire that could occur within a fire zone.

2.10 Fire-Resistant Boundaries

Fire-resistant boundaries are physical barriers or distance which can contain the design basis fire within the fire zone. Fire-resistant boundaries may take into account active and passive fire protection means.

3.0 BASIC REQUIREMENTS

3.1 A safety analysis shall be completed to show that the operation of the station will not pose an unacceptable risk to the public.

3.2 The safety analysis shall include:

(a) a review of the plant design, operational procedures and potential external influences to identify:

i) all serious process failures resulting from failure of a single component or system,

ii) all combinations of single component failures or single system failures resulting in serious process failures,

iii) all events of i) and ii) above combined with the failure or unavailability of systems or equipment whose action would mitigate the consequences of these events,

which may pose a comparable or greater risk to the public than the events specified in Table 1.

This review shall incorporate the events specified in Table 1 and shall show that as far as practicable all potential external influences, failure initiating mechanisms internal to the plant, common cause effects and cross-link effects have been taken into account.

(b) the analysis of all events specified in Table 1. Such analysis shall demonstrate that the relevant dose limits specified in Table 2 are not exceeded and shall show, by comparison with other specified events, that the events should not be placed in a lower Table 1 class number.

(c) the analysis of all events identified in accordance with Section 3.2(a) but not specified in Table 1. Such analysis shall demonstrate that the risk posed to the public by these events is not greater than that of the events specified in Table 1.

(d) the analysis of all events specified in Table 3. The analysis of these events shall meet the requirements of Sections 3.3, 4, 5, and 6 except that the consequences shall be calculated assuming the postulated containment impairment exists for five days.

3.3 The analysis of each of the events as required by Section 3.2 shall:

(a) determine that the reactor can be made and maintained safely subcritical;

(b) be carried out to the point where it is shown that the reactor has achieved a safe thermal equilibrium state.

(c) identify the reactor heat sinks credited from the start of the serious process failure until the reactor has reached a safe thermal equilibrium state;

(d) for each of the heat sinks determined in accordance with Section 3.3(c), identify the heat transfer routes from the reactor fuel to the ultimate heat sink and evaluate the heat transferred via each route;

(e) determine the dose to the most exposed member of the public at or beyond the site boundary either:

i) for 30 days from the time at which the event occurs; or

ii) until the dose rate to the most exposed member of the public at or beyond the site boundary is not greater than 0.0001 SV (10 mrem) per week whole body and 0.001 SV (100 mrem) per week to the thyroid;

whichever is the greater time period.

(f) show that equipment and structures required to operate following an event can be maintained.

3.4 Massive failure of all pressure vessels shall be analyzed unless it can be demonstrated that such a failure is of an acceptably low expected frequency of occurrence. If this is to be achieved, the following shall be taken as minimum requirements:

(a) design, fabrication, installation and operation in accordance with the requirements of Section III Class I of the ASME code and other requirements as the AECB may deem appropriate;

(b) the vessel connections are relatively few (reactor headers shall not be considered as vessels for the purpose of safety analysis);

(c) an in-place inservice inspection program;

(d) a critical crack length such that a detectable leak will occur at normal operating pressure well in advance of the critical crack length being reached.

(e) equipment in place which will detect the presence of a leak (as identified in accordance with Section 3.4(d)) and alert the operator, and to have procedures for action to be taken following the detection of a leak.

4.0 GENERAL ANALYSIS REQUIREMENTS

The following requirements pertain to the events requiring analysis under Section 3.2;

4.1 Each event shall be analyzed crediting the following:

(a) each reactor shutdown system in turn;

(b) of the reactor shutdown system assumed available, the less effective of the two trip parameters provided in accordance with the requirements of Reference 3.

4.2 Each event shall be analyzed with and without credit for process protective actions and with action by process systems where it cannot be shown by inspection that such actions would be beneficial. For events specified in Table 1, the reference dose limits given in Table 2 shall apply to both of the above postulated cases. For events identified in accordance with the requirements of Section 3.2(a) the same approach shall apply.

4.3 The analysis of each event shall include the determination of the following except for those items which are not applicable:

(a) the reactor physics transient;

(b) the transient behaviour of the reactor fuel;

(c) the reactor trip times for:

i) the full range of reactor power

ii) the full range of failure potential of the event;

(d) the pressure and temperature transients of the pressure retaining components showing that the appropriate service limits of the applicable code for pressure retaining components are not exceeded;

(e) the pressure, temperature and flow transients within the pressure retaining systems which affect the outcome of the event.

(f) the pressure, temperature and flow transients within containment;

(g) the release of radioactive material from the fuel;

(h) the release of radioactive material into containment;

(i) the distribution of radioactive material within containment;

(j) the release of radioactive material from containment;

(k) the necessary operator actions, indications available to identify the need for such action, and the period of time between the indication and the point when the operator must begin taking action.

6.4 The values of input parameters used in the analysis of each event shall ensure that the predictions of consequences is conservative and applicable at all times by taking account of:

(a) the different plant states for which continued operation will be permitted by the operating procedures;

(b) the uncertainties associated with each parameter.

6.5 Mathematical models and associated calculational methods used shall satisfy the following requirements:

(a) conservative prediction is obtained;

(b) all important physical phenomena shall be represented;

(c) simplifications shall be justified as being appropriate and conservative;

(d) adequate numerical accuracy shall be demonstrated;

(e) as far as practicable mathematical modes shall be verified by operating experience or experimental evidence;

(f) changes, arising from the event, in the effectiveness of processes shall be accounted for. These shall include but not be limited to:

i) adverse environmental conditions such as steam, dousing, flooding and radiation.

ii) changes in support system performance e.g. electrical power, cooling water and instrument air supplies.

4.6 Empirical correlations shall be conservatively based on relevant experiments done, to the extent practicable, in the applicable range of operating parameters. Scaling of results beyond the range of experimental data must be justified.

4.7 Where neither a mathematical model nor a correlation is suitable to simulate a physical phenomenon, limiting assumptions shall be used, such that the prediction is demonstrably conservative.

4.8 The analysis of each event shall consider the partial and total loss of the function provided by the component or systems whose failure defines the event. The worst case shall meet the applicable reference dose limits given in Table 2. Where only the worst case is analyzed the basis on which it is chosen shall be given.

4.9 The analysis of each event shall include the determination of:

a) the expected frequency of occurrence of the event taking into account all credible failure mechanisms as far as practicable.

b) the credible event sequences following the event for the time specified under Section 3.3(e) taking into account as far as practicable:

i) the event initiating mechanisms,

ii) common cause effects,

iii) cross-link effects,

iv) operator errors,

v) equipment unavailability.

4.10 The analysis of events for which it is desired to take credit for the continued availability of normal electrical power shall include the following:

(a) analysis assuming the continued availability of normal power except where Reference 1, 2 or 3 specify that such power shall not be credited.

(b) a reliability analysis determining the likelihood of continued availability of normal electrical power during the event taking into account common cause and cross-link effects.

(c) analysis assuming the failure of all sources of normal electrical power supply to the unit.

In determining the appropriate event class for the combination, the credit given the availability of normal electrical power shall take into account the outcome of the reliability analysis of Section 4.10(b) but shall not exceed that given by the following table:

Initiating Event Class	Event Class for Combination
1	3
2	4
3	5
4	5
5	5*

* Where it can be shown that the occurrence of the event and normal electrical power failure is of an order of likelihood less than that expected for Class 5 events, the combined failure need not be analyzed.

4.11 Pipe failure analysis shall consider both circumferential and longitudinal failures at any location in a system.

(a) For circumferential pipe failures a discharge area up to and including twice the cross-sectional area of the pipe shall be analyzed.

(b) Failures resulting from longitudinal cracks shall also be considered and justification given for the maximum crack size postulated.

4.12 The analysis of all events leading to calculated fuel sheath failures shall assume the maximum steam generator tube leakage for which continued reactor operation is permitted.

4.13 The analysis of each event shall only take credit for the continued operation of equipment which is both designed and qualified to withstand the effects of the event.

4.14 In the analysis of each event, the credited effectiveness of equipment shall be based on:

(a) for process systems, the minimum intended operational availability.

(b) for special safety systems, the minimum allowable performance standards specified in accordance with the requirements of Reference 1, 2 and 3.

(c) performance to an acceptable confidence level.

5.0 SAFETY ANALYSIS RULES

The applicant shall define the rules that lay out the principles and practices which will be followed in the safety analysis to ensure that the requirements of Sections 3 and 4 will be met. Such rules shall be approved by the AECB and shall include but not be limited to:

(a) the method of review of the plant design, operational procedures, and potential external influences to ensure the requirements of Section 3.2(a) are met;

(b) the method of categorization of the events and event combinations identified in accordance with Section 3.2(a) into the classes of Table 1;

(c) the method of taking into account common cause and cross-link effects.

(d) the assumptions regarding safety support actions and process protective actions;

(e) the assumptions regarding the responses (both success and failure) of all operationally and functionally interrelated systems, equipment and structures;

(f) the application of the service limits of the applicable code for pressure retaining components to the events defined by Section 3.2;

(g) the assumed response of the operator taking into account items such as plant indications, response time and procedures;

(h) the treatment of the subsequent effects of pressure boundary failures such as pipe whip, jet impingement forces, high temperature, flooding and radiation;

(i) the method of selection of input parameter values to satisfy the requirements of Section 4.4. These methods shall address but not be limited to input parameters such as:

weather conditions,

reactor power,

maximum channel power,

fission product inventory of the core,

tritium content of the moderator system

plant operating mode (reactor leading or following turbine),

reactor core flow rate,

reactor main coolant system temperature and pressure,

steam generator pressure and level,

dousing tank water level,

coolant void reactivity coefficient

trip signal delays,

shut-off rod characteristics,

fuel temperature coefficient,

flux distribution in the core.

(j) the use of mathematical models, associated calculational methods, and empirical correlations which satisfy the requirements of Sections 4.5, 4.6 and 4.7.

(k) assumptions in the analysis pertaining to the operation of overpressure relief devices, in particular for the following:

- failure to open when called upon
- failure to reclose

6.0 SAFETY ANALYSIS REPORTING REQUIREMENTS

6.1 General

6.1.1 Sufficient information shall be submitted to the AECB to show that the requirements of Sections 3, 4 and 5 have been met such that a comprehensive independent assessment of the adequacy and acceptability of the analysis can be done.

6.2 Additional Specific Reporting Requirements

The following apply to the reporting of the analysis of each of the events required under Section 3.2:

(a) a listing of the input assumptions and data;

(b) an estimate of the uncertainty in the results with identification of the contributing factors;

(c) a listing of the conservatisms (this should include factors of conservatism used in correlations, mathematical models and failure rates with the rationale for the values chosen);

(d) a listing of the mathematical models, calculational methods and correlations used indicating the range and conditions of applicability of each;

(e) a listing of the parameters to which the results are relatively sensitive including the degree of sensitivity of each;

(f) identification of simplifications and approximations used in mathematical models and calculational methods;

(g) an estimation of the numerical accuracy of the calculational methods.

6.3 Mathematical Models, Calculational Methods and Correlations

Each mathematical model, calculational method and correlation used in the safety analysis of the plant shall be documented and submitted to the AECB. They shall reference all the material on which the models are based. In the case of computerized models the program descriptions and computer listings shall be submitted.

7.0 REFERENCES

Reference 1

Criteria for Reactor Containment Systems for Nuclear Power Plants

Atomic Energy Control Board - October 16, 1979.

Reference 2

Requirements for Emergency Core Cooling Systems for Candu Nuclear Power Plants

Atomic Energy Control Board - November 27, 1979.

Reference 3

Requirements for Shutdown Systems for Candu Nuclear Power Plants

Atomic Energy Control Board - January 2, 1980.

TABLE 1

SPECIFIED EVENTS REQUIRED TO MEET TABLE 2 REFERENCE DOSE LIMITS

NOTES:

(a) Not all events in this table will be applicable to a specific design.

(b) Where more than one process system is provided to carry out a function, each fully capable and available, and where each can be shown to be sufficiently independent and diverse that the failure of one cannot result in failure of the other(s), the failure of only one needs to be postulated as a single process failure.

(c) The multiple events involving failure of subsystems of Special Safety Systems assume sufficient independence and diversity between the subsystems that each may be considered as a Special Safety System for the purpose of safety analysis. Where such independence and diversity cannot be shown the analysis must assume failure of all such subsystems. (For example, under Class 5 a feeder failure is to be analyzed with a failure of rapid cooldown of the steam generators and separately with a failure to close of the isolation devices on the interconnects between the reactor main coolant loops. If there is insufficient independence and diversity between the subsystems giving rapid cooldown and loop isolation, then a feeder failure is to be analyzed with failure of rapid cooldown and failure of loop isolation.)

(d) Where more than one subsystem of a Special Safety System is provided to perform a safety function and each subsystem has a high degree of independence and diversity from each other, then each may be considered as a Special Safety System for the purpose of safety analysis. For such designs, events specifying the failure of a Special Safety System function need only consider the failure of each of the subsystems in turn.

Class 1

Failure of control[1]

Failure of normal electrical power

Failure of the normal steam generator feedwater flow

Failure of a service water flow[2]

Failure of the instrument air

Failure of reactor moderator flow

Turbine-generator load rejection

Fuelling machine backing off the reactor without the fuel channel assembly closure plug being replaced

Failure of a single steam generator tube

Failure resulting in the opening of the instrumented pressure relief valves of the reactor main coolant system

Failure of the cooling of a fuelling machine when off reactor containing a full complement of irradiated fuel

Failure resulting in the opening of a pressure relief valve in a subatmospheric pressure containment system[3]

Failure at any location of any small pipe connected to the reactor main coolant system (such as an instrument line) where crimping is the accepted method of isolation[4].

Class 2

Failure at any location of any reactor fuel channel assembly feeder pipe (hereafter referred to as "feeder failure")

Failure of the end fitting of any reactor fuel channel assembly (hereinafter referred to as "end fitting failure")

Failure of the pressure tube of any reactor fuel channel assembly followed immediately by the failure of the calandria tube through which the pressure tube runs (hereafter referred to as "pressure tube/calandria tube failure")

Flow blockage in any single reactor fuel channel assembly

Seizure of a single reactor coolant main circulating pump

Failure resulting in the opening of the instrumented pressure relief valves of the reactor main coolant system + failure of the relief valves on the blowdown tank to reclose

Failure of all mechanical seals on a reactor main coolant pump

Failure at any location of any pipe or component in the system which controls the inventory and pressure in the reactor main coolant system

Failure at any location of any pipe of the service water systems

Design basis fires

Class 3

Failure at any location of any pipe of the reactor main coolant system considering failure sizes from the size greater than a fuel channel assembly feeder up to and including the largest pipe (hereafter referred to as a "reactor main coolant system large LOCA")[5]

Failure of a large number of steam generator tubes[6]

Failure at any location of any pipe or header carrying steam from the steam generators to the turbine generator

Failure at any location of any pipe or header carrying feedwater to the steam generators

Failure at any location of any pipe of the reactor moderator system

Failure of control of the reactor main coolant pressure and inventory control system + failure of the reactor main coolant system instrumented pressure relief valves to open

Failure of the end fitting of any fuel channel assembly followed immediately by the failure of the lattice tube of the end shield through which the end fitting runs (hereafter referred to as "end fitting/lattice tube failure")[7]

Design Basis Earthquake

Failure of a large number of tubes in any heat exchanger, except the steam generators, which is connected to the reactor main coolant system[8]

Class 4

Fuelling machine backing off the reactor without the fuel channel assembly closure plug being replaced plus each of the following in turn:

- failure of emergency coolant injection
- failure to close of the isolation devices on the interconnects between the reactor main coolant loops
- failure of rapid cooldown of the steam generators

Class 4 (Continued)

- one door open of the airlock or transfer chamber most critical for radioactive releases from containment and the seals on the second door deflated
- failure to close of the containment isolation devices associated with a single containment subsystem for the subsystem most critical for radioactive releases from containment
- degraded operation of containment atmosphere cooling equipment
- for a subatmospheric pressure containment system, failure of one bank of pressure relief valves with operation of the second bank at the minimum level acceptable for continued station operation
- for a subatmospheric pressure containment system, failure of the bypass relief valves to open on increasing or decreasing pressure in the valve manifold
- the largest containment leak that could not be detected quickly by a monitoring system, or the largest leak for which continued reactor operation for more than four hours would be proposed
- failure of containment dousing assuming the more severe of the following:

  i) a douse has occurred prior to the accident

  ii) the dousing system is unavailable following the accident

Failure of the cooling of a fuelling machine when off reactor containing a full complement of irradiated fuel plus each of the following in turn:

- failure to close of the containment isolation devices associated with a single containment subsystem for the subsystem most critical for radioactive releases from containment

Class 4 (Continued)

- one door open of the airlock or transfer chamber most critical for radioactive releases from containment and the seals on the second door deflated

Failure of the drive shaft of a reactor coolant main circulating pump

Class 5

Failure inside containment of any pipe or header carrying steam from the steam generators to the turbine-generator plus

Failure at any location of any pipe or header carrying feedwater to the steam generators plus

Failure of all mechanical seals on a reactor main coolant pump plus

Feeder failure plus

Flow blockage in any single reactor fuel channel assembly plus

End fitting failure plus

End fitting/lattice tube failure plus

Pressure tube/calandria tube failure plus

Reactor main coolant system large LOCA plus

Failure at any location of a pipe in the system which controls the pressure and inventory in the reactor main coolant system plus

each of the following in turn:

- failure of emergency coolant injection
- failure to close of the isolation devices on the interconnects between the reactor main coolant loops
- failure of rapid cooldown of the steam generators
- one door open of the airlock or transfer chamber most critical for radioactive releases from containment and the seals on the second door deflated

Class 5 (Continued)

- failure to close of the containment isolation devices associated with a single containment subsystem for the subsystem most critical for radioactive releases from containment
- degraded operation of containment atmosphere cooling equipment
- for a subatmospheric pressure containment system, failure of one bank of pressure relief valves with operation of the second bank at the minimum level acceptable for continued station operation
- for a subatmospheric pressure containment system, failure of the bypass relief valves to open on increasing or decreasing pressure in the valve manifold
- the largest containment leak that could not be detected quickly by a monitoring system or the largest leak for which continued reactor operation for more than four hours would be proposed
- failure of containment dousing assuming the more severe of the following:

  i) a douse has occurred prior to the accident

  ii) the dousing system is unavailable following the accident

Failure of a large number of steam generator tubes[9] plus each of the following in turn:

- failure of rapid cooldown of the steam generator
- failure of emergency coolant injection
- failure to close of the isolation devices on the interconnects between the reactor main coolant loops
- failure to close of the isolation devices on the pipe carrying steam from the steam generators

Class 5 (Continued)

Failure of a large number of tubes in any heat exchanger, except the steam generators, which is connected to the reactor main coolant system[10] plus each of the following in turn:

- failure of rapid cooldown of the steam generators
- failure of emergency coolant injection
- failure to close of the isolation devices on the interconnects between the reactor main coolant loops
- failure to close of the isolation devices on the pipes carrying service water to and from the heat exchangers

Design Basis Earthquake plus each of the following in turn:

- one door open of the airlock or transfer chamber most critical for radioactive releases from containment and the seals on the second door deflated
- failure to close of the containment isolation devices associated with a single containment subsystem for the subsystem most critical for radioactive releases from containment
- degraded operation of containment atmosphere cooling equipment
- for a subatmospheric pressure containment system, failure of one bank of pressure relief valves with operation of the second bank at the minimum level acceptable for continued station operation
- for a subatmospheric pressure containment system, failure of the bypass relief valves to open on increasing or decreasing pressure in the valve manifold
- the largest containment leak that could not be detected quickly by a monitoring system, or the largest leak for which continued reactor operation for more than four hours would be proposed

Class 5 (Continued)

- failure of containment dousing assuming the more severe of the following:

  i) a douse has occurred prior to the DBE

  ii) the dousing system is unavailable following the DBE

Flow blockage in any single reactor fuel channel assembly plus

End fitting failure plus

Pressure tube/calandria tube failure plus

Feeder failure plus

- for a subatmospheric pressurized containment, pressure in the main vacuum building chamber at atmospheric pressure prior to the accident

Turbine-generator load rejection + failure of turbine overspeed protection

Turbine breakup

Design Basis Tornado

Failure of the mechanical joint between the pump cover and the pump casing of a reactor coolant main circulating pump

Large load dropped on the reactor reactivity mechanism deck[11]

Failure of a steam generator support[11]

Massive failure of the pump casing of a reactor coolant main circulating pump[11]

Massive failure of the pump cover of a reactor coolant main circulating pump[11]

Massive failure of the station cooling water intake tunnel[11]

Massive failure of the station cooling water discharge duct[11]

FOOTNOTES

1. "Failure of control" denotes the loss of the ability of control equipment to maintain system or equipment operation in a predetermined state. "Failure of control" shall include:

1.1 Failure of reactivity control including:

a) positive reactivity insertion from all power levels for normal and distorted flux shapes at a range of rates up to and including the maximum credible rate

b) positive reactivity insertion to give a constant log rate for a range of log rates up to a value just below the point at which the automatic neutron detection devices of the Special Safety Systems would shut down the reactor

c) positive reactivity insertion at a range of rates up to and including the maximum credible rate while the reactor is subcritical.

1.2 Failure of computer control (except as covered by Section 1.1 above) including:

i) failure to control a single parameter

ii) sudden total computer control failure

iii) gradual computer control deterioration leading to total control failure*

iv) failure to control more than a single parameter*

v) programming errors*

1.3 Failure of each analogue control system.

* Specific cases within these categories may be placed in other than Class 1.

FOOTNOTES (Continued)

2. "Service water" is the water normally taken from the sea, lake or river and used directly for the cooling of plant equipment.

3. This event shall be shown not to result in a serious process failure or damage to the Special Safety Systems

4. The reference dose limit shall be shown not to be exceeded during the period in which the reactor is shut down consequent to the failure, and the crimping is executed. The system which controls the inventory and pressure in the reactor main coolant system may not be credited during this period.

5. The analysis shall assume the reactor coolant main circulating pumps do not continue to operate unless the following can be shown to the satisfaction of the AECB:

   a) the main circulating pumps are qualified to run under the conditions of a large LOCA

   b) cavitation effects will not trip the main circulating pumps

   c) administrative rules ensure the pumps will not be shutdown during that portion of the event where their continued operation is credited.

   Where the above have been shown to the satisfaction of the AECB, reactor main coolant system large LOCA + loss of reactor coolant main circulating pumps must be considered as a Class 4 event.

6. For this event the consequences of failure of a large number of steam generator tubes shall be determined and justification given for the number of tubes chosen.

FOOTNOTES (Continued)

In addition, the following shall be shown:

a) the number of steam generator tubes required to fail in order to exceed the capability of the pressure and inventory control system of the reactor main coolant system assuming it operates as designed.

b) the number of steam generator tube failures necessary to result in calculated fuel sheath failures.

7. This analysis is not required if it can be shown that a lattice tube cannot fail following the failure of the end fitting or pressure tube of any fuel channel assembly.

8. The consequences of failure of a large number of heat exchanger tubes shall be determined and justification given for the number of tubes chosen.

9. The number of steam generator tubes failed shall be those determined in accordance with the requirements of Footnote 6.

10. The number of heat exchanger tubes failed shall be those determined in accordance with the requirements of Footnote 8.

FOOTNOTES (Continued)

11. For each of these events either of the following shall be shown:

a) the consequences will not exceed the Class 5 reference dose limits

b) the postulated event should not be regarded as a design basis event and therefore does not require consequence analysis. To be considered, arguments supporting this position shall include:

- design, manufacture, installation and operating considerations and features
- the predicted failure frequency based upon direct operating experience or reasonable extrapolation therefrom.

TABLE 2

Safety Analysis Class/Consequence Table

The following table gives the maximum permissible reference doses to the most exposed member of the public at or beyond the site boundary for each class of postulated event.

	Reference Dose Limit	
Class	Whole Body	Thyroid
1*	.0005 Sv	0.005 Sv
	(50 mrem)	(500 mrem)
2*	0.005 Sv	0.05 Sv
	(500 mrem)	(5 rem)
3	.03 Sv	0.3 Sv
	(3 rem)	(30 rem)
4	0.1 Sv	1.0 Sv
	(10 rem)	(100 rem)
5	0.25 Sv	2.5 Sv
	(25 rem)	(250 rem)

* Class 1 and Class 2 events other than single channel events shall be shown to have no systematic fuel pin failures.

TABLE 3

SPECIFIED NON DESIGN BASIS EVENTS

The events of Table 3 consist of those single failures combined with massive containment impairments which could result in very large releases of radioactive material from containment. These events are not considered as design basis because of their expected very low frequency of occurrence.

However, in the interest of fully assessing the risk to the public posed by the station, the consequences of these very low probability events shall be determined. The AECB shall judge the acceptability of the consequences of these events on a case-by-case basis.

Flow blockage in any single reactor fuel channel assembly — plus

End fitting failure — plus

Pressure tube/calandria tube failure — plus

Reactor main coolant system large LOCA — plus

each of the following in turn:

- total failure of containment atmosphere cooling equipment
- both doors open of the airlock or transfer chamber most critical for the release of radioactive material from containment.

Consultative Document / Document de consultation

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

CONSULTATIVE DOCUMENT C-7/REV-1

Proposed Regulatory Guide

REQUIREMENTS FOR CONTAINMENT SYSTEMS FOR CANDU NUCLEAR POWER PLANTS

Issued for trial use on nuclear power stations for which a Construction Approval is issued after January 1, 1981

Publication: May 21, 1982

Canada

This document is part of a set of regulatory documents relating to the safety requirements for CANDU nuclear power plants:

C-7/REV-1 "Requirements for Containment Systems for CANDU Nuclear Power Plants"

C-8/REV-1 "Requirements for Shutdown Systems for CANDU Nuclear Power Plants"

C-9/REV-1 "Requirements for Emergency Core Cooling Systems for CANDU Nuclear Power Plants".

These documents will be used together and they are being issued for a trial use period of three years. They replace AECB Licensing Guides 40, 41 and 42. These new documents apply only to reactors licensed for construction after January 1st, 1981.

Consultative Document C-8/REV-1 for trial use is the second document issued by the AECB on the subject of shutdown system requirements. It does not conflict with the one issued in September, 1977.

All three documents refer to Consultative Document C-6, "Requirements for the Safety Analysis of CANDU Nuclear Power Plants" (formerly known as Licensing Guide No. 39). This document has not yet been revised and it will be re-issued at a later date.

THE AECB REGULATORY DOCUMENTS SYSTEM

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5. Copies of Consultative Documents, Regulatory Documents and related index lists are available in both English and French on request from the Office of Public Information. Requests for technical information on and interpretation of documents should be addressed to this office.

6. The Atomic Energy Control Board may be contacted as follows:

Postal address: Atomic Energy Control Board
P.O. Box 1046
Ottawa, Ontario
CANADA
K1P 5S9

Telephone
General Inquiries: (613) 995-5894

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REQUIREMENTS FOR CONTAINMENT
SYSTEMS FOR CANDU NUCLEAR POWER PLANTS

1. BASIC REQUIREMENTS

1.1 All water-cooled nuclear power reactors shall be installed within a containment structure. All piping which is part of the main circuit of the primary heat transport system excluding boiler tubing shall be totally within the containment structure.

1.2 There shall be a clearly defined continuous containment envelope which is capable of limiting to an acceptably low value the release of radioactive material from the station for all postulated failures of a fuel cooling system as specified in reference 1. The boundary of this containment envelope shall be defined for all conditions which could exist in operation or maintenance of the reactor.

1.3 (a) Except as noted in (b) below, all equipment required for correct operation of the containment system shall be considered to be part of that system and shall meet all requirements of this document. This shall include:

(i) the containment structure and appurtenances;

(ii) equipment required to isolate the containment envelope and assure its completeness and continuity following an accident;

(iii) equipment required to reduce the pressure or free radioactive material within the containment envelope;

(iv) equipment required to limit the release of radioative material from containment following an accident.

(b) Equipment required to supply compressed air, lubrication, electrical power or cooling water to equipment for operation of the containment system shall be considered as safety support equipment. Such equipment shall meet all the requirements of this document with the exception of 2.7 (a) and 2.12.

1.4 The containment system shall be considered to be a special safety system.

2. DESIGN REQUIREMENTS

2.1 Design Information

a) The Safety Report shall clearly state the values of and bases for the following containment design parameters:

(i) positive design pressure(s);
(ii) negative design pressure(s) where applicable;
(iii) the maximum allowable leakage rate at the positive design pressure.

b) Minimum allowable performance standards shall be defined for the containment system and shall be listed or referenced in the Safety Report. The minimum allowable performance standards shall also be specified for all major equipment necessary for correct operation of the containment system.

c) A report shall be submitted which clearly identifies the containment envelope as described in 1.2 above.

2.2 Dose Limits Under Accident Conditions

The containment system shall be capable of limiting the release of radioactive material such that the dose limits specified in Table 2 of reference 1 are not exceeded.

2.3 Structural Integrity

a) The positive design pressure of each part of containment shall be not less than the highest pressure which could be generated in that part as a result of any postulated events as specified in Table 1 of reference 1 for which radioactive material may be released into containment.

b) The negative design pressure of each part of containment shall be not greater than the lowest pressure which could be generated in that part as a result of any postulated event as specified in Table 1 of reference 1 for which radioactive material may be released into containment.

c) It shall be shown that, for all events for which analysis of the consequences is required by reference 1, the structural integrity of containment will not be impaired.

2.4 Leakage Criteria

a) The maximum allowable leakage rate from containment shall be the value used in the safety analyses which demonstrate that the relevant dose limits specified in reference 1 are not exceeded.

b) A test acceptance leakage rate shall be established, giving the maximum acceptable leakage rate under actual measurement tests. The margin between maximum allowable leakage rate defined in 2.4 a) and the test acceptance leakage rate, shall require approval by the AECB prior to the first leakage rate tests.

2.5 Environmental Requirements

a) All parts of the containment which are required to operate, or to continue operating, in response to any of the relevant events specified in reference 1 shall be designed to withstand the most severe environmental conditions which could be present when or before operation of such parts are required. These may include but are not necessarily limited to the effects of debris, steam, water, high temperature, radiation fields and pressure differentials.

Qualification is required for any containment equipment which is required to operate, or to continue operating, after an accident has occurred. Qualification shall consist of tests to demonstrate that the type of equipment can operate under conditions similar to those which would exist during or following an accident. Where such tests are impracticable, analysis shall be required to demonstrate that this requirement is met.

b) The containment system shall be designed such that, for all relevant class 1, 2, 3 or 4 events specified in Table 1 of reference 1, dynamic effects or jet forces caused by the event cannot result in impairment of the containment system to an extent that the relevant requirements in sections 2.2, 2.3 and 2.4 would not be met.

2.6 Availability Requirements

a) The containment shall be designed such that the fraction of time for which it is not available can be demonstrated to be less than 10^{-3} years per year. The system shall be considered available only if it can be demonstrated to meet all the minimum allowable performance standards as defined in accordance with section 2.1(b).

The availability of support systems necessary for correct operation of the containment system shall be commensurate with the availability requirements of the containment system. Availability calculations to demonstrate that this requirement can be met shall be included or referenced in the Safety Report. Such calculations shall be based on direct experience or reasonable extrapolations thereof.

b) The design of the containment system and safety support systems shall take into account the long term reliability requirements of those components which must continue to function following an accident.

c) The design shall have sufficient redundancy that no failure of a single component of the containment system can result in impairment of containment to an extent that the system will not meet its minimum allowable performance standards under accident conditions.

If a component, which is not required to change state and which does not depend on safety support equipment in order to perform its design function, is designed, manufactured, inspected, and maintained to standards acceptable to the AECB, this requirement does not apply.

d) Correct operation of the containment system following an accident shall not be dependent on power supplies from the electrical grid or from the turbine generators associated with any reactor unit sharing that containment system.

e) As far as practicable, all equipment shall be designed such that its most likely failure mode is to a safe state.

f) As far as practicable, the design shall be such that all maintenance and unavailability testing which may be required during reactor operation can be carried out:

i) without impairment of the containment boundary;

ii) without a reduction in the effectiveness of containment below the minimum allowable performance standards.

g) As far as practicable the design shall be such that a failed component can be put in a safe state.

h) The design shall be such that all necessary actions of containment equipment which are initiated by automatic control logic can also be initiated manually from the appropriate control room.

i) The design shall be such that, in the event of an accident, it is not readily possible for an operator to prevent a safe automatic action from taking place.

2.7 Separation and Independence Requirements

a) The containment system shall be physically and operationally independent from other special safety systems. No equipment which is part of the containment system shall be used as part of another special safety system.

b) As far as practicable, the containment system shall be independent from all process systems. This requirement does not apply to equipment discussed in

section 1.3 (a) (iii & iv) provided that such equipment is normally operating when the reactor is operating. Where such containment equipment is also used for process purposes, it shall be designed in accordance with the most demanding of its functions.

c) Principles for separation of redundant instrument channels and the services to them, associated with the containment system, shall be prepared and shall require approval by the AECB.

d) If subsystems of containment are considered to be independent for the purpose of the safety analyses, principles for separation and independence of such subsystems shall be prepared and shall require approval by the AECB.

2.8 Requirements for Penetrations of Containment

Piping systems which penetrate the containment boundary shall be designed to meet the requirements specified in appendix 1.

2.9 Containment Atmosphere Control

a) Systems shall be incorporated into the containment design to assist in the control of the containment internal pressure and to minimize the release of fission products to the environment following an accident.

b) Provision shall be made for controlling the concentration of hydrogen and oxygen following an accident to prevent explosion or deflagration.

c) The design of the plant shall be such that following an accident, it is possible to isolate all engineered sources of compressed air and other non-condensable gases leading into the containment atmosphere, other than those required for the operation of necessary equipment.

2.10 Shielding Requirements

The design of the containment system and associated equipment shall incorporate sufficient provision for shielding to ensure that radiation fields are not excessive in areas of the plant to which access might be required following an

accident. A report demonstrating the adequacy of the shielding provisions shall be prepared, and shall specify:

i) the postulated accident which results in the largest release of fission products inside containment;

ii) all areas to which access might be required following such an accident, with the frequency and duration of necessary access;

iii) the maximum radiation fields expected in such areas when access might be required.

NOTE: Equipment required only for shielding purposes need not be considered as part of the containment system.

2.11 Status Monitoring Requirements

a) The design of the containment system shall be such that the status of important equipment can be monitored from the appropriate control room.

b) The design of the containment shall be such that any gross breach of the containment envelope can be readily and reliably detected.

2.12 Codes and Standards

a) The application for a licence shall identify any aspects of the design which fail to comply with the applicable requirements of the following codes and standards:

i) CSA N287 - Series on "Concrete Containment Structures for CANDU Nuclear Power Plants"

ii) CAN3 - N285.1 - "Requirements for Class 1, 2 and 3 Pressure Retaining Systems and Components in CANDU Nuclear Power Plants"

All exceptions to the requirements of these standards shall require approval by the AECB.

b) A list of additional codes and standards to be applied to the containment system shall be prepared and shall require approval by the AECB.

2.13 Seismic Requirements

All parts of the containment system credited in the safety analysis following a design basis seismic ground motion for that plant site, shall be designed to remain fully functional following such an event.

3. OPERATING REQUIREMENTS

3.1 Requirements for Normal Operation

a) The containment system shall not be intentionally made unavailable, unless all of the following conditions are met:

i) all reactors within the containment envelope are in a guaranteed shutdown state approved by the AECB.

ii) all reactor cooling systems are cooled to a temperature and depressurized to a pressure approved by the AECB.

iii) all irradiated fuel within containment is adequately cooled and has an alternate cooling supply available.

The containment system shall be considered to be available only when it meets all the minimum allowable performance standards as defined in accordance with section 2.1(b).

b) Procedures for taking corrective action, in the event that containment is found to be unavailable when the above conditions are not met, shall be prepared and shall require approval by the AECB.

c) In the event that any component of the containment system is found to be inoperable or impaired below its minimum allowable performance standards, the component and its associated equipment shall as far as practicable immediately be put in a safe condition, i.e. a state which would not reduce the availability of the containment system, except as approved in accordance with b) above.

d) As far as practicable maintenance on a containment system component shall be carried out only when that component and its associated equipment have been put in a state which would not reduce the availability of the containment system.

e) In the event that redundant components require maintenance, each component shall be thoroughly tested following its maintenance prior to the start of work on a subsequent component.

f) Maintenance shall be of such standard that the reliability and effectiveness of all equipment, as claimed in the Safety Report and other documentation in support of an Operating Licence, are assured.

NOTE: Requirements 3.1(c), (d) and (e) do not apply during periods when the containment system has been made unavailable in accordance with procedures approved pursuant to section 3.1(a).

3.2 Requirements for Accident Conditions

In the event that operator action is required for actuation of any containment equipment, all of the following requirements must be met:

i) the containment system instrumentation shall be designed to give the operator clear and unambiguous indication of the necessity for operator action.

ii) operator action shall not be required within 15 minutes of such clear and unambiguous indication.

iii) there shall be clear, well-defined and readily available operating procedures to identify the necessary actions.

4. TESTING REQUIREMENTS

4.1 Commissioning Tests

a) Pressure Proof Tests

Prior to first criticality of any reactor, positive pressure proof tests shall be done to demonstrate the structural integrity of all parts of the containment

envelope and containment systems. If the design specifications include a negative design pressure, a negative pressure proof test shall also be done.

Positive pressure proof tests shall be done at a pressure not less than 1.15 times the positive design pressure for each part of containment.

Negative pressure proof tests shall be done at a pressure not greater than the negative design pressure.

b) Leakage Rate Tests

Prior to first criticality of any reactor, the leakage rate of its containment envelope shall be measured to demonstrate that it is not greater than the test acceptance leakage rate. Measurements shall be made at a range of pressures up to and including the positive design pressure for each part of containment. The test shall be conducted with containment components in a state sufficiently representative of those which would exist following an accident to demonstrate that the appropriate leakage rate would not be exceeded under such conditions.

Testing of individual penetrations, isolating devices and airlocks shall be done where necessary to obtain baseline leakage measurements against which the future in-service leakage tests specified in 4.2(d) may be compared.

c) Tests of Containment Equipment

Prior to first criticality of any reactor, tests shall be carried out to demonstrate, as far as practicable, that all equipment which is part of the containment system meets its minimum allowable performance standards.

d) Wiring Tests

Prior to first criticality of any reactor, tests shall be carried out on all electrical wiring associated with the containment system, to demonstrate that all connections are in accordance with the design.

4.2 In-Service Tests and Inspections

a) Pressure Proof Tests

Pressure proof tests, as specified in section 4.1(a) above, shall be repeated

following any major modification to the containment boundary or after the containment system has been subjected to elevated pressure differentials as a result of an accident or after the containment has been subjected to severe environmental effects.

b) Leakage Tests

In-service leakage rate tests shall be carried out in accordance with one of the following alternative methods

i) a leakage rate test shall be carried out at full design pressure every three years to demonstrate that the measured leakage rate is not greater than the maximum allowable leakage rate. If the measured leakage rate is in excess of the test acceptance leakage rate, the frequency of such tests shall be increased to once every two years or

ii) a test shall be carried out at a frequency not less than once per two years to demonstrate that the leakage rate is not greater than the maximum allowable leakage rate.

Such tests may be carried out at reduced, or negative pressures. However, if the test results when extrapolated to full design pressure indicate leakage in excess of the test acceptance leakage rate, a leakage rate test at the full positive design pressure shall be carried out to demonstrate that the maximum allowable leakage rate is not exceeded. A leakage test at full design pressure shall be carried out a minimum of once per six years in any case.

In addition to the above routinely scheduled leakage rate tests, a leakage rate test at the full design pressure shall be performed in conjunction with the pressure proof test required under section 4.2(a).

c) Containment Systems

To the maximum extent practicable, tests to demonstrate that containment equipment meets its minimum allowable performance standards (see section 4.1(c)) shall be carried out at a frequency not less than once per six years.

d) Tests of Penetrations and Isolating Devices

The licensee shall prepare for approval by the AECB, an in-service test program for penetrations, air locks and isolating devices. The program shall detail for each type of penetration, isolating device and airlock to be tested, the nature of the test, test frequency and leakage acceptance criteria.

e) Visual Inspections

Visual inspection of external containment surfaces, appurtenances and penetrations shall be carried out in conjunction with each of the tests called up in 4.2 a), b) and d) above. The interior of all containment structures shall be visually inspected at a frequency to be approved by the AECB.

f) Reporting Requirements

The results of all in-service tests and inspections of the containment system shall be reported in the annual reports for the station.

4.3 Availability Tests

a) All containment system equipment shall be monitored or tested at a frequency which is adequate to demonstrate compliance with the availability requirements specified in section 2.6 (a).

b) A report on the availability of the containment system shall be included in each annual report on operation of the station. This report shall include a statement of the total fraction of time in the year during which the containment system was not demonstrated to be available, as defined in section 2.6 (a). Only periods during which the containment system is intentionally made unavailable, in accordance with the conditions of section 3.1, shall be excluded from such calculations.

REFERENCE:

1) AECB, "Requirements for the Safety Analysis of CANDU Nuclear Power Plants", Consultative Document C-6 (formerly known as Licensing Document 39), June, 1980.

APPENDIX 1

REQUIREMENTS FOR METAL EXTENSIONS OF THE CONTAINMENT ENVELOPE

1. CODE REQUIREMENTS

Systems or portions of systems which form part of the containment envelope shall be constructed to the requirements of the ASME Boiler and Pressure Vessel Code, Section III, Division 1, Subsection NC (Class 2 Components) or Subsection NE (Class MC components) except for:

a) those systems whose process requirements are Class 1 or 2 in accordance with CAN3-N285.0

b) those closed systems inside containment, which have a design pressure $\geq$ 0.7 MP_a (g) and are continuously operated at or above 0.35 MP_a (g) at all points in the system, and which can be monitored for leaks. Such systems may be constructed to the process systems requirements but shall be to not less than the non-nuclear requirements of CSA B51.

Closed systems inside containment which do not meet the requirements in a) and b) above may be built to the requirements of Class 3 if it can be shown to the satisfaction of AECB that, due to the smallness of size or other factors, the proposed design provides an adequate barrier.

2. ISOLATION

Piping systems shall be provided with isolation barriers having redundancy,

reliability, and performance capabilities which reflect the importance to safety of isolating the various types of piping systems penetrating containment. Where isolation in a piping system is provided by valves, provisions shall be made to periodically test the valve operability and to check that the valve leakage is within acceptable limits. To consider a manual isolation valve closed it shall be either locked closed or continuously monitored to show that the valve is in the closed position.

The various types of piping systems penetrating containment shall be provided with the following isolation unless it can be shown that for a specific type of line other isolation provisions would be acceptable.

2.1 Primary Heat Transport Auxiliary Systems Penetrating Containment

Each line that is connected to the primary heat transport system pressure boundary and penetrates the containment structure shall be provided with two isolation valves in series. The valves shall normally be arranged with one inside and one outside containment. If it can be shown that two valves inside containment can provide an equivalent barrier in certain applications then this may also be an acceptable arrangement.

A check valve may be used as one of the isolation barriers but it shall be located inside containment. Two check valves in series are not considered an acceptable barrier.

Where the valves provide isolation of the heat transport system during normal operation of the station then both valves shall be in the closed position.

Systems directly connected to the heat transport system and which may be open during normal operation of the station shall also be provided with the same isolation as the normally closed system except that manual isolating valves inside containment shall not be used. At least one of the two isolation valves shall be either an automatic isolation valve (for instance, a check valve) or a powered isolation valve operable from the control room.

For small lines 25 mm dia. nominal size and under, a single closed isolation valve inside containment may be used provided the line is connected into a closed system outside containment.

The line up to andincluding the second isolation valve, or the first valve in the case of small lines under 25 mm dia. shall be constructed to the requirements of Class 1 in accordance with CAN3-N285.0.

2.2 Systems Connected to Containment Atmosphere

Each line that connects directly to the containment atmosphere, penetrates the containment structure and is not part of a closed system, shall be provided with two isolation barriers as follows:

a) Two automatic isolation valves in series for those lines which may be open to the containment atmosphere.

b) Two closed isolation valves in series for those lines that are normally closed to the containment atmosphere.

c) One closed isolation valve for lines 50 mm dia. and under which are normally closed to the containment atmosphere and connected to an easily-defined closed system outside containment.

The line up to an including the second valve, or the first valve in the case of (c) above, shall be part of the containment envelope and shall be constructed to the requirements of ASME Code Section III Class 2.

2.3 Closed Systems

Closed systems inside or outside containment which form part of the containment envelope and which meet the requirements of Class 2 and can be continuously monitored for leaks need no further isolation. All other closed systems shall be provided with a single isolation valve on each line penetrating containment. The valves shall be located outside containment as close as practicable to the containment structure. Valves required for process purposes may be used as the isolation valves for these closed loops.

2.4 Small Lines

For ductile piping of small bore, crimping of the pipe is a possible means of providing an isolation barrier instead of a valve. For this to be acceptable the details of its application shall be submitted for approval in each case of its proposed use. In particular, the method of crimping, the location of the part to be crimped and the method of identifying the failed line shall be shown to be satisfactory. In the case of primary heat transport system instrument lines the following extra conditions are required.

(i) Space must be available for crimping the tubes where they penetrate through the containment structure.

(ii) The quality of the lines is to be as good as the rest of the primary heat transport system.

(iii) The Class 1 release limits must be shown not to be exceeded during the period in which the reactor is shut down consequent to the failure, and the crimping is executed.

(iv) Any outflow from the breaks is to be filtered before release to the atmosphere to minimize the escape of fission products.

APPENDIX 2

DEFINITIONS

Note: A CSA Standard on definitions of terms relating to CANDU nuclear power plants is presently under preparation and will replace this appendix when complete. This appendix does not therefore contain a complete list of terms used in the licensing guide, but it is included in the interim to clarify the intent of the requirements.

Closed System means a piping system which penetrates and forms a closed loop or an enclosed volume either inside or outside the containment structure. For closed systems inside containment, the fluid in the system does not directly communicate with either the primary coolant or containment atmosphere.

Containment Appurtenances means the metallic and non-metallic portion of the Containment Envelope which are not part of the Containment Structure.

Containment Envelope means structures and appurtenances which provide a pressure retaining barrier to prevent or limit the escape of any radioactive matter that could be released from the fuel elements, as a result of a failure in a fuel element cooling system.

Containment Structure means the concrete portion and embedded parts of the Containment System.

Fuel Cooling System means any cooling system whose failure has the potential for release of radioactive material in excess of the limits given in reference 1. Included would be the primary heat transport system, a booster fuel cooling system and the fuelling machine cooling system. Excluded would be the irradiated fuel bay cooling system.

Minimum Allowable Performance Standards means the set of operating limits or range of conditions established for components or sub-systems and which define the acceptable states for those components or sub-systems as credited in the safety analyses.

Primary Heat Transport System means that system of components which permit the transfer of heat from the fuel in the reactor to the steam generators or other heat exchangers employing secondary cooling. For purposes of this document, it does not necessarily include auxiliary purification and pressure control sub-systems.

Special Safety System means one of the following systems: shutdown systems, containment system, emergency core cooling system.

Consultative Document / Document de consultation

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

DOCUMENT DE CONSULTATION C-7/RÉV-1

Projet de guide de réglementation

LES SYSTÈMES DE CONFINEMENT DES CENTRALES NUCLÉAIRES CANDU

Publié pour essai pratique dans les centrales nucléaires qui ont reçu un permis de construction après le 1er janvier 1981

Publication: le 21 mai 1982

Canada

Ce document fait partie d'un ensemble de textes de réglementation liés aux prescriptions de sûreté des centrales nucléaires CANDU:

C-7/RÉV-1 "Les Systèmes de confinement des centrales nucléaires CANDU"

C-8/RÉV-1 "Les Systèmes d'arrêt d'urgence des centrales nucléaires CANDU"

C-9/RÉV-1 "Les Systèmes de refroidissement d'urgence des centrales nucléaires CANDU".

Ces documents doivent être utilisés ensemble et sont publiés pour une période d'essai pratique de trois ans. Ils remplacent les Documents d'autorisation 40, 41 et 42. Ces nouveaux documents s'appliquent seulement aux réacteurs qui ont reçu un permis de construction après le 1er janvier 1981.

Le Document de consultation C-8/RÉV-1 pour essai pratique est le second émis par la CCEA au sujet des systèmes d'arrêt d'urgence. Il ne contredit en aucune façon le premier document publié en septembre 1977.

Les trois documents font référence au Document de consultation C-6, "Analyse de sûreté des centrales nucléaires CANDU" (connu auparavant comme le Document d'autorisation 39). Ce document n'a pas encore été révisé et il sera publié de nouveau un peu plus tard.

TEXTES DE RÉGLEMENTATION DE LA CCEA

1. Le choix d'emplacement, la conception, la fabrication, la construction, la mise en service, l'exploitation et le déclassement d'installations nucléaires ou la production, la possession, l'utilisation et l'élimination de substances prescrites, au Canada ou sous contrôle canadien, sont assujettis aux dispositions de la Loi sur le contrôle de l'énergie atomique et de son Règlement d'application, dont l'administration relève de la Commission de contrôle de l'énergie atomique (CCEA).

2. En plus du Règlement susmentionné, la CCEA utilise trois catégories de textes de réglementation. En voici une courte description.

   Conditions générales d'autorisation de permis - ensemble de conditions types figurant dans tous les permis similaires délivrés par la CCEA, à moins de circonstances exceptionnelles;

   Déclarations de principe en matière de réglementation - déclarations laissant clairement entendre que certaines "exigences" qui ne figurent ni dans le Règlement ni dans les conditions des permis sont obligatoires ou que certaines exigences doivent être respectées d'une façon déterminée laissant également entendre que la CCEA se réserve le droit de permettre des écarts ou d'envisager d'autres façons d'en arriver aux mêmes fins, lorsque ces façons semblent convenir; et

   Guides de réglementation - directives ou conseils donnés sur tout aspect de la réglementation assurée par la CCEA mais formulés de façon moins rigoureuse que dans les déclarations de principe.

3. Lors de l'élaboration de ses textes de réglementation, la CCEA en publie d'abord le projet à titre de Document de consultation, afin de connaître les commentaires du secteur nucléaire et du grand public, avant que le projet de texte de réglementation paraisse sous sa forme définitive. Dans certains cas, après l'achèvement de la période réservée aux commentaires, la Commission peut faire mettre le document de consultation à l'essai pratique pour un temps limité. Après cette période d'essai, on demande encore une fois l'opinion du public, avant que le document révisé soit publié sous sa forme définitive.

4. Tout commentaire sur les documents de consultation et toute suggestion à l'égard des nouveaux textes de réglementation ou ceux déjà en vigueur sont les bienvenus: il suffit de les transmettre à la Section du développement des règlements de la CCEA.

5. On peut se procurer des exemplaires des documents de consultation et des textes de réglementation, dans les deux langues officielles, en s'adressant au Bureau d'information publique. Toute demande de renseignements techniques ou d'interprétation des textes devrait être acheminée au Bureau susmentionné.

6. L'adresse de la CCEA est la suivante:

   Commission de contrôle de l'énergie atomique
   C.P. 1046
   Succursale "B"
   OTTAWA (Ontario)
   CANADA K1P 5S9

   Renseignements: (613) 995-5894

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LES SYSTÈMES DE CONFINEMENT
DES CENTRALES NUCLÉAIRES CANDU

1. EXIGENCES FONDAMENTALES

1.1 Tous les réacteurs nucléaires refroidis à l'eau doivent être installés à l'intérieur d'une structure de confinement. Toute la tuyauterie faisant partie du circuit caloporteur primaire, sauf les tuyaux des générateurs de vapeur, doit être complètement à l'intérieur de ladite structure.

1.2 Il doit y avoir une enceinte de confinement continue et clairement délimitée capable de maintenir à une valeur suffisamment faible les rejets de matières radioactives de la centrale pour chacune des défaillances hypothétiques d'un système de refroidissement du combustible spécifiées à la référence 1. Les limites physiques de cette enceinte de confinement doivent être définies pour toutes les situations qui peuvent se présenter lors de l'exploitation ou de l'entretien du réacteur.

1.3 a) Sous réserve de l'alinéa (b) ci-après, tout équipement nécessaire au fonctionnement normal du système de confinement est considéré comme faisant partie de ce système et doit satisfaire à toutes les exigences du présent document. Cet équipement comprend:

i) la structure de confinement et ses installations connexes;
ii) l'équipement nécessaire pour isoler l'enceinte de confinement et pour assurer son intégrité en cas d'accident;
iii) l'équipement nécessaire pour réduire la pression ou libérer des matières radioactives à l'intérieur de l'enceinte de confinement;
iv) l'équipement nécessaire pour limiter les rejets de matières radioactives de l'enceinte de confinement suite à un accident.

b) L'équipement nécessaire pour fournir l'air comprimé, la lubrification, l'électricité ou l'eau de refroidissement pour le fonctionnement du système de confinement est considéré comme matériel de sûreté auxiliaire. Celui-ci doit satisfaire à toutes les exigences posées dans le présent document, à l'exception de l'alinéa 2.7(a) et du paragraphe 2.12.

1.4 Le système de confinement est considéré comme un système spécial de sûreté.

2. EXIGENCES CONCEPTUELLES

2.1 Renseignements sur la conception

a) Le Rapport de sûreté doit indiquer clairement la valeur des paramètres théoriques suivants, relatifs au système de confinement ainsi que la base sur laquelle ils ont été obtenus:

i) la ou les pressions positives de conception;
ii) la ou les pressions négatives, s'il y a lieu;
iii) les fuites maximales admissibles à la pression positive de conception.

b) Le Rapport de sûreté doit également fournir la liste ou la référence des normes de rendement minimal admissible qui doivent être établies pour le système de confinement. Les normes de rendement minimal admissible doivent être aussi spécifiées pour tout équipement important nécessaire au fonctionnement normal du système de confinement.

c) On doit soumettre à la CCEA un rapport qui définit clairement les limites physiques de l'enceinte de confinement, conformément au paragraphe 1.2 ci-dessus.

2.2 Doses maximales en cas d'accident

Le système de confinement doit être en mesure de limiter les rejets de matières radioactives de telle sorte que les doses maximales précisées au Tableau 2 de la référence 1 ne soient pas dépassées.

2.3 Intégrité structurale

a) La pression positive de conception de toute partie du système de confinement ne doit pas être inférieure à la pression maximale qui serait atteinte dans ladite partie suite à n'importe quel des événements hypothétiques indiqués au Tableau I de la référence 1, qui peuvent causer le rejet de matières radioactives dans le système de confinement.

b) La pression négative de conception de toute partie du système de confinement ne doit pas être supérieure à la pression la plus faible pouvant être causée par n'importe quel des événements hypothétiques indiqués au Tableau 1 de la référence 1, qui peuvent causer le rejet de matières radioactives dans le système de confinement.

c) Il doit être démontré que l'intégrité structurale du système de confinement ne serait pas affectée par les événements indiqués à la référence 1.

2.4 Critères relatifs aux fuites

a) Le débit de fuite maximal admissible du système de confinement doit correspondre à la valeur utilisée dans les analyses de sûreté qui démontrent que les limites de doses précisées à la référence 1 ne sont pas dépassées.

b) Un débit de fuite acceptable en cours d'essai, qui représente le débit de fuite maximal admissible lors d'un essai, doit être établi. L'écart entre le débit de fuite maximal admissible indiqué à l'alinéa 2.4(a) et le débit de fuite acceptable en cours d'essai doit recevoir l'approbation de la CCEA avant le début des premiers essais de fuite.

2.5 Normes relatives aux conditions ambiantes

a) Toutes les parties du système de confinement qui doivent fonctionner ou continuer à fonctionner, en réponse aux situations pertinentes spécifiées à la référence 1, doivent être conçues de façon à résister aux conditions les plus rigoureuses qui pourraient exister à l'intérieur du système au moment où le fonctionnement de ces parties est rendu nécesseire ou avant qu'il le soit. Ces conditions peuvent s'étendre aux effets causés par des débris, de la vapeur, de l'eau, de hautes températures, des champs de rayonnement et des pressions différentielles, mais ne s'y limitent pas nécessairement.

Tout équipement du système de confinement qui doit fonctionner ou continuer à fonctionner à la suite d'un accident, doit répondre à certaines exigences de rendement. À cet effet, des essais doivent démontrer que le genre d'équipement visé peut fonctionner dans des conditions semblables à celles qui existeraient lors d'un accident ou après. Si de tels essais sont impraticables, il faudra

effectuer des analyses pour démontrer que cette exigence est satisfaite.

b) Le système de confinement devra être conçu de telle façon que, pour tous les événements pertinents de la classe 1, 2, 3 et 4 spécifiés dans le Tableau I de la référence 1, les effets dynamiques et les forces de jet causés par l'événement, ne résultent pas en une détérioration telle du système de confinement que les exigences 2.2, 2.3 et 2.6 ne soient pas satisfaites.

2.6 Normes relatives à la disponibilité

a) Le système de confinement doit être conçu de façon telle que le temps pendant lequel il est indisponible représente une fraction inférieure à 10^{-3} an par année. Le système est considéré disponible seulement si l'on peut démontrer qu'il satisfait à toutes les normes de rendement minimal admissible telles que définies à l'alinéa 2.1(b).

La disponibilité des systèmes auxiliaires nécessaires au fonctionnement normal du système de confinement doit être proportionnée à celle qui est exigée pour ce dernier. Les calculs de disponibilité établissant que cette condition est remplie doivent être inclus dans le Rapport de sûreté ou fournis comme référence. Ces calculs doivent s'appuyer sur l'expérience directe ou sur des extrapolations raisonnables à partir de celle-ci.

b) La conception du système de confinement et des systèmes de sûreté auxiliaires doit tenir compte des exigences de fiabilité à long terme des composants qui doivent continuer à fonctionner à la suite d'un accident.

c) La conception doit faire appel au principe de redondance de façon telle que la défaillance d'un seul composant du système de confinement ne lui porte pas atteinte au point qu'il ne puisse plus satisfaire aux normes de rendement minimal admissible en cas d'accident.

Dans le cas des composants qui ne sont pas appelés à changer d'état et qui ne dépendent pas de l'équipement de sûreté auxiliaire pour remplir leurs fonctions, la présente exigence ne s'applique pas dans la mesure où ledit composant est conçu, fabriqué, inspecté et entretenu selon des normes acceptables aux yeux de la CCEA.

d) Le fonctionnement normal du système de confinement à la suite d'un accident ne doit pas dépendre de l'électricité provenant du réseau électrique ou des turbo-alternateurs associés à un réacteur inclus dans le même système de confinement.

e) Dans la mesure du possible, tout l'équipement doit être conçu de façon telle que son mode de défaillance le plus probable tende à assurer un état de sûreté.

f) Dans la mesure du possible, la conception doit être telle que tous les essais de maintenance et d'indisponibilité pouvant être nécessités pendant le fonctionnement du réacteur soient effectués:

i) sans affecter l'intégrité de l'enceinte du système de confinement;
ii) sans réduire l'efficacité de l'enceinte au-dessous des normes de rendement minimal admissible.

g) Dans la mesure du possible, la conception doit être telle qu'un composant ayant subi une défaillance puisse être mis dans un état sûr.

h) La conception doit être telle que toutes les interventions nécessaires de l'équipement du système de confinement qui sont déclenchées par l'entremise d'une logique de commande automatique, puissent également l'être manuellement à partir de la salle de commande appropriée.

i) La conception doit être telle que, en cas d'accident, un opérateur ne puisse pas empêcher facilement toute intervention automatique de sûreté.

2.7 Normes de séparation et d'indépendance

a) Le système de confinement doit être physiquement et fonctionnellement indépendant des autres systèmes spéciaux de sûreté. Aucun équipement faisant partie du système de confinement ne peut faire partie d'un autre système spécial de sûreté.

b) Dans la mesure du possible, le système de confinement doit être indépendant de tous les systèmes fonctionnels. Cette exigence ne s'applique pas à

l'équipement mentionné aux alinéas 1.3(a)(iii) et (iv), à condition que ledit équipement fonctionne normalement lorsque le réacteur est en marche. Lorsque cet équipement du système de confinement fait également partie d'un système fonctionnel, il doit être conçu selon la plus exigeante de ses fonctions.

c) Les principes de séparation des canaux des dispositifs redondants associés au système de confinement et leur alimentation, doivent être définis et soumis à l'approbation de la CCEA.

d) Si certains sous-systèmes de confinement sont considérés comme indépendants aux fins des analyses de sûreté, les principes de séparation et d'indépendance de ces sous-systèmes doivent être définis et recevoir l'approbation de la CCEA.

2.8 Normes relatives aux parties pénétrantes

La tuyauterie qui pénètre l'enceinte de confinement doit répondre aux exigences formulées à l'Annexe I.

2.9 Contrôle de l'atmosphère de l'enceinte de confinement

a) Des systèmes doivent être inclus dans la conception de l'enceinte de confinement pour aider au contrôle de la pression interne et pour minimiser les rejets de produits de fission dans l'environnement suite à un accident.

b) Des dispositions doivent être prises pour contrôler la concentration d'hydrogène et d'oxygène à la suite d'un accident et prévenir ainsi toute explosion ou déflagration.

c) La conception de la centrale doit être telle que, à la suite d'un accident, il soit possible d'isoler toute source mécanique d'air comprimé et de gaz non condensables conduisant à l'atmosphère de l'enceinte de confinement, sauf celles qui sont nécessaires au fonctionnement de l'équipement essentiel.

2.10 Normes relatives au blindage

La conception du système de confinement et de l'équipement connexe doit comporter suffisamment de dispositions relatives au blindage pour assurer que

les champs de rayonnement ne seront pas excessifs dans les endroits de la centrale où il pourrait être nécessaire d'avoir accès à la suite d'un accident. Un rapport démontrant l'efficacité du blindage doit être préparé de façon à préciser:

i) l'accident hypothétique susceptible de provoquer la plus importante libération de produits de fission à l'intérieur de l'enceinte;
ii) tous les endroits où il pourrait être nécessaire d'avoir accès à la suite d'un accident, ainsi que la fréquence et la durée des interventions à effectuer; et
iii) les champs maximaux de rayonnement prévus dans les endroits où l'accès peut être nécessaire.

Nota: L'équipement nécessaire aux seules fins du blindage ne doit pas nécessairement être considéré comme faisant partie du système de confinement.

2.11 Normes relatives à la vérification de l'équipement

a) La conception du système de confinement doit être telle que l'état de tout l'équipement important puisse être vérifié à partir de la salle de commande appropriée.

b) La conception du système de confinement doit être telle que toute brèche importante dans l'enceinte de confinement puisse être détectée promptement et sûrement.

2.12 Codes et normes

a) La demande de permis doit identifier tous les points sur lesquels la conception du réacteur n'est pas conforme aux exigences applicables des normes suivantes:

i) ACNOR N287 - série sur "Les Enceintes de confinement en béton des centrales nucléaires CANDU" (Concret Containment Structures for CANDU Nuclear Power Plants) -- série française incomplète, à la traduction par l'ACNOR;

ii) ACNOR CAN3-N285.1 - "Exigences relatives aux systèmes et aux composants sous pression des classes 1, 2 et 3 des centrales nucléaires CANDU" (Requirements for Class 1, 2 and 3 Pressure Retaining Components in CANDU Nuclear Power Plants) — à la traduction par l'ACNOR

Toute dérogation à ces normes doit être approuvée par la CCEA.

b) Une liste de tous code et norme supplémentaires applicables au système de confinement doit être dressée et soumise à l'approbation de la CCEA.

2.13 Exigences en cas de secousses séismiques

La conception de chaque partie du système de confinement, mentionnée dans l'analyse de sûreté menée d'après un séisme hypothétique de référence à l'emplacement de la centrale, doit être telle qu'elle demeure en parfait état de marche à la suite d'un tel événement.

3. EXIGENCES RELATIVES AU FONCTIONNEMENT

3.1 Exigences pour le fonctionnement normal

a) Le système de confinement ne doit pas être mis délibérément en état d'indisponibilité, à moins que toutes les conditions suivantes ne soient satisfaites:

i) tous les réacteurs situés à l'intérieur de l'enceinte de confinement sont dans un état d'arrêt assuré et approuvé par la CCEA;
ii) la température et la pression de tous les systèmes de refroidissement des réacteurs ont été abaissées à un niveau approuvé par la CCEA; et
iii) tout le combustible irradié à l'intérieur de l'enceinte est convenablement refroidi et dispose d'une source de refroidissement auxiliaire.

Le système de confinement n'est considéré disponible que lorsqu'il satisfait à toutes les normes de rendement minimal admissible définies à l'alinéa 2.1(b).

b) Des mesures de rectification en cas d'indisponibilité du système de confinement quand les conditions ci-dessus ne sont pas satisfaites, doivent être préparées et soumises à l'approbation de la CCEA.

c) Si un composant du système de confinement ne fonctionne pas ou si son rendement est réduit en-deçà de ses normes minimales admissibles, le composant et son équipement connexe doivent être mis immédiatement en un état aussi sûr que possible, c'est-à-dire dans un état qui ne réduirait pas la disponibilité du système de confinement, à moins que des mesures aient été approuvées en vertu de l'alinéa (b) ci-dessus.

d) Dans la mesure du possible, la maintenance d'un composant du système de confinement ne doit s'effectuer seulement quand ce composant et son équipement connexe ont été mis dans un état qui ne réduirait pas la disponibilité du système de confinement.

e) Au cas où il faudrait effectuer des travaux de maintenance sur des composants redondants, chaque composant doit être vérifié à fond après les travaux de maintenance et avant le début de tout travail sur un autre composant.

f) La maintenance sera d'une qualité telle que la fiabilité et l'efficacité de l'équipement seront assurées, comme le déclarent le rapport de sûreté et la documentation à l'appui de la demande du permis d'exploitation.

Nota: Les exigences 3.1(c), (d) et (e) ne s'appliquent pas quand le système de confinement est dans un état d'indisponibilité, conformément aux dispositions prises en vertu de l'alinéa 3.1(a).

3.2 Exigences en cas d'accident

Si l'intervention d'un opérateur est nécessaire pour la mise en marche d'une partie du système de confinement, il faut satisfaire à toutes les exigences qui suivent:

i) les instruments du système de confinement doivent être conçus de façon à donner à l'opérateur des indications claires et sans équivoque sur la nécessité de son intervention;

ii) l'intervention de l'opérateur ne doit pas être nécessaire avant un minimum de quinze minutes après ladite indication claire et sans équivoque; et

iii) la marche à suivre pour identifier les interventions nécessaires doit être claire, bien définie et facilement accessible.

4. EXIGENCES RELATIVES AUX ESSAIS

4.1 Essais de mise en service

a) Essais de résistance à la pression

Avant que l'on procède à la première divergence d'un réacteur, des essais de résistance à la pression positive doivent être effectués pour démontrer l'intégrité structurale de toutes les parties de l'enceinte et des systèmes de confinement. Si les spécifications de la conception comportent une pression de conception négative, un essai de résistance à la pression négative doit également être effectué.

Les essais de résistance à la pression positive doivent être effectués à une pression non inférieure à 1,15 fois la pression de conception positive pour chaque partie du confinement.

Les essais de résistance à la pression négative doivent être effectués à une pression n'excédant pas la pression de conception négative.

b) [illegible] de fuite

Avant que l'on procède à la première divergence d'un réacteur, le débit de fuite de son enceinte de confinement doit être mesuré pour démontrer qu'il n'est pas supérieur au débit de fuite acceptable en cours d'essai. Des mesures devront être relevées à différentes pressions jusqu'à la limite incluse de la pression positive de conception de chaque partie du confinement. Les composants du système de confinement devront être autant que possible dans un état identique à celui qui prévaudrait à la suite d'un accident, de façon à démontrer que le débit de fuite approprié n'est pas dépassé dans de telles conditions.

Des essais des parties pénétrantes individuelles, des dispositifs d'isolement ainsi que des sas, doivent être effectués où cela s'avère nécessaire pour obtenir des mesures de référence qu'on pourra comparer aux résultats des essais de débit de fuite stipulés à l'alinéa 4.2(d).

c) Essais de l'équipement du système de confinement

Avant que l'on procède à la première divergence d'un réacteur, des essais doivent être effectués pour démontrer, dans la mesure du possible, que tout l'équipement du système de confinement satisfait aux normes de rendement minimal admissible qui lui correspondent.

d) Essais du câblage

Avant que l'on procède à la première divergence d'un réacteur, des essais doivent être effectués sur tout le câblage électrique associé au système de confinement pour démontrer que toutes les connexions sont conformes aux spécifications.

4.2 Essais et inspections en cours de marche

a) Essais de résistance à la pression

Des essais de résistance à la pression comme ceux décrits à l'alinéa 4.1(a) ci-dessus doivent être répétés après toute modification majeure des limites physiques de l'enceinte de confinement, ou après que le système de confinement a dû subir des différences de pression élevées à la suite d'un accident, ou après que l'enceinte a été soumise à des conditions ambiantes rigoureuses.

b) Essais de débit de fuite

Des essais de débit de fuite doivent être effectués en cours de marche suivant l'une ou l'autre des méthodes suivantes:

i) un essai de débit de fuite doit être effectué à la pleine pression de conception, tous les trois ans, pour démontrer que le débit de fuite mesuré n'excède pas le débit maximal admissible. Si le débit de fuite

mesuré est supérieur au débit de fuite acceptable en cours d'essai, la fréquence de ces essais doit être portée à une fois tous les deux ans, ou

ii) un essai doit être effectué à une fréquence minimale d'une fois tous les deux ans pour démontrer que le débit de fuite n'excède pas le débit de fuite maximal admissible.

Ces essais peuvent être effectués à des pressions réduites ou négatives. Toutefois, si les résultats des essais, après extrapolation pour la pleine pression de conception, indiquent un débit de fuite supérieur au débit de fuite acceptable en cours d'essai, un essai de débit de fuite doit être effectué à la pleine pression de conception pour démontrer que le débit de fuite maximal admissible n'est pas dépassé. Un essai de fuite doit être effectué au moins une fois tous les six ans, quoi qu'il advienne.

En plus des essais réguliers de débit de fuite, un essai de débit de fuite à la pleine pression de conception doit être effectué conjointement avec l'essai de résistance à la pression requis en vertu de l'alinéa 4.2(a).

c) Système de confinement

Dans toute la mesure du possible, des essais pour démontrer que l'équipment du confinement satisfait à ses normes de rendement minimal admissible (cf. alinéa 4.1(c)) doivent être effectués au moins une fois tous les six ans.

d) Essais des parties pénétrantes et des dispositifs d'isolement

Le détenteur de permis doit soumettre à l'approbation de la CCEA un programme d'essais en cours de marche des parties pénétrantes et des dispositifs d'isolement, ainsi que des sas. Pour chaque type de parties pénétrantes, de dispositifs d'isolement et de sas, le programme indiquera la nature et la fréquence des essais et précisera les critères d'approbation relatifs aux fuites.

e) Inspections visuelles

Une inspection visuelle des surfaces extérieures de l'enceinte de confinement, de ses installations connexes et parties pénétrantes doit être effectuée conjointement avec les essais stipulés en 4.2(a), (b) et (d) ci-dessus. L'intérieur de toutes les structures de confinement doit faire l'objet d'une inspection visuelle à une fréquence que doit approuver la CCEA.

f) Rapports soumis

Les résultats de tous les essais et inspections en cours de marche du système de confinement doivent être consignés dans les rapports annuels de la centrale.

4.3 Preuve de disponibilité

a) Tout l'équipement du système de confinement doit être contrôlé ou soumis à des essais à une fréquence suffisante pour démontrer que les normes de disponibilité stipulées à l'alinéa 2.6(a) sont satisfaites.

b) Un rapport sur la disponibilité du système de confinement doit être inclus dans chaque rapport annuel sur l'exploitation de la centrale. Ce rapport doit comporter un compte rendu de la fraction de l'année où il n'a pas été démontré que le système était disponible conformément à l'alinéa 2.6(a). Seules doivent être exclues de ces calculs les périodes au cours desquelles le système d'arrêt d'urgence était mis intentionnellement en état d'indisponibilité, conformément aux exigences du paragraphe 3.1.

RÉFÉRENCE

1. CCEA, "Analyse de sûreté des centrales nucléaires CANDU", Document de consultation C-6, connu auparavant comme Document d'autorisation 39, juin 1980.

ANNEXE I

NORMES RELATIVES AUX PROLONGEMENTS MÉTALLIQUES DE L'ENCEINTE DE CONFINEMENT

1. NORMES

Les systèmes ou les parties des systèmes qui constituent l'enceinte de confinement doivent être construits selon les normes définies dans ASME Boiler and Pressure Vessel Code, Section III, Division I, Subsection NC (Class 2 Components) et Subsection NE (Class MC Components), à l'exception:

a) des systèmes dont les exigences fonctionnelles sont de Classe 1 ou 2, selon les normes ACNOR CAN3-N285.0;

b) des systèmes fermés à l'intérieur de l'enceinte qui peuvent supporter une pression de conception supérieure ou égale à 0,7 MPa (relative) et qui sont utilisés continuellement à une pression égale ou supérieure à 0,35 MPa (relative) partout dans le système, et qui peuvent être surveillés pour les fuites. De tels systèmes peuvent être construits selon les exigences des systèmes fonctionnels, mais ne doivent pas être inférieurs aux exigences non nucléaires de la norme ACNOR B51.

Des systèmes fermés à l'intérieur de l'enceinte de confinement qui ne satisfont pas aux exigences définies en (a) et (b) ci-dessus peuvent être construits selon les exigences de la Classe 3, si l'on peut démontrer à la satisfaction de la CCEA qu'à cause de dimensions réduites ou d'autres facteurs, la conception offre une barrière suffisante.

2. ISOLEMENT

La tuyauterie doit être dotée de barrières d'isolement dont la redondance, la fiabilité et le rendement reflètent l'importance d'isoler les divers types de tuyauteries qui pénètrent dans l'enceinte. Lorsque l'isolement d'un système de tuyauterie est assuré par des vannes, des dispositions doivent être prises pour vérifier périodiquement leur état de fonctionnement et pour s'assurer que la fuite de ces vannes demeure dans des limites acceptables. Pour qu'une vanne d'isolement à fonctionnement manuel soit considérée fermée, il faut qu'elle soit

verrouillée ou qu'il soit possible de vérifier continuellement qu'elle soit fermée.

Les différents types de tuyauteries qui pénètrent dans l'enceinte doivent être munis des dispositifs ci-après, à moins qu'il ne soit démontré que pour une conduite particulière, un autre mode d'isolement est acceptable.

2.1 Systèmes auxiliaires du circuit caloporteur primaire qui pénètrent dans l'enceinte

Toute conduite reliée au système caloporteur primaire et qui pénètre dans l'enceinte de confinement doit être dotée de deux vannes d'isolement disposées en série. Normalement, l'une des vannes doit être à l'intérieur de l'enceinte et l'autre à l'extérieur. Si l'on peut démontrer que la disposition des deux vannes à l'intérieur de l'enceinte offre une barrière équivalente en certains cas, une telle disposition peut être acceptée.

Un clapet peut être utilisé comme l'une des barrières d'isolement mais il doit être placé à l'intérieur de l'enceinte de confinement. Deux clapets disposés en série ne constituent pas une barrière acceptable.

Lorsque les vannes assurent l'isolement du circuit caloporteur au cours de l'exploitation normale de la centrale, elles doivent toutes deux être en position fermée.

Les systèmes directement reliés au circuit caloporteur et pouvant être ouverts au cours de l'exploitation normale de la centrale, doivent être munis des mêmes dispositifs d'isolement que le système normalement fermé, si ce n'est que l'on ne doit pas utiliser de vannes manuelles à l'intérieur de l'enceinte. Il faut qu'une des deux vannes d'isolement au moins soit une vanne automatique (un clapet, par exemple) ou une vanne actionnée depuis la salle de commande.

Pour les conduites dont le diamètre nominal est de 25 mm ou moins, une seule vanne d'isolement fermée, à l'intérieur de l'enceinte peut être utilisée si la conduite en question est reliée à un système fermé à l'extérieur de l'enceinte.

Toute la conduite jusqu'à la deuxième vanne d'isolement incluse, ou jusqu'à la première vanne dans le cas des conduites de moins de 25 mm de diamètre, doit être construite conformément aux exigences de la Classe I de la norme ACNOR CAN3-285.0.

2.2 Systèmes reliés à l'atmosphère de l'enceinte

Toute conduite qui est directement reliée à l'atmosphère de l'enceinte, qui pénètre dans l'enceinte de confinement et qui ne fait pas partie d'un système fermé, doit être munie de deux barrières d'isolement, tel que décrit ci-après:

a) deux vannes d'isolement automatiques disposées en série pour les tuyaux qui peuvent s'ouvrir sur l'atmosphère de l'enceinte;

b) deux vannes d'isolement fermées disposées en série pour les tuyaux qui sont normalement fermés à l'atmosphère de l'enceinte de confinement; ou

c) une vanne d'isolement fermée pour les conduites dont le diamètre est inférieur à 50 mm, qui sont normalement fermées à l'atmosphère de l'enceinte et qui sont reliées à un système fermé aisément identifié à l'extérieur de l'enceinte.

Toute la conduite jusqu'à la deuxième vanne d'isolement incluse, ou jusqu'à la première dans le cas de (c) ci-dessus, fait partie de l'enceinte de confinement et doit être construite selon les exigences formulées par le code ASME Section III Class 2.

2.3 Systèmes fermés

Les systèmes fermés à l'intérieur ou à l'extérieur de l'enceinte, qui font partie de l'enceinte de confinement, qui satisfont aux exigences de la Classe 2 et qui peuvent être vérifiés continuellement pour les fuites, n'ont pas besoin d'autres dispositifs d'isolement. Tous les autres systèmes fermés doivent être munis d'une seule vanne d'isolement pour chaque conduite qui pénètre à l'intérieur de l'enceinte de confinement. Les vannes doivent être situées à l'extérieur de l'enceinte, aussi proches que possible de celle-ci. Les vannes requises à des fins fonctionnelles peuvent être utilisées comme vannes

d'isolement pour ces boucles fermées.

2.4 Petites conduites

Pour la tuyauterie ductile de faible calibre, le fait d'aplatir le tuyau peut tenir lieu de barrière d'isolement à la place d'une vanne. Pour que cette méthode soit acceptable, les détails de son application doivent faire l'objet d'une approbation dans chaque cas. En particulier, il faut montrer que la méthode d'aplatissement, la localisation des parties à aplatir et le mode d'identification des canalisations ayant subi une défaillance, sont satisfaisants. Dans le cas des conduites reliées aux appareils de mesure du circuit caloporteur primaire, les conditions supplémentaires suivantes doivent être remplies:

i) il doit y avoir suffisamment d'espace pour l'aplatissement des tubes à l'endroit où ils pénètrent à travers l'enceinte de confinement;
ii) la qualité des tuyaux doit être aussi bonne que celle du reste du circuit du caloporteur primaire;
iii) les limites de rejet de la Classe I ne doivent pas être dépassées au cours de la période pendant laquelle le réacteur est à l'état d'arrêt à la suite d'une défaillance, et que l'aplatissement est effectué; et
iv) tout rejet provenant d'une rupture doit être filtré avant d'être libéré dans l'atmosphère pour minimiser la [illegible] de produits de fission.

ANNEXE 2

DÉFINITIONS

Nota: L'ACNOR est actuellement en train de préparer un glossaire des termes relatifs aux centrales nucléaires CANDU qui remplacera la présente annexe aussitôt qu'il sera complété. La liste donnée ici ne couvre donc pas tous les termes utilisés dans ce document, mais elle peut être utilisée en attendant pour clarifier le sens des exigences formulées.

Circuit caloporteur primaire désigne l'ensemble de composants qui permet le transfert de la chaleur du combustible dans le réacteur jusqu'aux générateurs de vapeur ou jusqu'à d'autres échangeurs de chaleur utilisant un système de refroidissement secondaire. Dans le cadre du présent document, il n'inclut pas nécessairement les sous-systèmes auxiliaires de purification et de contrôle de la pression.

Enceinte de confinement désigne les structures et les installations connexes qui offrent une barrière de rétention de la pression pour empêcher ou limiter la libération de matières radioactives qui pourraient s'échapper des éléments combustibles à la suite d'une défaillance d'un système de refroidissement du combustible.

Installations connexes désigne les parties métalliques et non métalliques de l'enceinte de confinement qui ne font pas partie de la structure de confinement.

Normes de rendement minimal admissible désigne l'ensemble des limites d'exploitation ou les conditions établies pour les composants ou les sous-systèmes et qui définissent les états acceptables pour ces composants ou sous-systèmes dans les analyses de sûreté.

Structure de confinement désigne la partie en béton et les parties encastrées du système de confinement.

Système de refroidissement du combustible désigne tout système de refroidissement dont une défaillance peut avoir pour conséquence la libération de matières radioactives en quantité supérieure aux limites données dans la

référence 1. Un tel système peut comprendre un circuit caloporteur primaire, un système de refroidissement du combustible de dopage et le système de refroidissement de l'appareil de chargement du combustible. Il faut en exclure le système de refroidissement de la piscine de stockage du combustible irradié.

Système fermé désigne un système de tuyauterie qui pénètre dans l'enceinte et qui forme une boucle fermée ou englobe un volume fermé à l'intérieur ou à l'extérieur de la structure de confinement. Pour les systèmes fermés à l'intérieur de l'enceinte de confinement, le fluide qu'ils contiennent ne communique pas directement avec le fluide caloporteur ou avec l'atmosphère de l'enceinte.

Système spécial de sûreté désigne l'un des systèmes suivants: systèmes d'arrêt, système de confinement, système de refroidissement d'urgence du coeur du réacteur.

Consultative Document / Document de consultation

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

CONSULTATIVE DOCUMENT C-8/REV-1

Proposed Regulatory Guide

REQUIREMENTS FOR SHUTDOWN SYSTEMS FOR CANDU NUCLEAR POWER PLANTS

Issued for trial use on nuclear power stations for which a Construction Approval is issued after January 1, 1981

Publication: May 21, 1982

Canada

This document is part of a set of regulatory documents relating to the safety requirements for CANDU nuclear power plants:

C-7/REV-1 "Requirements for Containment Systems for CANDU Nuclear Power Plants"

C-8/REV-1 "Requirements for Shutdown Systems for CANDU Nuclear Power Plants"

C-9/REV-1 "Requirements for Emergency Core Cooling Systems for CANDU Nuclear Power Plants".

These documents will be used together and they are being issued for a trial use period of three years. They replace AECB Licensing Guides 40, 41 and 42. These new documents apply only to reactors licensed for construction after January 1st, 1981.

Consultative Document C-8/REV-1 for trial use is the second document issued by the AECB on the subject of shutdown system requirements. It does not conflict with the one issued in September, 1977.

All three documents refer to Consultative Document C-6, "Requirements for the Safety Analysis of CANDU Nuclear Power Plants" (formerly known as Licensing Guide No. 39). This document has not yet been revised and it will be re-issued at a later date.

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   K1P 5S9

   Telephone
   General Inquiries: (613) 995-5894

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REQUIREMENTS FOR SHUTDOWN SYSTEMS FOR CANDU NUCLEAR POWER PLANTS

1. BASIC REQUIREMENTS

1.1 All CANDU nuclear power reactors shall be equipped with two independent and diverse shutdown systems each of which must conform to the requirements of this document.

1.2 Each shutdown system shall be considered as a special safety system.

Note:
For postulated events requiring action by a shutdown system, it shall be accepted that at least one of the shutdown systems will operate in accordance with its minimum allowable performance standards as defined pursuant to section 2.1 below.

2. DESIGN REQUIREMENTS

2.1 Minimum Allowable Performance Standards

Minimum allowable performance standards shall be defined for each shutdown system and shall be listed or referenced in the Safety Report. The minimum allowable performance standards shall also be specified for all major equipment necessary for correct operation of each shutdown system.

2.2 Performance Requirements

NOTE: The performance requirements of a shutdown system refer only to its role in shutting the reactor down. For those requirements for which fuel cooling or containment are also necessary, credit for these functions may be taken in demonstrating that such requirements are met, in accordance with the terms of reference 1.

a) For events specified in reference 1 requiring prompt shutdown action, each shutdown system shall be designed such that, acting alone, it can ensure that:

i) the reactor is rendered subcritical and maintained subcritical;
ii) the relevant dose limits specified in reference 1 are not exceeded;
iii) loss of primary heat transport system integrity shall not result from any fuel failure mechanism.

b) For relevant Class 1 and Class 2 events listed in Table 1 of reference 1, each shutdown system shall ensure that fuel in the reactor with no defects prior to the event does not fail as a consequence of the event.

c) For relevant Class 1 and Class 2 events listed in Table 1 of reference 1;

i) one of the shutdown systems shall be capable of limiting the stresses in the primary heat transport system pressure boundary to no greater than the level B service limits defined in ASME Boiler and Pressure Vessel Code Section III;
ii) either shutdown system acting alone shall be capable of limiting the stresses in the primary heat transport system pressure boundary to no greater than the level C service limits defined in ASME Boiler and Pressure Vessel Code Section III.

NOTE: For those events where the initiating failure is in a single fuel channel or its appurtenances, requirements (a) (iii), (b), and (c) do not apply to that channel or the fuel therein.

2.3 Environmental Requirements

a) All parts of each shutdown system which may be required to operate in response to any of the relevant events specified in reference 1 shall be designed to meet all necessary performance requirements while subjected to the most severe environmental conditions which could be present when or before operation of such parts is required. These may include, but are not necessarily limited to, the effects of steam, water, high temperature, and radiation fields.

Qualification is required for all shutdown system equipment which may be required to operate following exposure to any of the above conditions. Qualification shall consist of tests to demonstrate to the extent practicable that the type of equipment can be operated under similar conditions to those which would exist during or following an accident. Where such tests are impracticable, analysis shall be required to demonstrate that this requirement is met.

b) Each shutdown system shall be designed such that, for all relevant class 1, 2, 3, and 4 events specified in table 1 of reference 1, dynamic effects or jet forces caused by the event cannot result in impairment of the shutdown system to an extent that relevant requirements in section 2.2 would not be met.

c) For all relevant class 5 events in table 1 of reference 1, at least one shutdown system shall be designed such that dynamic effects or jet forces caused by the event cannot result in impairment of that shutdown system to an extent that the relevant requirements in section 2.2 would not be met.

2.4 Availability Requirements

a) Each shutdown system shall be designed such that the fraction of time for which it is not available can be demonstrated to be less than 10^{-3} years per year. The system shall be considered available only if it can be demonstrated to meet all the minimum allowable performance standards as defined in accordance with section 2.1 above, and if all parameters required in accordance with section 2.6 are available.

The availability of safety support systems necessary for actuation of a shutdown system shall be commensurate with the availability requirements of the shutdown system.

Availability calculations to demonstrate that this requirement can be met shall be included or referenced in the Safety Report. Such calculations shall be based

on direct experience or reasonable extrapolations therefrom.

b) The design shall have sufficient redundancy that no failure of a single component of a shutdown system can result in impairment of that system to an extent that it will not meet its minimum allowable performance standards.

If a component, which is not required to change state and which does not depend on safety support equipment in order to perform its design function, is designed, manufactured, inspected and maintained to standards acceptable to the AECB, this requirement does not apply.

c) Actuation of a shutdown system shall not be dependent on any electrical power supply unless the electrical supply is designed to be continuously available during normal operation and anticipated operational transients.

d) As far as practicable, all equipment shall be designed such that its most probable failure modes will not result in a reduction in safety.

e) As far as practicable the design shall be such that all maintenance and availability testing which may be required during reactor operation can be carried out without a reduction in the effectiveness of each shutdown system below the minimum allowable performance standards.

f) As far as practicable the design shall be such that a failed component can be put in a safe state or alternatively, such that the failure can be converted to a safe failure in some other manner.

g) The design shall be such that each shutdown system can be actuated manually from the main control room. It shall also be possible to manually initiate shutdown system action for each shutdown system from a location remote from the main control room.

h) The design shall be such that it is not readily possible for an operator to prevent a safe automatic action from taking place.

2.5 Separation and Independence Requirements

a) The shutdown systems shall be of diverse designs and shall be physically and operationally independent from each other, from process systems and from other special safety systems.

b) Principles used to prevent failures in more than one shutdown system as a result of the use of common equipment, procedures, or personnel in design, construction, commissioning, or operation, shall be prepared and shall require approval by the AECB.

c) Principles for separation of redundant instrument channels and the services to them, associated with shutdown systems, shall be prepared and shall require approval by the AECB.

d) The effectiveness of a shutdown system in shutting the reactor down in accordance with section 2.2 shall not be dependent on the correct functioning of a process system or other special safety system.

e) The design shall be such that normal functioning of process systems cannot reduce the effectiveness of a shutdown system such that the requirements of section 2.2 would not be met.

2.6 Actuation Instrumentation Requirements

For each event specified in reference 1 for which action by a shutdown system is required, there shall be at least two diverse parameters on each shutdown system, each designed to detect the need for and automatically initiate shutdown action such that all requirements for effectiveness are met. Exceptions to this requirement may be permitted only if it can be shown to the satisfaction of the AECB that incorporation of a second parameter for protection against a postulated event is

a) impracticable or
b) would be detrimental to safety.

Manual actuation may be considered acceptable in place of a second automatic parameter provided it is shown to the satisfaction of the AECB that adequate unambiguous information and sufficient time are available to alert an operator and to permit him to assess the need for intervention and to actuate the shutdown system manually.

2.7 Status Monitoring Requirements

a) The design of a shutdown system shall be such that the status of all important equipment required for its actuation can be monitored or inferred from the appropriate control room.

b) As far as practicable all failures of shutdown system components which may interfere with proper functioning of the shutdown system shall be annunciated in the control room.

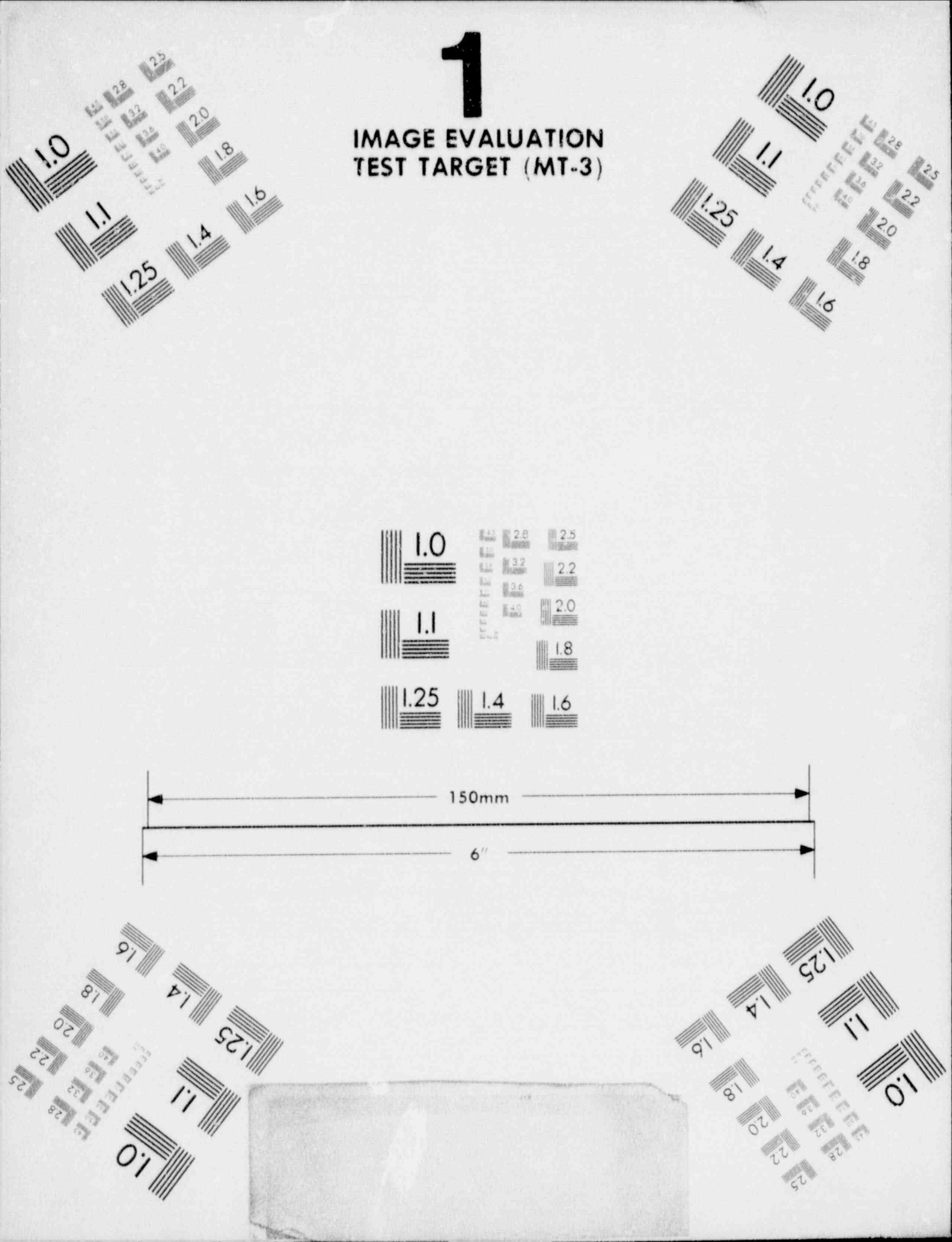
2.8 Codes and Standards

a) The application for a licence shall identify any aspects of the design which fail to comply with the applicable requirements of the following codes and standards

i) CSA N290.1 "Requirements for the Shutdown Systems of CANDU Nuclear Power Plants".

ii) CAN 3-N285.1 "Requirements for Class 1, 2 and 3 Pressure Retaining Systems and Components in CANDU Nuclear Power Plants".

All exceptions to the requirements of these standards shall require approval by the AECB.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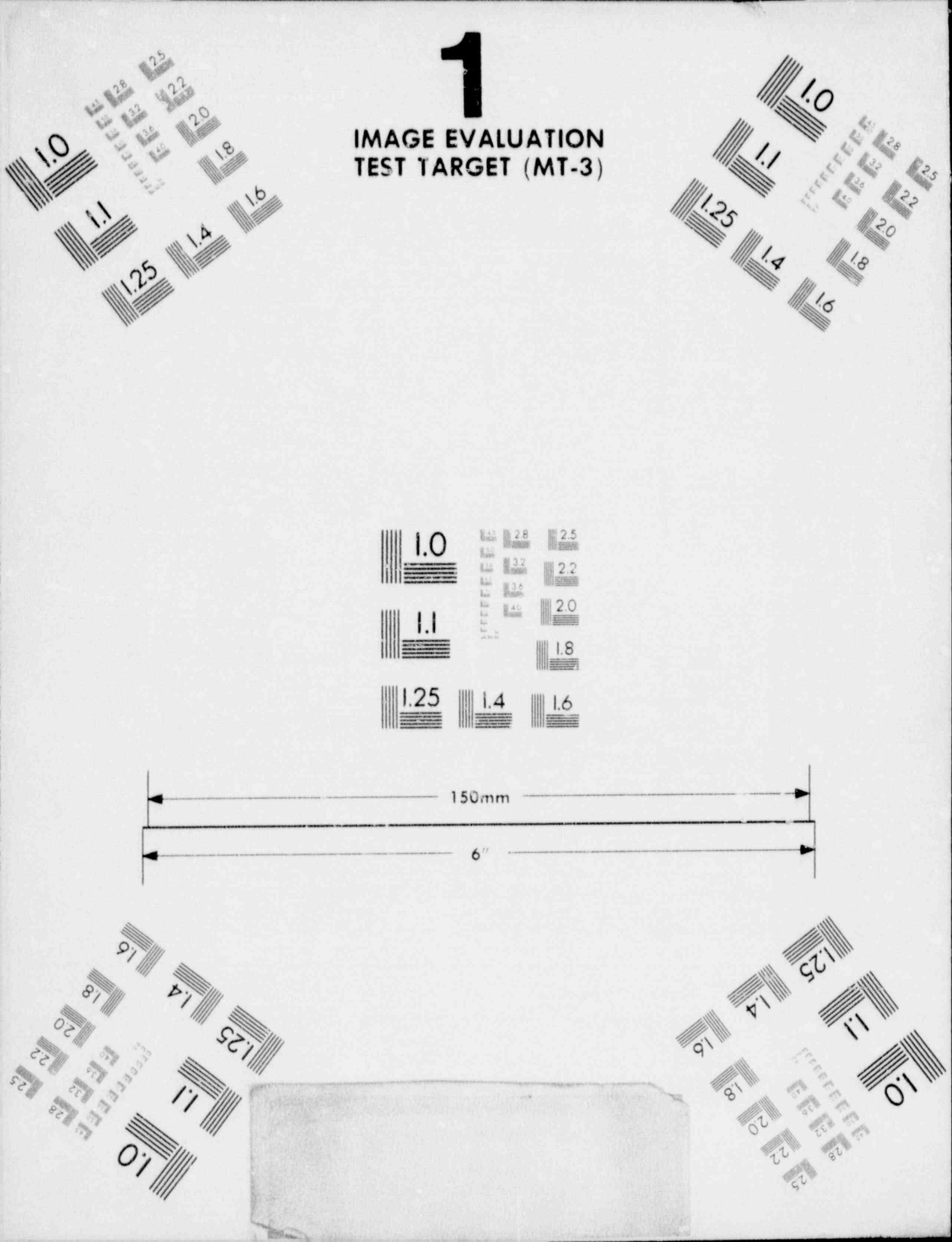
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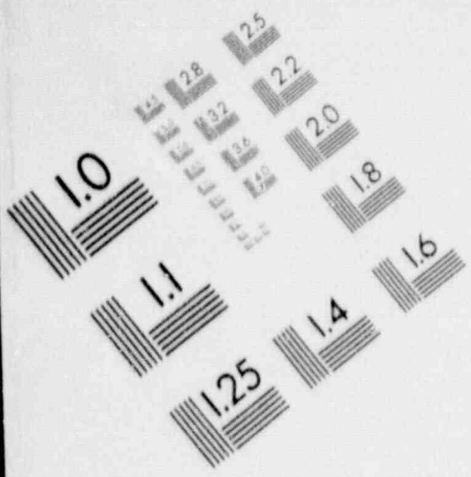

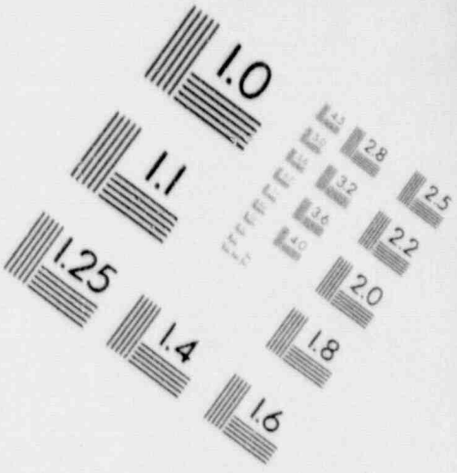

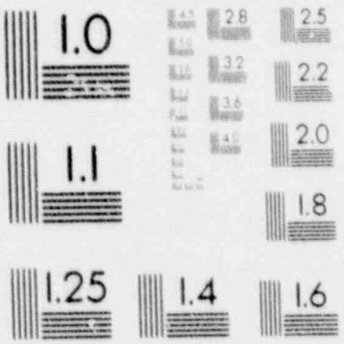

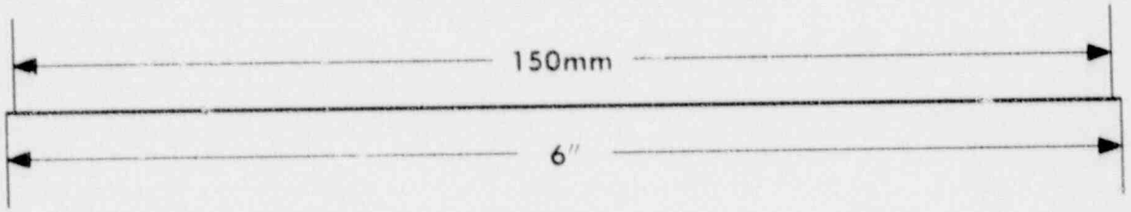

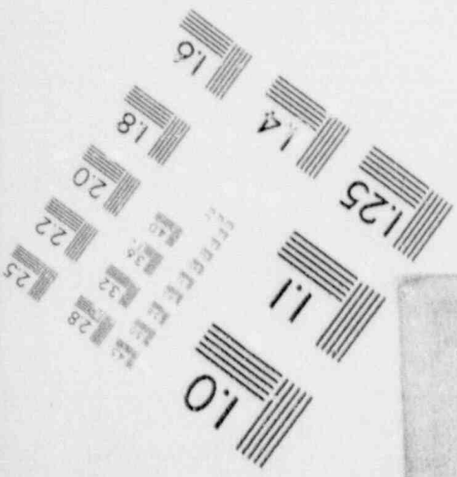

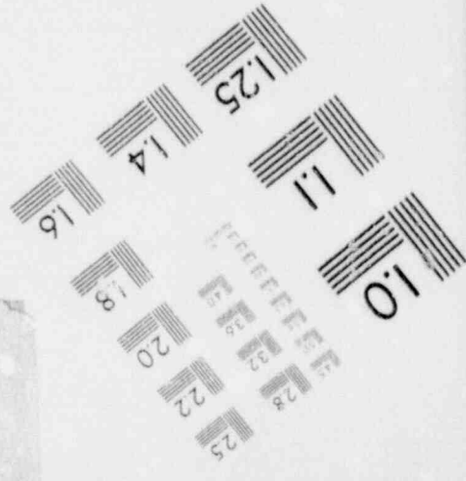

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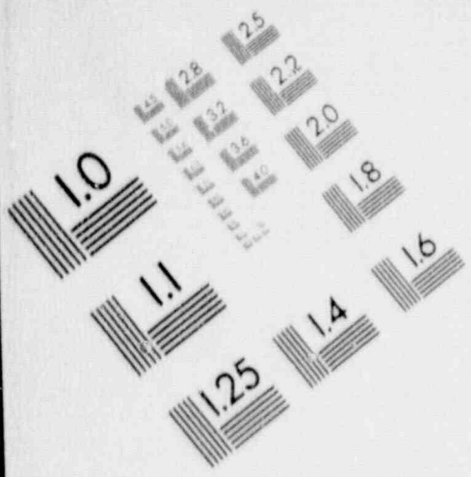
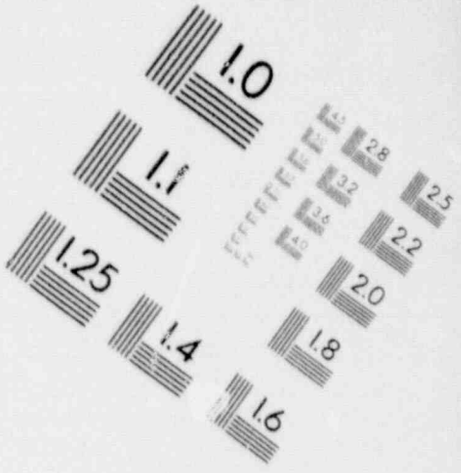
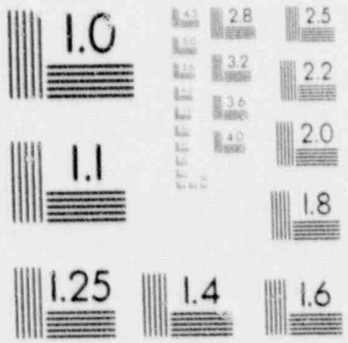
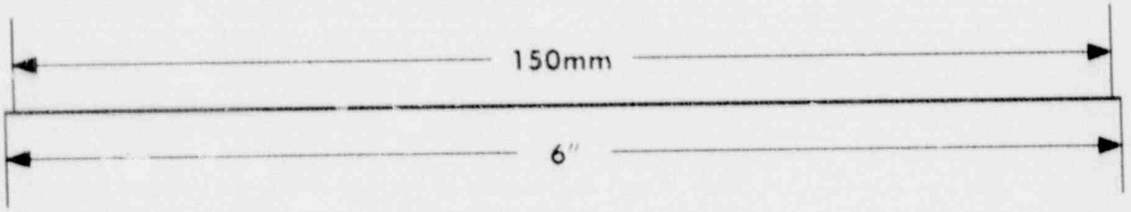
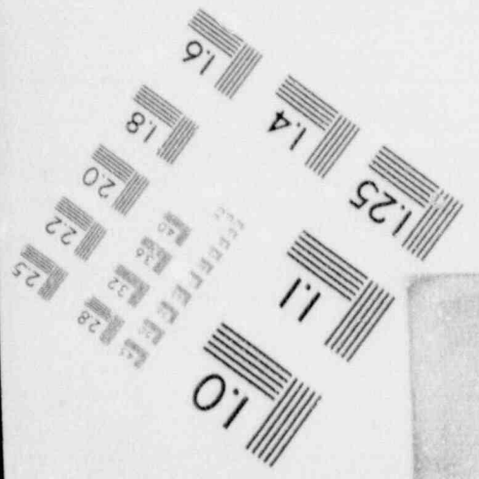
IMAGE EVALUATION TEST TARGET (MT-3)

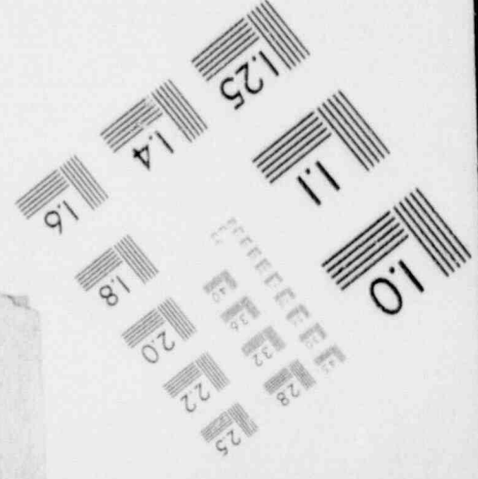












b) A list of any additional codes and standards to be applied to the shutdown systems and the extent of their application, shall be prepared and shall require approval by the AECB.

2.9 Seismic Requirements

Each shutdown system shall be designed such that it can perform its necessary functions as defined in Section 2.2 during and following the design basis seismic ground motion for the site. The design shall be such that it possible to manually actuate each shutdown system from a seismically-qualified area following a design basis seismic event.

3. OPERATING REQUIREMENTS

3.1 Requirements in Normal Operations

a) Procedures for putting the reactor in a guaranteed shutdown state shall be prepared and shall require approval by the AECB. Such procedures shall specify at least two independent means of ensuring that the reactor remains subcritical.

b) A shutdown system shall not be intentionally made unavailable at any time when there is fuel in the reactor except when the reactor is an approved guaranteed shutdown state.

c) When the reactor is in an approved guaranteed shutdown state, not less than one shutdown system shall be available at all times when this is practicable.

d) Requirements b), and c) do not apply to the period immediately after a shutdown system has operated. In the event that a shutdown system operates, it shall be returned to the poised state as soon as practicable without causing criticality, or the reactor shall be placed in an approved guaranteed shutdown state.

e) Procedures for taking corrective action, in the event that a shutdown system is found to be impaired when the reactor is not in a guaranteed shutdown state, shall be prepared and shall require approval by the AECB.

f) In the event that any component of a shutdown system is found to be inoperable, or impaired below its minimum allowable performance standards, that component and its associated channel shall immediately be put in a safe condition i.e. a state which would not reduce the shutdown system availability, except as otherwise approved in accordance with (e) above.

g) As far as practicable, maintenance on a shutdown system component shall be carried out only when that component and its associated channel have been put in a state which would not reduce the availability of the shutdown system.

h) Maintenance of shutdown system components shall be carried out only on one channel at a time and with the affected channel placed in a safe state.

i) When maintenance on a channel is completed, it shall be thoroughly tested to demonstrate to the extent practicable that the equipment associated with that channel is capable of functioning in accordance with its design requirements. This shall be done prior to returning the channel to its poised state.

j) Maintenance on instrumentation associated with the measurement of neutron power shall be carried out as far as practicable when the reactor is at a power level at which the instrumentation gives sensible indications.

k) The standard of maintenance shall be such as to assure the reliability and effectiveness of all equipment as claimed in the Safety Report and other documentation in support of an Operating Licence.

NOTE: Requirements (f), (g), and (h) apply only when the shutdown system is required to be available as specified in requirements (b) and (c).

3.2 Requirements for Accident Conditions

Operator action shall not be necessary for any function associated with shutting down the reactor in accident conditions except as approved in accordance with section 2.6.

4. TESTING REQUIREMENTS

4.1 Commissioning Tests

a) Performance Tests

Commissioning tests shall be done to demonstrate as far as practicable that all design requirements of each shutdown system are met. Those tests which are possible when the reactor is subcritical shall be done prior to first criticality, and with the reactor in an approved guaranteed shutdown state. Procedures for performing commissioning tests when the reactor is critical shall be prepared and shall require approval by the AECB.

b) Wiring Tests

Prior to first criticality of any reactor, tests shall be carried out on all electrical wiring associated with a shutdown system to demonstrate that all connections are in accordance with the design.

4.2 In-Service Tests

Complete operational tests to demonstrate the effectiveness of each shutdown system shall be carried out at least once every two years.

4.3 Availability Tests

a) All shutdown system equipment shall be monitored or tested at a frequency which is adequate to demonstrate compliance with the availability requirement specified in section 2.4(a).

b) A report on the availability of each shutdown system shall be included in each annual report on operation of the station. This report shall include a statement of the total fraction of time in the year during which a shutdown system was not demonstrated to be available, as defined in section 2.4(a).

Only periods during which a shutdown system is intentionally made unavailable, in accordance with the conditions of section 3.1, or is being repoised subsequent to actuation, shall be excluded from such calculations.

REFERENCE:

1) AECB, "Requirements for the Safety Analysis of CANDU Nuclear Power Plants", Consultative Document C-6 (formerly known as Licensing Document 39), June, 1980.

APPENDIX 1

DEFINITIONS

Note: A CSA Standard on definitions of terms relating to CANDU nuclear power plants is presently under preparation and will replace this appendix when complete. This appendix does not therefore contain a complete list of terms used in the licensing guide, but it is included in the interim to clarify the intent.

Minimum Allowable Performance Standards means the set of operating limits or range of conditions established for components or sub-systems and which define the acceptable states for those components or sub-systems as credited in the safety analyses.

Primary Heat Transport System means that system of components which permit the transfer of heat from the fuel in the reactor to the steam generators or other heat exchangers employing secondary cooling. For purposes of this document, it does not necessarily include auxiliary purification and pressure control sub systems.

Special Safety System means one of the following systems: shutdown systems, containment system, emergency core cooling system.

Fuel Failure means any rupture of the fuel sheath such that fission products may be released.

Consultative Document / Document de consultation

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

DOCUMENT DE CONSULTATION C-8/RÉV-1

Projet de guide de réglementation

LES SYSTÈMES D'ARRÊT D'URGENCE
DES CENTRALES NUCLÉAIRES CANDU

Publié pour essai pratique dans les centrales nucléaires qui ont reçu un permis de construction après le 1er janvier 1981

Publication: le 21 mai 1982

Canada

Ce document fait partie d'un ensemble de textes de réglementation liés aux prescriptions de sûreté des centrales nucléaires CANDU:

C-7/RÉV-1 "Les Systèmes de confinement des centrales nucléaires CANDU"

C-8/RÉV-1 "Les Systèmes d'arrêt d'urgence des centrales nucléaires CANDU"

C-9/RÉV-1 "Les Systèmes de refroidissement d'urgence des centrales nucléaires CANDU".

Ces documents doivent être utilisés ensemble et sont publiés pour une période d'essai pratique de trois ans. Ils remplacent les Documents d'autorisation 40, 41 et 42. Ces nouveaux documents s'appliquent seulement aux réacteurs qui ont reçu un permis de construction après le 1er janvier 1981.

Le Document de consultation C-8/RÉV-1 pour essai pratique est le second émis par la CCEA au sujet des systèmes d'arrêt d'urgence. Il ne contredit en aucune façon le premier document publié en septembre 1977.

Les trois documents font référence au Document de consultation C-6, "Analyse de sûreté des centrales nucléaires CANDU" (connu auparavant comme le Document d'autorisation 39). Ce document n'a pas encore été révisé et il sera publié de nouveau un peu plus tard.

TEXTES DE RÉGLEMENTATION DE LA CCEA

1. Le choix d'emplacement, la conception, la fabrication, la construction, la mise en service, l'exploitation et le déclassement d'installations nucléaires ou la production, la possession, l'utilisation et l'élimination de substances prescrites, au Canada ou sous contrôle canadien, sont assujettis aux dispositions de la Loi sur le contrôle de l'énergie atomique et de son Règlement d'application, dont l'administration relève de la Commission de contrôle de l'énergie atomique (CCEA).

2. En plus du Règlement susmentionné, la CCEA utilise trois catégories de textes de réglementation. En voici une courte description.

   Conditions générales d'autorisation de permis - ensemble de conditions types figurant dans tous les permis similaires délivrés par la CCEA, à moins de circonstances exceptionnelles;

   Déclarations de principe en matière de réglementation - déclarations laissant clairement entendre que certaines "exigences" qui ne figurent ni dans le Règlement ni dans les conditions des permis sont obligatoires ou que certaines exigences doivent être respectées d'une façon déterminée laissant également entendre que la CCEA se réserve le droit de permettre des écarts ou d'envisager d'autres façons d'en arriver aux mêmes fins, lorsque ces façons semblent convenir; et

   Guides de réglementation - directives ou conseils donnés sur tout aspect de la réglementation assurée par la CCEA mais formulés de façon moins rigoureuse que dans les déclarations de principe.

3. Lors de l'élaboration de ses textes de réglementation, la CCEA en publie d'abord le projet à titre de Document de consultation, afin de connaître les commentaires du secteur nucléaire et du grand public, avant que le projet de texte de réglementation paraisse sous sa forme définitive. Dans certains cas, après l'achèvement de la période réservée aux commentaires, la Commission peut faire mettre le document de consultation à l'essai pratique pour un temps limité. Après cette période d'essai, on demande encore une fois l'opinion du public, avant que le document révisé soit publié sous sa forme définitive.

4. Tout commentaire sur les documents de consultation et toute suggestion à l'égard des nouveaux textes de réglementation ou ceux déjà en vigueur sont les bienvenus; il suffit de les transmettre à la Section du développement des règlements de la CCEA.

5. On peut se procurer des exemplaires des documents de consultation et des textes de réglementation, dans les deux langues officielles, en s'adressant au Bureau d'information publique. Toute demande de renseignements techniques ou d'interprétation des textes devrait être acheminée au Bureau susmentionné.

6. L'adresse de la CCEA est la suivante:

   Commission de contrôle de l'énergie atomique
   C.P. 1046
   Succursale "B"
   OTTAWA (Ontario)
   CANADA K1P 5S9

   Renseignements: (613) 995-5894

TABLE DES MATIÈRES

LES SYSTÈMES D'ARRÊT D'URGENCE DES CENTRALES NUCLÉAIRES CANDU

1. EXIGENCES FONDAMENTALES

1.1 Tous les réacteurs nucléaires CANDU doivent être dotés de deux systèmes d'arrêt d'urgence différents et indépendants, et chacun de ces systèmes doit remplir les exigences du présent document.

1.2 Chaque système d'arrêt d'urgence doit être considéré comme un système spécial de sûreté.

Nota: Dans le cas d'accidents hypothétiques exigeant l'intervention d'un système d'arrêt d'urgence, il est reconnu qu'au moins un des systèmes d'arrêt d'urgence fonctionnera conformément aux normes de rendement minimal admissible telles que définies au paragraphe 2.1 ci-dessous.

2. EXIGENCES CONCEPTUELLES

2.1 Normes de rendement minimal admissible

Des normes de rendement minimal admissible doivent être établies pour chaque système d'arrêt d'urgence et être citées ou faire l'objet d'un renvoi dans le rapport de sûreté. Les normes de rendement minimal admissible de tout l'équipement important nécessaire pour assurer le bon fonctionnement de chaque système d'arrêt d'urgence doivent aussi être spécifiées.

2.2 Exigences relatives au rendement

Nota: Les exigences en matière de rendement d'un système d'arrêt d'urgence n'ont trait qu'à son rôle d'arrêter le réacteur. Pour les exigences qui nécessitent également le refroidissement du combustible ou le confinement, on pourra tenir compte de ces fonctions lorsqu'on voudra démontrer que ces exigences sont remplies, conformément aux termes de la référence 1.

a) Dans les cas précisés à la référence 1 qui nécessitent un arrêt rapide du réacteur, chaque système d'arrêt d'urgence doit être conçu de façon à assurer à lui seul:

i) que le réacteur est ramené à un niveau sous-critique et y est maintenu;
ii) que les limites pertinentes de la dose de rayonnement n'excèdent pas les niveaux indiqués à la référence 1;
iii) qu'aucune atteinte à l'intégrité du circuit du caloporteur primaire ne résulte d'une défaillance du combustible.

b) En ce qui concerne les événements pertinents des Classes 1 et 2 du Tableau I de la référence 1, chaque système d'arrêt d'urgence doit faire en sorte que tout assemblage de combustible intact dans le réacteur avant l'événement ne fasse pas l'objet d'une défaillance à cause de l'événement.

c) En ce qui concerne les événements pertinents des classes 1 et 2 du tableau I de la référence 1:

i) l'un des systèmes d'arrêt d'urgence doit limiter les contraintes exercées sur l'enveloppe du circuit caloporteur primaire à une valeur égale ou inférieure au niveau B, tel que défini à la section III de ASME Boiler and Pressure Vessel Code;
ii) chacun des systèmes d'arrêt d'urgence doit être capable de limiter à lui seul les contraintes exercées sur l'enveloppe du circuit caloporteur primaire à une valeur égale ou inférieure au niveau C, tel que défini à la section III de ASME Boiler and Pressure Vessel Code.

Nota: Si la défaillance initiale est dans un seul canal de combustible ou ses installations connexes, les exigences (a)(iii), (b) et (c) ne s'appliquent pas à ce canal ou au combustible qu'il contient.

2.3 Exigences relatives aux conditions ambiantes

a) Toutes les parties de chaque système d'arrêt d'urgence qui pourraient être actionnées à la suite d'un des événements indiqués à la référence 1 doivent être conçues de façon à pouvoir remplir toutes les exigences de rendement pertinentes

lorsqu'elles sont soumises aux conditions les plus rigoureuses qui pourraient exister au moment où le fonctionnement de ces parties est rendu nécessaire ou avant qu'il le soit. Ces conditions peuvent comprendre, sans toutefois s'y limiter, les effets de la vapeur, de l'eau, des températures élevées et des champs de rayonnement. Des essais doivent démontrer que tout l'équipement d'un système d'arrêt d'urgence qui doit continuer de fonctionner après un accident, peut en effet fonctionner dans des conditions semblables à celles qui existeraient lors d'un tel accident ou après. Dans le cas où les essais seraient impraticables, cette démonstration doit se faire à partir d'analyses.

b) Chaque système d'arrêt d'urgence doit être conçu de façon que, dans tous les cas d'événements pertinents de la classe 1, 2, 3 et 4 spécifiés au tableau I de la référence 1, les effets dynamiques et les forces de jet occasionnés par l'événement ne résultent pas en une détérioration telle du système d'arrêt qu'il serait impossible de respecter les exigences pertinentes du paragraphe 2.2.

c) Au moins un des deux systèmes d'arrêt d'urgence doit être conçu de façon que, dans tous les cas d'événements pertinents de la classe 5 spécifiés au tableau I de la référence 1, les effets dynamiques ou les forces de jet occasionnés par l'événement ne résultent pas en une détérioration telle du système d'arrêt d'urgence qu'il serait impossible de respecter les exigences pertinentes du paragraphe 2.2.

2.4 Exigences relatives à la disponibilité

a) Chaque système d'arrêt d'urgence doit être conçu pour qu'il puisse être démontré que la fraction de temps d'indisponibilité est inférieure à 10^{-3} an par année. On considérera le système disponible seulement si on peut démontrer qu'il répond à toutes les normes de rendement minimal admissible définies en vertu du paragraphe 2.1 et si tous les paramètres exigés conformément au paragraphe 2.6 sont disponibles.

La disponibilité des systèmes auxiliaires de sûreté nécessaires au déclenchement d'un système d'arrêt d'urgence doit être compatible avec les exigences de disponibilité du système d'arrêt d'urgence.

On doit inclure dans le rapport de sûreté les calculs de disponibilité destinés à démontrer que ces exigences peuvent être respectées, ou y faire un renvoi. Ces calculs seront fondés sur l'expérience directe ou sur des extrapolations raisonnables.

b) Il faut prévoir, dans la conception, un nombre suffisant de dispositifs redondants afin d'assurer que la défaillance d'un seul composant ne compromette pas le fonctionnement du système à un point tel qu'il ne puisse plus répondre aux normes de rendement minimal admissible.

Cette exigence ne s'applique pas aux composants qui n'ont pas à changer d'état et dont le fonctionnement normal ne dépend pas de l'équipement auxiliaire de sûreté, à la condition qu'ils soient conçus, manufacturés, inspectés et entretenus selon des normes acceptables aux yeux de la CCEA.

c) Le déclenchement d'un système d'arrêt d'urgence ne doit pas dépendre d'une source d'alimentation en électricité à moins que cette source ne soit conçue pour être constamment disponible au cours de l'exploitation normale et au cours de régimes transitoires prévus pendant l'exploitation.

d) Dans la mesure du possible, tout l'équipement doit être conçu pour que les types les plus probables de défaillances ne résultent pas en une diminution de la sûreté.

e) Dans la mesure du possible, la conception sera telle que toute maintenance et tout essai de fiabilité qui pourront être effectués au cours de l'exploitation du réacteur, ne réduiront pas l'efficacité de chaque système d'arrêt d'urgence en-deçà des normes de rendement minimal admissible.

f) Dans la mesure du possible, la conception doit être telle que tout composant qui fait défaut puisse être mis dans un état de sûreté, ou qu'il soit possible d'atteindre l'état de sûreté par un autre moyen.

g) La conception doit être telle que chaque système d'arrêt d'urgence puisse être déclenché manuellement de la salle de commande principale. Il faut également que chaque système d'arrêt d'urgence puisse être déclenché manuellement d'un autre endroit éloigné de la salle de commande principale.

h) La conception doit être telle qu'un opérateur ne puisse pas empêcher facilement toute intervention automatique de sûreté.

2.5 Exigences de séparation et d'indépendance

a) Les systèmes d'arrêt d'urgence doivent être de conception différente, ainsi que physiquement et fonctionnellement indépendants l'un de l'autre, des systèmes fonctionnels et des autres systèmes spéciaux de sûreté.

b) Les principes utilisés dans la conception, la construction, la mise en service et l'exploitation pour empêcher des défaillances dans plus d'un système d'arrêt d'urgence en raison de l'utilisation du même équipement, des mêmes procédures, ou encore du même personnel, doivent être rédigés et soumis à l'approbation de la CCEA.

c) Les principes de séparation des canaux d'instrumentation redondants et des services connexes associés aux systèmes doivent être rédigés et soumis à l'approbation de la CCEA.

d) L'efficacité d'un système d'arrêt d'urgence, telle que définie au paragraphe 2.2, ne doit pas dépendre du bon fonctionnement d'un système fonctionnel ou d'un autre système spécial de sûreté.

e) La conception doit être telle que le fonctionnement normal des systèmes fonctionnels ne puisse réduire l'efficacité d'un système d'arrêt d'urgence à un niveau qui ne répondrait pas à l'exigence 2.2.

2.6 Exigences relatives aux mécanismes d'intervention

Pour chacun des événements précisés à la référence 1 et nécessitant l'intervention d'un système d'arrêt d'urgence, il faut compter au moins deux paramètres différents pour chaque système. Ces paramètres doivent être conçus

de façon à déterminer la nécessité de l'arrêt et à déclencher automatiquement un système d'arrêt d'urgence afin de satisfaire à toutes les exigences en matière d'efficacité. Des exceptions à cette règle peuvent être autorisées s'il est prouvé, à la satisfaction de la CCEA, que l'intégration d'un deuxième paramètre de protection en cas d'événement hypothétique:

a) est impraticable, ou
b) nuirait à la sûreté.

On pourra considérer le déclenchement manuel comme acceptable à la place d'un second paramètre automatique, s'il est prouvé, à la satisfaction de la CCEA, que l'opérateur bénéficie de renseignements appropriés non équivoques et de suffisamment de temps pour prendre connaissance de la situation, évaluer le besoin d'intervention et déclencher manuellement le système d'arrêt.

2.7 Exigences relatives à la vérification de l'équipement

a) Un système d'arrêt d'urgence doit être conçu de telle sorte que tout l'équipement important nécessaire à son fonctionnement puisse être vérifié à partir de la salle de commande appropriée.

b) Dans la mesure du possible, toutes les défaillances de composants d'un système d'arrêt d'urgence qui peuvent nuire à son fonctionnement doivent être signalées dans la salle de commande.

2.8 Codes et normes

a) Toute demande de permis doit indiquer quels aspects de la conception ne répondent pas aux exigences des codes et normes ci-dessous:

i) norme N290.1 de l'ACNOR "Exigences relatives aux systèmes d'arrêt des centrales nucléaires CANDU" (Requirements for the Shutdown Systems of CANDU Nuclear Power Plants) - à la traduction par l'ACNOR;
ii) norme CAN3-285.1 de l'ACNOR, "Exigences relatives aux systèmes et aux composants sous pression des classes 1, 2 et 3 des centrales nucléaires CANDU" (Requirements for Class 1, 2 and 3 Pressure Retaining Components in CANDU Nuclear Power Plants) - à la traduction par l'ACNOR.

Toute dérogation à ces normes doit être approuvée par la CCEA.

b) Une liste de tout code et norme supplémentaire applicable aux systèmes d'arrêt d'urgence, y compris leur champ d'application, doit être dressée et soumise à l'approbation de la CCEA.

2.9 Exigences en cas de secousses séismiques

Chaque système d'arrêt d'urgence doit être conçu de façon à remplir ses fonctions essentielles, telles que définies au paragraphe 2.2, pendant et après un séisme hypothétique de référence à l'emplacement de la centrale. Le système doit être conçu de façon à pouvoir être déclenché manuellement d'une zone à l'épreuve des séismes après un séisme hypothétique de référence.

3. EXIGENCES RELATIVES AU FONCTIONNEMENT

3.1 Exigences pour le fonctionnement normal

a) Les méthodes de mise en état d'arrêt assuré du réacteur doivent être rédigées et soumises à l'approbation de la CCEA. Ces méthodes doivent comprendre au moins deux moyens indépendants de s'assurer que le réacteur demeure sous-critique.

b) Un système d'arrêt d'urgence ne doit jamais être mis délibérément en état d'indisponibilité lorsque du combustible se trouve dans le réacteur, sauf quand le réacteur est en état d'arrêt assuré, approuvé par la CCEA.

c) Lorsque le réacteur se trouve dans un état d'arrêt assuré, au moins un système d'arrêt d'urgence doit, dans la mesure du possible, être disponible en tout temps.

d) Les exigences (b) et (c) ne s'appliquent pas à la période qui suit immédiatement le déclenchement d'un système d'arrêt d'urgence. À la suite d'un déclenchement, le système d'arrêt d'urgence doit être réarmé aussitôt que possible sans provoquer de divergence, ou bien, le réacteur doit être mis à l'état d'arrêt assuré.

e) Les mesures correctives prévues en cas de défaillance d'un système d'arrêt d'urgence au cours d'une période pendant laquelle le réacteur n'est pas dans un état d'arrêt assuré, doivent être rédigées et soumises à l'approbation de la CCEA.

f) Si un composant quelconque d'un système d'arrêt d'urgence ne fonctionne pas ou si le rendement de ce composant est inférieur aux normes de rendement minimal admissible, ce composant et le canal connexe doivent immédiatement être mis dans un état sûr, c'est-à-dire en état tel que la disponibilité du système d'arrêt d'urgence n'est pas réduite, à moins d'indications contraires approuvées conformément aux dispositions de l'exigence (e) ci-dessus.

g) Dans la mesure du possible, l'entretien d'un composant d'un système d'arrêt d'urgence ne doit être effectué que lorsque ledit composant et canal connexe ont été mis dans un état tel que la disponibilité du système d'arrêt d'urgence n'est pas réduite.

h) L'entretien des composants d'un système d'arrêt d'urgence ne doit viser qu'un seul canal à la fois et ledit canal doit être dans un état sûr.

i) Une fois l'entretien du canal terminé, celui-ci doit faire l'objet d'essais complets afin de démontrer, dans la mesure du possible, que son équipement connexe peut fonctionner conformément à ses exigences de conception. Les essais doivent être effectués avant de réarmer le canal.

j) La maintenance des instruments associés au système de mesure de la puissance neutronique doit, dans la mesure du possible, être exécutée lorsque le réacteur atteint un niveau de puissance permettant aux instruments de donner des indications valables.

k) La maintenance sera d'une qualité telle que la fiabilité et l'efficacité de l'équipement seront assurées comme le déclarent le rapport de sûreté et la documentation à l'appui de la demande du permis d'exploitation.

Nota: Les exigences (f), (g) et (h) s'appliquent seulement lorsque le système d'arrêt d'urgence doit être disponible conformément aux exigences (b) et (c).

3.2 Exigences en cas d'accident

Il ne faut pas que l'opérateur soit obligé d'intervenir dans une activité associée à l'arrêt du réacteur en cas d'accident, sauf dans les situations autorisées en vertu du paragraphe 2.6.

4. EXIGENCES RELATIVES AUX ESSAIS

4.1 Essais de mise en service

a) Essais de rendement

Des essais de mise en service doivent être effectués afin de démontrer, dans la mesure du possible, que toutes les exigences de conception de chaque système d'arrêt d'urgence sont respectées.

Les essais qu'il est possible d'exécuter lorsque le réacteur est dans un état sous-critique, doivent être réalisés avant la première divergence, lorsque le réacteur est dans un état d'arrêt assuré. Des instructions pour les essais de mise en service à effectuer lorsque le réacteur est devenu critique doivent être rédigées et soumises à l'approbation de la CCEA.

b) Essais du câblage

Avant la première divergence, des essais doivent être effectués sur tout le câblage électrique connexe d'un système d'arrêt d'urgence afin de démontrer que toutes les connexions répondent aux normes de conception.

4.2 Essais et inspections en cours de marche

Au moins une fois tous les deux ans, des essais de fonctionnement complets doivent être effectués afin de démontrer l'efficacité de chaque système d'arrêt d'urgence.

4.3 Essais de disponibilité

a) Tout l'équipement des systèmes d'arrêt d'urgence doit être contrôlé ou soumis à des essais à une fréquence suffisante pour démontrer qu'il est conforme aux exigences de disponibilité précisées à l'alinéa 2.4(a).

b) Un rapport sur la disponibilité de chaque système d'arrêt d'urgence doit être intégré à chaque rapport annuel sur l'exploitation de la centrale. Ce rapport doit indiquer la fraction totale de temps pendant laquelle il a été impossible de démontrer au cours de l'année que le système d'arrêt d'urgence était disponible, comme le mentionne l'alinéa 2.4(a).

Seules doivent être exclues de ces calculs les périodes au cours desquelles le système d'arrêt d'urgence était mis intentionnellement en état d'indisponibilité, conformément aux exigences du paragraphe 3.1, ou les périodes nécessaires pour le réarmer après fonctionnement.

RÉFÉRENCE

1. CCEA, "Analyse de sûreté des centrales nucléaires CANDU", Document de consultation C-6, connu auparavant comme Document d'autorisation 39, juin 1980.

ANNEXE I

DÉFINITIONS

Nota: L'ACNOR est actuellement en train de préparer un glossaire des termes relatifs aux centrales nucléaires CANDU qui remplacera la présente annexe aussitôt qu'il sera complété. La liste donnée ici ne couvre donc pas tous les termes utilisés dans ce document, mais elle peut être utilisée en attendant pour clarifier le sens des exigences formulées.

Circuit caloporteur primaire désigne l'ensemble de composants qui permet le transfert de la chaleur du combustible dans le réacteur jusqu'aux générateurs de vapeur ou jusqu'à d'autres échangeurs de chaleur utilisant un système de refroidissement secondaire. Dans le cadre du présent document, il n'inclut pas nécessairement les sous-systèmes auxiliaires de purification et de contrôle de la pression.

Normes de rendement minimal admissible désigne l'ensemble des limites d'exploitation ou les conditions établies pour les composants ou les sous-systèmes et qui définissent les états acceptables pour ces composants ou sous-systèmes dans les analyses de sûreté.

Rupture de gaine du combustible désigne toute rupture de gaine du combustible qui provoque le rejet de produits fissiles.

Système spécial de sûreté désigne l'un des systèmes suivants: systèmes d'arrêt d'urgence, système de confinement, système de refroidissement d'urgence du coeur du réacteur.

Consultative Document / Document de consultation

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

CONSULTATIVE DOCUMENT C-9/REV-1

Proposed Regulatory Guide

REQUIREMENTS FOR EMERGENCY CORE COOLING SYSTEMS FOR CANDU NUCLEAR POWER PLANTS

Issued for trial use on nuclear power stations for which a Construction Approval is issued after January 1, 1981

Publication: May 21, 1982

Canada

This document is part of a set of regulatory documents relating to the safety requirements for CANDU nuclear power plants:

C-7/REV-1 "Requirements for Containment Systems for CANDU Nuclear Power Plants"

C-8/REV-1 "Requirements for Shutdown Systems for CANDU Nuclear Power Plants"

C-9/REV-1 "Requirements for Emergency Core Cooling Systems for CANDU Nuclear Power Plants".

These documents will be used together and they are being issued for a trial use period of three years. They replace AECB Licensing Guides 40, 41 and 42. These new documents apply only to reactors licensed for construction after January 1st, 1981.

Consultative Document C-8/REV-1 for trial use is the second document issued by the AECB on the subject of shutdown system requirements. It does not conflict with the one issued in September, 1977.

All three documents refer to Consultative Document C-6, "Requirements for the Safety Analysis of CANDU Nuclear Power Plants" (formerly known as Licensing Guide No. 39). This document has not yet been revised and it will be re-issued at a later date.

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   P.O. Box 1046
   Ottawa, Ontario
   CANADA
   K1P 5S9

   Telephone
   General Inquiries: (613) 995-5894

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REQUIREMENTS FOR EMERGENCY CORE COOLING SYSTEMS FOR CANDU NUCLEAR POWER PLANTS

1. BASIC REQUIREMENTS

1.1 All CANDU nuclear power reactors shall be equipped with an alternate means of cooling the reactor fuel in the event that the normal cooling supply is lost as a result of a breach in the primary heat transport system pressure boundary.

In this document, such a system shall be referred to as the emergency core cooling system (ECCS).

NOTE:
Current CANDU reactor designs incorporate various systems for emergency coolant injection, supply, recovery, circulation and heat removal. In this licensing document, all necessary sub-systems and components performing these functions shall be collectively referred to as the emergency core cooling system (ECCS).

1.2 (a) Except as noted in (b) below, all equipment required for correct operation of the ECCS shall be considered to be part of the ECCS and shall meet all requirements of this document.

(b) Equipment required to supply compressed air, lubrication, electrical power or cooling water to equipment for operation of ECCS shall be considered as safety support equipment. Such equipment shall meet all the requirements of this document with the exception of 2.5 and 2.10.

1.3 The design requirements of the ECCS shall be based on the assumption that the least effective of the shutdown systems has operated successfully.

1.4 The ECCS shall be considered to be a special safety system.

2. DESIGN REQUIREMENTS

2.1 Minimum Allowable Performance Standards

Minimum allowable performance standards shall be defined for the ECCS and shall be listed or referenced in the Safety Report. The minimum allowable performance standards also be specified for all major equipment and sub-systems necessary for correct operation of the ECCS.

2.2 Cooling Requirements

For all relevant events specified in Table 1 of reference 1, the ECCS shall be capable of maintaining or re-establishing sufficient cooling of the fuel and fuel channels so as to limit the release of fission products from the fuel in the reactor and maintain fuel channel integrity. For such events, the ECCS shall meet all of the following requirements.

(a) The release of radioactive material from the fuel in the reactor shall be limited such that the corresponding dose limits for all relevant events specified in reference 1 are not exceeded.

(b) For revelant events listed under Class 1 and Class 2 of table 1 of reference 1, there shall be no failure of fuel in the reactor due to lack of adequate cooling.

(c) All fuel in the reactor and all fuel channels shall be kept in a configuration such that continued heat removal by the ECCS can be maintained.

(d) After sufficient cooling of the fuel is re-established by the ECCS, the system shall be capable of continuing to supply sufficient cooling flow for as long as it is required to prevent further damage to the fuel.

NOTE:

The cooling requirements specified in 2.2 (b), (c), and (d) above, apply only to fuel in the reactor. For those events where the initiating failure is in a single fuel channel or its appurtenances, these requirements do not apply to that channel or the fuel associated with it.

2.3 Environmental Requirements

(a) All parts of the ECCS which may be required to operate in response to any of the relevant events specified in reference 1 shall be designed to meet all necessary performance requirements while subjected to the most severe environmental conditions which could be present when or before operation of such parts are required. These may include, but are not necessarily limited to, the effects of debris, steam, water high temperature, and radiation fields.

Qualification is required for all ECCS equipment which is required to operate, or continue operating, after an accident has occurred. Qualification shall consist of tests to demonstrate to the extent practicable that the type of equipment can be operated under conditions similar to those which would exist during or following an accident. Where such tests are impracticable, analysis shall be required to demonstrate that this requirement is met.

(b) The ECCS shall be designed such that, for all relevant Class 1, 2, 3 and 4 events specified in Table 1 of reference 1, dynamic effects or jet forces caused by the event cannot result in impairment of the ECCS to an extent that relevant requirements in section 2.2 would not be met.

2.4 Availability Requirements

(a) The ECCS and all equipment required for correct operation of the ECCS shall be designed such that the fraction of time for which the ECCS is not available can be demonstrated to be less than 10^{-3} years per year. The system shall be considered available only if it can be demonstrated to meet all the minimum allowable performance standards as defined in accordance with section 2.1 above.

The availability of safety support systems necessary for correct operation of the ECCS shall be commensurate with this requirement.

Availability calculations to demonstrate that this requirement can be met shall be included or referenced in the Safety Report. Such calculations shall be based on direct experience or reasonable extrapolations therefrom.

(b) The design of the ECCS and safety support systems shall take into account the long-term reliability requirements of those components which must continue to function following an accident.

(c) The design shall have sufficient redundancy that no failure of a single component of the ECCS can result in impairment of that system to an extent that it will not meet its minimum allowable performance standards under accident conditions.

If a component, which is not required to change state and which does not depend on safety support equipment in order to perform its design function, is designed, manufactured, inspected, and maintained to standards acceptable to the AECB, this requirement does not apply.

(d) Correct operation of ECCS equipment following an accident shall not be dependent on power supplies from the electrical grid or from the turbine generators associated with any reactor unit sharing the same containment system as the reactor involved in the accident, unless it is shown to the satisfaction of the AECB that the availability of such power supplies could not be impaired by the consequences of any accident for which the ECCS is required to operate.

(e) As far as practicable, all ECCS equipment shall be designed such that its most probable failure modes will not result in a reduction in the availability of the system.

(f) As far as practicable the design shall be such that all maintenance and availability testing which may be performed when the ECCS is required to be available can be carried out without a reduction in the effectiveness of the system below the minimum allowable performance standards.

(g) As far as practicable the design shall be such that a failed component can be put in a safe state.

(h) The design shall be such that all necessary actions of ECCS equipment which are initiated by automatic control logic can also be initiated manually from the appropriate control room.

(i) The design shall be such that, in the event of an accident, it is not readily possible for an operator to prevent a safe automatic action from taking place.

2.5 Separation and Independence Requirements

(a) The ECCS shall be physically and operationally independent from other special safety systems. No ECCS equipment shall be used as part of another special safety system.

(b) As far as practicable, the ECCS shall be independent from all process systems. Where correct operation of the ECCS may be dependent on process equipment, such equipment shall be designed in accordance with the most demanding of its functions.

(c) Principles for separation of redundant instrument channels and the services to them, associated with the ECCS, shall be prepared and shall require approval by the AECB.

(d) If subsystems of the ECCS are considered to be independent for the purpose of the safety analyses, principles for separation and independence of such subsystems shall be prepared and shall require approval by the AECB.

2.6 Leakage Control Requirements

ECCS components located exterior to the reactor containment structure and which may contain fission products following a loss of coolant accident (LOCA), shall be housed in a structure which permits control of any leakage which may occur from such components. This requirement does not apply to fully welded piping and components designed and manufactured to containment standards.

2.7 Inadvertent Operation

The ECCS shall be designed as far as practicable such that inadvertent operation of all or part of the system shall not have a detrimental effect on plant safety.

2.8 Shielding Requirements

There shall be provisions made for adequate shielding of any ECCS equipment which could contain radioactive material following an accident to permit personnel access to plant equipment for which such access might be required.

2.9 Status Monitoring Requirements

(a) The design of the ECCS shall be such that the status of important equipment required for operation of the ECCS can be monitored from the control room.

(b) As far as practicable all failures of ECCS components which may interfere with proper functioning of the ECCS shall be annunciated in the control room.

2.10 Codes and Standards

(a) The applicant for a licence shall identify any aspects of the design which fail to comply with the applicable requirements of CAN3-N285.0-M81 "General Requirements for Pressure Retaining Systems and Components in CANDU Nuclear Power Plants". All exceptions to the requirements of this standard shall require approval by the AECB.

(b) The minimum acceptable standards for pressure retaining components of the ECCS shall be CSA N285.1 Class 3.

(c) The rules of the CAN3-N285.1 Class 2 shall be applied, as a minimum, to those portions of the ECCS which may be outside containment and which could contain appreciable quantities of radioactive materials as a result of an accident.

(d) A list of any additional codes and standards to be applied to the ECCS shall be prepared and shall require approval by the AECB.

2.11 Seismic Requirements

All equipment required for continued fuel cooling after such cooling has been re-established shall be designed to remain functional following the site design earthquake for the plant site.

3. OPERATING REQUIREMENTS

3.1 Normal Operation

(a) The ECCS shall not be intentionally made unavailable at any time when its operation could potentially be required except in accordance with procedures which shall be prepared and which shall require approval by the AECB.

(b) Procedures for taking corrective action, in the event that the ECCS is found to be unavailable during periods when availability is required, shall be prepared and shall require approval of the AECB.

(c) In the event that any component of the ECCS is found to be inoperable or impaired below its minimum allowable performance standards, the component and its associated equipment shall as far as practicable immediately be put in a safe condition, i.e. a state which would not reduce the availability of the ECCS except as approved in accordance with (b).

(d) As far as practicable maintenance on an ECCS component shall be carried out only when that component and its associated equipment have been put in a state which would not reduce the availability of the ECCS.

(e) In the event that redundant components require maintenance, each component shall be thoroughly tested following its maintenance prior to the start of work on a subsequent component.

(f) Maintenance shall be of such standard that the reliability and effectiveness of all equipment, as claimed in the Safety Report and other documentation in support of an Operating Licence, are assured.

NOTE:
Requirements 3.1(c), (d) and (e) do not apply during periods when the ECCS has been made unavailable in accordance with procedures approved pursuant to section 3.1(a).

3.2 Requirements for Accident Conditions

In the event that operator action is required for actuation of any ECCS function, all of the following requirements must be met:

(a) The ECCS instrumentation shall be designed to give the operator clear and unambiguous indication of the necessity for operator action.

(b) operator action shall not be required within 15 minutes of such clear and unambiguous indication.

(c) there shall be clear, well-defined operating procedures to identify the necessary actions.

4. TESTING REQUIREMENTS

4.1 Commissioning Tests

(a) Performance Tests

Prior to first criticality of the reactor, tests of the ECCS shall be performed to verify that all design specifications have been achieved. Exceptions to this requirement shall be allowed only if it is shown to the satisfaction of the AECB that some operational characteristics are impracticable to demonstrate under non-accident conditions or that such tests would have a detrimental effect on plant safety.

(b) Wiring Tests

Prior to first criticality of any reactor, tests shall be carried out on all electrical wiring associated with the ECCS to demonstrate that all connections are in accordance with the design.

4.2 Availability Tests

(a) All ECCS equipment shall be monitored or tested at a frequency which is adequate to demonstrate compliance with the availability requirements specified in section 2.4(a).

(b) A report on the availability of the ECCS shall be included in each annual report on operation of the station. This report shall include a statement of the total fraction of time in the year during which the ECCS was not demonstrated to be available, as defined in section 2.4(a). Only periods during which the ECCS is not required to be available, in accordance with the conditions of section 3.1, shall be excluded from such calculations.

REFERENCE

1) AECB, "Requirements for the Safety Analysis of CANDU Nuclear Power Plants", Consultative Document C-6 (formerly known as Licensing Document 39), June, 1980.

APPENDIX 1

DEFINITIONS

NOTE:

A CSA Standard on definitions of terms relating to CANDU nuclear power plants is presently under preparation and will replace this appendix when complete. This appendix does not therefore contain a complete list of terms used in this document, but it is included in the interim to clarify the intent.

Minimum Allowable Performance Standards means the set of operating limits or range of conditions established for components or sub-systems and which define the acceptable states for those components or sub-systems as credited in the safety analyses.

Primary Heat Transport System means that system of components which permit the transfer of heat from the fuel in the reactor to the steam generators or other heat exchangers employing secondary cooling. For purposes of this document, it does not necessarily include auxiliary purification and pressure control sub-systems.

Special Safety System means one of the following systems: shutdown systems, containment system, emergency core cooling system.

Consultative Document / Document de consultation

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

DOCUMENT DE CONSULTATION C-9/RÉV-1

Projet de guide de réglementation

LES SYSTÈMES DE REFROIDISSEMENT D'URGENCE DES CENTRALES NUCLÉAIRES CANDU

Publié pour essai pratique dans les centrales nucléaires qui ont reçu un permis de construction après le 1er janvier 1981

Publication: le 21 mai 1982

Canada

Ce document fait partie d'un ensemble de textes de réglementation liés aux prescriptions de sûreté des centrales nucléaires CANDU:

C-7/RÉV-1 "Les Systèmes de confinement des centrales nucléaires CANDU"

C-8/RÉV-1 "Les Systèmes d'arrêt d'urgence des centrales nucléaires CANDU"

C-9/RÉV-1 "Les Systèmes de refroidissement d'urgence des centrales nucléaires CANDU".

Ces documents doivent être utilisés ensemble et sont publiés pour une période d'essai pratique de trois ans. Ils remplacent les Documents d'autorisation 40, 41 et 42. Ces nouveaux documents s'appliquent seulement aux réacteurs qui ont reçu un permis de construction après le 1er janvier 1981.

Le Document de consultation C-8/RÉV-1 pour essai pratique est le second émis par la CCEA au sujet des systèmes d'arrêt d'urgence. Il ne contredit en aucune façon le premier document publié en septembre 1977.

Les trois documents font référence au Document de consultation C-6, "Analyse de sûreté des centrales nucléaires CANDU" (connu auparavant comme le Document d'autorisation 39). Ce document n'a pas encore été révisé et il sera publié de nouveau un peu plus tard.

TEXTES DE RÉGLEMENTATION DE LA CCEA

1. Le choix d'emplacement, la conception, la fabrication, la construction, la mise en service, l'exploitation et le déclassement d'installations nucléaires ou la production, la possession, l'utilisation et l'élimination de substances prescrites, au Canada ou sous contrôle canadien, sont assujettis aux dispositions de la loi sur le contrôle de l'énergie atomique et de son Règlement d'application, dont l'administration relève de la Commission de contrôle de l'énergie atomique (CCEA).

2. En plus du Règlement susmentionné, la CCEA utilise trois catégories de textes de réglementation. En voici une courte description.

   Conditions générales d'autorisation de permis - ensemble de conditions types figurant dans tous les permis similaires délivrés par la CCEA, à moins de circonstances exceptionnelles;

   Déclarations de principe en matière de réglementation - déclarations laissant clairement entendre que certaines "exigences" qui ne figurent ni dans le Règlement ni dans les conditions des permis sont obligatoires ou que certaines exigences doivent être respectées d'une façon déterminée laissant également entendre que la CCEA se réserve le droit de permettre des écarts ou d'envisager d'autres façons d'en arriver aux mêmes fins, lorsque ces façons semblent convenir; et

   Guides de réglementation - directives ou conseils donnés sur tout aspect de la réglementation assurée par la CCEA mais formulés de façon moins rigoureuse que dans les déclarations de principe.

3. Lors de l'élaboration de ses textes de réglementation, la CCEA en publie d'abord le projet à titre de Document de consultation, afin de connaître les commentaires du secteur nucléaire et du grand public, avant que le projet de texte de réglementation paraisse sous sa forme définitive. Dans certains cas, après l'achèvement de la période réservée aux commentaires, la Commission peut faire mettre le document de consultation à l'essai pratique pour un temps limité. Après cette période d'essai, on demande encore une fois l'opinion du public, avant que le document révisé soit publié sous sa forme définitive.

4. Tout commentaire sur les documents de consultation et toute suggestion à l'égard des nouveaux textes de réglementation ou ceux déjà en vigueur sont les bienvenus; il suffit de les transmettre à la Section du développement des règlements de la CCEA.

5. On peut se procurer des exemplaires des documents de consultation et des textes de réglementation, dans les deux langues officielles, en s'adressant au Bureau d'information publique. Toute demande de renseignements techniques ou d'interprétation des textes devrait être acheminée au Bureau susmentionné.

6. L'adresse de la CCEA est la suivante:

   Commission de contrôle de l'énergie atomique
   C.P. 1046
   Succursale "B"
   OTTAWA (Ontario)
   CANADA K1P 5S9

   Renseignements: (613) 995-5894

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LES SYSTÈMES DE REFROIDISSEMENT D'URGENCE DES CENTRALES NUCLÉAIRES CANDU

1. EXIGENCES FONDAMENTALES

1.1 Tous les réacteurs nucléaires CANDU doivent être dotés d'un autre moyen de refroidir le combustible du réacteur en cas de fuite du caloporteur par suite de la rupture de l'enceinte de pression du système caloporteur primaire du réacteur. Dans le présent document, ce système s'appellera système de refroidissement d'urgence du coeur (SRUC).

REMARQUE

Les réacteurs CANDU actuels comprennent différents systèmes pour l'injection de l'eau d'urgence, l'approvisionnement, la récupération, la circulation du caloporteur et l'évacuation de la chaleur. Dans le présent document, on appellera système de refroidissement d'urgence du coeur (SRUC) l'ensemble des sous-systèmes et éléments qui accomplissent ces fonctions.

1.2 a) Sous réserve de l'alinéa (b) ci-après, tout l'équipement nécessaire au fonctionnement correct du SRUC doit être considéré comme partie intégrante du SRUC et doit répondre à toutes les exigences énumérées dans le présent document.

b) L'équipement nécessaire pour fournir l'air comprimé, la lubrification, l'énergie électrique ou l'eau de refroidissement pour le fonctionnement du SRUC doit être considéré comme équipement auxiliaire de sûreté. Celui-ci doit satisfaire à toutes les exigences posées dans le présent document à l'exception des paragraphes 2.5 et 2.10.

1.3 Les exigences conceptuelles du SRUC doivent être fondées sur l'hypothèse que le système d'arrêt d'urgence le moins efficace a fonctionné correctement.

1.4 Le SRUC doit être considéré comme un système spécial de sûreté.

2. EXIGENCES CONCEPTUELLES

2.1 Normes de rendement minimal admissible

Des normes de rendement minimal admissible doivent être établies en ce qui concerne le SRUC et être énumérées ou faire l'objet d'un renvoi dans le Rapport de sûreté. Il faut également préciser les normes de rendement minimal admissible pour tout l'équipement principal et tous les sous-systèmes nécessaires pour le fonctionnement correct du SRUC.

2.2 Exigences relatives au refroidissement

En ce qui concerne tous les événements pertinents indiqués au tableau I de la référence 1, le SRUC doit être capable de maintenir ou de rétablir un refroidissement adéquat du combustible et des canaux de combustible afin de limiter le dégagement de produits de fission du combustible dans le réacteur et de maintenir l'intégrité des canaux de combustible. Lors de ces événements, le SRUC doit satisfaire à toutes les exigences suivantes:

a) le dégagement de substances radioactives du combustible dans le réacteur doit être limité de telle sorte que les doses maximales précisées à la référence 1 ne soient pas dépassées;

b) dans le cas des événements pertinents des classes 1 et 2 du tableau I de la référence 1, aucune rupture des gaines de combustible ne doit se produire dans le réacteur à cause du manque de refroidissement approprié;

c) l'arrangement géométrique du combustible et de tous les canaux de combustible doit être maintenue de façon telle que le SRUC puisse évacuer la chaleur sans interruption;

d) lorsque le SRUC a suffisamment rétabli le refroidissement du combustible, il doit pouvoir continuer à fournir suffisamment d'eau de refroidissement aussi longtemps que nécessaire afin d'empêcher toute détérioration supplémentaire du combustible.

REMARQUE

Les exigences relatives au refroidissement précisées aux alinéas 2.2 b), c) et d) ci-dessus, ne s'appliquent qu'au combustible qui se trouve dans le réacteur.

Lorsque la rupture initiale se produit dans un seul canal de combustible ou ses prolongements, ces exigences ne s'appliquent pas au canal ou au combustible qu'il contient.

2.3 Exigences relatives aux conditions ambiantes

a) Tous les composants du SRUC qui pourraient être appelés à opérer à la suite de n'importe quel des événements pertinents indiqués à la référence 1 doivent être conçus de façon à satisfaire à toutes les exigences citées en 2.2 ci-dessus, même lorsque soumis aux plus sévères conditions environnementales qui pourraient être présentes lors de leur fonctionnement ou auparavant. Ces conditions peuvent comprendre, sans toutefois s'y limiter, les effets de la présence de débris, de vapeur, d'eau à température élevée et de champs de rayonnement.

Il faut que soient autorisés tous les composants du SRUC qui doivent fonctionner ou continuer à fonctionner après un accident. L'autorisation de ces composants devra inclure une série d'essais visant à démontrer autant que possible que ces composants peuvent fonctionner dans des conditions semblables à celles qui existeraient pendant ou après un accident. Lorsqu'il est impossible d'effectuer ces essais, on devra prouver au moyen d'analyses que cette exigence est satisfaite.

b) La conception du SRUC doit être telle que, dans les cas d'événements des classes 1, 2, 3 et 4 spécifiés au tableau I de la référence 1, les effets dynamiques ou les forces de jet occasionnés par l'événement ne résultent pas en une détérioration telle du SRUC qu'il ne remplisse plus les exigences pertinentes du paragraphe 2.2.

2.4 Exigences relatives à la disponibilité

a) Le SRUC et tout l'équipement nécessaire à son bon fonctionnement doivent être conçus de façon telle que le temps pendant lequel il n'est pas disponible représente une fraction inférieure à 10^{-3} an par année. Le système est considéré disponible seulement si l'on peut démontrer qu'il satisfait à toutes les normes de rendement minimal admissible telles qu'elles sont définies au paragraphe 2.1 ci-dessus.

La disponibilité des systèmes fonctionnels nécessaires au fonctionnement correct du SRUC doit être du même ordre que celle qui est exigée pour ce dernier.

Les calculs de disponibilité établissant que cette exigence peut être satisfaite doivent être inclus dans le Rapport de sûreté ou fournis comme référence. Ces calculs doivent s'appuyer sur l'expérience directe ou sur des extrapolations raisonnables à partir de celle-ci.

b) La conception du SRUC et des systèmes fonctionnels nécessaires à son fonctionnement doit tenir compte des exigences relatives à la fiabilité à long terme des composants qui devront continuer de fonctionner à la suite d'un accident.

c) La conception du SRUC doit tenir compte suffisamment du principe de redondance des composants pour que la défaillance d'un composant ne porte pas atteinte au système à un point tel que le système ne puisse plus satisfaire aux normes de rendement minimal admissible lors d'un accident.

Dans le cas des composants qui ne changent pas d'état et qui ne dépendent pas de l'équipement des systèmes fonctionnels pour accomplir leur fonction, la présente exigence ne s'applique pas dans la mesure où ledit composant est conçu, fabriqué, inspecté et entretenu selon des normes acceptables aux yeux de la CCEA.

d) Le fonctionnement correct du SRUC à la suite d'un accident ne doit pas dépendre de l'électricité provenant du réseau électrique ou des turbo-alternateurs associés à un réacteur partageant le même système de confinement avec le réacteur impliqué dans l'accident, à moins qu'il soit démontré, à la satisfaction de la CCEA, que la disponibilité des sources d'alimentation électrique ne soit pas compromise à la suite d'un accident qui nécessiterait le déclenchement du SRUC.

e) Dans la mesure du possible, tout l'équipement du SRUC doit être conçu de façon telle que ses modes de défaillance les plus probables ne diminuent pas la disponibilité du système.

f) Dans la mesure du possible, la conception sera telle que tous les essais d'entretien et de disponibilité qui pourraient être effectués quand le SRUC pourrait être appelé à fonctionner ne réduiront pas l'efficacité du système en dessous des normes de rendement minimal admissible.

g) La conception du SRUC doit, dans la mesure du possible, être telle qu'un composant défectueux puisse être placé dans un état sûr.

h) La conception du SRUC doit être telle que toutes les interventions du SRUC déclenchées par l'entremise d'une logique de commande automatique puissent également l'être manuellement à partir de la salle de commande.

i) La conception du SRUC doit être telle qu'en cas d'accident il ne soit pas possible pour un opérateur d'empêcher facilement un déclenchement automatique sûr de se produire.

2.5 Exigences de séparation et d'indépendance

a) Le SRUC doit être physiquement et fonctionnellement indépendant des autres systèmes spéciaux de sûreté. Aucun équipement faisant partie du SRUC ne peut faire partie d'un autre système spécial de sûreté.

b) Dans la mesure du possible, le SRUC doit être indépendant de tous les systèmes fonctionnels. Dans le cas où le fonctionnement correct du SRUC peut dépendre de l'équipement d'un système fonctionnel, cet équipement doit être conçu selon la plus exigeante de ses fonctions.

c) Les principes de séparation des canaux d'instrumentation redondants et des services connexes, associés au SRUC, doivent être rédigés et soumis à l'approbation de la CCEA.

d) Si les sous-systèmes du SRUC doivent être considérés comme indépendants aux fins des analyses de sûreté, il faut établir des principes de séparation et d'indépendance, et les faire approuver par la CCEA.

2.6 Exigences relatives au contrôle des fuites

Les composants du SRUC situés à l'extérieur de l'enceinte de retenue du réacteur et qui peuvent contenir des produits de fission à la suite d'une fuite du caloporteur, doivent être abrités dans une structure permettant de contrôler toute fuite pouvant venir de ces composants. Cette exigence ne s'applique pas aux canalisations et aux éléments complètement soudés, conçus et manufacturés selon les normes en vigueur pour les enceintes de retenue.

2.7 Manoeuvre accidentelle

Le SRUC doit, dans la mesure du possible, être conçu de façon qu'une manoeuvre accidentelle mettant en cause la totalité ou une partie du système n'aura pas d'effet fâcheux sur la sûreté de la centrale.

2.8 Exigences relatives au blindage

Les dispositions relatives au blindage de tout l'équipement du SRUC pouvant contenir des matières radioactives à la suite d'un accident doivent assurer que les employés peuvent avoir accès à l'équipement de la centrale, en cas de besoin.

2.9 Exigences relatives à la vérification de l'équipement

a) La conception du SRUC doit être telle que l'état de l'équipement important, nécessaire au fonctionnement du SRUC, puisse être surveillé à partir de la salle de commande.

b) Toute défaillance des composants du SRUC qui pourrait nuire au fonctionnement correct de ce dernier doit, dans la mesure du possible, être annoncée dans la salle de commande.

2.10 Codes et normes

a) La demande de permis doit identifier tous les aspects de la conception qui ne sont pas conformes aux exigences applicables des normes de l'ACNOR, CAN3-N285.0-M81, "Prescriptions générales pour les systèmes et composants pressurisés et centrales nucléaires CANDU". Toute dérogation à ces normes doit être approuvée par la CCEA.

b) Les normes minimales admissibles pour les composants de l'enceinte de pression du SRUC doivent être conformes à la norme N285.1 Classe 3 de l'ACNOR.

c) La norme ACNOR CAN3-N285.1 Classe 2 doit être appliquée au moins aux composants du SRUC qui peuvent se trouver à l'extérieur de l'enceinte de confinement et qui pourraient contenir des quantités appréciables de matières radioactives à la suite d'un accident. L'usage de normes supplémentaires applicables au SRUC devra recevoir au préalable l'approbation de la CCEA.

2.11 Exigences en cas de secousses séismiques

La conception de chaque partie du SRUC nécessaire pour le refroidissement, lorsque celui-ci aura été rétabli, doit être compatible avec les hypothèses posées dans les analyses des conséquences du "séisme hypothétique fondamental" pour le site en question.

3. EXIGENCES RELATIVES AU FONCTIONNEMENT

3.1 Exigences pour le fonctionnement normal

a) Il ne faut pas que le SRUC soit indisponible intentionnellement, à quelque moment que ce soit, quand son fonctionnement pourrait être nécessaire, sauf si l'on se soumet à des directives préparées et approuvées par la CCEA.

b) Des mesures de rectification en cas d'indisponibilité du SRUC pendant une période où ce dernier devrait être disponible doivent être préparées et soumises à l'approbation de la CCEA.

c) Si l'on se rend compte que certains composants du SRUC ne sont pas en état de fonctionnement ou qu'ils sont endommagés au point de ne pas répondre aux normes de rendement minimal admissible, on doit, autant que possible, mettre immédiatement en état sûr les composants et l'équipement connexe, c'est-à-dire dans un état qui ne réduirait pas la disponibilité du SRUC sauf dans les cas approuvés en vertu de l'alinéa b) ci-dessus.

d) Autant que possible, l'entretien d'un composant du SRUC ne doit être effectué que lorsque le composant et l'équipement connexe ont été mis dans un état qui ne réduit pas la disponibilité du SRUC.

e) Lorsque des composants redondants ont besoin d'entretien, chaque composant doit être testé à fond à la suite de l'entretien et avant le commencement des travaux sur le composant suivant.

f) Les normes d'entretien doivent être telles qu'elles permettent d'assurer la fiabilité et l'efficacité de tout l'équipement, telles que définies dans le Rapport de sûreté et d'autres documents soumis a l'appui de la demande du permis d'exploitation.

REMARQUE

Les exigences 3.1 c), d) et e) ne s'appliquent pas lorsque le SRUC a été mis en indisponibilité en vertu des directives approuvées conformément à l'alinéa 3.1 a).

3.2 Exigences en cas d'accident

Si l'on prévoit que l'intervention d'un opérateur sera nécessaire pour la mise en marche d'une partie du SRUC, il faut satisfaire à toutes les exigences suivantes:

a) Les instruments du SRUC devront être conçus de façon à donner à l'opérateur des indications claires et sans équivoque sur la nécessité de son intervention.

b) L'opérateur doit disposer de quinze minutes après une indication claire et sans équivoque avant d'avoir à intervenir.

c) La marche à suivre pour identifier les interventions nécessaires doit être claire, bien définie et facilement accessible.

4. EXIGENCES RELATIVES AUX ESSAIS

4.1 Essais de mise en service

a) Essais de rendement

Avant que l'on procède à la première divergence du réacteur, on doit effectuer des essais afin de vérifier que toutes les spécifications de conception ont été respectées. Les exceptions à cette exigence ne seront

permises que s'il est établi à la satisfaction de la CCEA, qu'il n'est pas possible de démontrer certaines caractéristiques de fonctionnement lorsqu'il n'y a pas d'accident, ou que ces essais auraient un effet fâcheux sur la sûreté de la centrale.

b) Essais du câblage

Avant que l'on procède à la première divergence du réacteur, des essais doivent être effectués sur tout le câblage électrique associé au SRUC afin de démontrer que les raccords sont conformes aux spécifications.

4.2 Essais de disponibilité

a) Tout l'équipement du SRUC doit faire l'objet de vérifications ou de tests à une fréquence suffisante pour démontrer que les normes de disponibilité stipulées à l'alinéa 2.4 a) sont satisfaites.

b) Un rapport sur la disponibilité du SRUC doit être inclus dans chaque rapport annuel sur l'exploitation de la centrale. Ce rapport doit comporter un compte rendu sur la fraction de l'année que représente le temps total pour lequel il n'a pas été démontré que le système était disponible conformément à l'alinéa 2.4 a). Seules les périodes durant lesquelles le SRUC a été rendu intentionnellement indisponible, en conformité avec les conditions stipulées au paragraphe 3.1, peuvent être exclues des calculs en question.

RÉFÉRENCE

(1) CCEA, "Analyse de sûreté des centrales nucléaires CANDU", Document de consultation C-6, connu auparavant comme Document d'autorisation 39, juin 1980.

ANNEXE I

DÉFINITIONS

NOTE:
L'ACNOR est actuellement en train de préparer un glossaire des termes relatifs aux centrales nucléaires CANDU qui remplacera la présente annexe aussitôt qu'il sera complété. La liste donnée ici ne couvre donc pas tous les termes utilisés dans ce document, mais elle peut être utilisée en attendant pour clarifier le sens des exigences formulées.

Normes de rendement minimal admissible désigne l'ensemble des limites d'exploitation ou les conditions établies pour les composants ou les sous-systèmes, et qui définissent les états acceptables pour ces composants ou sous-systèmes dans les analyses de sûreté.

Système caloporteur primaire désigne l'ensemble des composants qui permet le transfert de la chaleur du combustible dans le réacteur jusqu'aux générateurs de vapeur ou jusqu'à d'autres échangeurs de chaleur utilisant un système de refroidissement secondaire. Dans le cadre du présent document, il n'inclut pas nécessairement les sous-systèmes auxiliaires de purification et de contrôle de la pression.

Système spécial de sûreté désigne l'un des systèmes suivants: les systèmes d'arrêt d'urgence, le système de confinement, le système de refroidissement d'urgence du coeur du réacteur.

Regulatory Document

Texte de réglementation

Atomic Energy Control Board

Commission de contrôle de l'énergie atomique

REGULATORY DOCUMENT R-10

Regulatory Policy Statement

THE USE OF TWO SHUTDOWN SYSTEMS IN REACTORS

Effective date:

January 11, 1977

Canada

PREFACE

1. Siting, design, manufacture, construction, commissioning, operation, and decommissioning of nuclear facilities, or the production, possession, use and disposal of prescribed substances, in Canada or under Canadian control, are subject to the provisions of the Atomic Energy Control Act and Regulations administered by the Atomic Energy Control Board (AECB).

2. In addition to the Atomic Energy Control Regulations, three other categories of Regulatory Document are employed by the AECB. These are:

   Generic Licence Conditions - standard sets of conditions that are included in particular AECB licences of a common type, unless specific circumstances indicate otherwise;

   Regulatory Policy Statements - firm expressions that particular "requirements" not expressed as Regulations or Licence Conditions be complied with or that any requirements be met in a particular manner but where the AECB retains the discretion to allow deviations or to consider alternative means of attaining the same objectives where a satisfactory case is made; and

   Regulatory Guides - guidance or advice on any aspect of the AECB's regulatory process that is given in a manner less rigid than that intended by Policy Statements.

3. In developing Regulatory Documents, the AECB publishes its proposals as Consultative Documents in order to solicit comments both from the nuclear industry and from the public. This is done prior to releasing any Regulatory Document in final form. In certain cases, after the period for public comment, a Consultative Document may be issued for "trial use". This is done for a limited period of time to gain practical experience. Following the period of trial use, the revised document is re-issued for further public comment prior to release in final form.

4. Comments on Consultative Documents and suggestions for new Regulatory Documents and for improvement to those that exist are encouraged and should be directed to the Regulations Development Section of the AECB.

5. Copies of Consultative Documents, Regulatory Documents and related index lists are available in both English and French on request from the Office of Public Information. Requests for technical information on and interpretation of documents should be addressed to this office.

6. The Atomic Energy Control Board may be contacted as follows:

   Postal address: Atomic Energy Control Board
   P.O. Box 1046
   Ottawa, Ontario
   K1P 5S9
   CANADA

   Telephone
   General Inquiries: (613) 995-5894

DATE: 11, January 1977

THE USE OF TWO SHUTDOWN SYSTEMS IN REACTORS

PART I - Licensing Requirements

Pursuant to Section 10 Subsection (4) of the Atomic Energy Control Regulations SOR/74-334 the Atomic Energy Control Board gives notice of the following requirements for protective shutdown systems in nuclear power reactors.

1) All nuclear power reactors licensed for construction in Canada after January 1, 1977 shall incorporate two independent protective shutdown systems unless otherwise approved by the Board.

2) The quality of the detailed design, construction, commissioning, testing, maintenance and operation of each protective shutdown system shall be at least equal to the quality expected of the protective shutdown system in plants licensed for operation prior to January 1, 1976. Compliance with applicable codes, standards and practices in effect at the time of licensing will be required.

3) The protective shutdown systems shall be of diverse designs and each shall be physically and functionally separate from the other, from process systems, and from other special safety systems.

4) The applicant for an operating licence shall show by analysis, adequately supported by experimental evidence that when protective shutdown action is necessary, the combined action of the two protective shutdown systems is not required to prevent the consequences of a failure from exceeding those shown in Table 1. This requires that the applicant show that:

   i) the consequences of all serious process failures can be limited by at least one of the two protective shutdown systems acting alone to shut down the reactor to less than those shown in Table 1 for Class 1 failures, assuming proper operation of the containment and emergency core cooling system;

   ii) the consequences of all serious process failures can be limited by each of the protective shutdown systems acting alone to shut down the reactor to less than those shown in Table 1 for Class 2 failures, assuming proper operation of the containment and assuming unavailability of the emergency core cooling system;

iii) the consequences of all serious process failures can be limited by each of the shutdown systems acting alone to shut down the reactor to less than those shown in Table 1 for Class 2 failures, assuming proper operation of the emergency core cooling systems and assuming impairment of the containment.

Table 1: Reference Dose Limits for Postulated Failure Conditions

Situation	Meteorology to be used in Calculation	Maximum Individual Dose Limits	Maximum Total Population Dose Limits[c]
Class 1 Failure	Either worst weather existing at most 10% of time or Pasquill F condition if local data incomplete	0.5 rem whole body 3 rem to thyroid[a]	10^4 man-rem 10^4 thyroid-rem
Class 2 Failure	Either worst weather existing at most 10% of time or Pasquill F condition if local data incomplete	25 rem whole body 250 rem thyroid[b]	10^6 man-rem 10^6 thyroid-rem

(a) For other organs use 1/10 ICRP occupation values.

(b) For other organs use 5 times ICRP annual occupational dose.

(c) For purposes of safety analysis the population dose is integrated from the station boundary out to a distance where the individual dose is 1% of the dose to an individual at the boundary.

PART II - Application of Part I

1) Preamble

1.1) It is considered credible that any one of the special safety systems may fail to perform its required function when called upon to counteract any serious process system failure. Consequently, a plant design must ensure that under such circumstances the release of radioactive material will be within the limits specified by the Atomic Energy Control Board. Because of the particular importance of reactor protective shutdown action the application of the single failure/dual failure approach previously used in assessing nuclear plant safety is modified when two protective shutdown systems are incorporated as part of the plant design.

1.2) For those plant designs incorporating two independent reactor protective shutdown systems of suitable design amongst the special safety systems, it is accepted that at least one of them will operate as designed when protective shutdown action is required.

1.3) The design and performance of each protective shutdown system should meet the requirements of Part II of this document unless otherwise specifically approved.

2) Definitions

2.1) A serious process system failure means any failure of process equipment or procedure which could lead to a significant release of radioactive material from the station in the absence of special safety system action.* A significant release is one which would result in individual or population doses in excess of those given in Table 1 for Class 1 failures.

2.2) A Class 1 failure means a serious process failure with the following assumptions regarding performance of the special safety systems:

(a) Protective Shutdown System 1 operates as designed, the containment operates as designed and the emergency core cooling system operates as designed;

or

(b) Protective Shutdown System 2 operates as designed, the containment operates as designed and the emergency core cooling system operates as designed

2.3) A Class 2 failure means a serious process failure with the following assumptions regarding performance of the special safety systems:

*The identification of those serious process system failures which must be considered in the design of the plant is outside the scope of the document.

(a) Protective Shutdown System 1 operates as designed, the containment operates as designed and the emergency core cooling system is unavailable;

or

(b) Protective Shutdown System 2 operates as designed, the containment operates as designed and the emergency core cooling system is unavailable;

or

(c) Protective Shutdown System 1 operates as designed, the emergency core cooling system operates as designed and the containment is impaired;*

or

(d) Protective Shutdown System 2 operates as designed, the emergency core cooling system operates as designed and the containment is impaired.*

3) Design Requirements

3.1) Each of the two protective shutdown systems, acting alone to shut down the reactor, shall be capable of preventing failure of the primary heat transport system due to overpressure, excessive fuel temperatures or fuel break-up. The action of safety-related devices, such as overpressure relief valves, may be taken into account if the design of such devices is commensurate with the design of special safety systems.

*The identification of those modes of containment failure which must be considered in the design of the plant is outside the scope of this document.

3.2) Following a serious process failure, each of the two protective shutdown systems, acting alone to shut down the reactor shall be capable of limiting both the rate of energy production and the total energy production to the extent that the integrity of the containment system is not jeopardized.

3.3) Each of the two protective shutdown systems, acting alone, shall be capable of maintaining the reactor in a suitable subcritical shutdown state indefinitely or, alternatively for a period long enough to permit the protective shutdown system to be supplemented reliably.

3.4) Each protective shutdown system shall incorporate sufficient redundancy to ensure that no single failure results in the loss of its protective action.

3.5) Where practicable, two diverse trip parameters shall be incorporated into the sensing and control logic of each protective shutdown system for each of the serious process failures requiring shutdown action. Manual actuation is acceptable as a "trip parameter" provided it is shown that adequate information and time are available to alert an operator and to permit him to assess the need for intervention and to actuate the protective shutdown system manually.

3.6) Each protective shutdown system shall be readily testable at a frequency sufficient to demonstrate to the extent practicable that its unavailability is less than 1×10^{-3} years per year.

3.7) Each protective shutdown system shall be readily maintainable without increasing the probability that the system may become unavailable.

3.8) Each protective shutdown system shall be designed to fail in the safe direction unless the required availability can be otherwise demonstrated.

3.9) The design of each protective shutdown system shall be such that partial or incomplete operation of one system will not render the other system ineffective.

3.10) In the safety analysis the action of process systems to complement or supplement the safety action of one or both of the protective shutdown systems shall not be taken into account except to show that normal functioning of process systems does not impair the effectiveness of one or both of the protective shutdown systems.

Regulatory Document

Texte de réglementation

Atomic Energy Control Board

Commission de contrôle de l'énergie atomique

TEXTE DE RÉGLEMENTATION R-10

Déclaration de principe en matière de réglementation

L'UTILISATION DE DEUX SYSTÈMES D'ARRÊT DES RÉACTEURS

Date d'entrée en vigueur :

le 11 janvier 1977

Canada

PRÉFACE

1. Le choix d'emplacement, la conception, la fabrication, la construction, la mise en service, l'exploitation et la mise hors service d'installations nucléaires ou la production, la possession, l'utilisation et l'élimination de substances prescrites, au Canada ou sous contrôle canadien, sont assujettis aux dispositions de la Loi sur le contrôle de l'énergie atomique et de son règlement d'application, dont l'administration relève de la Commission de contrôle de l'énergie atomique (CCEA).

2. En plus du Règlement susmentionné, la CCEA utilise trois catégories de textes de réglementation. En voici une courte description.

   Conditions générales d'autorisation de permis - ensemble de conditions types figurant dans tous les permis similaires délivrés par la CCEA, à moins de circonstances exceptionnelles;

   Déclarations de principe en matière de réglementation - déclarations laissant clairement entendre que certaines "exigences" qui ne figurent ni dans le Règlement ni dans les conditions des permis sont obligatoires ou que certaines exigences doivent être respectées d'une façon déterminée laissant également entendre que la CCEA se réserve le droit de permettre des écarts ou d'envisager d'autres façons d'en arriver aux mêmes fins, lorsque ces façon semblent convenir; et

   Guides de réglementation - directives ou conseils donnés sur tout aspect de la réglementation assurée par la CCEA mais formulés de façon moins rigoureuse que dans les déclarations de principe.

3. Lors de l'élaboration de ses textes de réglementation, la CCEA publi d'abord ses projets à titre de Documents de consultation, afin de connaître les commentaires du secteur nucléaire et du grand public, avant que le projet de texte de réglementation ne paraisse sous sa forme définitive. Dans certains cas, après l'achèvement de la période réservée aux commentaires, la Commission peut faire mettre le Document de consultation à l'essai pratique pour un temps limité. Après cette période d'essai, on demande encore une fois l'opinion du public, avant que le document révisé soit publié sous sa forme définitive.

4. Tout commentaire sur les Documents de consultation et toute suggestion à l'égard de textes de réglementation nouveaux ou déjà appliqués sont les bienvenus; il suffit de les transmettre à la Section du développement des règlements, à la CCEA.

5. On peut se procurer des exemplaires des documents de consultation et des textes de réglementation, dans les deux langues officielles, en s'adressant au Bureau d'information publique. Toute demande de renseignements techniques ou d'interprétation des textes devrait être acheminée au Bureau susmentionné.

6. L'adresse de la CCEA est la suivante:

   Commission de contrôle de l'énergie atomique
   C.P. 1046
   OTTAWA (Ontario)
   K1P 5S9
   CANADA

   nº de téléphone (renseignements): (613) 995-5894

L'UTILISATION DE DEUX SYSTEMES D'ARRET DES REACTEURS

PARTIE 1 - Exigences pour l'obtention de l'autorisation

Conformément à l'article 10, paragraphe (4), du Règlement sur le contrôle de l'énergie atomique DORS/74-334, la Commission de contrôle de l'énergie atomique fait connaître les exigences suivantes pour les systèmes d'arrêt de protection des réacteurs de puissance.

1) Tous les réacteurs nucléaires de puissance dont la construction est autorisée au Canada après le 1er janvier 1977, devront être équipés de deux systèmes d'arrêt de protection indépendants, à moins de disposition contraire approuvée par la Commission.

2) La qualité de la conception globale et détaillée, de la construction, de la mise en service, des essais, de l'entretien et du fonctionnement de chaque système d'arrêt de protection sera au moins égale à la qualité attendue du système d'arrêt de protection des centrales dont le fonctionnement a été autorisé avant le 1er janvier 1976. La Commission exigera le respect des codes, normes et méthodes applicables, en vigueur au moment de l'autorisation.

3) Les systèmes d'arrêt de protection seront de conceptions diverses et chacun sera, dans sa construction et son fonctionnement, indépendant de l'autre, ainsi que des mécanismes de fonctionnement et autres systèmes spéciaux de sécurité.

4) Le demandeur d'un permis d'exploitation devra prouver, par une analyse suffisamment étayée par des expériences, que s'il est nécessaire d'actionner un système d'arrêt de protection, l'action combinée des deux systèmes n'est pas nécessaire pour empêcher les conséquences d'une défaillance d'être plus importantes que celles qui figurent au tableau 1.

Le demandeur devra prouver:

i) que les conséquences de toute défaillance grave d'un système fonctionnel peuvent être, par l'action unique d'au moins un des deux systèmes d'arrêt de protection du réacteur, moindres que celles figurant au tableau 1, pour les défaillances de la classe 1, compte tenu du bon fonctionnement du système de confinement et du système de refroidissement d'urgence du coeur;

ii) que les conséquences de toute défaillance grave d'un système fonctionnel peuvent être, par l'action unique de chacun des deux systèmes d'arrêt de protection, moindres que celles figurant au tableau 1, pour les défaillances de la classe 2, compte tenu du bon fonctionnement du système de confinement, et en supposant l'indisponibilité du système de refroidissement d'urgence du coeur;

iii) que les conséquences de toute défaillance grave d'un système fonctionnel peuvent être, par l'action unique de chacun des deux systèmes d'arrêt du réacteur, moindres que celles figurant au tableau 1, pour les défaillances de classe 2, en supposant le bon fonctionnement du système de refroidissement d'urgence du coeur, et en supposant également la détérioration du système de confinement.

TABLEAU 1

Dose limites de référence en cas de défaillances présumées

Situation	Météorologie devant servir aux calculs	Dose maximale par individu	Dose maximale pour l'ensemble de la population (c)
Défaillance de Classe 1	Soit les pires conditions atmosphériques prévalant, au plus, 10 pour cent du temps, soit la condition F de Pasquill, si les données locales sont incomplètes.	0,5 rem au corps entier.	10^4 rems-hommes
		3 rems à la thyroide (a)	10^4 rems-thyroides
Défaillance de Classe 2	Soit les pires conditions atmosphériques prévalant, au plus, 10 pour cent du temps, soit la condition F de Pasquill, si les données locales sont incomplètes	3 rems (a) à la thyroide	10^4 rems-hommes
			10^4 rems-thyroides
		25 rems au corps entier	10^6 rems-hommes
		250 rems à la thyroide (b).	10^6 rems-thyroides

(a) Pour les autres organes, on se sert de 1/10 des valeurs professionnelles selon la CIPR.

(b) Pour les autres organes, on prend 5 fois la dose professionnelle annuelle selon la CIPR.

(c) Pour fin d'analyse de la sûreté, la dose pour la population est intégrée à partir de la limite de la centrale jusqu'à une distance où la dose par individu n'est plus que le centième de ce qu'elle était à la limite de la centrale.

PARTIE 2 - Mise en Application de la partie 1

1. Préambule

1.1 On estime possible que tout système spécial de sécurité ne parvienne pas à remplir ses fonctions après sa mise en marche pour remédier à toute défaillance grave d'un système fonctionnel. En conséquence, il faut donc concevoir une centrale de façon à garantir que dans de telles circonstances, l'échappement de matières radioactives soit inférieur aux limites déterminées par la Commission de contrôle de l'énergie atomique. En raison de l'importance particulière de l'arrêt de protection du réacteur, la mise en application de la méthode précédemment utilisée, en cas de défaillance unique ou double, pour évaluer la sécurité d'une centrale nucléaire est modifiée si deux systèmes d'arrêt de protection sont intégrés à la conception de la centrale.

1.2 Dans le cas de centrales dont le plan prévoit deux systèmes indépendants d'arrêt de protection du réacteur, conçus de façon appropriée parmi les systèmes spéciaux de sécurité, on admet qu'au moins l'un d'entre eux fonctionnera comme prévu, au besoin.

1.3 La conception et le fonctionnement de chaque système d'arrêt de protection doivent répondre aux exigences de la partie 2 du présent document à moins que d'autres exigences particulières ne soient approuvées.

2. Définitions

2.1 Une défaillance grave d'un système fonctionnel signifie toute défaillance du matériel ou des procédés d'un système fonctionnel qui pourrait entraîner une fuite importante de matières radioactives hors de la centrale, à défaut de la mise en marche du système spécial de sécurité.* Une fuite importante est une fuite qui résulterait en des doses par individu ou pour toute la population, dépassant les valeurs données au tableau 1 pour les défaillances de classe 1.

2.2 Une défaillance de classe 1 signifie une défaillance grave d'un système fonctionnel, en supposant les conditions suivantes quant au fonctionnement des systèmes spéciaux de sécurité:

a) le système d'arrêt de protection numéro 1 fonctionne comme prévu, ainsi que le système de confinement et le système de refroidissement d'urgence du coeur; ou

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* L'identification de ces défaillances graves des systèmes fonctionnels qui doivent être envisagées dans la conception de la centrale n'est pas le propos du présent document.

b) le système d'arrêt de protection numéro 2 fonctionne comme prévu, ainsi que le système de confinement et le système de refroidissement d'urgence du coeur.

2.3 Une défaillance de classe 2 signifie une défaillance grave d'un système fonctionnel, en supposant les conditions suivantes quant au fonctionnement des systèmes spéciaux de sécurité:

a) le système d'arrêt de protection numéro 1 fonctionne comme prévu, ainsi que le système de confinement mais le système de refroidissement d'urgence du coeur est indisponible; ou

b) le système d'arrêt de protection numéro 2 fonctionne comme prévu, ainsi que le système de confinement, mais le système de refroidissement d'urgence du coeur est indisponible; ou

c) le système d'arrêt de protection numéro 1 fonctionne comme prévu, ainsi que le système de refroidissement d'urgence du coeur, mais le système de confinement est détérioré;* ou

d) le système d'arrêt de protection numéro 2 fonctionne comme prévu, ainsi que le système de refroidissement d'urgence du coeur, mais le système de confinement est détérioré.*

* L'identification de ces modes de rupture du système de confinement qui doivent être envisagés dans la conception de la centrale n'est pas le propos du présent document.

3. Conditions requises pour la conception de la centrale

3.1 Chacun des deux systèmes d'arrêt de protection, fonctionnant seul pour arrêter le réacteur, devra pouvoir empêcher toute défaillance du système caloporteur primaire en raison d'une surpression, de températures excessives du combustible ou d'une rupture de gaine. La mise en marche des dispositifs de sécurité, tels que les soupapes de sûreté en cas de surpression, peut être envisagée, si la conception de ces dispositifs est en rapport avec celle des systèmes spéciaux de sécurité.

3.2 A la suite d'une défaillance grave d'un système fonctionnel, chacun des deux systèmes d'arrêt de protection, fonctionnant seul pour arrêter le réacteur, devra pouvoir limiter, à la fois, le taux de production d'énergie et la production totale d'énergie, de façon que l'intégrité du système de confinement ne soit pas mise en danger.

3.3 Chacun des deux systèmes d'arrêt de protection, fonctionnant seul, devra pouvoir maintenir le réacteur dans un état d'arrêt sous-critique approprié, indéfiniment ou sinon, pour une durée suffisante pour permettre au système d'arrêt de protection d'être secondé sûrement.

3.4 Chaque système d'arrêt de protection doit comporter suffisamment de redondance pour qu'une défaillance simple ne puisse entraîner la perte de sa fonction de protection.

3.5 Si praticable, il faudra intégrer deux paramètres de déclenchement différents dans la détection et la logique de commande de chaque système d'arrêt de protection dans le cas de chacune des défaillances graves des systèmes fonctionnels nécessitant l'arrêt du réacteur. On admet l'opération manuelle comme "paramètre de déclenchement", pourvu qu'il soit prouvé qu'on dispose de renseignements et de temps suffisants pour alerter un opérateur et lui permettre d'évaluer le besoin d'intervention et de mettre en marche manuellement le système d'arrêt de protection.

3.6 Chaque système d'arrêt de protection devra pouvoir subir facilement des essais à une fréquence suffisante qui prouvera dans la mesure du possible que son indisponibilité est inférieure à 1×10^{-3} années par an.

3.7 Chaque système d'arrêt de protection devra pouvoir être entretenu facilement sans qu'augmente la probabilité d'indisponibilité du système.

3.8 Chaque système d'arrêt de protection devra être conçu pour que l'effet de toute défaillance aille dans le sens de la sûreté maximale, à moins qu'on puisse démontrer la fiabilité acceptable de fonctionnement.

3.9 Chaque système d'arrêt de protection devra être conçu de façon que le fonctionnement partiel ou incomplet d'un système ne rende pas l'autre inefficace.

3.10 Dans l'analyse de sûreté, on ne devra pas considérer l'action des systèmes fonctionnels pour compléter ou augmenter l'action de l'un ou des deux systèmes d'arrêt de protection sauf pour montrer que le fonctionnement normal des systèmes fonctionnels ne diminue pas l'efficacité de l'un ou des deux systèmes d'arrêt de protection.

Regulatory Document

Texte de réglementation

Atomic Energy Control Board

Commission de contrôle de l'énergie atomique

REGULATORY DOCUMENT R-77

Regulatory Policy Statement

OVERPRESSURE PROTECTION REQUIREMENTS FOR PRIMARY HEAT TRANSPORT SYSTEMS IN CANDU POWER REACTORS FITTED WITH TWO SHUTDOWN SYSTEMS

Effective date:

October 20, 1987

Canada

THE AECB REGULATORY DOCUMENTS SYSTEM

1. Siting, design, manufacture, construction, commissioning, operation, and decommissioning of nuclear facilities, or the production, possession, use and disposal of prescribed substances, in Canada or under Canadian control, are subject to the provisions of the Atomic Energy Control Act and Regulations administered by the Atomic Energy Control Board (AECB).

2. In addition to the Atomic Energy Control Regulations, three other categories of Regulatory Document are employed by the AECB. These are:

   Generic Licence Conditions - standard sets of conditions that are included in particular AECB licences of a common type, unless specific circumstances indicate otherwise;

   Regulatory Policy Statements - firm expressions that particular "requirements" not expressed as Regulations or Licence Conditions be complied with or that any requirements be met in a particular manner but where the AECB retains the discretion to allow deviations or to consider alternative means of attaining the same objectives where a satisfactory case is made; and

   Regulatory Guides - guidance or advice on any aspect of the AECB's regulatory process that is given in a manner less rigid than that intended by Policy Statements.

3. In developing Regulatory Documents, the AECB publishes its proposals as Consultative Documents in order to solicit comments both from the nuclear industry and from the public. This is done prior to releasing any Regulatory Document in final form. In certain cases, after the period for public comment, a Consultative Document may be issued for "trial use". This is done for a limited period of time to gain practical experience. Following the period of trial use, the revised document is re-issued for further public comment prior to release in final form.

4. Comments on Consultative Documents and suggestions for new Regulatory Documents and for improvement to those that exist are encouraged and should be directed to the Health Effects and Regulatory Documents Section of the AECB.

5. Copies of Consultative Documents, Regulatory Documents and related index lists are available in both English and French on request from the Office of Public Information. Requests for technical information on and interpretation of documents should be addressed to this office.

6. The Atomic Energy Control Board may be contacted as follows:

Postal address: Atomic Energy Control Board
P.O. Box 1046
Ottawa, Ontario
CANADA
K1P 5S9

Telephone
General Inquiries: (613) 995-5894

OVERPRESSURE PROTECTION REQUIREMENTS FOR PRIMARY HEAT TRANSPORT SYSTEMS IN CANDU POWER REACTORS FITTED WITH TWO SHUTDOWN SYSTEMS

1. INTRODUCTION

The overpressure protection requirements of Article NB 7000 of Section III of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code) are incorporated in the National Standard of Canada N285.1 [Ref. 1]. These requirements do not, however, refer to a particular nuclear system design. This is recognized in paragraphs NCA-2141 and NB-7120 of the ASME Code which make reference to the requirements of the appropriate regulatory authority for guidance.

For CANDU power reactors fitted with two shutdown systems, some guidance is given in the Atomic Energy Control Board (AECB) Regulatory Document R-10 [Ref. 2], but this does not address overpressure protection as a specific topic and further clarification is required. This document seeks to provide such clarification.

NOTE: In this document, references are made to Section III of the 1980 Edition of the ASME Code. This is for convenience only; the requirements stated herein apply to whichever edition of the Code is being applied at a particular reactor site.

2. PROBLEM DEFINITION

2.1 Reference 2 requires that CANDU power reactors be fitted with two independent shutdown systems, and that each of these should incorporate two diverse trip parameters for serious process failures requiring shutdown action, insofar as this is practicable. Because the reactor shutdown systems form part of an integrated overpressure protection system, it is necessary to define the role of each of the shutdown systems (and of each trip parameter) in the integrated system. Specifically, it is necessary to define appropriate service limits for events or failures which lead to overpressure and which occur coincidently with various shutdown system impairments (e.g., failure of one trip parameter of a shutdown system).

2.2 Where power-actuated relief valves are connected to instrumentation associated with one or both shutdown systems, the credit which may be given to these valves under conditions of shutdown system impairment must be specified in the overpressure protection analysis.

2.3 Shutdown system action is normally only required for overpressure protection of primary heat transport systems. Therefore, the requirements of this document apply exclusively to primary heat transport systems.

2.4 Shutdown system action can make no contribution to overpressure protection in situations where the reactor is initially at zero power and remains at zero power. The requirements of this document do not apply to such situations.

3. ALLOWABLE SERVICE CONDITIONS

3.1 In order to define the allowable service conditions following certain events or failures, the latter have been graded in terms of probability of occurrence. This is necessary if service conditions with various shutdown system impairments are to be specified, because of the probabilistic nature of the impairments themselves. The events or failures have been graded into three categories according to the frequency at which they are expected to occur:

(a) moderate frequency,

(b) low frequency, or

(c) extremely low frequency.

Agreement is to be reached between the licensee and the AECB as to the correct placement of individual events in these categories on a case-by-case basis. To assist in this process the following numerical ranges of probability of occurrence are suggested:

(a) moderate frequency $> 10^{-2}$/year,

(b) low frequency $10^{-2} - 10^{-4}$/year,

(c) extremely low frequency $< 10^{-4}$/year.

3.2 Table I states the allowable service limit for each of the event categories assuming that either:

(a) the first shutdown system trips as intended; or

(b) the first shutdown system fails to act, but the second shutdown system trips.

The "first shutdown system" is the one which is intended to trip first for the particular event under consideration. It may be either of the two shutdown systems (i.e., either SDS1 or SDS2).

3.3 In analyses to demonstrate that the requirements of Table I are met:

(a) process system protective action (including regulating system action) must not be credited; and

(b) only second trip parameters in each of the shutdown systems may be credited (except for the special cases outlined in Sections 3.4 to 3.6 below).

This is consistent with the more general requirements of Reference 1.

3.4 The first trip parameter may be credited in the case where this trip parameter is high pressure in the system under consideration. (This recognizes the unique relevance of a high-pressure trip to overpressure protection.)

3.5 In a case where only one trip parameter is installed in the first shutdown system and where this parameter is not high pressure in the system under consideration, the service limits given for the first shutdown system in Table I must be met by the first parameter of the second shutdown system.

3.6 In a case where only one trip parameter is installed in the second shutdown system, this trip parameter may be credited.

4. CONNECTIONS BETWEEN POWER-ACTUATED RELIEF VALVES AND SHUTDOWN SYSTEMS

4.1 In reactor plants where power-actuated relief valves are installed and are connected to the instrumentation associated with one of the shutdown systems, these relief valves should be considered as part of the shutdown system in question. Consequently, such relief valves should only be credited in analyses in which it is assumed that the shutdown system in question trips.

NOTE: Where power-actuated relief valves are connected to the first shutdown system's instrumentation, it is conceivable that operation of these valves without a successful reactor trip could occur. It can be argued that such operation could lead to more severe overpressure conditions by delaying a trip of the second shutdown system. In this case, analyses both with and without relief valve operation are required.

4.2 Where power-actuated relief valves are installed but are not connected to the instrumentation associated with either shutdown system, these relief valves may be credited in all overpressure protection analyses, providing that:

(a) each relief valve is equipped with its own instrumentation (and power supplies, etc.) so that no single failure would result in the disablement of more than one relief valve; and

(b) this instrumentation is designed to the same standards as equivalent instrumentation in the shutdown systems.

These requirements are consistent with those of:

(a) paragraph NB-7532 of the ASME code;

(b) paragraph 7.2.4.2 of CSA Standard N285.1 [Ref. 1].

TABLE 1

OVERPRESSURE PROTECTION REQUIREMENTS FOR PRIMARY HEAT TRANSPORT SYSTEMS
IN CANDU POWER REACTORS
FITTED WITH TWO SHUTDOWN SYSTEMS

FREQUENCY OF EVENT OR FAILURE	SERVICE LIMIT WITH TRIP OF:*	
	1ST SHUTDOWN SYSTEM	2ND SHUTDOWN SYSTEM
MODERATE	B	C
LOW	C	D
EXTREMELY LOW	D	D

NOTES:
1. Process system protective action (including regulating system action) may not be credited.
2. Second trip parameters only may be credited, except as outlined in note 3 below.
3. The first trip parameter may be credited if it is high pressure in the system under consideration.
4. The "first shutdown system" is first to trip (it may be either SDS1 or SDS2).

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*Level B, C and D Service Limits are those defined in the General Requirements under Section III of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code (ASME Code).

REFERENCES

1. CAN3-N285.1-M81, Requirements for Class 1, 2 and 3 Pressure-Retaining Systems and Components in CANDU Nuclear Power Plants.

2. AECB Regulatory Document R-10, The Use of Two Shutdown Systems in Reactors. January 1977.

Regulatory Document

Texte de réglementation

Atomic Energy Control Board

Commission de contrôle de l'énergie atomique

TEXTE DE RÉGLEMENTATION R-77

Déclaration de principe en matière de réglementation

EXIGENCES POUR LA PROTECTION CONTRE LA SURPRESSION DANS LE CIRCUIT CALOPORTEUR PRIMAIRE DES RÉACTEURS DE PUISSANCE CANDU MUNIS DE DEUX SYSTÈMES D'ARRÊT D'URGENCE

Date d'entrée en vigueur :

le 20 octobre 1987

Canada

TEXTES DE RÉGLEMENTATION DE LA CCEA

1. Le choix d'emplacement, la conception, la fabrication, la construction, la mise en service, l'exploitation et le déclassement d'installations nucléaires ou la production, la possession, l'utilisation et l'élimination de substances prescrites, au Canada ou sous contrôle canadien, sont assujettis aux dispositions de la Loi sur le contrôle de l'énergie atomique et de son Règlement d'application, dont l'administration relève de la Commission de contrôle de l'énergie atomique (CCEA).

2. En plus du Règlement susmentionné, la CCEA utilise trois catégories de textes de réglementation. En voici une courte description.

   Conditions générales d'autorisation de permis - ensemble de conditions types figurant dans tous les permis similaires délivrés par la CCEA, à moins de circonstances exceptionnelles;

   Déclarations de principe en matière de réglementation - déclarations laissant clairement entendre que certaines "exigences" qui ne figurent ni dans le Règlement ni dans les conditions des permis sont obligatoires ou que certaines exigences doivent être respectées d'une façon déterminée laissant également entendre que la CCEA se réserve le droit de permettre des écarts ou d'envisager d'autres façons d'en arriver aux mêmes fins, lorsque ces façons semblent convenir; et

   Guides de réglementation - directives ou conseils donnés sur tout aspect de la réglementation assurée par la CCEA mais formulés de façon moins rigoureuse que dans les déclarations de principe.

3. Lors de l'élaboration de ses textes de réglementation, la CCEA en publie d'abord le projet à titre de Document de consultation, afin de connaître les commentaires du secteur nucléaire et du grand public, avant que le projet de texte de réglementation paraisse sous sa forme définitive. Dans certains cas, après l'achèvement de la période réservée aux commentaires, la Commission peut faire mettre le document de consultation à l'essai pratique pour un temps limité. Après cette période d'essai, on demande encore une fois l'opinion du public, avant que le document révisé soit publié sous sa forme définitive.

4. Tout commentaire sur les documents de consultation et toute suggestion à l'égard des nouveaux textes de réglementation ou ceux déjà en vigueur sont les bienvenus; il suffit de les transmettre à la section des Effets sur la santé et documents de réglementation de la CCEA.

5. On peut se procurer des exemplaires des documents de consultation et des textes de réglementation, dans les deux langues officielles, en s'adressant au Bureau d'information publique. Toute demande de renseignements techniques ou d'interprétation des textes devrait être acheminée au Bureau susmentionné.

6. L'adresse de la CCEA est la suivante:

   Commission de contrôle de l'énergie atomique
   C.P. 1046
   Succursale "B"
   OTTAWA (Ontario)
   CANADA K1P 5S9

   Renseignements: (613) 995-5894

EXIGENCES POUR LA PROTECTION CONTRE LA SURPRESSION DANS LE CIRCUIT CALOPORTEUR PRIMAIRE DES RÉACTEURS DE PUISSANCE CANDU MUNIS DE DEUX SYSTÈMES D'ARRÊT D'URGENCE

1. INTRODUCTION

Les exigences relatives à la protection de l'article NB 7000 de la section III du Boiler and Pressure Vessel Code de l'American Society of Mechanical Engineers (ASME Code) sont reprises dans la norme nationale du Canada N285.1 (référence 1). Ces exigences, cependant, ne traitent pas d'une conception de système nucléaire particulière . Cet élément est reconnu dans les paragraphes NCA-2141 et NB-7120 de l'ASME Code qui renvoie aux exigences de l'autorité réglementaire pertinente pour avoir plus de renseignements.

En ce qui a trait aux réacteurs de puissance CANDU munis de deux systèmes d'arrêt d'urgence, il existe certaines directives dans le document de réglementation R-10 (référence 2) de la Commission de contrôle de l'énergie atomique (CCEA), mais le document lui-même ne traite pas en particulier de la protection contre la surpression. Le présent document a donc pour but de fournir les indications plus claires qui s'imposaient.

NOTA : Les références à la section III de l'ASME Code renvoient, pour des raisons d'ordre pratique seulement, à l'édition de 1980. Les exigences mentionnées dans le présent document s'appliquent à toute édition du Code utilisée pour un projet de réacteur particulier.

2. HISTORIQUE DU PROBLÈME

2.1 Selon les prescriptions de la référence 2, les réacteurs de puissance CANDU doivent être équipés de deux systèmes d'arrêt d'urgence indépendants, chacun étant muni, dans la mesure du possible, de deux paramètres de déclenchement distincts pour toute défaillance grave des systèmes de procédé nécessitant l'arrêt du réacteur. Étant donné que les systèmes d'arrêt d'urgence font partie intégrante d'un système de protection contre la surpression, il est nécessaire de déterminer le rôle de chacun des systèmes d'arrêt d'urgence et de chacun des paramètres de déclenchement dans le système complet. Il importe particulièrement d'établir des limites de contraintes opérationnelles adéquates pour tout incident ou toute défaillance occasionnant une surpression coïncidant avec diverses pannes du système d'arrêt d'urgence (par exemple, la défaillance d'un paramètre de déclenchement dans un système d'arrêt d'urgence).

2.2 Lorsque les soupapes de décharge à servo-commande sont reliées aux instruments associés à l'un des systèmes d'arrêt d'urgence, ou aux deux, il importe de préciser, dans l'analyse de protection contre la surpression, les limites d'efficacité de ces soupapes en divers cas de défaillance d'un système d'arrêt d'urgence.

2.3 Vu que seul le circuit caloporteur primaire nécessite normalement la protection contre la surpression, les exigences prévues dans le présent document ne s'appliquent donc uniquement qu'aux composants de ce système.

2.4 Le système d'arrêt d'urgence ne peut contribuer en aucune façon à la protection contre la surpression si le réacteur est à l'arrêt au départ et continue à ne produire aucune puissance. Les exigences du présent document ne s'appliquent pas à une telle situation.

3. CONDITIONS OPÉRATIONNELLES ADMISSIBLES

3.1 Dans le but de déterminer les conditions opérationnelles admissibles à la suite de certains incidents ou défaillances, ces derniers ont été catégorisés en termes de probabilité. Cette mesure s'impose si des conditions opérationnelles comportant diverses défaillances du système d'arrêt d'urgence doivent être précisées et à cause de la nature probabiliste de ces défaillances. Les incidents ou les défaillances sont donc répartis en trois catégories générales selon les fréquences prévues suivantes :

a) à fréquence moyenne;

b) à basse fréquence;

c) à très basse fréquence.

Il incombe au titulaire de permis d'en venir à un accord avec la CCEA au sujet de la catégorisation correcte des événements individuels à partir d'une étude cas par cas. Les suggestions suivantes d'éventails numériques de probabilité faciliteront peut-être la tâche :

a) fréquence moyenne $> 10^{-2}$/année,

b) basse fréquence 10^{-2} à 10^{-4}/année,

c) très basse fréquence $< 10^{-4}$/année.

3.2 Le tableau I fait état de chaque limite opérationnelle admissible pour chacune des catégories d'incidents, en supposant que l'une des situations suivantes se produit :

a) le premier système d'arrêt d'urgence se déclenche tel que prévu;

b) le premier système d'arrêt d'urgence fait défaut, mais le second système d'arrêt d'urgence se déclenche.

Le «premier système d'arrêt d'urgence» est celui qui devrait se déclencher le premier dans le cas en question; ce peut être l'un ou l'autre des deux systèmes d'arrêt d'urgence, soit le SAU-1, soit le SAU-2.

3.3 Dans le cas d'analyses servant à démontrer la conformité aux exigences du tableau I,

a) il ne faut pas tenir compte du fonctionnement d'aucun système de protection du procédé, y compris le système de régulation;

b) on ne peut seulement tenir compte que des deuxièmes paramètres de déclenchement de chaque système d'arrêt d'urgence (sauf pour les cas spéciaux mentionnés aux paragraphes 3.4, 3.5 et 3.6).

Ceci est conforme aux exigences plus générales exposées à la référence 1.

3.4 On peut tenir compte du premier paramètre de déclenchement seulement dans le cas où ce paramètre en est un de haute pression dans le système en question. Ceci atteste l'importance primordiale du déclenchement par haute pression dans le cadre de la protection contre la surpression.

3.5 Dans le cas où le premier système d'arrêt d'urgence n'est muni que d'un seul paramètre de déclenchement qui n'en est pas un de haute pression dans le système en question, le premier paramètre du deuxième système d'arrêt d'urgence doit respecter les limites opérationnelles données au tableau 1 pour le premier système d'arrêt d'urgence.

3.6 Dans le cas où il n'y a qu'un paramètre de déclenchement dans le deuxième système d'arrêt d'urgence, on peut tenir compte de celui-ci.

4. LIENS ENTRE LES SOUPAPES DE DÉCHARGE À SERVO-COMMANDE ET LES SYSTÈMES D'ARRÊT D'URGENCE

4.1 Lorsque l'on installe des soupapes de décharge à servo-commande dans une centrale nucléaire et qu'on les relie aux instruments associés à l'un des systèmes d'arrêt d'urgence, il faut considérer ces soupapes de décharge à servo-commande comme composants du système d'arrêt d'urgence en question. Par conséquent, il ne faut tenir compte du fonctionnement de ces soupapes que dans les analyses où l'on suppose que le système d'arrêt d'urgence en question se déclenche normalement.

NOTA : Dans le cas où les soupapes de décharge à servo-commande sont reliées aux instruments du premier système d'arrêt d'urgence, il est possible que les soupapes puissent fonctionner sans que l'arrêt du réacteur soit déclenché; ceci pourrait entraîner une plus grande surpression en retardant le déclenchement du deuxième système d'arrêt d'urgence. Dans ce cas, il faut procéder à des analyses des deux modes, c'est-à-dire avec et sans fonctionnement des soupapes de décharge.

4.2 Lorsque des soupapes de décharge à servo-commande sont installées sans être reliées aux instruments associés à l'un ou l'autre des systèmes d'arrêt d'urgence, on peut tenir compte du fonctionnement de ces soupapes dans toute analyse concernant la protection contre la surpression, pourvu que :

a) chacune des soupapes de décharge soit munie de sa propre source d'énergie et d'instruments individuels, afin d'éviter toute défaillance commune des soupapes à la suite d'une défaillance particulière; et que

b) la conception des instruments soit conforme aux mêmes normes qui s'appliquent aux instruments équivalents des systèmes d'arrêt d'urgence.

Ces exigences correspondent aux normes suivantes :

a) paragraphe NB-7532 de l'ASME Code, et

b) paragraphe 7.2.4.2. de la norme N285.1 de l'ACNOR (référence 1).

TABLEAU I

EXIGENCES POUR LA PROTECTION CONTRE LA SURPRESSION
DU CIRCUIT CALOPORTEUR PRIMAIRE DES RÉACTEURS DE PUISSANCE CANDU
MUNIS DE DEUX SYSTÈMES D'ARRÊT D'URGENCE

FRÉQUENCE DE L'INCIDENT OU DE LA DÉFAILLANCE	LIMITE OPÉRATIONNELLE EN CAS DE DÉCLENCHEMENT*	
	1er SYSTÈME D'ARRÊT D'URGENCE	2e SYSTÈME D'ARRÊT D'URGENCE
Moyenne	B	C
Basse	C	D
Très basse	D	D

NOTES : 1. On ne peut pas tenir compte du fonctionnement des systèmes de protection du procédé, y compris du système de régulation.

2. On ne peut seulement tenir compte que des deuxièmes paramètres de déclenchement, sauf dans les cas mentionnés à la note 3.

3. On peut tenir compte du premier paramètre de déclenchement seulement s'il en est un de haute pression dans le système en question.

4. L'expression «premier système d'arrêt d'urgence» signifie le premier système à se déclencher, que ce soit le SAU-1 ou le SAU-2.

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* Les niveaux B, C et D sont définis dans les exigences générales de la section III du Boiler and Pressure Vessel Code de l'American Society of Mechanical Engineers (ASME Code).

RÉFÉRENCES

1. ACNOR, Norme CAN3-N285.1-M81, «Exigences relatives aux systèmes et aux composants sous presssion des classes 1, 2 et 3 des centrales nucléaires CANDU».

2. CCEA, Document de réglementation R-10, «L'utilisation de deux systèmes d'arrêt des réacteurs», janvier 1977.

Consultative Document / Document de consultation

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

CONSULTATIVE DOCUMENT C-83

Proposed Amendments to Regulations

PROPOSED GENERAL AMENDMENTS TO THE ATOMIC ENERGY CONTROL REGULATIONS

Issued for comment:

April 28, 1986

Canada

This Consultative Document is issued in order to provide an opportunity for public review of the proposal it contains before formal issue as a Regulatory Document. Comments are encouraged and should be directed to the address below before July 28, 1986, for section 5, and before October 28, 1986, for the remainder of the proposed amendments.

Subject to the Access to Information Act, all comments will be disclosed to the public and will be placed in the AECB Public Documents Room in the AECB offices at 270 Albert Street, Ottawa. Commentators should identify those parts of their comments that should not be disclosed pursuant to the Access to Information Act, the reason why they should not be disclosed, and also identify those parts that they consent to the disclosure of.

Direct comments to:

Health Effects and Regulatory
Documents Section
Atomic Energy Control Board
P.O. Box 1046
Ottawa, Ontario
CANADA
K1P 5S9

THE AECB REGULATORY DOCUMENTS SYSTEM

1. Siting, design, manufacture, construction, commissioning, operation, and decommissioning of nuclear facilities, or the production, possession, use and disposal of prescribed substances, in Canada or under Canadian control, are subject to the provisions of the Atomic Energy Control Act and Regulations administered by the Atomic Energy Control Board (AECB).

2. In addition to the Atomic Energy Control Regulations, three other categories of Regulatory Document are employed by the AECB. These are:

   Generic Licence Conditions - standard sets of conditions that are included in particular AECB licences of a common type, unless specific circumstances indicate otherwise;

   Regulatory Policy Statements - firm expressions that particular "requirements" not expressed as Regulations or Licence Conditions be complied with or that any requirements be met in a particular manner but where the AECB retains the discretion to allow deviations or to consider alternative means of attaining the same objectives where a satisfactory case is made; and

   Regulatory Guides - guidance or advice on any aspect of the AECB's regulatory process that is given in a manner less rigid than that intended by Policy Statements.

3. In developing Regulatory Documents, the AECB publishes its proposals as Consultative Documents in order to solicit comments both from the nuclear industry and from the public. This is done prior to releasing any Regulatory Document in final form. In certain cases, after the period for public comment, a Consultative Document may be issued for "trial use". This is done for a limited period of time to gain practical experience. Following the period of trial use, the revised document is re-issued for further public comment prior to release in final form.

4. Comments on Consultative Documents and suggestions for new Regulatory Documents and for improvement to those that exist are encouraged and should be directed to the Health Effects and Regulatory Documents Section of the AECB.

5. Copies of Consultative Documents, Regulatory Documents and related index lists are available in both English and French on request from the Office of Public Information. Requests for technical information on and interpretation of documents should be addressed to this office.

6. The Atomic Energy Control Board may be contacted as follows:

   Postal address: Atomic Energy Control Board
   P.O. Box 1046
   Ottawa, Ontario
   CANADA
   K1P 5S9

   Telephone
   General Inquiries: (613) 995-5894

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PROPOSED GENERAL AMENDMENTS TO THE ATOMIC ENERGY CONTROL REGULATIONS

1. INTRODUCTION

The Atomic Energy Control (AEC) Act was proclaimed in force October 12, 1946, and the provisions that affect the regulatory powers of the Atomic Energy Control Board (AECB) have not changed since. The Act is very general in nature, and the purpose of the Act and the powers and responsibilities of the Board are described in broad terms. Principal among these is to make regulations to "control" the development, application and use of atomic energy. Regulations, therefore, are the instruments for setting out how atomic energy is to be controlled.

Although limited amendments and specialized regulations have been promulgated from time-to-time, the Atomic Energy Control (AEC) Regulations were last extensively amended in 1974. In these proposed General Amendments (see appendix 4) substantial changes are proposed in such matters as the designation of the authority of Board staff, exemptions from licensing, international safeguards, duties of licensees and atomic radiation workers, security of information, and provision for hearings. The proposed amendments have been drafted to reflect developments in the past ten years in administrative law, measures for regulatory reform, and comments from the Standing Joint Committee on Regulations and other Statutory Instruments. The scope of the "control" of atomic energy is related to matters of "health, safety, security, international safeguards, and the protection of the environment". The latter two items named are implicit in the current AEC Regulations but have been added for greater clarity in the proposed amendments. It is also proposed to limit the application of the General Amendments to be consistent with the preamble to the AEC Act, i.e., "...to the development, application and use of atomic energy, and to enable Canada to participate effectively in measures of international control of atomic energy..."

Proposed amendments to the AEC Regulations relating to the limitation of exposure to ionizing radiation (radiation protection provisions) were issued for public comment on November 14, 1983 as Consultative Document C-47. As announced by the AECB on June 20, 1984, the proposed amendments to the radiation protection provisions have been incorporated into the General Amendments with certain changes resulting from the AECB review of public comments. The public is now afforded a second opportunity to comment on the proposed amendments to these provisions. One of the proposed provisions in C-47 was related to dose limitations for female atomic radiation workers and is now law, the AEC Regulations having been amended in April, 1985 (SOR/85-335).

The industrial radiography sections of the current AEC Regulations and specialized regulations dealing with physical security, transport packaging of radioactive materials, and uranium and thorium mining will be consolidated with only consequential changes such as in numbering and cross-referencing of sections or the elimination of any duplication. As these parts are unchanged in substance, no public comment on them is sought; and so, they are not included in this Consultative Document. The Uranium Information Security Regulations and the Uranium Mines (Ontario) Occupational Health and Safety Regulations will not be consolidated.

The General Amendments are covered by the Government's policy on socio-economic impact analysis (SEIA) of regulations relating to health, safety and fairness (see appendix 1 for information on the SEIA policy). The AECB has decided that the probable impact of these amendments is sufficient to justify proceeding with a full-scale analysis. A contractor is being engaged by the AECB to collect information and to analyse it for the purpose of the SEIA. The contractor will be contacting various parties most affected by these amendments to obtain the necessary information. During the comment period, the AECB will also be re-examining these general amendments in the light of the government's Citizens' Code of Regulatory Fairness, which was announced on March 6, 1986.

Since international safeguards are outside the scope of the SEIA policy, Part VIII of the proposed regulations will not be included in the analysis.

In view of the extensive changes being proposed, the public comment period will be the six (6) months following the release date of the Consultative Document except for section 5 (not to be confused with Part V), for which the comment period will be ninety (90) days.

2. INFORMATION ON THE PROPOSED GENERAL AMENDMENTS TO THE ATOMIC ENERGY CONTROL REGULATIONS

PART I
INTERPRETATION

Definitions

Other than those definitions relating to the radiation protection provisions, which are dealt with in Part V, the major changes* in the definitions are:

- "construction", "decommissioning" and "operation" - added.
- "health" or "safety" - For atomic radiation workers, these definitions limit the application of the regulations to radiation aspects.
- "nuclear facility" - Large facilities for the processing or use of radioisotopes have been added to the definition.

Designated Officers

The designation procedure will no longer require a Board Order to be published in the Canada Gazette. Although not part of the General Amendments, a list of designated officers is presented as appendix 2 for information and comment.

Prescribed Substances

The designation of "prescribed substance" is substantially the same as in the current AEC Regulations.

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* unless otherwise stated, "change" refers to change from the current AEC Regulations.

Application

Most minerals and materials contain small or trace amounts of naturally-occurring radioactive substances. Except for the purpose of import control, naturally occurring radioactive substances will not become subject to the AEC Regulations until they are first associated with an activity that is related to the development, application or use of atomic energy. The scope of the control embodied in these General Amendments, as it applies to the possession of naturally occurring radioactive substances, will therefore be limited in accordance with the preamble of the AEC Act. This proposed change has already been discussed with provincial authorities. The Board intends to expedite making this change separately from the rest of these General Amendments. Public comments on section 5 should be received within ninety (90) days following the release of this Consultative Document.

PART II
PRESCRIBED SUBSTANCES AND PRESCRIBED ITEMS

The authority in section 4 of the current AEC Regulations to exempt prescribed substances from licensing has been deleted.

The licensing procedure for prescribed substances is unchanged; however, additional details have been added.

The requirement for a permit to export prescribed substances will be removed except for uranium, thorium, plutonium, tritium and deuterium.

PART III
NUCLEAR FACILITIES

The control over nuclear facilities has been increased to include environmentally significant site preparation work, decommissioning and abandonment, whether the abandonment occurs before or after the facility goes into operation. Environmental aspects are dealt with more explicitly than currently and are not limited to radiation effects. This will better enable the AECB to implement the Environmental Assessment and Review Process Guidelines Order (SOR/84-467 June 22, 1984). Information required in an application and the scope of licence conditions are described in more detail.

Control has been extended to include the manufacture of certain components of special importance to safety in nuclear reactors. Also, these are items whose manufacture might be started before any facility licence is required. It is important to review their design, code classification and quality assurance measures before manufacture begins.

PART IV
GENERAL

This part contains provisions which are common to prescribed substances and nuclear facilities.

Licensees will be obliged to ensure that they transfer prescribed substances or nuclear facilities only to persons licensed to have them.

The directive powers of the Board and designated officers are described in more detail than in the current AEC Regulations as are the provisions

regarding suspension, revocation or amendment of licences. Sections have been added on renewal of licences.

New provisions for emergency orders have been added.

PART V
RADIATION PROTECTION

As a result of public comments and further consideration by the AECB, the following changes have been made in the proposals which were set out in Consultative Document C-47. These proposals have been incorporated into the General Amendments and are open for further public comment. A detailed cross-reference between the General Amendments and C-47 has been included. Because most of these provisions have already received public comments, the changes are described in detail. For the convenience of readers, the original amendments published in C-47 are attached as appendix 3.

Part V of the General Amendments contains a number of sections dealing with the duties of and measures to be established by licensees to protect atomic radiation workers. However, during transport, radioactive prescribed substances are subject to the provisions of the Transport of Dangerous Goods Act and Regulations and are not subject to an AECB licence. In most cases of transport of radioactive prescribed substances, the doses to transport workers are very low because they are only occasionally exposed, and the design of the packaging for the radioactive prescribed substances ensures that the radiation dose rates from the packaging is very low. In a few cases, however, individual transport workers may be frequently involved in the transport of radioactive prescribed substances to the extent that they are atomic radiation workers as defined. In the final version of the General Amendments, it is intended to include provisions to cover transport workers equivalent to the substance of Part V in this draft, omitting references to licences and licensees. In effect, the transport workers who are atomic radiation workers will have the equivalent protection of other atomic radiation workers.

SECTION IN C-47	SECTION IN GENERAL AMENDMENTS	CHANGE RELATIVE TO C-47
definitions	definitions	- definition of "absorbed dose" clarified. - "atomic radiation worker" - reworded for clarity. - "committed dose equivalent" and "committed effective dose equivalent" in C-47 simplified by dropping "equivalent" and reworded for clarity. - the definition of "dose" has been made more explicit and removes the need for defining "dose equivalent".

		- "dosimetry year" redefined to allow 50 to 54 weeks to be used provided that the average over 5 years is not less than 52 weeks. This allows for the fact that dosimetry periods sometimes do not end precisely at the end of the dosimetry year.
		- "effective dose equivalent" in C-47 changed to "effective dose" and clarified as applying to persons.
		- definition of "extremity" added.
		- definition of "other worker" added.
		- definition of "radiation" made more general.
		- definition of "sievert" deleted because it is a commonly understood unit in radiation protection and it is described in the definition of "dose".
		- "weighted dose equivalent" in C-47 changed to "weighted dose".
		- "working level" and "working level hour" changed slightly for clarity.
11(1)(c)	72(b)	- requires that dose estimates be recorded if dose is not measured directly; records of dosimetry year must be kept.
11(4)	76(a)	- no change in substance.
11(5)	76(b)	- no change in substance.
17(1)(a)	39(1)(a)	- "forthwith" deleted, preamble to subsections 39(1) and 39(2) clarifies that the worker must be advised about radiation risks before commencing atomic radiation work.
17(1)(b)	39(1)(b)	- no change in substance.
17(1)(c)	39(3)(a)	- no change in substance.
17(1)(d)	39(3)(b)	- added that the Board as well as inspectors can request the list of atomic radiation workers.
17(2)	39(1)(c)	- no change in substance. The AECB is preparing a general document to assist employers to meet this requirement. However, employers will still be responsible for explaining the risks particular to each worker's job.

17(3)	40(1)	- reworded but the intent is the same.
NONE	39(2)	- added to cover female "other workers" (defined term) who become pregnant; to ensure that the rate of their exposure while known to be pregnant does not exceed the limit given in paragraph 43(1)(c); note that the total dose to a female "other worker" is still governed by paragraph 43(1)(d) in any dosimetry year.
19(1)(a) and (b)	43 44 45	- the dose limits are described in sections 43 and 44 instead of in a schedule.
	43(1)(a)(i), 43(b)(i)(A) and 43(b)(ii)(A)	- quarterly limits are retained to limit the rate at which atomic radiation workers may be exposed during a dosimetry year.
Sched. II Limits for Pregnant Women	43(1)(c)	- dosimetry period for pregnant female workers changed to semi-monthly to be consistent with actual practice by dosimetry services.
	43(1)(d)	- (see note at the end of this section)
Note (1) Sched. II	45(a)	- added explicit reference to external dosimeter for measuring dose from external sources of radiation.
	45(b)	- new provision to deal with committed dose from radionuclides with relatively short biological half-life.
Note (2) to Sched. II	46(1)	- provides for doses to be calculated based on exposure as well as intake under certain circumstances.
Note (3) to Sched. II	46(2) and (3)	- no change in substance.
Note (4) to Sched. II	45(c) and (d)	- no change in substance.
	45(e)	- added for clarification.
19(2)	37(1)	- reworded to apply to individual or collective dose to persons; "procedures" changed to "measures" to broaden the scope of the principle, since more than procedures are involved.

19(3),(4), (5),(6) and (7)	38	- measures to maintain doses as low as reasonably achievable will be approved as part of the licensing and process as for other health and safety measures. (see subsections 9(1)(e); 9(2)(f); 22(1)(h); 22(2); 23(1)(h); 23(2)(f).
19(8)	44(1)	- paragraph 44(1)(b) added to include occupational doses from X-rays or other man-made sources of radiation not subject to the AEC Regulations; (doses from medical treatment are still excluded by section 36). This change is being proposed to ensure that persons are not overexposed to ionizing radiation from occupational, man-made, non-medical sources. Some provinces have reciprocal provisions in their X-ray exposure regulations.
19(9)	44(2)	- reworded; no change in intent.
19.1	39(4)	- reworded to clarify two cases (i) a woman who becomes pregnant while employed as an atomic radiation worker and (ii) a woman who is already pregnant when hired as an atomic radiation worker. The second case was not adequately covered by the original wording.
19.2(1)	47(1)	- no change in substance.
19.2(2) and (3)	47(2) to (6)	- A change is proposed to protect the jobs of workers who might be discharged from their employment as a result of relatively small overexposures. Note that employers are still liable to prosecution in the event of an overexposure. The possibility of prosecution and the fact that radiation protection procedures are reviewed and approved by the Board are considered sufficient to ensure that licensees will not try to relax measures to prevent overexposure of workers.
19.3(1) and (3)	37(2)	- delineates more clearly a licensee's responsibility for measuring or estimating doses to atomic radiation workers, other workers, and others, e.g., members of the public or visitors.
19.3(2)	38	- measures for dosimetry will be approved as part of the licensing process.

19.4(1) and (2)	--	- deleted. Provision for planned exposures in excess of the limits is considered unecessary and undesirable. The AECB has never received any request for planned overexposures under the current AEC Regulations.
19.5	47	- deleted provision to permit radiation doses in excess of the limits.
		New Provisions
	40	- a duty on licensees to maintain a list of all atomic radiation workers by job category and to ensure persons are employed as atomic radiation workers, only if required for the licensed activity.
	41	- provides for the AECB to challenge the designation of persons as atomic radiation workers.

Note: The recommendations of International Commission on Radiological Protection regarding dose limits for members of the public (i.e., those who are not atomic radiation workers) have been changed recently. The ICRP recommended limit for members of the public is now 1 mSv during any dosimetry year instead of 5 mSv as contained in subsection 43(d) herein. Public comment is invited on whether this change should be made to the AEC Regulations. In addition, the effects of such a change in the dose limit will be included in the socio-economic impact analysis.

PART VI
INSPECTION AND COMPLIANCE

The powers of inspectors have been elaborated, particularly regarding actions for verifying compliance. Licensees and others are required to cooperate with and assist inspectors. The basis for issuing and the contents of directives are described in detail. Persons to whom directives are issued may request a hearing but such a request does not relieve the person from compliance with the directive.

PART VII
INTERNATIONAL SAFEGUARDS

This part outlines the role and responsibilities of safeguards inspectors and licensees. Safeguards inspectors have access to facilities and records, but directives can be issued only by the Board or a designated officer. There is a provision for the licensee to have a hearing before complying with a directive issued by a designated officer.

The purpose of this section is to put into the regulations the safeguards obligations in international agreements to which Canada is a party with the International Atomic Energy Agency and several countries.

PART VIII
GENERAL REQUIREMENTS

This part contains provisions relating to the keeping and disposal of certain records, loss or theft of prescribed substances, abnormal occurrences, duties of licensees and employees, posting of licences or a notice, posting of environmental conditions in the workplace, annual reports, service of documents, security of information about nuclear weapons and certain related nuclear facilities and the prohibition of false or misleading statements. Several of these sections were developed from and will replace a number of commonly-used conditions of licence.

APPENDIX 1

INFORMATION ON SOCIO-ECONOMIC IMPACT ANALYSIS (SEIA) POLICY

INFORMATION ON SOCIO-ECONOMIC IMPACT ANALYSIS (SEIA) POLICY

A. The Purpose and Scope of the SEIA Policy

The general purpose of the policy is to improve the quality of information available to those who are responsible for establishing federal regulations and to make the regulatory process more responsive to the concerns of the private sector. More specifically, the policy has three stated objectives:

(a) to promote a thorough, systematic analysis of the potential socio-economic impact of new regulations;

(b) to ensure that all government departments and agencies responsible for administering regulations use the same basic methods and assumptions in their analyses; and

(c) to provide an opportunity for increased public participation in the regulation-making process.

The policy applies to new or amended regulations in the areas of health, safety and fairness (HSF). The term "health and safety" includes the health and safety of the population as well as the protection of the environment. "Fairness" involves the protection of the public against fraud, deception or inaccuracy in the reporting of information. Regulations concerning economic rate-setting (e.g., railway and telephone rates) or the granting of licences* are not included in the policy.

B. Participants in the SEIA Policy Process

The primary participants in the SEIA process are the federal departments and agencies sponsoring HSF regulations and those parties in the private sector affected by those regulations. There are thirteen federal government participants including the Departments of Agriculture, Consumer and Corporate Affairs, Energy, Mines and Resources, Environment, Fisheries and Oceans, Health and Welfare, Indian and Northern Affairs, Labour and Transport, as well as the Atomic Energy Control Board, the Canadian Transport Commission, the Canada Mortgage and Housing Corporation and the National Energy Board.

Affected parties who may be notified concerning a proposed regulation include individual firms, industrial and business associations, labour and consumer groups, public interest groups and individuals. These groups may contribute to the development of draft regulations and the performance of analyses by supplying data and expert opinion. Often such information would otherwise be unavailable to the regulating body.

A secondary participant is the Technical Advisory Group on Impact Assessment (TAG) within the Treasury Board Secretariat. The TAG administers the policy,

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* For the purpose of the general amendments to the Atomic Energy Control Regulations, the provisions dealing with the granting of licences will be included.

evaluates its effectiveness and has an advisory role regarding the performance of SEIAs. Departments and agencies may request advice from the TAG at any point in the analysis of regulations.

C. The SEIA Policy Process

The SEIA policy works within the existing regulatory process, placing additional requirements on the regulating department or agency:

(a) Each department and agency, when contemplating a regulatory action, must initiate a process of consultation with "directly-affected" parties as early as the problem-definition stage of the regulatory process.

(b) Major new HSF regulations must be subjected to a socio-economic impact analysis by the sponsoring department or agency prior to their implementation (although in emergency situations requiring immediate government action, regulations may be enacted first with the analysis to be completed afterward). Minor regulations (defined basically as those which would impose less than $10 million in direct costs on the economy in the first year) are exempted.

(c) A summary of the analysis must be published in the Canada Gazette Part 1 with the notice of intent to regulate and the terms of the proposed regulation at least sixty (60) days before the intended promulgation date. Interested parties may forward any comments they have concerning the analysis or the regulations to the sponsoring department or agency during that period.

(d) When the summary is published in Part 1, the complete analysis must be made publicly available along with any comments or representations subsequently received.

D. Socio-Economic Impact Analysis

The analysis itself considers the social and economic costs and benefits of proposed regulations and compares them to the costs and benefits to society of feasible alternatives. There are two main sections to an analysis; the allocative and non-allocative sections.

The allocative section deals with the effect of a regulation on the efficient allocation of resources in the economy, measuring the economic costs and benefits of the regulations and their alternatives through the use of cost-benefit and cost-effectiveness analysis. The non-allocative section addresses the probable impact of the regulation on things such as the distribution of income (between individuals and between regions), technological progress, market structure and competition, employment, balance of payments and inflation. Since conventional cost-benefit and cost-effectiveness approaches are not appropriate when dealing with these matters, a variety of other measurement techniques is used.

The above analytical requirements of the policy are designed to ensure that:

(a) all pertinent issues are identified;

(b) information used in the analysis is accurate;

(c) analyses are objective and methodologically sound; and

(d) the social costs and benefits of feasible alternatives are considered.

APPENDIX 2

"DESIGNATED OFFICERS" FOR PURPOSES OF THE ATOMIC ENERGY CONTROL REGULATIONS

APPENDIX 2

"DESIGNATED OFFICERS" FOR PURPOSES OF THE ATOMIC ENERGY CONTROL REGULATIONS

	COLUMN 1	COLUMN 2*
1)	Subparagraph 8(2)(e)(i) - Approve design, etc. of device or equipment.	(a) President (b) Secretary (c) Director General - DFC (d) Manager - RTD
2)	Subsection 9(1) - Issue of a licence for the purpose of section 7 (possess any prescribed substance or any device or equipment).	(a) President (b) Secretary (c) Director General - DRR (d) Director General - DFC (e) Manager - RTD
3)	Subsection 11(1) - Issue import and export licence.	(a) President (b) Secretary (c) Managers of the following divisions: - SSD and RTD
4)	Subsection 14(3), sections 20 and 25 - Exempt a site for a sub-critical nuclear assembly or a particle accelerator.	(a) President (b) Secretary (c) Director General - DRR (for accelerators only) (d) Manager - OCRFD (for accelerators only)
5)	Section 15 and subsection 19(1) - Approval to abandon site or facility before operation.	(a) President (b) Secretary
6)	Section 15 and subsection 19(2) - Approval to abandon facility after operation.	(a) President (b) Secretary
7)	Section 20 - Issue of licences for facilities.	(a) President (b) Secretary (c) Director General - DRR (for accelerators only)
8)	Subsection 21(1) and section 25 - Request for information for siting licence or renewal.	(a) President (b) Secretary (c) Director General - DRR (d) Director General - DFC (e) Managers of the following divisions: - PRDA, PRDB, OCRFD, UMD, WMD and FWD (f) Senior Project Officer for each facility

* All abbreviations used under this column are spelled out in addendum to this Appendix.

COLUMN 1	COLUMN 2
9) Subsection 21(2) - Terms and conditions for licence to prepare a site for a nuclear facility.	(a) President (b) Secretary (c) Director General - DRR (for accelerators only)
10) Subsection 21(3) - Amendment to site licence.	(a) President (b) Secretary (c) Director General - DRR (d) Director General - DFC
11) Paragraph 22(1)(i) and section 25 - Request information for construction licence or renewal.	(a) President (b) Secretary (c) Director General - DRR (d) Director General - DFC (e) Managers of the following divisions: - PRDA, PRDB, OCRFD, UMD, WMD and FWD (f) Senior Project Officer for each facility
12) Subsection 22(2) - Terms and conditions for construction licence.	(a) President (b) Secretary (c) Director General - DRR (for accelerators only)
13) Paragraph 23(1)(l) and section 25 - Request information for operating licence or renewal.	(a) President (b) Secretary (c) Director General - DRR (d) Director General - DFC (e) Managers of the following divisions: - PRDA, PRDB, OCRFD, UMD, WMD and FWD (f) Senior Project Officer for each facility
14) Subsection 23(2) - Terms and conditions for operating licence.	(a) President (b) Secretary (c) Director General - DRR (for accelerators only)
15) Paragraph 24(1)(j) and section 25 - Request information for decommissioning licence or renewal.	(a) President (b) Secretary (c) Director General - DRR (d) Director General - DFC (e) Managers of the following divisions: - PRDA, PRDB, OCRFD, UMD, WMD and FWD (f) Senior Project Officer for each facility
16) Subsection 24(2) - Terms and conditions for decommissioning licence.	(a) President (b) Secretary (c) Director General - DRR (for accelerators only)

COLUMN 1	COLUMN 2
17) Paragraph 26(1)(a) - Approval for design, etc. of nuclear reactor components.	(a) President (b) Secretary (c) Director General - DRR
18) Section 28 - Written instructions to abandon, etc. contaminated premises.	(a) President (b) Secretary (c) Director General - DRR (d) Director General - DFC
19) Subsection 29(1) - Directives for technical information, tests, analyses, etc.	(a) President (b) Secretary (c) Director General - DRR (d) Director General - DFC (e) Managers of the following divisions: - PRDA, PRDB, OCRFD, UMD, WMD and FWD (f) Senior Project Officer for each facility
20) Subsection 31(1) - Renewal of licences.	(a) President (b) Secretary (c) Director General - DRR (for accelerators only)
21) Subsection 32(1) - Suspension, revocation or amendment of a licence.	(a) President (b) Secretary (c) Director General - DRR (for accelerators only)
22) Subsection 32(7) - Amendment to the terms and conditions of a licence if not more limiting or onerous.	(a) President (b) Secretary (c) Director General - DRR (d) Director General - DFC (e) Manager - RTD (for radioisotopes licence only)
23) Subsection 33(2) - Board options on receipt of an application by a licensee for an amendment of any term or condition of his licence.	(a) President (b) Secretary (c) Director General - DRR (d) Director General - DFC (e) Manager - RTD (for radioisotopes licence only)
24) Subsection 34(1) - Emergency orders.	(a) President (b) Secretary
25) Paragraph 40(2)(b) and section 41 - Request a list of Atomic Radiation Workers; notification to the licensee to justify absence or presence of name on ARW list, etc.	(a) President (b) Secretary (c) Director General - DRR (d) Director General - DFC

COLUMN 1	COLUMN 2
26) Subsections 47(2) to (4) - Actions in the event of doses of radiation exceeding the limits.	(a) President (b) Secretary (c) Director General - DRR (d) Director General - DFC
27) Subsections 54(1) and (2) - Appointment of inspectors.	(a) President (b) Secretary
28) Section 62 - Amendment, suspension or revocation of a direction.	(a) President (b) Secretary (c) Director General - DRR (d) Director General - DFC
29) Section 65 - Designation of safeguards inspectors.	(a) President (b) Secretary
30) Subsections 66(1) and (2) - Before a safeguards inspector enters any premises.	(a) President (b) Secretary (c) Director General - DFC (d) Head - OSS (e) Manager - SSD
31) Subsection 69(1) - Safeguards direction.	(a) President (b) Secretary (c) Director General - DFC (d) Head - OSS
32) Paragraph 74(a) - Request to keep records.	(a) President (b) Secretary (c) Any officer authorized to issue a licence (d) Director General - DRR (e) Director General - DFC
33) Subsection 75(1) - Copy of records.	(a) President (b) Secretary (c) Any officer authorized to issue a licence (d) Director General - DRR (e) Director General - DFC
34) Subsection 77(2) - Destruction of records.	(a) President (b) Secretary (c) Director General - DRR (d) Director General - DFC
35) Subsection 79(3) - Interim event reports.	(a) President (b) Secretary (c) Director General - DRR (d) Director General - DFC (e) Managers of the following divisions: - PRDA, PRDB, OCRFD, UMD, WMD and FWD (f) Senior Project Officer for each facility

ADDENDA

STANDARDS ABBREVIATIONS - AECB ORGANIZATIONAL UNITS

DFC	Directorate of Fuel Cycle and Materials Regulation
DRR	Directorate of Reactor Regulation
FWD	Fuel and Heavy Water Plant Division
OCRFD	Operator Certification and Research Facility Division
OSS	Office of Safeguards and Physical Security
PRDA	Power Reactor Division A
PRDB	Power Reactor Division B
RTD	Radioisotopes and Transportation Division
SSD	Safeguards and Security Division
UMD	Uranium Mine Division
WMD	Waste Management Division

APPENDIX 3

AMENDMENTS TO THE RADIATION PROTECTION PROVISIONS ORIGINALLY PUBLISHED IN CONSULTATIVE DOCUMENT C-47 AND SUPERSEDED BY CONSULTATIVE DOCUMENT C-83

AMENDMENTS TO THE RADIATION PROTECTION PROVISIONS
ORIGINALLY PUBLISHED IN CONSULTATIVE DOCUMENT C-47
AND SUPERSEDED BY CONSULTATIVE DOCUMENT C-83

SCHEDULE

1. (1) Subsection 2(1) of the Atomic Energy Control Regulations is amended by adding thereto, immediately prior to the definition "atomic radiation worker", the following definition:

""absorbed dose" means the energy absorbed in the body, organ or tissue due to exposure to radiation divided by the mass of that body, organ or tissue, and is expressed in units of joules per kilogram; (dose absorbée)"

(2) The definition "atomic radiation worker" in subsection 2(1) of the said Regulations is revoked and the following substituted therefor:

""atomic radiation worker" means any person who, as an essential requirement of his work, business, or occupation, could, in the course of that work, business, or occupation, receive a dose of radiation in excess of any dose limit specified in Part 2 of Schedule II; (travailleur sous rayonnements)"

(3) Subsection 2(1) of the said Regulations is further amended by adding thereto, immediately after the definition "atomic radiation worker", the following definition:

""committed dose equivalent" means the dose equivalent received from prescribed substances in the body during the 50 years immediately following the intake of those substances; (équivalent de dose engagé)

"committed effective dose equivalent" means the effective dose equivalent received from prescribed substances in the body during the 50 years immediately following the intake of those substances; (équivalent de dose effectif engagé)"

(4) Subsection 2(1) of the said Regulations is further amended by adding thereto, immediately after the definition "designated", the following definition:

""dose" means dose equivalent, committed dose equivalent, effective dose equivalent, or committed effective dose equivalent as the context may require; (dose)"

(5) Subsection 2(1) of the said Regulations is further amended by adding, immediately following the definition "dose", the following definition:

""dose equivalent" means the absorbed dose multiplied by the appropriate quality factor specified in Table I of Schedule III, and is expressed in sieverts; (équivalent de dose)"

(6) Subsection 2(1) of the said Regulations is further amended by adding, immediately following the definition "dose equivalent", the following definition:

""dosimetry year" means a calendar year except, with respect to any person, any period of fifty to fifty-four consecutive weeks' duration otherwise specified in writing and available for inspection by the Board; (année de dosimétrie)"

(7) Subsection 2(1) of the said Regulations is further amended by adding immediately following the definition "dosimetry year", the following definition:

""effective dose equivalent" means the sum of the weighted dose equivalents received by the organs and tissues of the body; (équivalent de dose effectif)"

(8) The definition "ionizing radiation" in subsection 2(1) of the said Regulation is revoked.

(9) The definition "licence" in subsection 2(1) of the said Regulations is revoked and the following substituted therefor:

""licence" means a licence issued pursuant to these Regulations; (permis)"

(10) Subsection 2(1) of the said Regulations is further amended by adding immediately following the definition "nuclear facility", the following definition:

""potential alpha energy" means the energy of all alpha particles that could be released during the radioactive decay of radon or thoron daughters to lead-210 or lead-208 respectively; (énergie potentielle alpha)"

(11) Subsection 2(1) of the said Regulations is further amended by adding immediately following the definition "prescribed item" the following definition:

""radiation" means any atomic or subatomic particle or electromagnetic wave emitted or produced by a prescribed substance or a nuclear facility and having sufficient energy to produce ionization; (rayonnement)"

(12) The definitions "radon daughters" and "rem" in subsection 2(1) of the said Regulations are revoked and the following substituted therefor:

""radon daughters" means polonium-218, lead-214, bismuth-214, and polonium-214; (produits de filiation du radon)"

(13) Subsection 2(1) of the said Regulations is further amended by adding, immediately following the definition "scheduled quantity", the following definition:

""sievert" means the name of the unit of dose (sievert)"

(14) Subsection 2(1) of the said Regulations is further amended by adding, immediately following the definition "sievert", the following definition:

""thoron daughters" means polonium-216, lead-212, bismuth-212, and polonium-212; (produits de filiation du thoron)"

(15) The definitions "working level" and "working level month" in subsection 2(1) of the said Regulations are revoked and the following substituted therefor:

""weighted dose equivalent" means the dose equivalent multiplied by the appropriate weighting factor specified in Table 2 of Schedule III; (équivalent de dose pondéré)"

(16) Subsection 2(1) of the said Regulations is further amended by adding, immediately following the definition "weighted dose equivalent", the following definition:

""working level" is a unit of concentration of radon or thoron daughters in air such that one working level means the amount of radon or thoron daughters with a potential alpha energy of 2.08×10^{-5} joules in one m^3 of air; (unité alpha ou WL)"

(17) Subsection 2(1) of the said Regulations is further amended by adding, immediately following the definition "working level", the following definition:

""working level hour" is a unit of exposure to radon or thoron daughters and is the product of the concentration in working levels of radon or thoron daughters and the duration of exposure expressed in hours; (unité alpha-heure ou WLh)"

(18) Subsection 2(3) of the said Regulations is revoked.

2. (1) Paragraph 11(1)(c) of the said Regulations is revoked and the following substituted therefor:

"(c) keep all necessary records to show the dose of radiation received by any person as a result of the licensee's use or possession of a prescribed substance or operation of a nuclear facility;"

(2) Section 11 of the said Regulations is further amended by adding thereto:

"(4) Every licensee shall, upon request by any person, make available to that person all records kept in compliance with these Regulations pertaining to doses of radiation received by that person while an atomic radiation worker and as a result of the licensee's use or possession of a prescribed substance or operation of a nuclear facility.

(5) Every licensee shall, upon termination of his employment of an atomic radiation worker, submit to that worker and the National Dose Registry of the federal Department of National Health and Welfare, the records maintained pursuant to paragraph (1)(c) respecting the worker".

3. Section 17 of the said Regulations is revoked and the following substituted therefor:

"17.(1) Any person who employs an atomic radiation worker shall

(a) forthwith inform that worker that he is an atomic radiation worker within the meaning of these Regulations;

(b) if that worker is a woman, inform her of the obligation imposed upon her in section 19.1;

(c) maintain a current list of all atomic radiation workers in his employ, and

(d) submit the list referred to in paragraph (c), or a copy thereof, to any inspector who so requests.

(2) Any person who employs an atomic radiation worker shall forthwith inform that worker of the risks associated with exposure to radiation, including the risks to embryos and foetuses.

(3) For purposes of this section, an atomic radiation worker who, in the course of his work, business, or occupation could receive a dose of radiation in excess of any dose limit specified in Part 2 of Schedule II as a result of a licensee's use or possession of a prescribed substance or operation of a nuclear facility shall be deemed to be employed by that licensee."

4. Section 19 of the said Regulations is revoked and the following substituted therefor:

"19. (1) Every licensee shall

(a) limit the dose of radiation received by any atomic radiation worker as a result of the licensee's use or possession of a prescribed substance or operation of a nuclear facility to the dose limits specified in Part 1 of Schedule II; and

(b) with respect to any person who is not an atomic radiation worker, limit the dose of radiation received by that person as a result of the licensee's use or possession of a prescribed substance or operation of a nuclear facility to the dose limits specified in Part 2 of Schedule II.

(2) Every licensee shall establish, implement and maintain procedures designed to maintain doses of radiation as low as reasonably achievable, social and economic factors being taken into account.

(3) The Board may from time to time request in writing any licensee or applicant for a licence to submit in writing to the Board a proposal that describes the procedures established or to be established by that person for the purpose of complying with subsection (2).

(4) A person to whom a request is addressed pursuant to subsection (3) shall deliver his proposal to the Board within 10 days of the date of the request.

(5) After receiving a proposal referred to in subsection (3) the Board shall consider the matter to determine whether or not the procedures proposed adequately or will adequately enable the person who submitted the proposal to maintain doses of radiation as low as reasonably achievable, social and economic factors being taken into account, and may

(a) approve the proposal; or

(b) subject to subsection (7), reject the proposal and require the submission of a new proposal.

(6) Where the Board has approved a proposal pursuant to subsection (5), the person who submitted the proposal shall forthwith, if a licensee or immediately upon issuance of a licence, if an applicant for a licence, establish, implement and maintain the procedures referred to in the approved proposal until a new proposal is approved by the Board.

(7) Where the Board intends to reject a proposal submitted pursuant to subsection (4) the Board shall notify in writing the person who submitted the proposal of the intended action and the reasons therefor and shall, if requested to do so within 15 days after service of the written notification, grant the person a reasonable opportunity to be heard.

(8) For purposes of this section, all doses of radiation received by an atomic radiation worker as a result of the use or possession of any prescribed substance or operation of any nuclear facility must be included in applying the applicable dose limits specified in Part 1 in Schedule II.

(9) No licensee shall be held to have breached these Regulations by operation of subsection (8) if he had no reasonable way of ascertaining the dose of radiation received by an atomic radiation worker prior to the time when that licensee's obligation towards the worker pursuant to subsection (1) came into effect.

19.1 Every woman who is an atomic radiation worker shall, upon learning that she is pregnant, forthwith inform her employer of her pregnancy.

19.2 (1) Every licensee shall in the event that, as a result of that licensee's use or possession of a prescribed substance or operation of a nuclear facility, a person receives a dose of radiation in excess of any dose limit specified in respect of such person in Schedule II,

(a) forthwith inform that person and the Board of the event;

(b) forthwith carry out an investigation to establish the causes of the event and report thereon to the Board; and

(c) assist the Board in any investigation it may carry out with respect to the event.

(2) Every licensee shall in the event that, as a result of that licensee's use or possession of a prescribed substance or operation of a nuclear facility, an atomic radiation worker receives a dose of radiation in a dosimetry year in excess of any dose limit specified in Part 1 of Schedule II, excluding the portion of the committed dose equivalent and the committed effective dose equivalent not received in that year, limit any further dose of radiation received by that person in any subsequent period of two weeks to one twenty-fifth the dose limits specified in Part 2 of Schedule II until the later of the termination of that person's dosimetry year or three months following the event.

(3) The Board may, upon application or on its own motion, abridge or extend the time limits specified in subsection (2) if

(a) the licensee and the atomic radiation worker have been afforded a reasonable opportunity to be heard or make representations;

(b) in the case of an abridgement, such abridgement is not inimical to the interests of health or safety; and

(c) in the case of an extension, such extension is deemed by the Board necessary in the interests of health or safety.

19.3 (1) Every licensee shall establish, implement and maintain procedures for determining the doses of radiation and intakes of prescribed substances received as a result of the licensee's use or possession of a prescribed substance or operation of a nuclear facility.

(2) Every licensee shall notify the Board in writing of the procedures established pursuant to subsection (1) and shall, if directed to do so by the Board, amend the procedures in accordance with the Board's directions.

(3) Every licensee shall implement and maintain any procedures amended pursuant to subsection (2).

19.4 (1) Subject to subsection (2), the Board may, upon application and in advance, permit a dose of radiation to an atomic radiation worker up to twice any dose limit specified in Part 1 of Schedule II.

(2) The Board shall not issue a permission pursuant to subsection (1) unless

(a) under extraordinary circumstances where no appropriate alternative is available; and

(b) the atomic radiation worker has been informed of the implications of the permission and has consented in writing to the permission being granted.

19.5 No limitation upon dose of radiation expressed in these Regulations applies to the dose received by

(a) a patient in the course of medical diagnosis or treatment by a medical practitioner; or

(b) a person carrying out emergency procedures to prevent serious injury, avert danger to human life or to avert a significant loss of property."

5. Section 22 of the said Regulations is amended by deleting, wherever it appears in that section, "Schedule III" and replacing it by "Schedule IV".

6. Schedule II of the said Regulations is revoked and the following substituted therefor:

"SCHEDULE II
(ss. 2, 7, 9, 15, 17.3, 19, 19.2 19.4 and 21)

PART 1

Dose Limits for Atomic Radiation Workers

1. The effective dose equivalent received during a dosimetry year from external sources of radiation(1) plus the committed effective dose equivalent(2)(3) from all prescribed substances that enter the body during that year shall not exceed 50 mSv.

2. The dose equivalent received by any organ or tissue(4) during a dosimetry year from external sources of radiation plus the committed dose equivalent(2)(3) to that organ or tissue from all prescribed substances that enter the body during that year shall not exceed

(a) for the lens of the eye, 150 mSv; or

(b) for any other organ or tissue, 500 mSv.

Additional Dose Limits for Pregnant Women

The dose equivalent to the embryo or foetus shall be limited during the time pregnancy is known to the licensee to 0.6 mSv in any two week period.

PART 2

Dose Limits for Persons who are not Atomic Radiation Workers

The dose limits shall be one tenth the limits specified in Part 1 for atomic radiation workers except that the dose equivalent to the lens of the eye shall be limited to 50 mSv.

Notes to Schedule II

For purposes of this Schedule:

(1) the effective dose equivalent from external sources of radiation is deemed to be equivalent to the dose equivalent to the body as determined by procedures that have been approved by the Board;

(2) if it is impractical to measure or calculate the committed effective dose equivalent or the committed dose equivalent contributed by a prescribed substance taken into the body from measurements of radiation from the body or excreta, the committed effective dose equivalent or the committed dose equivalent attributable to that prescribed substance shall be the ratio of the intake of that prescribed substance during the dosimetry year and the appropriate annual limit on intake for that prescribed substance multiplied by

(a) in the case of the committed effective dose equivalent, 50 mSv for atomic radiation workers, or 5 mSv for persons who are not atomic radiation workers; and

(b) in the case of the committed dose equivalent to an organ or tissue, 500 mSv for atomic radiation workers, or 50 mSv for persons who are not atomic radiation workers.

(3) The annual limit on intake for atomic radiation workers is the amount of prescribed substance taken into the body in a dosimetry year that will result in a committed effective dose equivalent of 50 mSv or a committed dose equivalent to an organ or tissue of 500 mSv. In the case of intake of radon and thoron daughters the annual limit shall be 0.02 and 0.06 joule respectively where,

(a) for radon daughters, an exposure of 800 working level hours is deemed equivalent to an intake of 0.02 joule; and

(b) for thoron daughters, an exposure of 2,400 working level hours is deemed equivalent to an intake of 0.06 joule.

The annual limit on intake for persons who are not atomic radiation workers is the amount of prescribed substance taken into the body in a dosimetry year that will result in a committed effective dose equivalent of 5 mSv or a committed dose equivalent to an organ or tissue of 50 mSv.

(4) The dose limit for the skin applies to the basal cell layer of the epidermis. If the skin is irradiated non-uniformly, the dose limit applies

(a) to the average dose to 100 cm^2 of skin in the area receiving the highest dose; or

(b) if the irradiated area of skin is substantially less than 100 cm^2, to the average dose to one cm^2 of skin in the area receiving the highest dose.

SCHEDULE III
(s. 2)
TABLE 1
Quality Factors(1)

Column I Type of radiation	Column II Quality factor
Gamma radiation and X-radiation	1
Beta particles and electrons	1
Neutrons	
of energy less than 10,000 electron volts	2
of energy equal to or greater than 10,000 electron volts	10
of unknown energy	10
Singly-charged particles of rest mass equal to or greater than one atomic mass unit	10
Multiply-charged particles	20

TABLE 2
Weighting Factors

Column I Organ or Tissue	Column II Weighting Factor (w_T)
Gonads (testes and ovaries)	0.25
Breast	0.15
Red bone marrow	0.12
Lungs	0.12
Bone surfaces	0.03
Thyroid gland	0.03
Other organs or tissues (0.06 for each of the five other organs or tissues receiving the highest dose equivalents)(2)	0.30
Extremities, eye lenses, skin, and other organs and tissues not covered by the above	0.00
Whole body (or trunk of body)	1.00

Notes to Schedule III

(1) The Board may, in the case of exposure to neutrons or high energy radiation, specify in writing different quality factors than those specified herein.

(2) The extremities, eye lenses and skin are excluded; in the case of irradiation of the gastrointestinal tract, the stomach, small intestine, upper large intestine, and lower large intestine are considered as separate organs."

7. Schedule III of the said Regulations is re-numbered Schedule IV.

APPENDIX 4

REGULATIONS MADE PURSUANT TO THE ATOMIC ENERGY CONTROL ACT

REGULATIONS MADE PURSUANT TO THE ATOMIC ENERGY CONTROL ACT

Short Title

1. These Regulations may be cited as the Atomic Energy Control Regulations.

PART I
INTERPRETATION

Definitions

2. (1) In these Regulations,

"Act" means the Atomic Energy Control Act; (Loi)

"absorbed dose" means the quotient, expressed in joules per kg, obtained by dividing the energy absorbed in the body of a person or an organ or a tissue thereof owing to exposure to radiation by the mass of that body, organ or tissue; (dose absorbée)

"Agency" means the International Atomic Energy Agency; (Agence)

"atomic radiation worker" means any person who is required, in the course of his work, business or occupation in connection with a nuclear facility or a prescribed substance, to perform duties in such circumstances that there is a reasonable probability that, during a dosimetry year,
(a) the aggregate of
(i) the effective dose of the person received from external sources of radiation during that dosimetry year, and
(ii) the committed effective dose from radioactive prescribed substances that enter the body of the person during that dosimetry year
may exceed 5 mSv, or
(b) the aggregate of
(i) the dose received by any organ or tissue of the body of the person from external sources of radiation during that dosimetry year, and
(ii) the committed dose to that organ or tissue from radioactive prescribed substances that enter the body of the person during that dosimetry year
may exceed 50 mSv; (travailleur sous rayonnements)

"committed dose" means the dose that will be received by an organ or a tissue of the body of a person from radioactive prescribed substances in the body of that person during the 50 years immediately following the intake of those substances; (dose engagée)

"committed effective dose" means the effective dose that will be received by a person from radioactive prescribed substances in the body of that person during the 50 years immediately following the intake of those substances; (dose effective engagée)

"construction" of a nuclear facility includes
(a) the development of a uranium or thorium mine,
(b) the installation of a concrete or structural foundation that is intended

to become part of the nuclear facility,
(c) the collection or assembling, on or in the vicinity of the land on which the nuclear facility is intended to be constructed, of parts, components or equipment that are intended to be used in, or for the construction of, the nuclear facility,
(d) the construction of a building or structure solely or principally for use in connection with the construction or operation of the nuclear facility, and
(e) any work carried out for the purpose of restoring the nuclear facility to an effective operating condition after it has been shut down for an indefinite period; (construction)

"decommissioning" of a nuclear facility or part thereof means any action taken to retire the nuclear facility or part thereof from a previously licensed activity; (déclassement)

"dose" means the result, expressed in millisieverts, obtained by multiplying the absorbed dose of the type of radiation set out in Column I of an item of Table 1 of Schedule I by the quality factor set out in Column II of that item or the quality factor designated by the Board pursuant to subsection (2) and by dividing the product by 1000; (dose)

"dose of radiation" means dose,committed dose, effective dose or committed effective dose; (dose de rayonnement)

"dosimetry year" in respect of any person or group of persons, means a calendar year or such other period of time as may, pursuant to section 42, be designated for that person or group of persons; (année de dosimétrie)

"effective dose" means the sum of the weighted doses received by the organs and tissues of the body of a person; (dose effective)

"exposure device" means a device containing a prescribed substance for the purpose of carrying out radiography; (dispositif d'exposition)

"extremity" means any part of an arm from the elbow to the fingers, inclusive, or any part of a leg from the knee to the toes, inclusive; (extrémité)

"health" or "safety" means
(a) with respect to an atomic radiation worker or other worker, the health or safety, respectively, of that worker as it may be affected by radiation, and
(b) with respect to any person other than an atomic radiation worker or other worker, the health or safety, respectively of that person as it may be affected by radiation or otherwise; (santé ou sécurité)

"hearing" means a hearing of the Board under the AECB Rules of Proceedings; (audience)

"IAEA Agreement" means the Agreement for the application of safeguards in connection with the Treaty on the Non-Proliferation of Nuclear Weapons between the Government of Canada and the Agency that was signed in Vienna on February 21, 1972; (Accord de l'AIEA)

"inspector" means a person appointed as an inspector pursuant to section 55; (inspecteur)

"licence" means a licence issued under these Regulations; (permis)

"medical adviser" means a person appointed as a medical adviser pursuant to section 50; (conseiller médical)

"nuclear facility" means
(a) a nuclear reactor or sub-critical nuclear assembly,
(b) a particle accelerator,
(c) a uranium or thorium mine or mill,
(d) a plant for the separation, processing or reprocessing of an isotope of uranium, thorium or plutonium,
(e) a plant for the fabrication of a product from an isotope of uranium, thorium or plutonium,
(f) a plant for the processing or use of radioactive prescribed substances, other than isotopes of uranium, thorium or plutonium, in quantities greater than 10^{15} becquerel per calendar year,
(g) a plant for the production of deuterium or deuterium compounds, or
(h) a facility for the disposal or storage of waste prescribed substances,
and includes all land, buildings, structures and equipment that are connected or associated with such reactor, assembly, accelerator, mine, mill, plant or facility; (installation nucléaire)

"operation" of a nuclear facility includes any shutdown of the nuclear facility for any purpose where there is an intention resume operation; (exploitation)

"opportunity to be heard" means an opportunity to be heard by the Board at a hearing; (occasion de se faire entendre)

"other worker" means a worker, other than an atomic radiation worker, who is engaged in work related to activities authorized by a licence issued pursuant to section 9 or 20; (autre travailleur)

"place in transit" with respect to a prescribed substance, means to load the prescribed substance on a conveyance outside Canada and move the prescribed substance through Canada to a point outside Canada without any change of conveyance; (passer en transit)

"potential alpha energy" means the energy of all alpha particles that will be released during the radioactive decay of radon daughters to lead-210 or thoron daughters to lead-208; (énergie alpha potentielle)

"prescribed item" means an item listed in Schedule II being an item that in the opinion of the Board may be used for the production, use or application of atomic energy; (article prescrit)

"radiation" means radiation that is capable of producing ionization, directly or indirectly, in the material in which it is absorbed; (rayonnement)

"radon daughters" means polonium-218, lead-214, bismuth-214 and polonium-214; (produits de filiation du radon)

"safeguards" means a system of accounting for and control of nuclear material established pursuant to the IAEA Agreement or pursuant to an international agreement to which the Government of Canada is a party; (garanties)

"scheduled quantity" of a radioactive prescribed substance means
(a) where the substance contains a single radioactive isotope listed in Column I of Part I of Schedule III, the number of becquerels set out in Column II of that Part opposite that radioactive isotope,
(b) where the substance contains a single radioactive isotope that is not listed in Column I of Part I of Schedule III,
(i) 10^4 becquerels, if the atomic number of the radioactive isotope is equal to or less than 81, or
(ii) 10 becquerels, if the atomic number of the radioactive isotope is greater than 81; and
(c) where the substance contains more than one radioactive isotope, the number of becquerels calculated in accordance with Part II of Schedule III; (quantité réglementaire)

"thoron daughters" means polonium-216, lead-212, bismuth-212 and polonium-212; (produits de filiation du thoron)

"trans-ship" with respect to a prescribed substance, means to load the prescribed substance on a conveyance outside Canada and move the prescribed substance through Canada to a point outside Canada after transferring the prescribed substance from that conveyance to another conveyance in Canada, whether in bond or not; (transborder)

"weighted dose" means the dose received by an organ or a tissue set out in Column I of an item of Table 2 of Schedule I multiplied by the weighting factor set out in Column II of that item; (dose pondérée)

"working level" means the measure of concentration of radon daughters or thoron daughters in air where one working level equals the amount of radon daughters or thoron daughters in 1 m^3 of air with a potential alpha energy of 2.08×10^{-5} joules;(unité alpha)

"working level hour" means the measure of exposure to radon daughters or thoron daughters in air where the number of working level hours is the product of the number of working levels multiplied by the duration of exposure to that concentration measured in hours. (unité alpha-heure)

(2) For the purpose of calculating the dose received from exposure to neutrons or high energy radiation, the Board may designate in writing a quality factor other than the applicable quality factor set out in Column II of Table 1 of Schedule I.

Designated Officers

3. Where the expression "designated officer" appears in a provision of these Regulations, that expression means any officer or employee of the Board who is designated by the Board for the purposes of that provision.

Prescribed Substances

4. For the purpose of the definition "prescribed substance" in section 2 of the Act, a radioactive isotope of any element and any substance containing such an isotope are hereby designated as being capable of releasing atomic

energy, or as being requisite for the production, use or application of atomic energy.

Application

5. These Regulations, other than paragraph 10(1)(a) and section 11, do not apply to naturally occurring radioactive prescribed substances when they (a) are present in a mineral or other material; and
(b) have not been related to an activity associated with the development, application or use of atomic energy.

PART II
PRESCRIBED SUBSTANCES AND PRESCRIBED ITEMS

Restrictions

6. Subject to section 8, no person shall possess any prescribed substance except in compliance with the terms and conditions of a licence issued pursuant to section 9 or 31.

7. Subject to section 8 and subsections (*), no person shall possess any device or equipment containing a radioactive prescribed substance except in compliance with the terms and conditions of a licence issued pursuant to section 9 or 31.

8. (1) No licence is required by any person engaged in the transportation of goods for hire or reward in respect of the possession of any prescribed substance or of any device or equipment containing a radioactive prescribed substance or in respect of any temporary storage of such substance, device or equipment necessary for such transportation.

(2) Subject to subsection (3), no licence is required for the possession by any person of
(a) deuterium in any form unless it has been used in a nuclear reactor;
(b) any substance, material, device or equipment in which there is a radioactive prescribed substance, if
(i) the prescribed substance is distributed throughout the substance, material, device or equipment,
(ii) the quantity of prescribed substance per kilogram of substance, material device or equipment does not exceed the scheduled quantity, and
(iii) the prescribed substance in the substance, material, device or equipment is not readily separable;
(c) any solid object whose surface is contaminated with a radioactive prescribed substance, if that substance is not readily removable and the extent of the contamination is less than 3 Bq/cm^2 of the surface area averaged over a contiguous surface area of not more than 100 cm^2;
(d) any quantity of a radioactive prescribed substance if
(i) at any time, the quantity of such substance possessed by that person is not more than the applicable scheduled quantity, and

(*) This will be a cross-reference to the Industrial Radiography subsections of the current Regulations when they are consolidated.

(ii) during any calendar year, the total quantities of such substance possessed by that person are not more than 10 times the applicable scheduled quantity;

(e) any device or equipment, other than an exposure device, containing a radioactive prescribed substance if

(i) the radiological health and safety aspects of the design of the device or equipment, the method of incorporating the radioactive prescribed substance in the device or equipment and the labelling of the device or equipment have been approved in writing by the Board or a designated officer, and

(ii) a notice of the approval in writing referred to in subparagraph (i) has been published in Part I of the Canada Gazette;

(f) any incandescent mantle containing thorium;

(g) any prescribed substance that is disposed of by a licensee in accordance with a condition of the licence that permits disposal of the substance to a person who is not a licensee; or

(h) uranium or thorium contained in

(i) chemical reagents or chemical or physical standards,

(ii) metal alloys in which the content by weight is less than

(A) 0.05 per cent, in the case of uranium, or

(B) 5 per cent, in the case of thorium.

(3) Nothing in subsection (2) authorizes the possession for any purpose without a licence issued pursuant to section 9 of any substance containing

(a) uranium isotope 233;

(b) uranium having a greater concentration of the uranium isotope 235 than is normally found in nature; or

(c) plutonium.

Issue of Licences

9. (1) Subject to subsection (3), the Board or a designated officer may issue a licence for the possession of any prescribed substance or of any device or equipment referred to in section 7 on receipt from the person requiring the licence of an application in writing setting out such of the following information as the Board or designated officer may require:

(a) the nature and quantity of the prescribed substance and the purpose for which it is required;

(b) the maximum quantity of the prescribed substance likely to be required at any one time for the purpose set out in the application;

(c) a description of the premises in which the prescribed substance is to be located and of any equipment in connection with which it is to be used;

(d) a description of the measures to be taken to prevent theft, loss or any unauthorized use of the prescribed substance;

(e) a description of the measures proposed to be established by the applicant in order to comply with section 37;

(f) a description of the measures to be taken, including any plan in case of accident, to prevent the receipt by any person of a dose of radiation in excess of any limit specified with respect to such person in section 43;

(g) a description of the procedures proposed to be established by the applicant

(i) for the calibration of a measuring device carried on the surface of the body or for the determination otherwise of the dose received by the

body of a person for the purposes of paragraph 45(a), and
(ii) for the purposes of paragraph 45(b);
(h) a description of the proposed method of disposing of the prescribed substance;
(i) a description of the measures to be taken to clean up any premises contaminated as the result of the use of a radioactive prescribed substance;
(j) a description of the responsibilities, duties, qualifications, training and experience of any person who is to use the prescribed substance;
(k) a description of the measures and procedures for the use and storage of the prescribed substance; and
(l) any other information that the Board or designated officer may require to evaluate the application with respect to health, safety, security, any applicable safeguards and protection of the environment.

(2) A licence issued by the Board or a designated officer pursuant to subsection (1) shall set out the term for which the licence is valid and may contain such other terms and conditions as the Board or designated officer considers necessary in the interests of health, safety, security, any applicable safeguards and protection of the environment and, without limiting the generality of the foregoing, may include conditions respecting
(a) the devices for monitoring and the methods for determining or estimating, with respect to any person, the dose of radiation received, the amount of exposure to radiation or the amount of exposure to or intake of radioactive prescribed substances;
(b) the methods for detecting and recording the presence and amount of radiation and radioactive prescribed substances;
(c) the maximum quantities and concentrations of radioactive or other hazardous materials in effluents that may be discharged to the environment as a result of the use of the prescribed substance;
(d) the instructions to be given to any person respecting the hazards of radiation and the procedures to be followed to limit exposure to radiation;
(e) the methods of managing or disposing of radioactive or other hazardous materials resulting from the use of the prescribed substance; and
(f) anything referred to in paragraphs (1)(a) to (1).

(3) No licence shall be issued pursuant to subsection (1) unless the Board or designated officer is satisfied that the applicant for the licence will provide adequately
(a) for the protection of health and safety of persons;
(b) for the protection of the environment;
(c) for security in respect of all activities conducted under the licence; and
(d) for the implementation of any applicable safeguards.

Import and Export

10. (1) Subject to subsections (2) and (3), no person shall
(a) import any prescribed substance,
(b) export uranium, thorium or plutonium,
(c) export any prescribed item, or
(d) export deuterium or tritium compounds or mixtures or solutions containing deuterium or tritium,

except in accordance with a licence issued pursuant to section 11.

(2) No licence is required for the importation or exportation by any person of

(a) uranium or thorium contained in
  (i) chemical reagents or chemical or physical standards,
  (ii) metal alloys in which the content by weight is less than
    (A) 0.05 per cent, in the case of uranium, or
    (B) 5 per cent, in the case of thorium, or
  (iii) ores that are intended to be used for analysis, where the total quantity of such ores does not exceed one tonne per calendar year; or

(b) deuterium or compounds, mixtures or solutions containing deuterium in which the ratio of deuterium atoms to hydrogen atoms
  (i) is less than 1:5000 by number, or
  (ii) is greater than 1:5000 by number, where the total quantity, imported or exported, is less than 10 kg per calendar year; or

(c) tritium or compounds, mixtures or solutions containing tritium in which the ratio of tritium atoms to hydrogen atoms is less than 1:1000 by number.

(3) Subsection (1) does not apply to prescribed substances that are placed in transit or trans-shipped.

11. (1) Subject to subsection (2), the Board or a designated officer may issue a licence for any purpose referred to in section 10 on receipt of a written application from the person requiring the licence.

(2) A licence to export a prescribed substance shall not be issued unless the Board is satisfied that the price and quantity of the prescribed substance in respect of which the application is made meet the criteria, if any, respecting price levels and quantities that may be specified in the public interest in a direction given to the Board by the Minister.

(3) A licence referred to in subsection (1)
(a) may set out the term for which the licence is valid; and
(b) shall be produced by or on behalf of the licensee to a collector of customs at the port of entry into or exit from Canada of the prescribed substance or the prescribed item, as the case may be, or at such other place as is designated by the Deputy Minister of National Revenue for Customs and Excise, before the prescribed substance or the prescribed item is released for import or export.

Place in Transit or Trans-ship

12. No person shall, except in accordance with a licence issued pursuant to section 13, place in transit or trans-ship

(a) 1000 kg or more of uranium hexafluoride;

(b) fissile material as defined in the Transport Packaging of Radioactive Materials Regulations that, in order to be caused to be transported, is required by section 9 of those Regulations to be contained in a Fissile Class I package, a Fissile Class II package or a Fissile Class III package; or

(c) radioactive material as defined in the Transport Packaging of Radioactive Materials Regulations that, in order to be caused to be

transported, is required by section 10 of those Regulations to be contained in a Type B(M) package or a Type B(U) package.

13. (1) The Board or a designated officer may issue a licence to place in transit or to trans-ship any prescribed substance referred to in section 12 on receipt of a written application from the person requiring the licence.

(2) A licence referred to in subsection (1)
(a) may set out the term for which the licence is valid; and
(b) shall be produced by or on behalf of the licensee to a collector of customs at the port of entry into or exit from Canada of the prescribed substance or at such other place as is designated by the Deputy Minister of National Revenue for Customs and Excise before the prescribed substance is released for entry into Canada or exit from Canada.

PART III
NUCLEAR FACILITIES

Restrictions

14. (1) Subject to subsections (2) and (3), no person shall clear or excavate land or otherwise prepare a site for the construction of a nuclear facili., except in compliance with the terms and conditions of a licence issued pursuant to paragraph 20(1)(a) or section 31.

(2) No licence is required for drilling, trenching, surface exploration, prospecting or other preliminary site investigation that is reasonably required for the purpose of determining whether to apply for a licence to be issued pursuant to paragraph 20(1)(a), if
(a) such preliminary site investigation does not have a significant adverse effect on the environment; and
(b) in the case of a site for a uranium or thorium mine, not more than 10 kg of uranium or thorium are removed in any calendar year from their place of natural deposit for the purpose of uranium or thorium recovery or metallurgical testing.

(3) The Board or a designated officer may, on application, exempt a site for a sub-critical nuclear assembly or a particle accelerator from the application of subsection (1), where in its or his opinion no significant adverse effects on the environment will result from the construction or operation of the assembly or accelerator on that site.

15. No person shall abandon
(a) a site for the preparation of which a licence has been issued pursuant to paragraph 20(1)(a),
(b) a site on which a nuclear facility is being constructed under a licence issued pursuant to paragraph 20(1)(b),
(c) a completed nuclear facility that has not been licensed under paragraph 20(1)(c) or a part of such a facility, or
(d) a nuclear facility that has been licensed under paragraph 20(1)(c) or (d) or a part of such a facility,
without the approval in writing of the Board or a designated officer issued pursuant to section 19.

16. No person shall construct a nuclear facility except in compliance with the terms and conditions of a licence issued pursuant to paragraph 20(1)(b) or section 31.

17. No person shall operate a nuclear facility except in compliance with the terms and conditions of a licence issued pursuant to paragraph 20(1)(c) or section 31.

18. No person shall decommission a nuclear facility or part thereof except in compliance with the terms and conditions of a licence issued pursuant to paragraph 20(1)(d) or section 31.

Issue of Approvals in Writing

19. (1) The Board or a designated officer may issue an approval in writing for the abandonment of a site referred to in paragraph 15(a) or (b) or of a nuclear facility or part thereof referred to in paragraph 15(c) where it or he is satisfied that

(a) the licensee has taken adequate measures to limit the environmental impact caused by any preparation, construction or development on the site;
(b) all buildings, machinery and equipment have been removed from the site; and
(c) the condition of the site is not inferior to the condition it was in before the commencement of the preparation of the site for the construction of a nuclear facility.

(2) The Board or a designated officer may issue an approval in writing for the abandonment of a nuclear facility or part thereof referred to in paragraph 15(d) where

(a) in the case of a nuclear facility licensed under paragraph 20(1)(c), the licensee obtains a licence issued pursuant to paragraph 20(1)(d) for the decommissioning of the nuclear facility and complies with the conditions of that licence; or
(b) in the case of a nuclear facility licensed under paragraph 20(1)(d), the licensee has complied with the conditions of that licence.

Issue of Licences

20. (1) Subject to subsection (2), the Board or a designated officer, on receipt of a written application containing the information required by section 21, 22, 23 or 24, as may be applicable, may issue

(a) a licence to prepare a site for the construction of a nuclear facility;
(b) a licence to construct a nuclear facility on a site licensed under paragraph (a) or exempted under subsection 14(3);
(c) a licence to operate a nuclear facility licensed under paragraph (b); or
(d) a licence to decommission a nuclear facility or part thereof.

(2) No licence shall be issued pursuant to subsection (1) unless the Board or designated officer is satisfied that the applicant for the licence will provide adequately

(a) for the protection of health and safety of persons;
(b) for the protection of the environment;

(c) for security in respect of all activities conducted under the licence; and
(d) for the implementation of any applicable safeguards.

Site Licence

21. (1) Subject to section 25, an application for a licence to prepare a site for a nuclear facility shall contain
(a) a description of investigations and preparatory work proposed to be done on the site and in the region around the site for the purpose of
(i) satisfying the Board or designated officer that the site is acceptable for the proposed nuclear facility with respect to health, safety, security and protection of the environment, and
(ii) preparing the site for the construction of the proposed nuclear facility;
(b) evidence that the applicant is the owner of the site or has authority from the owner of the site to prepare the site for the proposed nuclear facility;
(c) a schedule of and plan for the investigations and preparatory work referred to in paragraph (a);
(d) a description of the public information program that the applicant proposes to establish in accordance with subsection (4);
(e) full particulars of a quality assurance program for the site investigations and preparatory work as it relates to health, safety and protection of the environment; and
(f) any other information that the Board or designated officer may require to evaluate the application with respect to health, safety, security and protection of the environment.

(2) A licence to prepare a site for a nuclear facility may set out the term for which the licence is valid and may contain such other terms and conditions as the Board or designated officer considers necessary in the interests of health, safety, security and protection of the environment and, without limiting the generality of the foregoing, may contain conditions regarding anything referred to in subsection (1).

(3) Where a licence to prepare a site for a nuclear facility only authorizes part of the investigations and preparatory work referred to in paragraph (1)(a), the Board or a designated officer may amend the licence from time to time to authorize such further investigations and preparatory work as it or he decides is not adverse to the interests of health, safety, security or protection of the environment.

(4) The Board or a designated officer shall not issue a licence to prepare a site for a nuclear facility unless the applicant has, to the satisfaction of the Board or designated officer, established a public information program designed to inform persons living in the vicinity of the site of the general nature and characteristics of the nuclear facility and anticipated effects of the nuclear facility on health, safety, security and the environment.

Construction Licence

22. (1) Subject to section 25, an application for a licence to construct a nuclear facility shall contain

(a) a detailed description of the site and of all factors pertaining to the site that could influence the design, construction, operation and decommissioning of a nuclear facility thereon relating to health, safety, security, any applicable safeguards and protection of the environment;

(b) evidence that the applicant is the owner of the site or has authority from the owner of the site to construct the proposed nuclear facility on the site;

(c) a description of the proposed design and the proposed methods of construction of the nuclear facility;

(d) full particulars of a quality assurance program for the design, construction and commissioning of the nuclear facility and its components as it relates to health safety and protection of the environment;

(e) an assessment of the hazards that may result from the operation of the nuclear facility and a description of the measures to be taken to prevent or minimize such hazards;

(f) a conceptual plan for the decommissioning of the nuclear facility;

(g) a description of the staffing arrangements for the nuclear facility and the qualifications, training and experience of any person essential to the safe operation of the nuclear facility;

(h) a description of the measures intended to ensure that the design, fabrication and construction of the nuclear facility are consistent with maintaining doses of radiation during subsequent operation as low as reasonably achievable, taking into account relevant social and economic factors; and

(i) any other information that the Board or designated officer may require to evaluate the application with respect to health, safety, security, any applicable safeguards and protection of the environment.

(2) A licence to construct a nuclear facility may set out the term for which the licence is valid and may contain such other terms and conditions as the Board or designated officer considers necessary in the interests of health, safety, security, any applicable safeguards and protection of the environment respecting the site, design, construction and commissioning of the nuclear facility or part thereof, and without limiting the generality of the foregoing, may contain conditions regarding anything referred to in subsection (1).

Operating Licence

23. (1) Subject to section 25, an application for a licence to operate a nuclear facility shall contain

(a) a detailed description of the design and the construction of the facility as constructed;

(b) evidence that the applicant is the owner of the site or has authority from the owner of the site to operate the facility;

(c) full particulars of a quality assurance program for the operation, inspection and maintenance of the facility as it relates to health, safety and the protection of the environment;

(d) a detailed description of the operating procedures of the facility;

(e) a detailed description of the hazards that might result from the

operation of the facility and of the measures to be taken, including any plan in case of an accident, to prevent the receipt by any person of a dose of radiation in excess of any limit specified in respect of such person in section 43 or to prevent or minimize other hazards involved in the operation of the facility;

(f) a detailed description of the devices for monitoring and the methods for determining or estimating, with respect to any person, the dose of radiation received, the amount of exposure to radiation or the amount of exposure to or intake of radioactive prescribed substances resulting from the operation of the facility;

(g) a description of the procedures proposed to be established by the applicant

(i) for the calibration of a measuring device carried on the surface of the body or for the determination otherwise of the dose received by the body of a person for the purposes of paragraph 45(a), and

(ii) for the purposes of paragraph 45(b);

(h) a description of the measures proposed to be established by the applicant in order to comply with section 37;

(i) a detailed description of the measures to be taken to prevent theft, loss or any unauthorized use of any prescribed substance involved in the operation of the facility;

(j) a detailed description of the measures to be taken in the interests of security in respect of the facility;

(k) a detailed description of the staffing arrangements for the facility and the qualifications, training and experience of any person essential to the safe operation of the facility; and

(l) any other information that the Board or designated officer may require to evaluate the application with respect to health, safety, security, any applicable safeguards and protection of the environment.

(2) A licence to operate a nuclear facility shall set out the term for which the licence is valid and may contain such other terms and conditions as the Board or designated officer considers necessary in the interests of health, safety, security, any applicable safeguards and protection of the environment and, without limiting the generality of the foregoing, may include conditions respecting

(a) the devices for monitoring and the methods for determining, with respect to any person, the dose of radiation received, the amount of exposure to radiation or the amount of exposure to or intake of radioactive prescribed substances;

(b) the methods for detecting and recording the presence and amount of radiation and radioactive prescribed substances;

(c) the maximum quantities and concentrations of radioactive or other hazardous materials in effluents that may be discharged to the environment as a result of the operation of the nuclear facility;

(d) the instructions to be given to any person respecting the hazards of radiation and the procedures to be followed to limit exposure to radiation and exposure to or intake of radioactive prescribed substances;

(e) the methods of managing or disposing of radioactive or other hazardous materials resulting from the operation of the nuclear facility; and

(f) anything referred to in subsection (1).

Decommissioning Licence

24. (1) Subject to section 25, an application for a licence to

decommission a nuclear facility or part thereof shall contain such of the following information as may be applicable:

(a) the proposed date of the start of the decommissioning;

(b) a description and time schedule of the actions proposed to be taken to decommission the facility;

(c) a justification of the time schedule;

(d) the results of any survey carried out by the applicant to estimate

(i) the radiation levels and the quantities and types of radioactive prescribed substances that are present in the facility, and

(ii) the concentrations of radioactive prescribed substances that are present on surfaces and in air,

or, where it is not possible or reasonable to carry out such a survey, a projection of

(iii) the radiation levels and the quantities and types of radioactive prescribed substances that may be expected to be present in the facility, and

(iv) the concentrations of radioactive prescribed substances that may be expected to be present on surfaces and in air

at the time when operations will cease;

(e) a description of the anticipated inventory of radioactive waste and toxic wastes arising from the decommissioning of the facility and the place and manner in which it is proposed to dispose of such wastes;

(f) full particulars of a quality assurance program for the decommissioning of the facility as it relates to health, safety and the protection of the environment;

(g) a description of the hazards that might result from the decommissioning of the nuclear facility and of the measures to be taken, including any plan in case of an accident, to prevent the receipt by any person of a dose of radiation in excess of any limit specified in respect of such person in section 43 or to prevent or minimize other hazards involved in the decommissioning of the nuclear facility;

(h) a description of the predicted impact of the decommissioning operations and of any residual hazardous substances on the environment and on the health and safety of members of the public, together with an estimate of the residual radiation levels and the quantities and types of residual hazardous substances;

(i) details of any controls that may be required to keep the impact within predictions; and

(j) any other information that the Board or designated officer may require to evaluate the application with respect to health, safety, security and the protection of the environment.

(2) A licence to decommission a nuclear facility or part thereof may set out the term for which the licence is valid and may contain such other terms and conditions as the Board or designated officer considers necessary in the interests of health, safety, security, any applicable safeguards and protection of the environment and, without limiting the generality of the foregoing, may contain conditions respecting anything referred to in subsection (1).

Application for a Renewal Licence

25. Where an application is made to the Board or a designated officer on the expiration of the term of a licence issued pursuant to paragraph 20(1)(a),

(b), (c) or (d) for the issue of a new licence to replace that licence, the application shall contain such information as the Board or designated officer may require to evaluate the application with respect to health, safety, security, any applicable safeguards and the protection of the environment.

Components

26. (1) No person shall manufacture a component listed in Schedule IV for use in a nuclear reactor in Canada unless

(a) he obtains prior approval in writing from the Board or a designated officer of the design, materials intended to be used in and methods of manufacture of the component;

(b) he manufactures the component in accordance with the approval referred to in paragraph (a); and

(c) on request, he permits an inspector to have reasonable access to his factory for the purpose of ensuring that he complies with paragraph (b) and makes available to the inspector for examination any documents relating to the manufacture of the component.

(2) No person shall incorporate a component listed in Schedule IV in a nuclear reactor unless the manufacturer of the component satisfies him that the manufacturer obtained approval in writing for the component in accordance with paragraph (1)(a).

PART IV
GENERAL

Prohibitions

27. (1) No person shall transfer the possession of a prescribed substance for the possession of which a licence is required by section 6 to a person who is not authorized by these Regulations to possess that prescribed substance.

(2) No person shall convey, or transfer in any manner responsibility for,

(a) a site for a nuclear facility whose preparation was authorized under a licence issued to that person, or

(b) a nuclear facility whose construction, operation or decommissioning was authorized under a licence issued to that person

to a person who is not the holder of

(c) a licence to prepare the site referred to in paragraph (a), or

(d) a licence to construct, operate or decommission the nuclear facility referred to in paragraph (b), as may be applicable.

28. No person shall abandon, convey or otherwise dispose of any premises contaminated as a result of that person's use of a radioactive prescribed substance under a licence except in accordance with the conditions in the licence or the written instructions of the Board or a designated officer.

Directions by the Board or a Designated Officer

29. (1) Subject to subsection (2), the Board may, at any time by a direction

in writing, direct a licensee

(a) to supply the Board with such technical information and reports on the design, construction, commissioning, operation and decommissioning of the nuclear facility authorized by the licence as it may require;

(b) to carry out tests, analyses, investigations or inspections that the Board considers necessary to evaluate any aspect of the nuclear facility or of any use of a prescribed substance to which the licence relates in the interests of health, safety, security, any applicable safeguards or protection of the environment; and

(c) to report to the Board the results of tests, analyses, investigations or inspections carried out in accordance with a direction given pursuant to paragraph (b) within the time specified in the direction.

(2) The Board shall not give a direction pursuant to paragraph (1)(a) or (b) unless the licensee

(a) has been informed in writing of the reasons for the proposed direction; and

(b) has been given an opportunity to be heard by the Board after receiving the information referred to in paragraph (a).

(3) Subject to any decision of the Board given in a hearing, a licensee shall comply with a direction received under subsection (1).

30. (1) Subject to subsection (2), a designated officer may, at any time by a notice in writing setting out the reasons therefor, issue a direction to a licensee for any of the purposes set out in paragraph 29(1)(a), (b) or (c).

(2) Within 15 days of receipt of a notice under subsection (1), a licensee may apply to the Board for an opportunity to be heard.

(3) Subject to any decision of the Board given in a hearing, a licensee shall comply with a direction received under subsection (1).

Renewal of Licences

31. (1) Subject to subsections (2) to (4), where an application is made to the Board or a designated officer, on the expiration of the term of a licence issued pursuant to section 9 or paragraph 20(1)(a), (b), (c) or (d), for the issue of a new licence to replace that licence, the Board or designated officer may

(a) issue a new licence containing the same terms and conditions as the previous licence;

(b) issue a new licence containing new terms and conditions that are not more limiting or onerous than the terms and conditions of the previous licence;

(c) issue a new licence containing terms and conditions that are more limiting or onerous than the terms and conditions of the previous licence; or

(d) refuse to issue a new licence where it or he has reason to believe that the applicant has contravened a provision of these Regulations or where it or he considers that the refusal is necessary in the interests of health, safety, security, or protection of the environment.

(2) Before taking action under paragraph (1)(c) or (d), the Board or

designated officer shall give the licensee notice in writing of the proposed action and of the reasons therefor.

(3) Within 15 days of receipt of a new licence issued pursuant to paragraph (1)(b) or of a notice in writing given under subsection (2), the licensee may apply to the Board for an opportunity to be heard.

(4) No licence shall be issued pursuant to subsection (1) unless the Board or designated officer is satisfied that the applicant for the licence will provide adequately

(a) for the protection of health and safety of persons;
(b) for the protection of the environment;
(c) for security in respect of all activities conducted under the licence; and
(d) for the implementation of any applicable safeguards.

Suspension, Revocation or Amendment of a Licence by the Board or a designated officer

32. (1) Subject to subsections (2) and (5) to (8), the Board or a designated officer may, at any time,

(a) suspend or revoke a licence, or
(b) amend the terms and conditions of a licence, in a manner that renders the licence more limiting or onerous on the licensee,

where

(c) the Board or designated officer has reason to believe that the licensee has contravened a provision of these Regulations, or
(d) the Board or designated officer is of the opinion that the suspension, revocation or amendment is necessary in the interests of health, safety, security or protection of the environment.

(2) Before taking any action pursuant to subsection (1) the Board or designated officer shall give at least 15 days notice in writing to the licensee of the proposed action and the reasons therefor.

(3) Where the Board or designated officer gives notice to a licensee pursuant to subsection (2) that it or he proposes to suspend or revoke the licence, the Board or designated officer may direct the licensee in writing to take such reasonable measures as the Board or designated officer considers necessary

(a) to ensure the safe disposition of any prescribed substance in the possession of the licensee; or
(b) to put and maintain in a safe condition a nuclear facility operated under the licence.

(4) On receipt of a direction under subsection (3), a licensee shall forthwith comply therewith.

(5) Within 15 days of receipt of a notice in writing given by the Board or designated officer under subsection (2), a licensee may apply to the Board for an opportunity to be heard.

(6) Where a licensee

(a) agrees in writing to the proposed action of which the Board or designated officer has given him notice under subsection (2), or

(b) fails to apply for an opportunity to be heard pursuant to subsection (5), the Board or designated officer may forthwith suspend or revoke the licence or amend the terms and conditions thereof as proposed and shall inform the licensee in writing of such action.

(7) The Board or a designated officer may at any time make an amendment to the terms or conditions of a licence that does not render the licence more limiting or onerous on the licensee and send a copy of the amendment to the licensee.

(8) Within 15 days of receipt of a copy of an amendment of his licence made pursuant to subsection (7), a licensee may apply to the Board for an opportunity to be heard.

Request by Licensee for Amendment of a Term or Condition of his Licence

33. (1) Where a licensee applies to the Board for an amendment of any term or condition of his licence, the licensee shall inform the Board in writing of the reasons for the amendment applied for.

(2) On receipt of an application referred to in subsection (1) by the Board, the Board or a designated officer may, by notice in writing to the licensee,
(a) agree to the amendment applied for;
(b) refuse the amendment applied for; or
(c) agree to the amendment applied for subject to the insertion in the licence of such additional terms or conditions as the Board or designated officer considers necessary in the interests of health, safety, security, any applicable safeguards or protection of the environment.

(3) On receipt of a notice in writing under paragraph (2)(b) or (c), a licensee may apply to the Board for an opportunity to be heard.

Emergency Orders

34. (1) Where, on reasonable and probable grounds, a designated officer is of the opinion that an emergency exists because
(a) there is an unacceptable risk to the health or safety of any person or to the environment, or
(b) there has occurred or may occur a serious breach of security precautions,
he may issue an emergency order directing a licensee
(c) to cease any activity that contributes to the continuation of the emergency, or
(d) to carry out any measures considered by the designated officer to be necessary in the interests of ending the emergency.

(2) An emergency order issued pursuant to subsection (1) shall
(a) set out the designated officer's reasons for issuing the order; and
(b) be served personally on the licensee.

(3) Any licensee served with an emergency order under paragraph (2)(b) shall, without delay, comply with the order notwithstanding any term or

condition of the licence, but may, within 15 days thereafter, apply to the Board for an opportunity to be heard.

PART V
RADIATION PROTECTION

Definitions

35. In this Part,

"employer" means a corporation, individual or partnership that employs any person as an atomic radiation worker; (employeur)

"licensee" means a person to whom a licence has been issued pursuant to section 9 or 20. (titulaire de permis)

Application

36. This Part does not apply in respect of any dose of radiation received by a patient in the course of medical diagnosis or treatment by a medical practitioner.

Measures to be Established by Licensees

37. (1) Every licensee shall, in accordance with section 38, establish and implement measures to maintain doses of radiation received by any person or group of persons as low as reasonably achievable, taking into account relevant social and economic factors.

(2) Every licensee shall, in accordance with section 38, establish and implement measures

(a) to determine, with respect to atomic radiation workers,

(b) to determine or estimate, with respect to other workers and persons, other than atomic radiation workers, who at the invitation or with the permission of the licensee enter upon any area or premises under the control of the licensee, or

(c) to estimate, with respect to persons other than those referred to in paragraphs (a) and (b),

the dose of radiation received, the amount of exposure to radiation or the amount of exposure to or intake of radioactive prescribed substances as a result of the possession of a prescribed substance or any other activity carried on under the licence.

Specification of Measures

38. The measures to be established by a licensee pursuant to section 37 shall be such measures, if any, as are specified in his licence or any amendment or renewal thereof.

Duties of Employers

39. (1) Where any person is engaged by an employer as an atomic radiation worker, the employer shall, before that person commences to work as an atomic radiation worker,

(a) inform that person in writing that he is an atomic radiation worker within the meaning of these Regulations;
(b) if that person is a woman, inform her in writing of the obligation imposed on her by subsection (4) in the event of her pregnancy;
(c) inform that person of the risks associated with radiation to which that person may be exposed as a result of the employment, including the risks associated with exposure of embryos and foetuses to radiation;
(d) obtain from that person acknowledgement in writing of his receipt of the information referred to in paragraphs (a) to (c); and
(e) require that person to undergo a medical examination of such nature and extent and with such frequency as may be specified in any licence applicable to that person.

(2) Where any woman is engaged by an employer as an other worker, the employer shall, before that woman commences to work as an other worker,

(a) inform her in writing of the obligation imposed on her by subsection (4) in the event of her pregnancy;
(b) inform her of the risks associated with radiation to which she may be exposed as a result of her employment, including the risks associated with exposure of embryos and foetuses to radiation; and
(c) obtain from her acknowledgement in writing of her receipt of the information referred to in paragraphs (a) and (b).

(3) Every employer shall

(a) maintain an up to date list of all atomic radiation workers in his employ; and
(b) on the request of the Board or an inspector, submit a copy of the list referred to in paragraph (a) to the Board or inspector.

(4) Every woman who is pregnant shall

(a) if she is aware of her pregnancy, forthwith inform of her pregnancy any employer who engages her as an atomic radiation worker or other worker; or
(b) if she became pregnant or aware of the pregnancy after she was engaged by an employer as an atomic radiation worker or other worker, inform the employer of her pregnancy as soon as she becomes aware of it.

(5) Any employer who is informed of the pregnancy of any of his atomic radiation workers or other workers pursuant to subsection (4), shall forthwith inform of the pregnancy any licensee concerned.

Duties of Licensees in respect of Atomic Radiation Workers

40. (1) At the time any atomic radiation worker is first required, in the course of his work, business or occupation to perform duties in such circumstances that there is a reasonable probability of his receiving a dose of radiation or total doses of radiation exceeding an applicable limit specified in section 43 as a result of the possession of a prescribed substance or any other activity carried on under a licence, the licensee shall forthwith perform

the duties that he would have as the employer of that worker under subsection 39(1), whether or not the licensee is the employer of that worker.

(2) Every licensee shall
(a) maintain an up to date list containing the names and job category of all persons who are employed for the purposes of the licence as atomic radiation workers; and
(b) on the request of the Board or a designated officer, submit a copy of the list referred to in paragraph (a) to the Board or designated officer.

(3) Every licensee shall ensure that no person is employed as an atomic radiation worker unless such employment is essential for the conduct of any activity authorized by the licence.

41. (1) Where the Board or a designated officer has reason to believe that the name of a person should or should not be on a list submitted to it or him by a licensee under paragraph 40(2)(b), the Board or designated officer may, by notice in writing require the licensee to justify the absence or presence of the name of that person from or on the list, as may be appropriate.

(2) Within 15 days of the receipt of a notice under subsection (1), a licensee shall reply to the Board or designated officer in writing
(a) setting out the reasons for the absence or presence of the name of that person from or on the list; or
(b) enclosing a revised copy of the list showing the name of that person added thereto or deleted therefrom, as may be required.

(3) Subject to subsection (4), where the Board or designated officer is not satisfied with the reasons set out in a licensee's reply pursuant to paragraph (2)(a), the Board or designated officer may, by notice in writing, direct the licensee to add or delete the name of that person to or from the list as may be appropriate.

(4) Within 15 days of the receipt of a notice in writing from the Board or designated officer under subsection (3), a licensee shall
(a) comply with the direction contained therein; or
(b) apply to the Board for an opportunity to be heard.

Dosimetry Year

42. (1) Subject to subsection (2), a licensee or employer may designate in advance for any person or group of persons employed by him a dosimetry year that will comprise a period of time of not fewer than 50 consecutive weeks.

(2) Over each consecutive period of five years the dosimetry year of any person or group of persons shall average not less than 52 weeks.

Licensee's Duties in Respect of Limiting Doses of Radiation

43. (1) Every licensee shall ensure that
(a) with respect to every atomic radiation worker, the total of all effective doses and committed effective doses does not exceed

(i) 30 mSv, during any quarter of a dosimetry year, and
(ii) 50 mSv, during any dosimetry year;
(b) with respect to organs or tissues of the body of every atomic radiation worker, the total of all doses and committed doses does not exceed
(i) in the case of the lens of an eye,
(A) 80 mSv, during any quarter of a dosimetry year, and
(B) 150 mSv, during any dosimetry year,
(ii)in the case of any other organ or tissue,
(A) 300 mSv during any quarter of a dosimetry year, and
(B) 500 mSv during any dosimetry year;
(c) with respect to every embryo or foetus carried by an atomic radiation worker or other worker, the total of all doses of radiation does not exceed 0.6 mSv during any semi-monthly period in which the licensee is aware of the pregnancy of the worker;
(d) with respect to every person other than an atomic radiation worker, the total of all effective doses and committed effective doses does not exceed 5 mSv during any dosimetry year; and
(e) with respect to organs or tissues of the body of every person other than an atomic radiation worker, the total of all doses and committed doses does not exceed 50 mSv during any dosimetry year.

(2) Subject to section 44, in subsection (1)
(a) "effective doses" or "doses" means, respectively, all effective doses or all doses received from external sources of radiation during the period in question and received during that period from radioactive prescribed substances that entered the body before that period, and
(b) "committed effective doses" or "committed doses" means, respectively, all committed effective doses or all committed doses from radioactive prescribed substances that enter the body during the period in question as a result of the possession of a prescribed substance or any other activity carried on under the licence of the licensee.

44. (1) Subject to subsection (2), for the purposes of section 43, a licensee shall, with respect to every atomic radiation worker, include all effective doses and all doses received from external sources of radiation during the period in question and from radioactive prescribed substances that entered the body before that period and all committed effective doses and all committed doses from radioactive prescribed substances that enter the body during that period
(a) as a result of the possession of a prescribed substance or any other activity carried on under any licence other than the licence of the licensee; or
(b) during the course of any work, business or occupation to which these Regulations are not applicable from X-rays or other man-made sources of radiation.

(2) Subsection (1) does not apply to any dose of radiation
(a) received by an atomic radiation worker before the licensee's obligations under sections 40 and 43 arose in respect of that worker, or
(b) that will be received by an atomic radiation worker from radioactive prescribed substances that entered his body before the licensee's obligations referred to in paragraph (a) arose in respect of that worker, if the licensee had no reasonable means of ascertaining the amount of that dose of radiation.

45. For the purposes of section 43,
(a) the effective dose of a person received from external sources of

radiation shall be deemed to be equivalent to the dose received by the body of that person as determined by a measuring device carried on the surface of the body that is calibrated in accordance with procedures that have been established by the licensee and approved by the Board or as determined otherwise by such procedures;

(b) if half or more of the committed effective dose or committed dose resulting from the intake of a radioactive prescribed substance within 10 days before the end of a quarter of a dosimetry year or of a dosimetry year is received within 20 days following the intake of that substance, a licensee shall, in accordance with procedures established by the licensee and approved by the Board, consider

(i) all that committed effective dose or committed dose to have been received during that quarter or dosimetry year, as the case may be, or

(ii) any part of that committed effective dose or committed dose to have been received during that quarter or dosimetry year, as the case may be, and the remainder thereof to have been received in the following quarter or dosimetry year;

(c) the limit applicable to the skin applies to the basal cell layer of the epidermis;

(d) if the skin is irradiated non-uniformly, the applicable limit applies

(i) to the average dose to 100 cm^2 of skin in the area receiving the highest dose, or

(ii) where the irradiated area of skin is substantially less than 100 cm^2, to the average dose to 1 cm^2 of skin in the area receiving the highest dose; and

(e) where the gastrointestinal tract is irradiated, the stomach, small intestine, upper large intestine and lower large intestine are considered as separate organs.

46. (1) Where, for the purposes of section 43, it is impracticable to calculate the committed effective dose or the committed dose attributable to a radioactive prescribed substance in the body from measurements of radiation from the body or excreta, that committed effective dose or committed dose shall be deemed to be the product of

(a) the ratio of intake of or exposure to the radioactive prescribed substance during the dosimetry year to the applicable annual limit on intake or exposure for the radioactive prescribed substance determined in accordance with the measures required to be established by section 37 and in accordance with subsection (2) or (3), as may be applicable,

multiplied by

(b) in the case of the committed effective dose, 50 mSv for atomic radiation workers, or 5 mSv for persons who are not atomic radiation workers, and

(c) in the case of the committed dose, 500 mSv for atomic radiation workers, or 50 mSv for persons who are not atomic radiation workers.

(2) For the purposes of subsection (1) in the case of atomic radiation workers,

(a) the annual limit on intake or exposure for radon daughters is 0.02 joule, which shall be deemed to be equivalent to an annual limit of exposure of 800 working level hours;

(b) the annual limit on intake or exposure for thoron daughters is 0.06 joule, which shall be deemed to be equivalent to an annual limit of exposure of 2,400 working level hours; and

(c) the annual limit on intake or exposure for radioactive prescribed substances other than radon and thoron daughters is the amount of the

radioactive prescribed substance taken into the body or the exposure to that substance in a dosimetry year that will result in a committed effective dose of 50 mSv or a committed dose of 500 mSv.

(3) For the purposes of subsection (1) in the case of persons who are not atomic radiation workers, the annual limit on intake or exposure for a prescribed substance is the amount of the radioactive prescribed substance taken into the body or the exposure to that substance in a dosimetry year that will result in a committed effective dose of 5 mSv or a committed dose of 50 mSv.

Actions in the Event of Doses of Radiation Exceeding the Limits on Doses of Radiation

47. (1) Where a licensee becomes aware that a person has, in any period, received a total dose of radiation exceeding the applicable limit specified with respect to such person in section 43, the licensee shall
(a) forthwith inform that person and the Board of the event;
(b) forthwith carry out an investigation to establish the causes of the event;
(c) report to the Board the results of the investigation referred to in paragraph (b); and
(d) assist the Board in any investigation the Board may carry out with respect to the event.

(2) Where the person referred to in subsection (1) is an atomic radiation worker and the total dose of radiation received does not exceed twice any applicable limit specified in section 43, the licensee shall restrict doses of radiation received by that worker in any semi-monthly period to 1/24 of the limits specified in subparagraph 43(1)(a)(ii) and clauses 43(1)(b)(i)(B) and (ii)(B) until the licensee has reported to the Board in accordance with paragraph (1)(c) and the Board or a designated officer has notified the licensee and the worker in writing that such restriction is no longer applicable.

(3) Where the person referred to in subsection (1) is an atomic radiation worker and the total dose of radiation received exceeds twice any applicable limit specified in section 43, that worker shall be prohibited from any further employment as an atomic radiation worker until the licensee has reported to the Board in accordance with paragraph (1)(c) and the Board or a designated officer has notified the licensee and that worker in writing that such prohibition is no longer applicable.

(4) Where, during any semi-monthly period referred to in subsection (2) an atomic radiation worker receives a total dose of radiation exceeding 1/24 of the applicable limit specified in subparagraph 43(1)(a)(ii) or clause 43(1)(b)(i)(B) or (ii)(B), that worker shall be prohibited from any further employment as an atomic radiation worker until the licensee has followed the procedures set out in paragraphs (1)(a) to (d) and the Board or a designated officer has notified the licensee and the worker in writing that such prohibition is no longer applicable.

(5) Where the Board or designated officer, pursuant to subsection (2), (3) or (4) notifies a licensee and an atomic radiation worker that the restriction

or prohibition referred to in that subsection is no longer applicable, the Board or designated officer may, as a condition of any further employment of that person as an atomic radiation worker, direct that the person be subject to such limitation of doses of radiation, such additional supervision, medical surveillance, dose monitoring or other additional attention as the Board or designated officer considers necessary in the interests of the health and safety of that person and other persons.

(6) Any person who is subject to restricted doses of radiation or is prohibited from being employed as an atomic radiation worker by virtue of subsection (2), (3) or (4) or whose employment as an atomic radiation worker is subject to conditions under subsection (5) may apply to the Board for an opportunity to be heard.

Radiation Warning Signs

48. (1) Subject to subsection (2), no person shall use a container or device to store or otherwise hold radioactive prescribed substances, unless there appears clearly on the outside of the container or device

(a) the radiation warning symbol specified in Schedule V and the words "RADIATION-DANGER" or "DANGER-RAYONNEMENT", prominently displayed; and

(b) information describing the nature, form, quantity and date of measurement of the radioactive prescribed substances in the container or device.

(2) Subsection (1) does not apply to any container or device

(a) that forms part of the manufacturing or processing equipment of a nuclear facility;

(b) in which the quantity of radioactive prescribed substances is less than the scheduled quantity;

(c) that is used temporarily to store radioactive prescribed substances under the continuous supervision and in the presence of an atomic radiation worker; or

(d) that is used exclusively for shipping substances containing radioactive prescribed substances and is labelled in accordance with the requirements of the Transport Packaging of Radioactive Materials Regulations.

(3) Where a container or device to which subsection (1) is applicable ceases to be used to store or otherwise hold radioactive prescribed substances, the person in charge of the container or device shall remove therefrom the radiation warning symbol and words referred to in paragraph (1)(a).

49. (1) Every person in charge of an area, room or enclosure

(a) in which radioactive prescribed substances are present in a quantity in excess of 100 times the scheduled quantity, or

(b) in which there is a reasonable probability of a person therein receiving a dose of radiation per hour exceeding 1/2000 of an applicable limit specified in subparagraph 43(1)(a)(ii) or clause 43(1)(b)(i)(B) or (ii)(B),

shall post at the boundary of such area, room or enclosure or at the entrance giving access thereto a clearly legible and durable sign bearing the radiation warning symbol specified in Schedule V, the words "RADIATION- DANGER" or "DANGER-RAYONNEMENT", and information describing current conditions with respect to the nature and extent of the radiation hazard.

(2) Any person in charge of an area, room or enclosure described in subsection (1) shall remove the sign posted in accordance with that subsection if

(a) radioactive prescribed substances in excess of the quantity referred to in paragraph (1)(a) are no longer present in such area, room or enclosure; or

(b) there is no longer a reasonable possibility of a person therein receiving a dose of radiation at a rate in excess of that specified in paragraph (1)(b).

(3) This section does not apply to an area, room or enclosure in an uranium mine or that is used for temporary storage during the transportation for hire or reward of radioactive prescribed substances or of any device or equipment containing radioactive prescribed substances.

Appointment of Medical Advisers

50. (1) The Board or a designated officer may, in respect of any place or area, appoint as a medical adviser for the purpose of these Regulations a person who

(a) is licensed to practise medicine under the laws of the province in which the place or area is situated; and

(b) in the opinion of the Board or designated officer, is qualified to act as a medical adviser for the purposes of these Regulations.

(2) The Board or a designated officer shall furnish every medical adviser with a certificate of his appointment specifying

(a) the places or areas in respect of which he has been appointed; and

(b) the period for which he has been appointed.

Duties of Medical Advisers

51. A medical adviser shall, on request, make recommendations to the Board or a designated officer respecting

(a) the nature, extent and frequency of medical examinations of atomic radiation workers for the purposes of section 39; and

(b) any additional medical surveillance required as a condition of further employment of a person as an atomic radiation worker for the purposes of subsection 47(5).

Power of Medical Advisers

52. A medical adviser may, for the purposes of section 51, inspect any records required to be kept by licensees by paragraphs 72(b) and 73(c) and (d).

Licensees' Duty to Medical Advisers

53. A licensee referred to in section 52 shall, at the request of a medical adviser, make available for inspection by him any record referred to in that section.

PART VI
INSPECTION AND COMPLIANCE

Appointment of Inspectors

54. (1) The Board or a designated officer may appoint as an inspector for any purpose relating to the enforcement or administration of these Regulations any person who, in its or his opinion, is qualified to be so appointed.

(2) The Board or a designated officer shall furnish every inspector with a certificate of his appointment specifying

(a) the purposes for which he has been appointed and the places or areas in respect of which he has been appointed; and

(b) the period for which he has been appointed.

Powers of Inspectors

55. (1) Subject to subsection (3), an inspector may, at any reasonable time, for any purpose specified in his certificate of appointment, enter and inspect

(a) any nuclear facility so specified or any site so specified on which a nuclear facility is being constructed;

(b) any place so specified in which a prescribed substance is authorized by a licence to be located; and

(c) any factory so specified in which a component listed in Schedule IV is being manufactured.

(2) Subject to subsection (3), an inspector who has been appointed for that purpose may, at any reasonable time, enter and inspect any place, vessel or vehicle, other than a private dwelling place or any part of a place, vessel or vehicle that is being used as a private dwelling place, where he believes, on reasonable and probable grounds, that a prescribed substance or any device or equipment containing a radioactive prescribed substance is located in that place, vessel or vehicle.

(3) On entering any nuclear facility, factory, place, vessel or vehicle pursuant to subsection (1) or (2), an inspector shall, if so requested, produce his certificate of appointment to the person in charge thereof.

56. (1) An inspector may, at any reasonable time, inspect any plan, drawing, book, paper, document or any other record whatsoever relating to

(a) the design, siting, construction, testing, commissioning, operation, maintenance or decommissioning of a nuclear facility specified in his certificate of appointment,

(b) the possession or use of a prescribed substance, if specified in his certificate of appointment, or

(c) the manufacture of a component listed in Schedule IV in a factory specified in his certificate of appointment,

for the purpose of verifying that these Regulations are not being contravened.

(2) An inspector may make a copy of any record inspected pursuant to subsection (1).

57. An inspector may, at any reasonable time,

(a) meet with and interview, at the site of any inspection carried out by him any person who may reasonably be expected to have information relevant to the inspection; and

(b) if the proprietary and commercial interests of the licensee are suitably protected,

(i) be accompanied by persons of the inspector's choice to assist in any inspection of the nuclear facility or licensed activity,

(ii) take measurements or photographs respecting the nuclear facility or licensed activity, and

(iii) carry out tests and take samples respecting the nuclear facility or licensed activity,

for the purpose of facilitating the carrying out of the inspection.

Assistance to Inspectors

58. (1) A person in charge of a nuclear facility, factory, place, vessel or vehicle that an inspector enters pursuant to section 55 and every person found therein shall

(a) if it is within his authority and capacity to do so, grant the inspector complete access to the nuclear facility, factory, place, vessel or vehicle;

(b) give the inspector all reasonable assistance to enable him to carry out his duties and functions under these Regulations;

(c) furnish the inspector with such information for the purpose of the administration of these Regulations as the inspector may reasonably request; and

(d) if it is within his authority and capacity to do so, make available to the inspector for inspection or for the purpose of making copies thereof, any record referred to in section 56.

(2) No person shall knowingly make any false or misleading statement either orally or in writing to an inspector or obstruct or hinder an inspector in the execution of his duties under these Regulations.

Directions

59. (1) An inspector whose certificate specifies that he is appointed for the purposes of this section may issue a direction in writing to

(a) a licensee,

(b) a person in charge of a nuclear facility or any site, area, place or premises at a nuclear facility,

(c) a person in possession of a prescribed substance, or any device or equipment containing a radioactive prescribed substance, or

(d) a person who, in the opinion of the inspector, has contravened these Regulations

requiring that person to carry out such measures as are reasonably necessary to

(e) prevent or remedy a contravention of these Regulations,

(f) prevent a loss or theft of a prescribed substance,

(g) prevent or correct a situation that is capable of threatening health, safety, security or the environment or of interfering with safeguards, or

(h) minimize any threat to health, safety, security or the environment resulting from a loss, theft, occurrence or contravention of these Regulations.

(2) A direction issued pursuant to subsection (1) shall
(a) state the provision of these Regulations that constitutes the inspector's authority for issuing the direction;
(b) if applicable, state the provision of these Regulations that, in the opinion of the inspector has been contravened;
(c) if applicable, state the grounds on which the inspector bases his belief that a situation described in paragraph (1)(g) exists; and
(d) state any action to be taken or activity to be ceased by the person to whom the direction is issued.

60. A person to whom an inspector issues a direction pursuant to section 59 shall
(a) forthwith comply with the direction; and
(b) if he is not the licensee, provide the licensee with a copy of the direction.

61. Where a direction issued pursuant to section 59 concerns health, safety, security or the protection of the environment, the licensee shall forthwith post a copy of the direction at locations where the direction is likely to come to the attention of the majority of the workers who may be affected by the direction.

62. A designated officer may amend, suspend or revoke a direction issued pursuant to section 59 at any time before the person to whom the direction has been issued takes any action pursuant to section 60.

Review of Directions

63. (1) A person to whom a direction has been issued pursuant to section 59 may make a written representation to the Board or apply to the Board for an opportunity to be heard to review the direction.

(2) Where the Board has received a written representation or held a hearing pursuant to subsection (1), it may confirm, amend, suspend or revoke the direction.

(3) Nothing in this section affects the obligations imposed by section 60 or 61 upon a person to whom an inspector has issued a direction.

PART VII
INTERNATIONAL SAFEGUARDS

Interpretation

64. In this Part,

"applicable measures", in respect of a licensee, means the procedures, inspections, records and equipment for the implementation of safeguards at the nuclear facility of the licensee that are prescribed in
(a) a safeguards agreement,
(b) a document issued by the Board in accordance with the conditions of the licence, or

(c) a direction issued by the Board or a designated officer pursuant to section 69; (mesures applicables)

"safeguards agreement" means
(a) the IAEA Agreement and any subsidiary arrangements made between the Government of Canada and the Agency pursuant to the IAEA Agreement, and
(b) any international agreement to which the Government of Canada is a party respecting the application of safeguards in Canada and any administrative arrangements made pursuant to the international agreement; (accord de garanties)

"safeguards equipment" means equipment necessary for the purpose of a safeguards inspection; (équipement de garanties)

"safeguards inspection" means an inspection carried out by a safeguards inspector pursuant to a safeguards agreement; (inspection de garanties)

"safeguards inspector" means a person designated by the Agency or the government of a foreign country with the consent of the Government of Canada, as a safeguards inspector. (inspecteur de garanties)

Safeguards Inspections

65. The Board or a designated officer shall furnish every safeguards inspector with a document evidencing his designation as a safeguards inspector and specifying the nuclear facilities or other premises that he is authorized to enter for the purposes of a safeguards inspection.

66. (1) Subject to subsection (2), a safeguards inspector may, at any reasonable time in accordance with the applicable measures, enter any premises specified in the document referred to in section 65 for the purpose of carrying out a safeguards inspection, on condition that, if so requested, he produces the document referred to in section 65 to the person in charge of the premises or to a designated officer.

(2) Before a safeguards inspector enters any premises pursuant to subsection (1), the Board or a designated officer shall ensure that the licensee in charge of the premises has been provided with a copy of any document referred to in paragraphs (a) to (c) of the definition "applicable measures" in section 64 that prescribes applicable measures that are relevant to the proposed safeguards inspection.

Duties of Licensees

67. (1) The licensee in charge of any premises in which a safeguards inspection is to be carried out shall, for the purposes of the inspection, in accordance with the applicable measures,
(a) permit the safeguards inspector to enter the premises,
(b) make available to the safeguards inspector any relevant records;
(c) permit the safeguards inspector to take samples and to operate safeguards equipment;
(d) co-operate with the safeguards inspector in the performance of the safeguards inspection;

(e) assist the safeguards inspector to install, remove, carry out maintenance on, or to operate, safeguards equipment;
(f) supply such services as are necessary to enable the safeguards inspector to perform the safeguards inspection; and
(g) provide the safeguards inspector with reasonable office space for the purposes of the safeguards inspection.

(2) Where safeguards equipment, whether temporary or permanent, has been installed on the premises of a licensee by a safeguards inspector for the purpose of a safeguards inspection or has been supplied by the Agency or the government of a foreign country in accordance with the applicable measures, the licensee shall provide a reliable source of electrical power, lighting, liquid nitrogen and other services required for the operation of the safeguards equipment in accordance with the applicable measures.

68. Every licensee who is in charge of a nuclear facility or in possession of a radioactive prescribed substance to which safeguards are applicable shall, in accordance with the applicable measures,
(a) submit reports to the Board; and
(b) keep records for the purposes of safeguards inspections.

Directions

69. (1) The Board or a designated officer may issue a direction to a licensee
(a) to install, remove or modify safeguards equipment or to permit the Board, the Agency or a representative of the government of a foreign country with which the Government of Canada has made a safeguard agreement to install, remove or modify safeguards equipment, and
(b) to operate safeguards equipment,
where the licensee is not required to do so by applicable measures prescribed in a document referred to in paragraph (a) or (b) of the definition "applicable measures" in section 64; and
(c) where the licensee has not, to the satisfaction of the Board or designated officer, complied with any applicable measure prescribed in a document referred to in paragraph (a) or (b) of the definition "applicable measures" in section 64, to comply with that applicable measure to the satisfaction of the Board or designated officer.

(2) On receipt of a direction from the Board, a licensee shall forthwith comply therewith.

(3) On receipt of a direction from a designated officer a licensee may, within 15 days,
(a) comply with the direction, or
(b) if he believes that the direction
(i) would have an unduly adverse effect on health, safety or security,
(ii) would not be consistent with prudent management practices for the economic conduct of the licensed activity, or
(iii) would unduly interfere with the licensed activity,
apply to the Board for an opportunity to be heard.

Prohibitions

70. (1) No person shall obstruct or hinder a safeguards inspector in the performance of a safeguards inspection.

(2) No person shall, without the prior approval of the Board in writing, interfere with the operation or functioning of safeguards equipment or safeguards seals, except in accordance with the applicable measures.

PART VIII
GENERAL REQUIREMENTS

Records

71. In this Part, "record" means any correspondence, memorandum, book, plan, map, drawing, diagram, pictorial or graphic work, photograph, film microform, sound recording, videotape, machine readable record and any other documentary material, regardless of physical form or characteristic. (document)

72. Every person to whom a licence has been issued pursuant to section 9 or 11 shall

(a) keep all records necessary to show, in respect of any prescribed substance or any equipment or device containing a radioactive prescribed substance that is the subject matter of the licence,

(i) its nature, form and quantity,

(ii) its location,

(iii) the names of all persons directly involved in its use and handling, and

(iv) where the prescribed substance, equipment or device has been disposed of, full particulars of such disposal, whether by sale or otherwise, and of the licence, if any, under which such disposal was effected; and

(b) keep all records necessary to show the dose of radiation received, or estimated to have been received, by any person as a result of the licensee's use or possession of a prescribed substance, including a record of the designation of any dosimetry year for that person pursuant to section 42.

73. Every person to whom a licence has been issued pursuant to section 20 shall

(a) keep all records necessary to show the design, siting, construction or development, testing, commissioning, operation, maintenance and decommissioning of the nuclear facility;

(b) keep all records required to be kept under paragraph 72(a) in respect of any prescribed substance at the nuclear facility;

(c) keep all records necessary to show the dose of radiation received by any person as a result of the operation of the nuclear facility; and

(d) keep a record of each time that a medical examination is carried out under paragraph 39(1)(e) or subsection 40(1).

74. Every person to whom a licence has been issued pursuant to section 9, 11 or 20 shall

(a) keep, in addition to the records referred to in section 72 or 73, such records as the Board or a designated officer may require in the interests of health, safety, security, any applicable safeguards and protection of the environment; and

(b) keep a register of the records kept by that person in accordance with paragraph (a) and section 72 or 73.

75. (1) The Board or a designated officer may, by a direction in writing, require any person to whom a licence has been issued pursuant to section 9 or 20 to deposit a copy of the records and register kept by him in accordance with sections 72 to 74 with any person or agency specified in the direction.

(2) Any person who receives a direction in writing under subsection (1) shall forthwith comply therewith.

76. Any licensee who has kept a record in accordance with paragraph 72(b) or 73(c) shall

(a) at the request of any person to whom that record relates, make that record available to that person;

(b) upon the termination of the employment as an atomic radiation worker of any person to whom that record relates, deliver a copy of that record to that person and to the National Dose Registry of the Department of National Health and Welfare; and

(c) where the licensee uses a dosimetry service operated by other than the Department of National Health and Welfare, inform any person employed as an atomic radiation worker, before the expiry of each quarter of the person's dosimetry year, of his dose for the previous quarter.

77. (1) Subject to subsection (2), no person shall destroy or otherwise dispose of a record or register kept by him in accordance with sections 72 to 74 except as follows:

(a) a record kept by a person in accordance with section 73 may be destroyed or otherwise disposed of by him if

(i) at least one year has elapsed since the prescribed substance was disposed of, and

(ii) he has given at least 30 days notice in writing to the Board of the proposed destruction or disposition; and

(b) a record kept by a person in accordance with section 72 or a record or register kept by a person in accordance with section 73 may be destroyed or otherwise disposed of by him if

(i) at least one year has elapsed since the nuclear facility, prescribed substance or device was subject to licensing under these Regulations, and

(ii) he has given at least 30 days notice in writing to the Board of the proposed destruction or disposition.

(2) At any time, with the consent in writing of the Board or a designated officer and in accordance with any conditions set out in such consent, any record or register kept in accordance with sections 72 to 74 may be destroyed.

Loss or Theft of Prescribed Substances

78. (1) In the event of any loss or theft of a prescribed substance for which a licensee is responsible under his licence, the licensee shall

(a) forthwith on becoming aware of the loss or theft report it to the Board; and

(b) as soon as possible thereafter send a complete report in writing to the Board of the loss or theft.

(2) In subsection (1), "loss" does not include any loss that is necessarily the result of any authorized use of the prescribed substance.

Abnormal Occurrences

79. (1) In the event of any of the following:
(a) any discharge or accidental release from a nuclear facility of a prescribed substance or of any other substance that could result in a significant hazard to the health or safety of any person or that could lead to a significant adverse effect on the environment,
(b) any discharge or accidental release, at, from, or within any place for which a licensee is responsible of a prescribed substance that could constitute or contribute to a significant hazard to the health or safety of any person or to a significant adverse effect on the environment,
(c) a threat of, or an attempted or actual breach of security or act of sabotage at a nuclear facility at which prescribed substances are kept,
(d) the discovery of any deficiency in the methods and procedures that have been approved by the Board for the purposes of a licence,
(e) a significant or abnormal degradation or weakening of any component in a nuclear facility whose failure could constitute or contribute to a significant hazard to the health or safety of any person or to a significant adverse effect on the environment, or
(f) any event or occurrence resulting from the ownership, possession or use of a prescribed substance under a licence or from the operation of a nuclear facility that has resulted, may have resulted or may result in the receipt by any person of a dose of radiation exceeding any limit specified in section 43 with respect to that person,
the licensee of the nuclear facility referred to in paragraph (a), (c), (e) or (f), the licensee referred to in paragraph (b) or the licensee under a licence referred to in paragraph (d) or (f) shall forthwith take action to eliminate or reduce the hazard from, to mitigate the consequence of, and to report to the Board the event in accordance with subsections (2) to (4).

(2) A licensee to whom subsection (1) applies shall
(a) make an initial report to the Board orally or in writing within 24 hours of becoming aware of the event;
(b) if the initial report was made orally, make a further report in writing within 7 days thereafter; and
(c) where all the facts or circumstances relating to the occurrence were not known by him when the report in writing was made to the Board pursuant to paragraph (a) or (b), make a further report in writing to the Board as soon as all the facts or circumstances are known by him.

(3) Where a licensee to whom subsection (1) applies is unable, within 30 days, to obtain knowledge of all the facts or circumstances relating to the event, he shall submit interim reports to the Board as requested by the Board or a designated officer.

(4) Any report submitted to the Board pursuant to subsections (1) to (3) shall contain any information known to the licensee submitting the report at the time the report is submitted concerning the possible effects that the event may have on health, safety, security, any applicable safeguards and the environment.

(5) Every licensee shall promptly report to the Board any available information that reveals significant inaccuracy or incompleteness in any report previously submitted by the licensee to the Board.

Additional Duties of Licensees

80. Every licensee shall
(a) ensure that sufficient qualified personnel are present at all times for the business or undertaking to be safely carried on or the nuclear facility to be safely constructed, operated or decommissioned under the licence;
(b) ensure that any person employed at the site of the operations of the licensee is aware of all conditions of the licence and all provisions of these Regulations that relate to the employment of that person;
(c) take all reasonable precautions in relation to the prescribed substance or nuclear facility to which the licence applies to protect persons from injury and property from damage;
(d) at all appropriate times, provide necessary devices for detecting and measuring radiation and the presence of radioactive prescribed substances or other hazardous or toxic substances at the site of the operations of the licensee;
(e) at all appropriate times, require the use of such devices, articles of clothing, equipment and procedures as are necessary for the radiological protection of any person at the site of the operations of the licensee;
(f) take all reasonable precautions to prevent an escape of radioactive prescribed substances or other hazardous or toxic substance from the site of the operations of the licensee;
(g) in the event of an escape of radioactive prescribed substances or other hazardous or toxic substance from the site of the operations of the licensee, provide adequate warning of the escape to any person who may be exposed to that material or substance; and
(h) ensure that any person using a prescribed substance or employed at the nuclear facility to which the licence applies is not impaired by drugs or alcohol.

81. Every licensee shall, for purposes of security,
(a) control and restrict access to the site of the operations of the licensee; and
(b) institute and implement measures designed to alert the licensee to any theft or unauthorized removal of prescribed substances from the site of the operations of the licensee.

82. Every licensee shall promptly inform the Board as soon as he learns of
(a) any application for workman's compensation filed in respect of a claim allegedly arising from a dose of radiation received at the site of the operations of the licensee; and
(b) any event that constitutes or reveals a failure to comply with the terms and conditions of the licence.

Duties of Employees

83. (1) Every person employed in or in connection with a nuclear facility or a business or undertaking involving the use of a prescribed substance to which these Regulations apply shall, in the course of his employment,
(a) at all appropriate times use in a responsible and reasonable manner and

in accordance with any conditions attached to its use by the Board or a designated officer, all equipment, facilities, devices or clothing provided for his use for the purpose of

(i) protecting the health and safety of any person, and

(ii) determining the dose of radiation and dose rate and the concentration of radioactive prescribed substances;

(b) comply with any measures established by the licensee to

(i) control the levels and doses of radiation, and

(ii) prevent accidental releases of radioactive and non-radioactive contaminants to the environment;

(c) forthwith report to his supervisor or a person duly appointed by the licensee any situation at the nuclear facility, business or undertaking of which he is aware that he believes

(i) could cause or contribute to a significant increase of risk to the health or safety of himself or any other person, or to security or the environment, or

(ii) could result in an accidental release of a significant quantity of radioactive or non-radioactive contaminants to the environment;

(d) act in compliance with all notices or warning signs posted by the licensee in compliance with these Regulations; and

(e) take all reasonable and necessary precautions to ensure his own safety, the safety of his fellow employees and protection of members of the public.

(2) No person employed in or in connection with a nuclear facility or a business or undertaking involving the use of a prescribed substance to which these Regulations apply shall, except as authorized by the licensee, interfere with, remove, alter, displace, or render ineffective

(a) any equipment or device intended to protect the health and safety of any person;

(b) any equipment, device or structure provided in the interests of security or for the protection of the environment;

(c) any equipment or installation intended to measure radiation; or

(d) any equipment or installation intended to measure substances released.

Reports of Contraventions of these Regulations

84. (1) Any employee referred to in section 83 may report to the Board or an inspector any situation referred to in paragraph 83(1)(c).

(2) The Board or an inspector shall, on receiving a report pursuant to subsection (1),

(a) immediately notify the licensee thereof and investigate or cause to be investigated the situation reported; and

(b) as soon as possible following the investigation referred to in paragraph (a), report in writing the results of the investigation to the employee who reported the situation and to the licensee concerned.

Duties of Persons in Charge of Certain Nuclear Facilities and Employees therein

85. (1) Every licensee or other person in charge of a nuclear reactor or a plant for the production of deuterium or deuterium compounds by the Girdler-sulphide process or the production of uranium hexafluoride shall ensure that

the minimum complement for each work group in that nuclear facility designated in the licence issued for that facility is, at all times, present and on duty as required by that licence.

(2) No member of a minimum complement referred to in subsection (1) shall
(a) leave his post, or
(b) except during a lawful strike, fail to report for duty
at a nuclear facility referred to in that subsection unless he has, with the permission of the licensee or other person in charge of the facility, been replaced at that post.

Interference with Workers' Rights

86. No licensee or any other person shall discipline or use any form of discrimination, coercion or intimidation against any employee carrying out, in good faith, any duties or functions under these Regulations.

Notice of Licensing

87. (1) Every licensee whose licence does not refer to any other document shall keep a copy of the licence posted during the term of the licence at the place specified in the licence or, where no place is so specified, at a conspicuous place at the premises where the licensee operates under the licence.

(2) Every licensee whose licence refers to other documents shall keep posted during the term of the licence at a conspicuous place at the premises where the licensee operates under the licence a notice containing
(a) a description of the nuclear facility operated or the prescribed substance possessed under the licence;
(b) a statement of the location of the nuclear facility or prescribed substance referred to in paragraph (a);
(c) a description of any activity authorized by the licence; and
(d) a statement of the place where the licence and the documents referred to in the licence may be inspected.

Agents of Applicants for Licences and Licensees

88. (1) Every applicant for a licence and every licensee shall specify in writing to the Board
(a) the persons who have authority to act for them in dealings with the Board; and
(b) the persons assigned responsibility for the control and management of the nuclear facility, prescribed substance or device or equipment containing a radioactive prescribed substance to which the licence will be or is applicable.

(2) Nothing in this section relieves a licensee from any duty imposed on him by these Regulations.

Workplace Conditions

89. (1) Every licensee shall, without delay following any measurement of the environmental conditions in any workplace to which the licence is applicable carried out under these Regulations, make the results of such measurement available to every person employed at the workplace.

(2) A licensee may meet the requirements of subsection (1) by posting for a reasonable period of time the results of the measurement at a location or locations within the workplace, accessible to a majority of the employees and, in particular, to the employees who may be affected by the conditions measured.

Annual Reports

90. Every licensee shall submit to the Board an annual report containing such information as may be required by the licence.

Service of Documents

91. (1) Except where personal service is required by these Regulations, any notice, direction, decision or other document required to be given by the Board to an applicant for a licence or a licensee shall be sent by registered mail to the latest address of that applicant or licensee or his agent appearing on the records of the Board.

(2) Where a document is sent by the Board by registered mail pursuant to subsection (1), it shall be deemed to have been received by the applicant for a licence or licensee to whom it was required to be given on the eighth day following the day it was so sent by registered mail.

Security of Information

92. Except where otherwise authorized or with the approval of the Board, no person shall knowingly disclose to any other person

(a) information relating to those properties of fissionable substances that are of special importance in nuclear weapons;

(b) with respect to plants for the separation of isotopes of fissionable substances, nuclear reactors primarily intended for large scale production of fissionable substances and nuclear power units primarily intended for military purposes, information relating to

(i) the design and operation thereof,

(ii) specifications for substances and equipment specially designed and adapted for use in connection therewith, and

(iii) specifications for and quantities of fissionable substances produced by such plants, nuclear reactors and nuclear power units; and

(c) the design, production and operation of nuclear weapons.

(2) Subsection (1) does not apply to the disclosure of information that has previously been published in scientific or technical journals, official publications or official press releases.

False or Misleading Statements

93. No person shall knowingly make any false or misleading statement
(a) in an application for a licence or in a document submitted in support of such an application;
(b) orally or in writing to the Board or a designated officer in response to a direction, request or other requirement under these Regulations; or
(c) orally or in writing to an inspector or a safeguards inspector carrying out his duties or functions under these Regulations.

Transitional

94. Any licence issued under the Atomic Energy Control Regulations approved by Order in Council P.C. 1960-348 of March 17, 1960, as amended, that is in force on the day these Regulations come into force shall be deemed to have been issued by the Board under these Regulations and shall, subject to these Regulations, continue in force for the term of the licence.

SCHEDULE I
(s. 2)
TABLE 1
Quality Factors

Column I Type of Radiation	Column II Quality Factor
1. Gamma radiation and X-radiation	1
2. Beta particles and electrons	1
3. Neutrons of energy less than 10,000 electron volts	2
4. Neutrons of energy equal to or greater than 10,000 electron volts	10
5. Neutrons of unknown energy	10
6. Singly-charged particles of mass at rest equal to or greater than one unit of atomic mass	10
7. Multiply-charged particles including alpha particles	20

TABLE 2
Weighting Factors

Column I Organ or Tissue	Column II Weighting Factor
1. Gonads (testes and ovaries)	0.25
2. Breast	0.15
3. Red bone marrow	0.12
4. Lungs	0.12
5. Bone surfaces	0.03
6. Thyroid gland	0.03
7. Each of the five organs or tissues that receive the highest doses other than extremities, eye lenses, skin and the organs and tissues listed in items 1 to 6	0.06
8. Extremities, eye lenses, skin and other organs and tissues not set out in items 1 to 7	0.00

SCHEDULE II
(ss. 2 and 10)

Prescribed Items

1. Zirconium metal alloys containing more than 50 per cent zirconium by weight, and compounds, in which the ratio of hafnium content to zirconium content is less than one part to 500 parts by weight, and manufactures wholly thereof.

2. Nickel, as follows:

(1) powder with a nickel content of 99 per cent or more, and a particle size of less than 100 microns;

(2) porous metal with a mean pore size of 25 microns or less, and a nickel purity content of 99 per cent or more, except single porous nickel metal sheets not exceeding 930 square centimetres in size, intended for use in batteries with civil applications.

Note: Subitem (2) refers to porous nickel metal manufactured from nickel powder, described in subitem (1) that has been compacted and sintered to form a metal material with fine pores interconnected throughout the structure.

3. Beryllium metal and manufactures wholly thereof, except beryllium windows for medical X-ray machines; alloys containing more than 50 percent of beryllium by weight; oxides and other compounds.

4. Fluorine.

5. Chlorine trifluoride.

6. Artificial graphite having a boron content of less than, or equal to, one part in 1 million parts, the total thermal neutron absorption cross section being less than, or equal to, 5 millibarns per atom.

7. Lithium as follows:

(1) metal;

(2) hydrides, in which lithium, whether normal, depleted or enriched in the 6 isotope, is compounded with hydrogen or its isotopes or complexed with other metals or aluminium hydride;

(3) alloys, as follows:

(a) magnesium-based alloys containing 10 per cent or more lithium;

(b) containing 50 per cent or more lithium either normal or depleted in the 6 isotope; or

(c) containing any quantity of lithium enriched in the 6 isotope; and

(4) any other material containing lithium enriched in the 6 isotope, including compounds, mixtures and concentrates.

8. Hafnium metal, and alloys and compounds of hafnium containing more than 60 per cent hafnium by weight.

9. Calcium containing both less than one hundredth (0.01) per cent by weight of impurities other than magnesium and less than 10 parts in 1 million of boron.

10. Parts for specially designed equipment described in items 11 to 23 inclusive of this schedule.

11. Plant and equipment specially designed for the fabrication of fuel elements containing source (fertile) or fissionable materials.

12. Plant and equipment specially designed for the production or concentration of deuterium or deuterium oxide.

13. Equipment specially designed for the separation of isotopes of uranium or lithium.

14. Machines, materials or equipment specially designed for use in the processing of irradiated nuclear materials in order to isolate or recover fissionable materials, such as nuclear reactor fuel chopping machines, counter-current solvent extractors, and specially designed parts and accessories therefor.

15. Equipment specially designed for the processing of source (fertile) or fissionable material including plants specially designed for the production of uranium hexafluoride (UF_6).

16. Valves, 3 centimetres or greater in diameter, with bellows seals, wholly made of or lined with aluminium, nickel, or alloy containing 60 per cent or more nickel, either manually or automatically operated.

17. Gas centrifuges capable of the enrichment or separation of isotopes and specially designed parts and equipment for gas centrifuges and gas centrigufes installations.

18. Blowers and compressors (turbo, centrifugal, and axial flow types), wholly made of or lined with aluminium, nickel, or alloy containing 60 per cent or more nickel, and having a capacity of 1,700 litres per minute or greater.

19. Electrolytic cells for the production of fluorine, with a production capacity greater than 250 grams of fluorine per hour.

20. Heat exchangers, suitable for use in gaseous diffusion plants (i.e. heat exchanger made of aluminium, copper, nickel, or alloys containing more than 60 per cent nickel or combinations of these metals as clad tubes), designed to operate at subatmospheric pressure, with a leak rate of less than 10 pascals per hour under a pressure differential of 100 kilopascals.

21. Nuclear reactors and equipment specially designed therefor.

22. Neutron generator tubes designed for operation without an external vacuum system, and utilizing electrostatic acceleration to induce a tritium-deuterium nuclear reaction.

23. Process control instrumentation, specially designed or modified for monitoring or controlling the processing of irradiated fissionable or fertile materials and lithium.

24. Technical data in material form, including but not limited to technical drawings, photographic negatives and prints, recordings, design data and technical and operating manuals, that can be used in the design, production, operation or testing of prescribed items described above, except data available to the public, i.e. in published books and periodicals.

SCHEDULE III
(ss. 2, 8 and 49)

PART I

Scheduled Quantities of Radioactive Prescribed Substances

Column I Radioactive Isotope	Column II Becquerels
Americium 241	3×10^1
Americium 243	3×10^1
Antimony 124	3×10^4
Antimony 125	3×10^4
Arsenic 73	3×10^4
Arsenic 74	3×10^4
Arsenic 76	1×10^4
Barium 131	3×10^5
Barium 133	3×10^5
Barium 140	1×10^4
Beryllium 7	1×10^6
Bismuth 206	1×10^5
Bismuth 207	1×10^4
Bismuth 210	1×10^4
Bromine 82	1×10^5
Cadmium 107	1×10^5
Cadmium 109	1×10^5
Cadmium 113m	1×10^4
Cadmium 115	3×10^4
Cadmium 115m	1×10^4
Calcium 45	1×10^6
Calcium 47	1×10^4
Carbon 11	1×10^6
Carbon 14	1×10^7
Cerium 139	1×10^5
Cerium 141	1×10^5
Cerium 144	1×10^4
Cesium 134	1×10^4
Cesium 134m	1×10^8
Cesium 137	3×10^4

Chlorine 36	1×10^6
Chlorine 38	3×10^5
Chromium 49	3×10^5
Chromium 51	3×10^5
Cobalt 56	1×10^4
Cobalt 57	1×10^5
Cobalt 58	3×10^4
Cobalt 58m	1×10^7
Cobalt 60	1×10^4
Copper 60	1×10^6
Copper 64	1×10^5
Copper 67	3×10^4
Dysprosium 159	3×10^5
Erbium 169	3×10^5
Erbium 171	1×10^7
Fluorine 18	3×10^5
Gallium 67	1×10^6
Gallium 68	3×10^5
Germanium 68	1×10^4
Gold 195	1×10^6
Gold 198	3×10^4
Hydrogen 3	3×10^8
Indium 111	1×10^6
Indium 113m	3×10^7
Indium 115	3×10^3
Iodine 123	1×10^7
Iodine 125	1×10^5
Iodine 129	1×10^5
Iodine 131	3×10^4
Iridium 192	3×10^4
Iron 52	1×10^5
Iron 55	1×10^5
Iron 59	3×10^4
Krypton 77	1×10^7
Krypton 85	3×10^6
Krypton 87	1×10^7
Lead 210	3×10^3

Magnesium 28	3×10^4
Mangenese 52	1×10^5
Mangenese 54	3×10^4
Mercury 203	1×10^5
Molybdenum 99	3×10^4
Nickel 59	3×10^4
Nickel 63	1×10^7
Nickel 65	1×10^5
Phosphorus 32	1×10^4
Polonium 210	3×10^3
Potassium 42	1×10^4
Promethium 147	3×10^5
Radium 226	3×10^3
Scandium 47	3×10^4
Selenium 75	3×10^4
Selenium 79	3×10^6
Sodium 22	1×10^4
Sodium 24	3×10^4
Strontium 85	3×10^4
Strontium 87m	1×10^6
Strontium 89	1×10^4
Strontium 90	1×10^4
Sulphur 35	1×10^7
Technetium 99m	3×10^7
Thallium 201	1×10^6
Thallium 204	3×10^4
Thorium 232	1×10^1
Tritium (1) (see Hydrogen 3)	
Uranium 234	3×10^2
Uranium 235	3×10^2
Uranium 238	3×10^2
Xenon 123	3×10^7
Xenon 129m	1×10^7
Xenon 133	3×10^6
Xenon 135	1×10^7
Zinc 65	3×10^4
Zirconium 95	3×10^4

Note: (1) For the purposes of this Schedule this only refers to tritium in the form of water or water vapour.

PART II

The scheduled quantity shall be calculated by using the summation equation

$$\sum_{i=1}^{n} \frac{Ai}{Mi} = 1$$

where

"n" represents the number of radioactive isotopes,

"A" represents the quantity of each radioactive isotope and

"M" represents the respective scheduled quantity of each radioactive isotope.

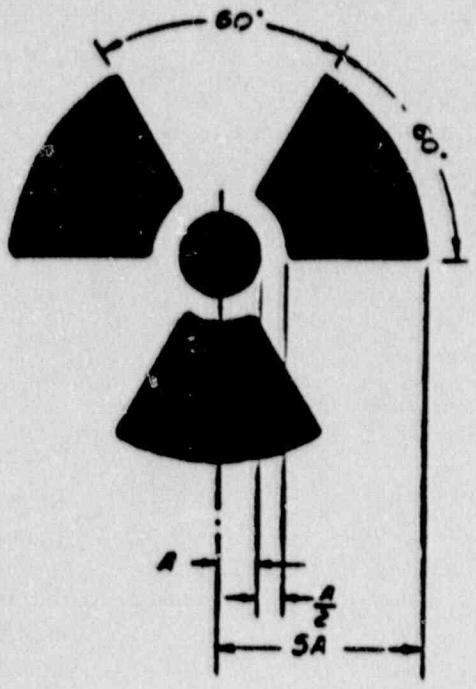
SCHEDULE IV
(s. 26)

Nuclear Reactor Components

1. Steam generator
2. Calandria assembly
3. Calandria shield tank
4. Reactivity mechanism deck
5. Fuelling machine
6. Primary heat transport system pumps
7. Primary heat transport system pressurizer vessel
8. Reactor feeder header assembly
9. Moderator heat exchanger

SCHEDULE V
(ss. 48 and 49)

Radiation Warning Symbol



A = Radius of Central Disc.

NOTE: Construction lines do not appear in actual symbol.

1. For the purposes of sections 48 and 49 the above radiation warning symbol shall be used.

2. The size of the symbol shall be as large as permitted by the size of the container, device or sign to which it is affixed or attached.

3. Where practicable, the symbol shall be oriented with one blade pointed downward and centered on the vertical axis.

4. No wording shall be superimposed on the symbol.

5. The three blades and the centre disc of the symbol shall be

(a) coloured reddish purple (magenta) or black, and
(b) located on a yellow background

and the colours shall be similar to those shown in Canadian Standards Association "Specification for a Radiation Symbol, Z69-1960".

CHAPTER A-16

An Act relating to the development and control of atomic energy

Preamble

WHEREAS it is essential in the national interest to make provision for the control and supervision of the development, application and use of atomic energy and to enable Canada to participate effectively in measures of international control of atomic energy that may hereafter be agreed on;

NOW THEREFORE, His Majesty, by and with the advice and consent of the Senate and House of Commons of Canada, enacts as follows:

SHORT TITLE

Short title

1. This Act may be cited as the *Atomic Energy Control Act*. R.S., c. A-19, s. 1.

INTERPRETATION

Definitions.

2. In this Act,

"atomic energy" «*énergie...*»

"atomic energy" means all energy of whatever type derived from or created by the transmutation of atoms;

"Board" «*Commission*»

"Board" means the Atomic Energy Control Board established by section 3;

"company" «*compagnie*»

"company" means a company incorporated or acquired pursuant to subsection 10(2) of the *Atomic Energy Control Act*, chapter A-19 of the Revised Statutes of Canada, 1970;

"member" «*commissaire*»

"member" means a member of the Board;

"Minister" «*ministre*»

"Minister" means such member of the Queen's Privy Council for Canada as is designated by the Governor in Council as the Minister for the purposes of this Act;

"prescribed substances" «*substances...*»

"prescribed substances" means uranium, thorium, plutonium, neptunium, deuterium, their respective derivatives and compounds and such other substances as the Board may by

CHAPITRE A-16

Loi concernant l'exploitation et le contrôle de l'énergie atomique

Préambule

Considérant qu'il est essentiel, dans l'intérêt national, de pourvoir au contrôle et à la surveillance de l'exploitation et des applications et usages de l'énergie atomique et de permettre au Canada de participer d'une manière efficace aux mesures de contrôle international de l'énergie atomique dont il pourra être convenu,

Sa Majesté, sur l'avis et avec le consentement du Sénat et de la Chambre des communes du Canada, édicte :

TITRE ABRÉGÉ

Titre abrégé

1. *Loi sur le contrôle de l'énergie atomique*. S.R., ch. A-19, art. 1.

DÉFINITIONS

Définitions

2. Les définitions qui suivent s'appliquent à la présente loi.

«commissaire» Membre de la Commission. «commissaire» "*member*"

«Commission» La Commission de contrôle de l'énergie atomique constituée par l'article 3. «Commission» "*Board*"

«compagnie» Personne morale constituée ou acquise aux termes du paragraphe 10(2) de la *Loi sur le contrôle de l'énergie atomique*, chapitre A-19 des Statuts revisés du Canada de 1970. «compagnie» "*company*"

«énergie atomique» Énergie libérée, sous quelque forme que ce soit, par transmutation atomique. «énergie atomique» "*atomic...*"

«ministre» Le membre du Conseil privé de la Reine pour le Canada chargé par le gouverneur en conseil de l'application de la présente loi. «ministre» "*Minister*"

«président» Le président de la Commission. «président» "*President*"

regulation designate as being capable of releasing atomic energy or as being requisite for the production, use or application of atomic energy;

«substances réglementées» Uranium, thorium, plutonium, neptunium, deutérium, ainsi que leurs dérivés et composés respectifs, et les autres substances que la Commission peut, par règlement, classer parmi les sources d'énergie atomique ou considérer comme nécessaires à la production et aux applications et usages de celle-ci. S.R., ch. A-19, art. 2; 1984, ch. 31, art. 14.

«substances réglementées» *"prescribed..."*

"President" *«président»*

"President" means the President of the Board. R.S., c. A-19, s. 2; 1984, c. 31, s. 14.

ESTABLISHMENT AND ORGANIZATION OF BOARD

CONSTITUTION ET FONCTIONNEMENT DE LA COMMISSION

Board established

3. (1) There is hereby established a body corporate, to be called the Atomic Energy Control Board, with powers exercisable by it only as an agent of Her Majesty.

Constitution

3. (1) Est constituée la Commission de contrôle de l'énergie atomique, dotée de la personnalité morale et exerçant ses pouvoirs uniquement à titre de mandataire de Sa Majesté.

Legal proceedings

(2) Actions, suits or other legal proceedings in respect of any right or obligation acquired or incurred by the Board on behalf of Her Majesty, whether in its name or in the name of Her Majesty, may be brought or taken by or against the Board in the name of the Board in any court that would have jurisdiction if the Board were not an agent of Her Majesty. R.S., c. A-19, s. 3.

Action en justice

(2) À l'égard des droits et obligations qu'elle assume pour le compte de Sa Majesté sous le nom de celle-ci ou le sien, la Commission peut ester en justice sous son propre nom devant les tribunaux qui seraient compétents si elle n'était pas mandataire de Sa Majesté. S.R., ch. A-19, art. 3.

Composition of the Board

4. (1) The Board shall consist of the President of the National Research Council of Canada and four other members appointed by the Governor in Council.

Composition

4. (1) La Commission se compose du président du Conseil national de recherches du Canada et de quatre autres commissaires nommés par le gouverneur en conseil.

Tenure of office and remuneration

(2) The members of the Board appointed by the Governor in Council hold office during pleasure and shall be paid such salaries as may be fixed by the Governor in Council.

Mandat et rémunération des commissaires

(2) Les commissaires nommés par le gouverneur en conseil occupent leur poste à titre amovible et reçoivent le traitement fixé par le gouverneur en conseil.

Expenses

(3) Each member is entitled to be paid travel and other expenses incurred in connection with the work of the Board.

Indemnités

(3) Tous les commissaires ont droit aux frais de déplacement et autres exposés dans le cadre des activités de la Commission.

Quorum

(4) Three members constitute a quorum.

Quorum

(4) Le quorum est constitué de trois commissaires.

Vacancy

(5) A vacancy in the Board does not impair the right of the remaining members to act. R.S., c. A-19, s. 4.

Vacance

(5) Une vacance au sein de la Commission n'entrave pas le fonctionnement de celle-ci. S.R., ch. A-19, art. 4.

President

5. (1) One of the members shall be appointed by the Governor in Council to be the President of the Board.

Président

5. (1) Le gouverneur en conseil nomme l'un des commissaires président de la Commission.

Duties

(2) The President is the chief executive officer of the Board and has supervision over and direction of the work of the Board and of the officers, technical and otherwise, employed for the purpose of carrying on the work of the Board. R.S., c. A-19, s. 5.

Fonctions

(2) Le président est le premier dirigeant de la Commission; à ce titre, il en assure la direction et contrôle la gestion de son personnel. S.R., ch. A-19, art. 5.

Meetings

6. The Board shall meet at least three times a year in the city of Ottawa on such days as it may determine and may also meet at such other times and at such places as it may determine. R.S., c. A-19, s. 6.

Réunions

6. La Commission tient au moins trois réunions par an à Ottawa, aux dates qu'elle fixe; elle peut tenir d'autres réunions aux dates, heures et lieux de son choix. S.R., ch. A-19, art. 6.

DUTIES AND POWERS OF BOARD

ATTRIBUTIONS DE LA COMMISSION

Duties of the Board

7. The Board shall comply with any general or special direction given by the Minister with reference to the carrying out of its purposes. R.S., c. A-19, s. 7.

Obligations

7. La Commission se conforme aux instructions générales ou particulières du ministre en ce qui a trait à la réalisation de sa mission. S.R., ch. A-19, art. 7.

Powers of the Board

8. The Board may

(*a*) make rules for regulating its proceedings and the performance of its functions;

(*b*) notwithstanding any statute or law, appoint and employ such professional, scientific, technical and other officers and employees as the Board deems necessary for the purposes of this Act;

(*c*) with the approval of the Minister, fix the tenure of appointment, the duties and, subject to the approval of the Treasury Board, the remuneration of officers and employees appointed or employed by the Board;

(*d*) with the approval of the Minister, disseminate or provide for the dissemination of information relating to atomic energy to such extent and in such manner as the Board may deem to be in the public interest; and

(*e*) without limiting the generality of any other provision of this Act, establish, through the National Research Council of Canada or otherwise, scholarships and grants in aid for research and investigations with respect to atomic energy or for the education or training of persons to qualify them to engage in such research and investigations. R.S., c. A-19, s. 8.

Pouvoirs

8. La Commission peut :

a) établir des règles pour la conduite de ses travaux et l'exercice de ses fonctions;

b) nonobstant toute autre loi ou règle de droit, recruter le personnel — scientifique, technique, administratif et autre — qu'elle estime nécessaire à l'application de la présente loi;

c) avec l'agrément du ministre, fixer la durée du mandat, les attributions et, sous réserve de l'approbation du Conseil du Trésor, la rémunération de son personnel;

d) avec l'agrément du ministre, diffuser ou faire diffuser l'information sur l'énergie atomique qui lui paraît d'intérêt public, et ce de la manière qu'elle juge propre à servir celui-ci;

e) sans que soit limitée la portée générale d'autres dispositions de la présente loi, offrir, notamment par l'intermédiaire du Conseil national de recherches du Canada, des bourses d'études et des subventions destinées aux recherches scientifiques et techniques sur l'énergie atomique ou à la formation théorique ou pratique de chercheurs aptes à les mener. S.R., ch. A-19, art. 8.

Regulations

9. The Board may, with the approval of the Governor in Council, make regulations

(*a*) for encouraging and facilitating research and investigations with respect to atomic energy;

(*b*) for developing, controlling, supervising and licensing the production, application and use of atomic energy;

(*c*) respecting mining and prospecting for prescribed substances;

(*d*) regulating the production, import, export, transportation, refining, possession, ownership, use or sale of prescribed sub-

Règlements

9. La Commission peut, avec l'agrément du gouverneur en conseil, prendre des règlements en vue de :

a) faciliter et encourager les recherches scientifiques et techniques sur l'énergie atomique;

b) développer, contrôler, surveiller et autoriser par l'attribution de licences, la production et les applications et usages de l'énergie atomique;

c) régir la prospection et l'exploitation minière des substances réglementées;

stances and any other things that in the opinion of the Board may be used for the production, use or application of atomic energy;

(*e*) for the purpose of keeping secret information respecting the production, use and application of, and research and investigations with respect to, atomic energy as, in the opinion of the Board, the public interest may require;

(*f*) governing cooperation and the maintenance of contact, through international organizations or otherwise, with scientists in other countries or with other countries with respect to the production, use, application and control of, and research and investigations with respect to, atomic energy; and

(*g*) generally as the Board may deem necessary for carrying out any of the purposes or provisions of this Act. R.S., c. A-19, s. 9.

d) régir la production, l'importation, l'exportation, le transport, le raffinage, la possession, la propriété, l'usage ou la vente des substances réglementées et de tout ce qui, à son avis, peut concourir à la production et aux applications et usages de l'énergie atomique;

e) garder secrètes l'information et les recherches scientifiques et techniques en matière de production et d'applications et d'usages de l'énergie atomique qui, à son avis, ne devraient pas être divulguées pour des raisons d'intérêt public;

f) régir la coopération et le maintien de relations, notamment par l'intermédiaire d'organisations internationales, avec d'autres pays ou les scientifiques de ces pays en matière de production, d'applications, d'usages et de contrôle de l'énergie atomique, et de recherches scientifiques et techniques sur cette dernière;

g) prendre toutes les autres mesures qu'elle juge nécessaires à l'application de la présente loi. S.R., ch. A-19, art. 9.

POWERS OF MINISTER

POUVOIRS DU MINISTRE

Powers of Minister

10. The Minister may

(*a*) undertake or cause to be undertaken research and investigations with respect to atomic energy;

(*b*) with the approval of the Governor in Council, utilize, cause to be utilized and prepare for the utilization of atomic energy;

(*c*) with the approval of the Governor in Council, acquire or cause to be acquired, by purchase, lease, requisition or expropriation, prescribed substances and any mines, deposits or claims of prescribed substances and patent rights relating to atomic energy and any works or property for production or preparation for production of, or for research or investigations with respect to, atomic energy; and

(*d*) with the approval of the Governor in Council, license or otherwise make available or sell or otherwise dispose of discoveries, inventions and improvements in processes, apparatus or machines, and patent rights acquired under this Act and collect royalties and fees thereon and payments therefor. R.S., c. A-19, s. 10.

Pouvoirs du ministre

10. Le ministre peut :

a) effectuer ou faire effectuer des recherches scientifiques et techniques sur l'énergie atomique;

b) avec l'agrément du gouverneur en conseil, tirer partie de l'énergie atomique en l'exploitant lui-même ou en la faisant exploiter, et se préparer dans cette perspective;

c) avec l'agrément du gouverneur en conseil, procéder ou faire procéder à l'acquisition — par achat, location, réquisition ou expropriation — des substances réglementées, des gisements, mines ou concessions de substances réglementées, des brevets d'invention relatifs à l'énergie atomique, ainsi que des ouvrages ou biens destinés à la production d'énergie atomique, ou la préparation en vue de celle-ci, ainsi qu'aux recherches scientifiques et techniques la concernant;

d) avec l'agrément du gouverneur en conseil, céder, notamment par vente ou attribution de licences, les découvertes, inventions et perfectionnements en matière de procédés, d'appareillage ou d'équipement, ainsi que les brevets d'invention acquis aux termes de la présente loi, et percevoir les redevances,

droits et autres paiements correspondants. S.R., ch. A-19, art. 10.

COMPANIES

Shares held in trust

11. (1) The shares, except shares necessary to qualify other persons as directors, of the capital stock of a company shall be owned or held by the Minister, or by another company, in trust for Her Majesty in right of Canada.

Agent of Her Majesty

(2) A company is for all its purposes an agent of Her Majesty in right of Canada.

Operation

(3) Nothing in this section affects the application to a company of regulations made under section 9. R.S., c. A-19, s. 10; 1984, c. 31, s. 14.

COMPAGNIES

Détention des actions

11. (1) Les actions des compagnies — sauf celles qui sont nécessaires pour conférer la qualité d'administrateurs — sont détenues en fiducie pour Sa Majesté du chef du Canada, soit par le ministre, soit par une autre compagnie.

Mandataire de Sa Majesté

(2) Les compagnies sont, dans le cadre de leurs attributions, mandataires de Sa Majesté du chef du Canada.

Effet

(3) Le présent article ne change en rien l'application des règlements pris sous le régime de l'article 9 en ce qui concerne les compagnies. S.R., ch. A-19, art. 10; 1984, ch. 31, art. 14.

GENERAL

Employee benefits continued

12. Any person who, at the time of that person's employment with the Board, held a position in the Public Service or was an employee within the meaning of the *Public Service Employment Act* continues to retain and is eligible for all the benefits, except salary as an employee in the Public Service, that that person would have retained or been eligible to receive had that person remained an employee in the Public Service. R.S., c. A-19, s. 11.

DISPOSITIONS GÉNÉRALES

Protection des avantages

12. Les personnes qui, au moment d'être engagées par la Commission, étaient régies par la *Loi sur l'emploi dans la fonction publique* conservent les avantages, à l'exception de la rémunération, auxquels elles auraient eu droit si elles étaient demeurées fonctionnaires. S.R., ch. A-19, art. 11.

Application of *Government Employees Compensation Act*

13. The *Government Employees Compensation Act* applies to officers and employees employed by the Board and for the purposes of that Act those officers and employees shall be deemed to be employees in the service of Her Majesty. R.S., c. A-19, s. 12.

Application de la *Loi sur l'indemnisation des agents de l'État*

13. Pour l'application de la *Loi sur l'indemnisation des agents de l'État*, les membres du personnel de la Commission sont assimilés à des agents de Sa Majesté. S.R., ch. A-19, art. 12.

Claim for compensation may be referred to Federal Court

14. Whenever any property has been requisitioned or expropriated under this Act and the compensation to be made therefor has not been agreed on, the claim for compensation shall be referred by the Minister of Justice to the Federal Court. R.S., c. A-19, s. 13; R.S., c. 10(2nd Supp.), s. 64.

Renvoi à la Cour fédérale

14. En cas de désaccord sur le montant de l'indemnité à verser pour des biens réquisitionnés ou expropriés sous le régime de la présente loi, le ministre de la Justice saisit la Cour fédérale de la question. S.R., ch. A-19, art. 13; S.R., ch. 10(2e suppl.), art. 64.

Application of *Financial Administration Act*

15. Subject to this Act, the *Financial Administration Act* applies to the Board. R.S., c. A-19, s. 14.

Application de la *Loi sur la gestion des finances publiques*

15. Sous réserve des autres dispositions de la présente loi, la Commission est régie par la *Loi sur la gestion des finances publiques*. S.R., ch. A-19, art. 14.

Expenses

16. All expenses under this Act shall be paid out of moneys appropriated by Parliament for the purpose or received by the Board or a company through the conduct of its operations

Dépenses

16. Les dépenses prévues par la présente loi sont payées sur les crédits votés à cette fin par le Parlement ou sur les montants reçus par la Commission ou une compagnie au titre notam-

or by bequest, donation or otherwise. R.S., c. A-19, s. 15.

ment de leurs activités ou de libéralités. S.R., ch. A-19, art. 15.

Audit

17. All receipts and expenditures of the Board shall be subject to examination and audit by the Auditor General of Canada. R.S., c. A-19, s. 16.

Vérification

17. Le vérificateur général du Canada vérifie les recettes et dépenses de la Commission. S.R., ch. A-19, art. 16; 1976-77, ch. 34, art. 30.

Works and undertakings

18. All works and undertakings constructed

(*a*) for the production, use and application of atomic energy,

(*b*) for research or investigation with respect to atomic energy, and

(*c*) for the production, refining or treatment of prescribed substances,

are, and each of them is declared to be, works or a work for the general advantage of Canada. R.S., c. A-19, s. 17.

Ouvrages et entreprises

18. Sont déclarés à l'avantage général du Canada les ouvrages et entreprises destinés :

a) à la production et aux applications et usages de l'énergie atomique;

b) à des recherches scientifiques et techniques sur l'énergie atomique;

c) à la production, à l'affinage ou au traitement des substances réglementées. S.R., ch. A-19, art. 17.

Oath of fidelity and secrecy

19. (1) Every member and every officer and employee of and every person acting under the direction of the Board shall, before acting as such, take before a justice of the peace or a commissioner for taking affidavits an oath of fidelity and secrecy in the form set out in Schedule I.

Serment de fidélité et de secret professionnel

19. (1) Les commissaires, les membres du personnel de la Commission ainsi que les personnes agissant sur les instructions de celle-ci doivent, préalablement à l'exercice de leurs fonctions, prêter devant un juge de paix, ou un commissaire aux serments, le serment de fidélité et de secret professionnel figurant à l'annexe I.

Idem

(2) Every director and every officer and employee of a company shall, before acting as such, take before a justice of the peace or a commissioner for taking affidavits an oath of fidelity and secrecy in the form set out in Schedule II. R.S., c. A-19, s. 18.

Idem

(2) Les administrateurs, dirigeants et préposés des compagnies doivent, de la même façon, prêter le serment de fidélité et de secret professionnel figurant à l'annexe II. S.R., ch. A-19, art. 18.

Offence and punishment

20. (1) Any person who contravenes or fails to comply with this Act or the regulations is guilty of an offence and liable on summary conviction to a fine not exceeding five thousand dollars or to imprisonment for a term not exceeding two years or to both, but that person may, at the election of the Attorney General of Canada or of the province in which the offence is alleged to have been committed, be prosecuted on indictment, and if found guilty is liable to a fine not exceeding ten thousand dollars or to imprisonment for a term not exceeding five years or to both.

Infractions et peines

20. (1) Quiconque contrevient à la présente loi ou à ses règlements commet une infraction et encourt, sur déclaration de culpabilité par procédure sommaire, une amende maximale de cinq mille dollars et un emprisonnement maximal de deux ans, ou l'une de ces peines; l'infraction peut toutefois, au choix du procureur général du Canada ou de la province où elle aurait été commise, être poursuivie par mise en accusation, son auteur encourant alors une amende maximale de dix mille dollars et un emprisonnement maximal de cinq ans, ou l'une de ces peines.

Officers, etc., of corporations

(2) Where a company or corporation commits an offence under subsection (1), any officer, director or agent of the company or corporation who directed, authorized, assented to, acquiesced in or participated in the commission of the offence is a party to and guilty of the offence and is liable on conviction to the pun-

Personnes morales et leurs dirigeants, etc.

(2) En cas de perpétration par une personne morale, y compris une compagnie, d'une infraction à la présente loi ou à ses règlements, ceux de ses dirigeants, administrateurs ou mandataires qui l'ont ordonnée ou autorisée, ou qui y ont consenti ou participé, sont considérés comme des coauteurs de l'infraction et encourent, sur

ishment provided for the offence whether or not the company or corporation has been prosecuted or convicted. R.S., c. A-19, s. 19.

Annual report

21. (1) The Board shall as soon as possible after March 31 in each year and in any event within three months thereafter submit to the Minister an annual report in such form as the Minister may prescribe of its affairs and operations during the twelve month period ending on March 31 and the Minister shall lay the report before Parliament forthwith, or, if Parliament is not then in session, within the first fifteen days of the next ensuing session.

Other reports

(2) The Board shall, in addition to making an annual report under subsection (1), make to the Minister such other report of its affairs and operations as the Minister may require. R.S., c. A-19, s. 20.

déclaration de culpabilité, la peine prévue, que la personne morale ait été ou non poursuivie ou déclarée coupable. S.R., ch. A-19, art. 19.

Rapport annuel

21. (1) Aussitôt que possible après le 31 mars de chaque année et, en tout cas, dans les trois mois qui suivent cette date, la Commission présente au ministre, en la forme prescrite par celui-ci, un rapport d'activité pour la période de douze mois se terminant à cette date. Le ministre le dépose devant le Parlement sans délai ou, si celui-ci n'est pas en session, dans les quinze premiers jours de la session suivante.

Autres rapports

(2) La Commission présente au ministre, outre son rapport annuel, tous les rapports que celui-ci exige relativement à ses activités. S.R., ch. A-19, art. 20.

SCHEDULE I

(*Section 19*)

OATH OF FIDELITY AND SECRECY

I, ..., do solemnly swear that I will faithfully, truly and to the best of my judgment, skill and ability execute and perform the duties required of me as a member (*or* officer *or* employee *or* person acting under the direction, *as the case may be*), of the Atomic Energy Control Board.

I further solemnly swear that I will not communicate or allow to be communicated to any person not legally entitled thereto any information relating to the affairs of the Board nor will I allow any such person to inspect or have access to any books or documents belonging to or in the possession of the Board and relating to its business.

R.S., c. A-19, Sch.

ANNEXE I

(*article 19*)

SERMENT DE FIDÉLITÉ ET DE SECRET PROFESSIONNEL

Je, ..., jure de bien et fidèlement remplir les fonctions attachées à l'emploi (*ou* au poste) que j'occupe à la Commission de contrôle de l'énergie atomique (*ou* les fonctions que me confie par instructions la Commission de contrôle de l'énergie atomique).

Je jure en outre de ne communiquer, ou laisser communiquer, aucun renseignement sur les affaires de la Commission à quiconque n'y a pas droit, ni de lui permettre l'accès aux documents appartenant à cette dernière ou en sa possession, et se rapportant à ses affaires.

S.R., ch. A-19, ann.

SCHEDULE II

(*Section 19*)

OATH OF FIDELITY AND SECRECY

I, ..., do solemnly swear that I will faithfully, truly and to the best of my judgment, skill and ability execute and perform the duties required of me as a director (*or* officer *or* employee, *as the case may be*), of .....

I further solemnly swear that I will not communicate or allow to be communicated to any person not legally entitled thereto any information relating to the affairs of the said company nor will I allow any such person to inspect or have access to any books or documents belonging to or in the possession of the said company and relating to its business.

R.S., c. A-19, Sch.

ANNEXE II

(*article 19*)

SERMENT DE FIDÉLITÉ ET DE SECRET PROFESSIONNEL

Je, ..., jure de bien et fidèlement remplir les fonctions attachées à l'emploi (*ou* au poste) que j'occupe à .....

Je jure en outre de ne communiquer, ou laisser communiquer, aucun renseignement sur les affaires de la compagnie à quiconque n'y a pas droit, ni de lui permettre l'accès aux documents appartenant à cette dernière ou en sa possession, et se rapp r-tant à ses affaires.

S.R., ch. A-19, ann.

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CHAPTER N-28

An Act respecting civil liability for nuclear damage

SHORT TITLE

Short title

1. This Act may be cited as the *Nuclear Liability Act*. R.S., c. 29(1st Supp.), s. 1.

INTERPRETATION

Definitions

2. In this Act,

"Commission" «commission»

"Commission" means a Nuclear Damage Claims Commission established pursuant to Part II;

"damage" «dommage»

"damage", in relation to any damage to property within the meaning of section 3, means any loss of or damage to property, whether real or personal, and, for the purposes of any other provision of this Act, includes any damage arising out of or attributable to any loss of or damage to that property;

"injury" «blessure»

"injury" means personal injury and includes loss of life;

"Minister" «ministre»

"Minister" means such member of the Queen's Privy Council for Canada as is designated by the Governor in Council as the Minister for the purposes of this Act;

"nuclear incident" «accident nucléaire»

"nuclear incident" means an occurrence resulting in injury or damage that is attributable to a breach of the duty imposed on an operator by this Act;

"nuclear installation" «installation nucléaire»

"nuclear installation" means a structure, establishment or place, or two or more structures, establishments or places at a single location, coming within any of the following description and designated as a nuclear installation for the purposes of this Act by the Atomic Energy Control Board, namely,

(*a*) a structure containing nuclear material in such an arrangement that a self-

CHAPITRE N-28

Loi concernant la responsabilité civile en matière de dommages nucléaires

TITRE ABRÉGÉ

Titre abrégé

1. *Loi sur la responsabilité nucléaire*. S.R., ch. 29(1er suppl.), art. 1.

DÉFINITIONS

Définitions

2. Les définitions qui suivent s'appliquent à la présente loi.

«accident nucléaire» "nuclear incident"

«accident nucléaire» Fait entraînant des blessures ou des dommages attribuables à une violation de l'obligation imposée à un exploitant par la présente loi.

«blessure» "injury"

«blessure» Blessures corporelles faites à une personne, y compris la mort.

«commission» "Commission"

«commission» Toute commission des réparations des dommages nucléaires constituée en conformité avec la partie II.

«dommage» "damage"

«dommage» Relativement à tout dommage aux biens au sens de l'article 3, toute perte de biens, meubles ou immeubles, ou tout dommage à ceux-ci; pour l'application de toute autre disposition de la présente loi, tous dommages procédant d'une perte de tels biens ou d'un dommage à ces biens ou qui leur sont attribuables.

«exploitant» "operator"

«exploitant» Le titulaire d'une licence valide attribuée en conformité avec la *Loi sur le contrôle de l'énergie atomique*, pour l'exploitation d'une installation nucléaire, ou relativement à toute installation nucléaire pour l'exploitation de laquelle il n'y a pas de licence valide semblable, le titulaire de la dernière en date des licences attribuées en conformité avec la *Loi sur le contrôle de l'énergie atomique* pour l'exploitation de cette installation nucléaire.

sustaining chain process of nuclear fission can be maintained therein without an additional source of neutrons, including any such structure that forms part of the equipment of a ship, aircraft or other means of transportation,

(*b*) a factory or other establishment that processes or reprocesses nuclear material, or

(*c*) a place in which nuclear material is stored other than incidentally to the carriage of the material;

"nuclear material" «*substance...*»

"nuclear material" means

(*a*) any material, other than thorium or natural or depleted uranium uncontaminated by significant quantities of fission products, that is capable of releasing energy by a self-sustaining chain process of nuclear fission,

(*b*) radioactive material produced in the production or utilization of material referred to in paragraph (*a*), and

(*c*) material made radioactive by exposure to radiation consequential on or incidental to the production or utilization of material referred to in paragraph (*a*),

but does not include radioactive isotopes that are not combined, mixed or associated with material referred to in paragraph (*a*);

"operator" «*exploitant*»

"operator" means the holder of a subsisting licence issued pursuant to the *Atomic Energy Control Act* for the operation of a nuclear installation or, in relation to any nuclear installation for the operation of which there is no subsisting licence, the recipient of the licence last issued pursuant to the *Atomic Energy Control Act* for the operation of that nuclear installation. R.S., c. 29(1st Supp.), s. 2.

«installation nucléaire» *Un assemblage, un établissement ou un lieu ou plusieurs assemblages, établissements ou lieux en un même endroit tombant dans l'une des catégories suivantes et désignés comme installation nucléaire pour l'application de la présente loi par la Commission de contrôle de l'énergie atomique :*

«installation nucléaire» "*nuclear installation*"

a) un assemblage contenant une substance nucléaire disposée d'une façon telle qu'une réaction de fission nucléaire en chaîne qui s'entretient d'elle-même puisse y être maintenue sans source supplémentaire de neutrons, notamment tout assemblage de cette sorte qui fait partie de l'équipement d'un navire, d'un aéronef ou d'un autre moyen de transport;

b) une usine ou un autre établissement qui transforme ou traite des substances nucléaires;

c) un lieu où une substance nucléaire est entreposée autrement qu'à l'occasion de son transport.

«ministre» *Le membre du Conseil privé de la Reine pour le Canada chargé par le gouverneur en conseil de l'application de la présente loi.*

«ministre» "*Minister*"

«substance nucléaire»

a) Toute substance, autre que le thorium ou l'uranium naturel ou appauvri non contaminé par des quantités importantes de produits de fission, qui est capable de libérer de l'énergie par une réaction de fission nucléaire en chaîne qui s'entretient d'elle-même;

«substance nucléaire» "*nuclear material*"

b) les substances radioactives produites au cours de la production ou de l'utilisation de substances visées à l'alinéa *a*);

c) les substances rendues radioactives par exposition à la radiation à la suite de la production ou de l'utilisation de substances visées à l'alinéa *a*) ou à l'occasion de celles-ci.

La présente définition exclut les isotopes radioactifs qui ne sont pas combinés, mélangés ou associés à des substances visées à l'alinéa *a*). S.R., ch. 29(1er suppl.), art. 2.

PART I

LIABILITY FOR NUCLEAR INCIDENTS

Duty of Operator

Duty imposed on operator

3. Subject to this Act, an operator is under a duty to secure that no injury to any other person or damage to any property of any other person is occasioned as a result of the fissionable or radioactive properties, or a combination of any of those properties with toxic, explosive or other hazardous properties, of

(*a*) nuclear material that is in the nuclear installation of which he is the operator;

(*b*) nuclear material that, having been in the nuclear installation of which he is the operator, has not subsequently been in a nuclear installation operated under lawful authority by any other person; or

(*c*) nuclear material that is in the course of carriage from outside Canada to the nuclear installation of which he is the operator or is in a place of storage incidental to that carriage. R.S., c. 29(1st Supp.), s. 3.

Absolute Liability of Operator

Operator liable for breach of duty

4. Subject to this Act, an operator is, without proof of fault or negligence, absolutely liable for a breach of the duty imposed on him by this Act. R.S., c. 29(1st Supp.), s. 4.

Operators jointly and severally liable

5. Where liability under this Act in respect of the same injury or damage is incurred by two or more operators, the liability of the operators shall, to the extent that the injury or damage attributable to a breach of the duty imposed on each of them by this Act is not reasonably separable, be treated as joint and several. R.S., c. 29(1st Supp.), s. 5.

Certain other damage deemed to be attributable to breach of duty

6. Injury or damage that, though not attributable to a breach of the duty imposed on an operator by this Act, is not reasonably separable from injury or damage that is attributable to a breach of that duty shall be deemed, for the purposes of this Act, to be attributable to that breach of duty. R.S., c. 29(1st Supp.), s. 6.

PARTIE I

RESPONSABILITÉ DES ACCIDENTS NUCLÉAIRES

Obligation de l'exploitant

Obligation imposée à un exploitant

3. Sous réserve des autres dispositions de la présente loi, un exploitant a l'obligation de voir à ce qu'aucune blessure à une autre personne ou qu'aucun dommage aux biens d'une autre personne ne soient occasionnés à la suite des propriétés fissiles ou radioactives ou à la fois de l'une de ces propriétés avec des propriétés toxiques, explosives ou autres propriétés dangereuses d'une substance nucléaire qui, selon le cas :

a) est dans l'installation nucléaire dont il est l'exploitant;

b) ayant été dans l'installation nucléaire dont il est l'exploitant, n'a pas, par la suite, été dans l'installation nucléaire exploitée légalement par une autre personne;

c) est en cours de transport à destination de l'installation nucléaire dont il est l'exploitant, en provenance de l'étranger, ou est dans un lieu d'entreposage à l'occasion de ce transport. S.R., ch. 29(1er suppl.), art. 3.

Responsabilité absolue de l'exploitant

Responsabilité de l'exploitant

4. Sous réserve des autres dispositions de la présente loi, un exploitant est, sans preuve de faute ou de négligence, responsable absolument d'une violation de l'obligation que lui impose la présente loi. S.R., ch. 29(1er suppl.), art. 4.

Responsabilité solidaire

5. Lorsque plusieurs exploitants sont responsables en vertu de la présente loi des mêmes blessures ou dommages, leur responsabilité, dans la mesure où les blessures ou les dommages attribuables à une violation de l'obligation imposée à chacun d'eux par la présente loi ne peuvent normalement être imputés à l'un ou l'autre, est solidaire. S.R., ch. 29(1er suppl.), art. 5.

Présomption

6. Les blessures ou les dommages qui, bien que non attribuables à une violation de l'obligation imposée à un exploitant par la présente loi, ne peuvent être normalement distingués des blessures ou des dommages qui sont attribuables à une violation de cette obligation seront réputés, pour l'application de la présente loi, être attribuables à cette violation de l'obligation. S.R., ch. 29(1er suppl.), art. 6.

Exceptions

Exceptions

No liability where incident due to act of armed conflict

7. An operator is not liable for injury or damage of the kind described in section 3 if the nuclear incident resulting in the injury or damage occurred as a direct result of an act of armed conflict in the course of war, invasion or insurrection. R.S., c. 29(1st Supp.), s. 7.

Guerre ou hostilités

7. Un exploitant n'est pas responsable des blessures ou des dommages visés à l'article 3 si l'accident nucléaire qui en est la cause résulte directement d'un acte de conflit armé au cours d'une guerre, d'une invasion ou d'une insurrection. S.R., ch. 29(1er suppl.), art. 7.

No liability to person responsible for nuclear incident

8. An operator is not liable for injury or damage suffered by any person if the nuclear incident resulting in the injury or damage occurred wholly or partly as a result of an unlawful act or omission of that person done or omitted to be done with intent to cause injury or damage. R.S., c. 29(1st Supp.), s. 8.

Exonération face à l'auteur de l'accident

8. Un exploitant n'est pas responsable des blessures ou des dommages soufferts par une personne si l'accident nucléaire qui en est la cause est survenu, en tout ou partie, à la suite d'un acte illégal ou d'une omission illégale de cette personne procédant de l'intention de causer des blessures ou des dommages. S.R., ch. 29(1er suppl.), art. 8.

Not liable for damage to nuclear installation or other property thereon

9. (1) Where a nuclear incident occurs at a nuclear installation, the operator thereof is not liable for damage caused by the nuclear incident to the nuclear installation, to property on the premises of the nuclear installation that is used or to be used in connection with the nuclear installation or to the ship, aircraft or other means of transportation of which the nuclear installation forms part of the equipment.

Exonération en cas de dommages à l'installation nucléaire

9. (1) Lorsqu'un accident nucléaire survient à une installation nucléaire, son exploitant n'est pas responsable des dommages causés par l'accident nucléaire à l'installation nucléaire, aux biens qui se trouvent à l'emplacement de cette installation nucléaire et qui sont ou doivent être utilisés en rapport avec elle, ou au navire, à l'aéronef ou autre moyen de transport de l'équipement duquel l'installation nucléaire fait partie.

Not liable for damage to means of carriage

(2) Where a nuclear incident occurs in the course of the carriage of nuclear material or while the material is in storage incidental to its carriage, an operator is not liable for damage to the means of carriage or to the place where the material is stored. R.S., c. 29(1st Supp.), s. 9.

Exonération en cas de dommages aux moyens de transport

(2) Lorsqu'un accident nucléaire survient au cours du transport d'une substance nucléaire ou pendant qu'une substance est entreposée à l'occasion de son transport, un exploitant n'est pas responsable des dommages aux moyens de transport ou à l'endroit où la substance est entreposée. S.R., ch. 29(1er suppl.), art. 9.

Limitations

Limitations

No right of recourse or indemnity

10. Subject to this Act, an operator has no right of recourse or indemnity against any person in respect of his liability under this Act for any injury or damage attributable to a breach of the duty imposed on him by this Act. R.S., c. 29(1st Supp.), s. 10.

Ni droit de recours ni indemnité

10. Sous réserve des autres dispositions de la présente loi, un exploitant n'a ni droit de recours ni droit à une indemnité envers toute personne quant à sa responsabilité en vertu de la présente loi pour des blessures ou des dommages attribuables à une violation de l'obligation que lui impose la présente loi. S.R., ch. 29(1er suppl.), art. 10.

No other person liable

11. Except as otherwise provided by or pursuant to this Act, no person is liable for any injury or damage attributable to a breach of the duty imposed on an operator by this Act. R.S., c. 29(1st Supp.), s. 11.

Aucune autre personne n'est responsable

11. Sauf disposition contraire de la présente loi, nul n'est responsable des blessures ou des dommages attribuables à une violation de l'obligation imposée à un exploitant par la présente loi. S.R., ch. 29(1er suppl.), art. 11.

Certain rights and obligations not limited

12. Nothing in this Act shall be construed as limiting or restricting

Certains droits et obligations ne sont pas limités

12. La présente loi n'a pas pour effet de limiter ou de restreindre :

(*a*) any right or obligation of any person arising under

(i) any contract of insurance, including any insurance required by subsection 15(1) to be maintained by an operator,

(ii) any scheme or system of health or hospitalization insurance, employees' compensation or occupational disease compensation, or

(iii) any survivorship or disability provision of or governing any superannuation or pension fund or plan; or

(*b*) where a nuclear incident resulting in any injury or damage of the kind described in section 3 occurred wholly or partly as a result of an unlawful act or omission of any person done or omitted to be done with intent to cause injury or damage, any right of recourse of an operator against that person. R.S., c. 29(1st Supp.), s. 12.

a) tout droit ou toute obligation d'une personne provenant, selon le cas :

(i) de tout contrat d'assurance, notamment de toute assurance qu'est tenu de maintenir un exploitant aux termes du paragraphe 15(1),

(ii) de tout régime ou système d'assurance médicale ou d'hospitalisation, d'indemnisation des accidents du travail ou des maladies professionnelles,

(iii) de toute disposition touchant la survivance ou l'invalidité prévue par un régime ou une caisse de retraite ou de pension, ou qui les régit;

b) tout droit de recours d'un exploitant contre une personne, lorsqu'un accident nucléaire entraînant des blessures ou des dommages visés à l'article 3 est survenu, en tout ou partie, à la suite d'un acte illégal ou d'une omission illégale de cette personne procédant de l'intention de causer des blessures ou des dommages. S.R., ch. 29(1er suppl.), art. 12.

Limitation on bringing of actions

13. No action under this Part shall be brought

(*a*) in the case of a claim for injury other than loss of life, or for damage to property, after three years from the earliest date on which the person making the claim had knowledge or ought reasonably to have had knowledge of the injury or damage, or

(*b*) in the case of a claim for loss of life,

(i) after three years from the date of the death of the person for whose loss of life the claim is made, or

(ii) where conclusive evidence of the death of that person is not available, after three years from the date an order presuming the person to be dead is made by a court having jurisdiction in those matters,

and in no case shall any such action be brought after ten years from the date the cause of action arose. R.S., c. 29(1st Supp.), s. 13.

Prescription

13. Aucune action ne peut être intentée en vertu de la présente partie :

a) dans le cas d'une réclamation pour des blessures corporelles à l'exclusion de la mort ou pour des dommages aux biens après expiration d'un délai de trois ans à compter de la date à laquelle la personne qui fait la réclamation a eu connaissance ou aurait normalement dû avoir connaissance des blessures ou des dommages;

b) dans le cas d'une réclamation pour cause de décès :

(i) soit après expiration d'un délai de trois ans à compter du décès de la personne dont la mort motive la réclamation,

(ii) soit, lorsqu'il ne peut être fourni de preuve irréfragable du décès de cette personne, après l'expiration d'un délai de trois ans à compter de la date à laquelle une ordonnance présumant que la personne est décédée est rendue par un tribunal compétent.

Une telle action ne peut en aucun cas être intentée après l'expiration d'un délai de dix ans à compter du fait générateur du litige. S.R., ch. 29(1er suppl.), art. 13.

Jurisdiction of Courts

Where action under this Part is to be brought

14. (1) An action under this Part shall be brought in the court that, having regard to the parties, the nature of the action and the amount involved, has jurisdiction and that exercises jurisdiction

(*a*) in the place where the injury or damage resulting from the nuclear incident in respect of which the action is brought was occasioned, or

(*b*) where the nuclear incident in respect of which the action is brought resulted in injury or damage occasioned in places in which more than one court would otherwise have jurisdiction under this subsection, in the place where the nuclear installation at or in relation to which the nuclear incident occurred was situated or, in the case of a nuclear installation that formed part of the equipment of a ship, aircraft or other means of transportation, was declared to be situated for the purposes of this section by the licence described in the definition "operator" in section 2 relating to that nuclear installation,

and that court, for the purpose of any question raised in the action relating to the place where the injury or damage was occasioned, shall be deemed to have jurisdiction throughout Canada.

Other laws and rules of practice and procedure to apply

(2) Except to the extent that they are inconsistent with any provision of this Act, all laws in force in the province where an action under this Part is brought and the rules of practice and procedure of the court in which the action is brought apply to the action. R.S., c. 29(1st Supp.), s. 14.

Compétence des tribunaux

Lieu où est intentée une action en vertu de la présente partie

14. (1) Une action en vertu de la présente partie est intentée devant le tribunal qui, eu égard aux parties, à la nature de l'action et au montant de la demande, est compétent et siège :

a) soit au lieu où les blessures ou les dommages résultant de l'accident nucléaire donnant lieu à l'action ont été occasionnés;

b) soit, lorsque l'accident nucléaire donnant lieu à l'action a entraîné des blessures ou des dommages occasionnés dans des endroits où plus d'un tribunal aurait autrement été compétent en vertu du présent paragraphe, au lieu où était située l'installation nucléaire dans laquelle l'accident nucléaire est survenu, ou à l'égard de laquelle il est survenu ou, s'il s'agit d'une installation nucléaire qui faisait partie de l'équipement d'un navire, d'un aéronef ou autre moyen de transport, au lieu où elle a été déclarée être située pour l'application du présent article par la licence visée à la définition de «exploitant» à l'article 2 se rapportant à cette installation nucléaire.

Ce tribunal, aux fins de toute question soulevée dans l'action ayant trait au lieu où les blessures ou les dommages ont été occasionnés, est considéré comme ayant compétence partout au Canada.

Autres lois et règles de pratique et de procédure à appliquer

(2) Sauf dans la mesure où elles sont incompatibles avec une disposition de la présente loi, les lois en vigueur dans la province où une action est intentée en vertu de la présente partie, ainsi que les règles de pratique et de procédure du tribunal où l'action est intentée, s'appliquent à l'action. S.R., ch. 29(1er suppl.), art. 14.

Insurance and Financial Responsibility

Operator to maintain insurance

15. (1) An operator shall, with respect to each nuclear installation of which he is the operator, maintain with an approved insurer insurance against the liability imposed on him by this Act, consisting of

(*a*) basic insurance for such term and for such amount not exceeding seventy-five million dollars as may be prescribed with respect to that nuclear installation by the Atomic Energy Control Board, with the approval of the Treasury Board, and

(*b*) supplementary insurance for the same term and for an amount equal to the differ-

Assurance et responsabilité financière

Assurance obligatoire

15. (1) Un exploitant est tenu, pour chaque installation nucléaire dont il est l'exploitant, de maintenir auprès d'un assureur agréé une assurance couvrant la responsabilité que lui impose la présente loi, contenant les modalités approuvées par le ministre et consistant :

a) d'une part, en une assurance de base pour la période et un montant maximal de soixante-quinze millions de dollars que peut fixer pour cette installation nucléaire la Commission de contrôle de l'énergie atomique avec l'approbation du Conseil du Trésor;

ence, if any, between the amount prescribed under paragraph (*a*) and seventy-five million dollars,

and containing such terms and conditions as are approved by the Minister.

b) d'autre part, en une assurance supplémentaire pour la même période et pour un montant qui est égal à la différence, le cas échéant, entre le montant fixé en vertu de l'alinéa *a*) et soixante-quinze millions de dollars.

Minister to designate approved insurers

(2) The Minister may designate as an approved insurer for the purposes of this Act any insurer or association of insurers that meets the requirements that, in his opinion, are necessary for the proper performance of the obligations to be undertaken by an approved insurer. R.S., c. 29(1st Supp.), s. 15.

Désignation des assureurs agréés

(2) Le ministre peut désigner à titre d'assureur agréé pour l'application de la présente loi tout assureur ou association d'assureurs qui répond aux exigences qui, à son avis, sont nécessaires pour que soient convenablement exécutées les obligations auxquelles doit s'engager un assureur agréé. S.R., ch. 29(1er suppl.), art. 15.

Reinsurance agreements

16. (1) Subject to the approval of the Treasury Board, the Minister may, with respect to the supplementary insurance described in paragraph 15(1)(*b*), enter into an agreement with an approved insurer reinsuring the risk assumed by that insurer on such terms and conditions, including the payment of such fee, as the Minister deems appropriate.

Contrat de réassurance

16. (1) Sous réserve de l'approbation du Conseil du Trésor, le ministre peut, à l'égard de l'assurance supplémentaire visée à l'alinéa 15(1)*b*), conclure un accord avec un assureur agréé réassurant le risque assumé par cet assureur, selon les modalités, notamment le paiement de la redevance, que le ministre estime appropriées.

Agreements to be laid before Parliament

(2) An agreement entered into under this section shall be laid before Parliament within fifteen days after the making thereof or, if Parliament is not then sitting, on any of the first fifteen days next thereafter that either House of Parliament is sitting. R.S., c. 29(1st Supp.), s. 16.

Dépôt des accords au Parlement

(2) Un accord conclu en vertu du présent article est déposé devant le Parlement dans les quinze jours de sa conclusion, ou si le Parlement ne siège pas, dans les quinze premiers jours de séance ultérieurs de l'une ou l'autre chambre. S.R., ch. 29(1er suppl.), art. 16.

Nuclear Liability Reinsurance Account

17. All amounts payable by Her Majesty pursuant to an agreement entered into under section 16 shall be paid out of the Consolidated Revenue Fund and charged to a special account in the accounts of Canada to be known as the Nuclear Liability Reinsurance Account, and all amounts received by Her Majesty pursuant to the agreement shall be paid into the Consolidated Revenue Fund and credited to that Account. R.S., c. 29(1st Supp.), s. 17.

Compte de réassurance de responsabilité nucléaire

17. Tous les montants payables par Sa Majesté en conformité avec un accord conclu en vertu de l'article 16 sont payés sur le Trésor et imputés à un compte spécial parmi les comptes du Canada, intitulé «compte de réassurance de la responsabilité nucléaire»; tous les montants reçus par Sa Majesté en conformité avec un tel accord sont versés au Trésor et portés au crédit de ce compte. S.R., ch. 29(1er suppl.), art. 17.

PART II

SPECIAL MEASURES FOR COMPENSATION

Proclamations

PARTIE II

MESURES SPÉCIALES D'INDEMNISATION

Proclamations

Issue of proclamation

18. Where the Governor in Council is of the opinion that

(*a*) the liability of an operator under Part I in respect of a nuclear incident could exceed seventy-five million dollars, or

Proclamation

18. Lorsqu'il est d'avis que, selon le cas :

a) la responsabilité d'un exploitant en vertu de la partie I relativement à un accident nucléaire pourrait dépasser soixante-quinze millions de dollars;

(*b*) as a result of any injury or damage attributable to a nuclear incident, it is in the public interest to provide special measures for compensation,

the Governor in Council shall by proclamation declare that this Part applies in respect of that nuclear incident. R.S., c. 29(1st Supp.), s. 18.

b) à la suite des blessures ou des dommages attribuables à un accident nucléaire, il est dans l'intérêt public de prévoir des mesures spéciales d'indemnisation,

le gouverneur en conseil, par proclamation, déclare que la présente partie s'applique à cet accident nucléaire. S.R., ch. 29(1er suppl.), art. 18.

Effect of proclamation

19. Subject to section 20, where a proclamation is issued pursuant to section 18, the operator otherwise liable for any injury or damage resulting from the nuclear incident described in the proclamation ceases to be liable for the injury or damage, and any proceedings under Part I in respect of that nuclear incident including proceedings to enforce judgment, brought or taken against the operator in any court either before or after the issue of the proclamation, are forever stayed. R.S., c. 29(1st Supp.), s. 19.

Effet de la proclamation

19. Sous réserve de l'article 20, lorsqu'une proclamation est prise en conformité avec l'article 18, l'exploitant qui serait autrement responsable des blessures ou des dommages qu'a entraînés l'accident nucléaire visé dans la proclamation cesse d'être responsable de ces blessures ou de ces dommages et toutes les procédures en vertu de la partie I relativement à cet accident nucléaire, y compris des procédures d'exécution d'un jugement, intentées ou prises contre l'exploitant devant tout tribunal, soit avant soit après la prise de la proclamation, sont définitivement suspendues. S.R., ch. 29(1er suppl.), art. 19.

Liability of operator to Her Majesty

20. (1) An operator described in section 19 is liable to Her Majesty for an amount equal to the lesser of

(*a*) the amount of insurance that he is required by paragraph 15(1)(*a*) to maintain in respect of the nuclear installation at or in relation to which the nuclear incident occurred, and

(*b*) the aggregate of all amounts paid pursuant to sections 27 and 30 in respect of any injury and damage resulting from the nuclear incident.

Responsabilité d'un exploitant envers Sa Majesté

20. (1) Un exploitant visé à l'article 19 est responsable envers Sa Majesté du moindre des montants suivants :

a) le montant de l'assurance qu'il est tenu en vertu de l'alinéa 15(1)*a*) de maintenir pour l'installation nucléaire dans laquelle l'accident nucléaire est survenu ou à l'égard de laquelle il est survenu;

b) le total de tous les montants payés en vertu des articles 27 et 30 pour des blessures et des dommages résultant de l'accident nucléaire.

Amount to be paid in accordance with demands

(2) Subject to subsection (3), the amount for which an operator is liable to Her Majesty under subsection (1) shall be paid to Her Majesty by the operator in accordance with demands therefor made by the Minister to the operator, and in the event of failure by the operator to pay any amount so demanded, the approved insurer with whom the insurance referred to in subsection (1) was maintained is liable to Her Majesty for that amount.

Le montant est payé selon les demandes

(2) Sous réserve du paragraphe (3), le montant dont un exploitant est responsable envers Sa Majesté en vertu du paragraphe (1) est payé à Sa Majesté par l'exploitant en conformité avec les réclamations présentées à cet effet par le ministre à l'exploitant et dans l'éventualité d'un manquement par l'exploitant à acquitter tout montant ainsi réclamé, l'assureur agréé avec lequel l'assurance mentionnée au paragraphe (1) était maintenue est responsable envers Sa Majesté de ce montant.

Limitation

(3) The aggregate of the amounts demanded from an operator by the Minister pursuant to subsection (2) shall not in any year exceed the aggregate of the amounts paid under sections 27 and 30 during that year in respect of any injury or damage resulting from the nuclear incident. R.S., c. 29(1st Supp.), s. 20.

Limitation

(3) Le total des montants réclamés à un exploitant par le ministre en conformité avec le paragraphe (2) ne peut, dans toute année, dépasser le total des montants payés en vertu des articles 27 et 30 pendant cette année pour des blessures ou dommages résultant de l'accident nucléaire. S.R., ch. 29(1er suppl.), art. 20.

Establishment of Commission

Governor in Council to establish Commission to deal with claims

21. (1) Where a proclamation has been issued pursuant to section 18, the Governor in Council shall establish a Nuclear Damage Claims Commission, consisting of a chairman, a vice-chairman and not less than one other member, to deal with claims for compensation arising out of the nuclear incident described in that proclamation.

Qualifications of commissioners

(2) The chairman and vice-chairman of a Commission and, where the other members of a Commission number more than two, not less than a majority of the other members, shall be appointed from among persons who are

(*a*) judges of the superior or county courts of Canada; or

(*b*) barristers or advocates of at least ten years standing at the bar of any of the provinces.

Powers of chairman

(3) The chairman is the chief executive officer of a Commission and has the control and direction of the work and staff of the Commission, but if the chairman is absent or unable to act or if the office is vacant, the vice-chairman of the Commission has all the powers and may perform all the functions of the chairman.

Eligibility

(4) A person who has reached the age of seventy years is not eligible to be appointed to a Commission and a person appointed to a Commission ceases to hold office on reaching the age of seventy years.

Increase or decrease in number of commissioners

(5) Subject to this section, the Governor in Council may at any time increase or reduce the number of members of a Commission.

Remuneration and other expenses

(6) Members of a Commission, other than a member in receipt of a salary or pension under the *Judges Act*, shall be paid such remuneration as may be fixed by the Governor in Council, and every member of a Commission is entitled to be paid reasonable travel and other expenses while absent from his ordinary place of residence in the course of his duties under this Act. R.S., c. 29(1st Supp.), s. 21.

Staff of Commission

22. A Commission may employ such officers and employees as it considers necessary for the proper conduct of its activities, may prescribe their duties and the terms and conditions of their employment and, with the approval of the Treasury Board, may fix and pay their remu-

Constitution d'une commission

Commission des réparations des dommages nucléaires

21. (1) Le gouverneur en conseil, après proclamation conforme à l'article 18, constitue une commission des réparations des dommages nucléaires chargée d'instruire les demandes d'indemnisation découlant de l'accident nucléaire visé dans la proclamation. La commission se compose d'au moins trois membres, ou commissaires, dont le président et le vice-président.

Choix des commissaires

(2) Le président, le vice-président et, si leur nombre est supérieur à deux, la majorité des autres commissaires sont choisis parmi :

a) les juges des cours supérieures ou des cours de comté du Canada;

b) les avocats inscrits depuis au moins dix ans au barreau d'une province.

Pouvoirs et fonctions du président

(3) Le président est le premier dirigeant de la commission; à ce titre, il en assure la direction et contrôle la gestion de son personnel. La présidence est assumée par le vice-président en cas d'absence ou d'empêchement du président ou de vacance de son poste.

Limite d'âge

(4) La limite d'âge pour la nomination ou le maintien à la commission est de soixante-dix ans.

Modification de l'effectif

(5) Sous réserve des autres dispositions du présent article, le gouverneur en conseil peut modifier le nombre des commissaires.

Rémunération et indemnités

(6) Les commissaires, à l'exclusion de ceux qui sont rétribués ou pensionnés au titre de la *Loi sur les juges*, reçoivent la rémunération fixée par le gouverneur en conseil; tous les commissaires ont droit aux frais de déplacement et autres entraînés par l'accomplissement, hors de leur lieu ordinaire de résidence, des fonctions qui leur sont confiées en application de la présente loi. S.R., ch. 29(1er suppl.), art. 21.

Personnel

22. La commission peut employer les personnes qu'elle estime nécessaires à l'exercice de ses activités, définir leurs fonctions et leurs conditions d'emploi et, avec l'approbation du Conseil du Trésor, fixer et payer leur rémunération et leurs frais. S.R., ch. 29(1er suppl.), art. 22.

neration and expenses. R.S., c. 29(1st Supp.), s. 22.

Existing Commission may be authorized to act

23. Where a Commission has been established pursuant to section 21 and a proclamation is issued pursuant to section 18 declaring that this Part applies in respect of another nuclear incident, the Governor in Council may instead of establishing another Commission designate that Commission to be the Commission to deal with claims for compensation arising out of that nuclear incident. R.S., c. 29(1st Supp.), s. 23.

Possibilité de cumul

23. Le gouverneur en conseil peut désigner pour instruire les demandes d'indemnisation découlant d'un accident nucléaire une commission constituée pour un autre accident nucléaire. S.R., ch. 29(1er suppl.), art. 23.

Powers of a Commission

24. (1) Subject to this Act, a Commission has exclusive original jurisdiction to hear and determine every claim brought before it for compensation arising out of the nuclear incident in respect of which it was established or designated and, in its discretion, to decide the amount of compensation to be awarded in respect of that claim.

Compétence exclusive

24. (1) Sous réserve des autres dispositions de la présente loi, a compétence exclusive en première instance pour connaître des demandes d'indemnisation découlant d'un accident nucléaire la commission constituée ou désignée à cette fin. Le quantum de l'indemnité est laissé à son appréciation.

Exercise of powers

(2) A Commission shall comply with and shall exercise its jurisdiction in accordance with this Part and any regulations made under this Part.

Exercice des pouvoirs

(2) La commission se conforme à la présente partie et aux règlements y afférents et exerce sa compétence en conformité avec cette partie et ces règlements.

Rules

(3) A Commission may, with the approval of the Governor in Council, make rules respecting

(*a*) the procedures for bringing claims;

(*b*) the time and place for sittings;

(*c*) the conduct of hearings; and

(*d*) the fees and travel expenses to be paid to witnesses.

Règles

(3) La commission peut, avec l'approbation du gouverneur en conseil, établir des règles régissant :

a) la procédure d'introduction des demandes;

b) les date, heure et lieu des séances;

c) la conduite des auditions;

d) les indemnités et les frais de déplacement des témoins.

Hearing of claims

(4) The chairman of a Commission may direct that a claim shall be heard by the Commission or by three or more members of the Commission.

Audition des demandes

(4) Le président peut décider qu'une demande soit entendue par l'ensemble de la commission ou par au moins trois commissaires.

Quorum

(5) Where the chairman of a Commission has directed that a claim is to be heard by the Commission or by more than two members of the Commission, a majority of the Commission or of those members directed to hear the claim, as the case may be, constitutes a quorum for the hearing of the claim.

Quorum

(5) Le quorum est constitué selon le cas par la majorité soit de l'ensemble de la commission, soit des commissaires chargés d'entendre la demande.

Rendering of decisions

(6) Where a claim is heard by more than two members of a Commission, a decision thereon may be rendered by a majority of the members directed to hear the claim, and a decision so rendered has the same force and effect as if it had been rendered by the Commission.

Prononcé et effets des décisions

(6) La décision rendue par la majorité des commissaires chargés d'entendre la demande vaut décision de l'ensemble de la commission.

Reports

(7) A Commission shall make such reports as the Minister may require it to make. R.S., c. 29(1st Supp.), s. 24.

(7) La commission établit les rapports demandés par le ministre. S.R., ch. 29(1er suppl.), art. 24.

Rapports

Evidence at hearings

25. (1) A Commission is not, in the hearing of any claim, bound by the legal rules of evidence.

25. (1) La commission n'est pas, dans l'audition des demandes, tenue aux règles juridiques applicables en matière de preuve.

Preuve

Powers with respect to witnesses and documents

(2) A Commission has, with respect to the attendance, summoning and examination of witnesses and the production and inspection of documents, all such powers, rights and privileges as are vested in a superior court of record in civil cases.

(2) La commission a, pour la comparution, l'assignation et l'interrogatoire des témoins ainsi que pour la production et l'examen des pièces, les attributions d'une cour supérieure d'archives en matière civile.

Pouvoirs relatifs aux témoins et aux pièces

Foreign evidence

(3) A Commission may issue commissions to take evidence outside Canada, and may make orders for that purpose and for the return and use of the evidence so obtained.

(3) La commission peut, par commission rogatoire, faire recueillir des éléments de preuve à l'étranger et rendre à cet effet une ordonnance où elle prévoit en outre leur utilisation ainsi que la remise d'un rapport d'exécution.

Commission rogatoire

Examinations and investigations

(4) A Commission may

(*a*) make such examinations and investigations respecting a nuclear incident and injury or damage attributable thereto as it considers desirable or engage other persons to make the examinations or investigations on its behalf;

(*b*) require persons claiming compensation to undergo physical or other examinations or to assist in any investigation being carried out by or on behalf of the Commission; and

(*c*) take such other steps as it considers necessary or desirable to determine the suffering or hardship of persons affected by a nuclear incident. R.S., c. 29(1st Supp.), s. 25.

(4) La commission peut :

a) effectuer elle-même ou faire effectuer pour son compte les examens et enquêtes qu'elle estime utiles au sujet de l'accident nucléaire et des blessures et dommages attribuables à cet accident;

b) exiger des demandeurs qu'ils passent des examens médicaux ou autres ou qu'ils collaborent aux enquêtes effectuées par elle ou pour son compte;

c) prendre toute autre mesure qu'elle estime utile pour apprécier les souffrances et les épreuves des victimes de l'accident. S.R., ch. 29(1er suppl.), art. 25.

Examens et enquêtes

Compensation Orders

Ordonnance d'indemnisation

Awards of compensation

26. (1) Where a Commission decides that compensation should be awarded in respect of a claim heard by it, the Commission shall issue an order specifying the amount of compensation awarded and the amount of any payments that may have been made by the operator, or any person on behalf of the operator, to or in respect of the person named in the order, on account of the injury or damage for which the award of compensation is made.

26. (1) Lorsqu'elle décide qu'une indemnité devrait être allouée relativement à une demande qu'elle a entendue, la commission peut rendre une ordonnance spécifiant le montant de l'indemnité allouée et le montant de tous paiements qui peuvent avoir été faits par l'exploitant ou pour son compte à la personne nommée dans l'ordonnance ou à son sujet, pour les blessures ou les dommages pour lesquels est intervenue l'attribution d'une indemnité.

Allocation d'indemnité

Orders to be sent to Minister

(2) Every order made by a Commission pursuant to subsection (1) shall be sent by the Commission to the Minister or to a person authorized by the Minister to receive it. R.S., c. 29(1st Supp.), s. 27.

(2) Toute ordonnance rendue par la commission en conformité avec le paragraphe (1) est transmise par la commission au ministre ou à une personne autorisée par le ministre à la recevoir. S.R., ch. 29(1er suppl.), art. 27.

Transmission au ministre

Payment of awards

27. On receipt of an order described in section 26, the Minister may, subject to any regulations made by the Governor in Council under this Part, pay out of the Consolidated Revenue Fund to or in respect of the person entitled thereto an amount equal to the difference between the amount of compensation awarded as specified in the order, and the aggregate amount of the payments, if any, specified in the order as having been made to or in respect of the person named in the order and any interim financial assistance paid to or in respect of that person pursuant to section 30. R.S., c. 29(1st Supp.), s. 28.

Paiement des sommes allouées

27. Sur réception d'une ordonnance visée à l'article 26, le ministre peut, sous réserve des règlements pris par le gouverneur en conseil en vertu de la présente partie, payer sur le Trésor à la personne qui y a droit, ou à son sujet, un montant égal à la différence entre le montant de l'indemnité allouée comme le précise l'ordonnance et le total des paiements, s'il en est, spécifiés dans l'ordonnance comme ayant été faits à la personne nommée dans l'ordonnance, ou à son sujet, et de toute assistance financière provisoire payée à cette personne, ou à son sujet, en conformité avec l'article 30. S.R., ch. 29(1re suppl.), art. 28.

Regulations respecting claims for compensation

28. (1) The Governor in Council may, with respect to claims for compensation under this Part arising out of a nuclear incident in respect of which this Part applies, make regulations

(*a*) providing for the payment by instalments of compensation awarded by order of a Commission;

(*b*) providing for pro rata payments in satisfaction of compensation awarded by order of a Commission;

(*c*) establishing priorities among persons claiming compensation, on the basis of classes of persons, categories of injury or damage, or any other basis that he considers appropriate;

(*d*) excluding, temporarily or permanently, any kind or class of injury or damage from the injury or damage for which compensation may be awarded by order of a Commission;

(*e*) respecting the proving of injury or damage before a Commission;

(*f*) providing for the prescription of claims for compensation by the effluxion of time; and

(*g*) respecting the giving of notices to persons affected by the proceedings or decisions of a Commission.

Règlements concernant les demandes d'indemnisation

28. (1) Le gouverneur en conseil peut, relativement aux demandes d'indemnisation en vertu de la présente partie naissant d'un accident nucléaire auquel s'applique la présente partie, prendre des règlements :

a) prévoyant le paiement par versements échelonnés de l'indemnité allouée par ordonnance de la commission;

b) prévoyant des paiements au prorata en règlement de l'indemnité allouée par ordonnance de la commission;

c) établissant les priorités parmi les personnes demandant une indemnité, en se fondant sur les catégories de personnes, les catégories de blessures ou dommages ou sur tout autre critère qu'il estime approprié;

d) excluant, temporairement ou définitivement, les blessures ou dommages d'une ou plusieurs sortes ou catégories des blessures ou dommages ouvrant droit à l'allocation d'une indemnité par ordonnance de la commission;

e) concernant les modes de preuve des blessures et des dommages devant la commission;

f) prévoyant la prescription des demandes d'indemnisation à la suite de l'expiration de délais;

g) concernant l'envoi d'avis aux personnes affectées par les procédures ou les décisions de la commission.

Regulations to be submitted to Parliament

(2) Any regulations made by the Governor in Council under this section shall be laid before Parliament forthwith after they are made, or, if Parliament is not then sitting, on any of the first fifteen days next thereafter that either House of Parliament is sitting. R.S., c. 29(1st Supp.), s. 29.

Dépôt des règlements au Parlement

(2) Les règlements pris par le gouverneur en conseil en vertu du présent article sont déposés devant le Parlement immédiatement ou, si le Parlement ne siège pas, dans les quinze premiers jours de séance ultérieurs de l'une ou l'autre chambre. S.R., ch. 29(1re suppl.), art. 29.

Power to make agreements

29. With the approval of the Governor in Council, the Minister or a Commission may, on behalf of the Government of Canada, enter into agreements or arrangements with the government of any province or with any person or group of persons for the carrying out of any duty or function in relation to the payment of compensation under this Part. R.S., c. 29(1st Supp.), s. 30.

Pouvoir de conclure des accords

29. Avec l'approbation du gouverneur en conseil, le ministre ou la commission peut, pour le compte du gouvernement du Canada, conclure des accords ou des arrangements avec le gouvernement de toute province ou avec toute personne ou tout groupe de personnes, pour l'exercice de ses fonctions relativement au paiement d'une indemnité en vertu de la présente partie. S.R., ch. 29(1er suppl.), art. 30.

Interim Financial Assistance

Assistance financière provisoire

Regulations providing for payment of interim financial assistance

30. (1) Where the Governor in Council, as a result of the distress, suffering or hardship caused by a nuclear incident, is of opinion that it is necessary to provide interim financial assistance to persons affected by the nuclear incident, he may make regulations providing for the payment by the Minister out of the Consolidated Revenue Fund of interim financial assistance to or in respect of those persons and may by those regulations

(*a*) specify the persons or classes of persons to or in respect of whom the assistance may be paid; and

(*b*) fix or determine the amounts that may be so paid to or in respect of any persons or classes of persons, and the terms and conditions on which the amounts may be paid.

Règlements prévoyant une assistance financière provisoire

30. (1) Lorsque le gouverneur en conseil, à la suite du dénuement, des souffrances ou des épreuves consécutives à un accident nucléaire, est d'avis qu'il est nécessaire de fournir une assistance financière provisoire aux personnes affectées par cet accident, il peut prendre des règlements prévoyant le paiement par le ministre sur le Trésor d'un montant en vue d'une assistance financière provisoire à ces personnes ou à leur sujet et il peut, par de tels règlements :

a) spécifier les personnes ou catégories de personnes auxquelles ou au sujet desquelles de tels paiements peuvent être faits;

b) fixer ou déterminer les montants qui peuvent être ainsi payés à ces personnes, ces catégories de personnes ou à leur égard ainsi que les modalités selon lesquelles ces montants peuvent être payés.

Authorization of Commission to act

(2) The Governor in Council may authorize a Commission to perform any duty or function in relation to the provision of interim financial assistance pursuant to subsection (1) and may authorize the Commission to issue warrants for the payment of the assistance.

Autorisation d'agir donnée à la commission

(2) Le gouverneur en conseil peut autoriser la commission à prendre des mesures relativement à la fourniture d'une assistance financière provisoire en conformité avec le paragraphe (1) et peut autoriser la commission à émettre des mandats pour le paiement de cette assistance.

Warrant deemed to be cheque

(3) A warrant issued by a Commission pursuant to subsection (2) shall be deemed to be a cheque lawfully drawn on the account of the Receiver General in accordance with the *Financial Administration Act*. R.S., c. 29(1st Supp.), s. 31.

Le mandat est réputé être un chèque

(3) Un mandat émis par la commission en conformité avec le paragraphe (2) est réputé être un chèque légalement tiré sur le compte du receveur général en conformité avec la *Loi sur la gestion des finances publiques*. S.R., ch. 29(1er suppl.), art. 31.

Limit of Payments

Limite des paiements

Limit

31. Except as otherwise authorized by Parliament, the aggregate of all amounts paid pursuant to sections 27 and 30 shall not, in respect of any one nuclear incident, exceed seventy-five million dollars. R.S., c. 29(1st Supp.), s. 32.

Limite

31. Sauf autorisation du Parlement, le total des montants payés en conformité avec les articles 27 et 30 ne peut, pour tout accident nucléaire, dépasser soixante-quinze millions de dollars. S.R., ch. 29(1er suppl.), art. 32.

PART III

GENERAL

Binding on Her Majesty

32. (1) Subject to subsection (2), this Act is binding on Her Majesty in right of Canada or a province.

Her Majesty deemed to be operator

(2) Where Her Majesty in right of Canada operates a nuclear installation, Her Majesty shall, for all purposes of this Act except sections 15 and 20, be deemed to be the operator thereof. R.S., c. 29(1st Supp.), s. 33.

Operator not liable where injury or damage occasioned outside Canada

33. (1) Except as may be provided for in rules made under subsection (3), an operator is not liable for any injury or damage occasioned outside Canada

(*a*) that is attributable to a breach of the duty imposed on him by this Act, or

(*b*) for which he may be liable pursuant to any law of a place outside Canada relating to liability for injury or damage resulting from the production, processing, carriage, storage, use or disposition of nuclear material,

and no court in Canada has jurisdiction to entertain any application or grant any relief or remedy arising out of or relating to any such injury or damage occasioned outside Canada.

Reciprocating countries

(2) Where the Governor in Council is of the opinion that satisfactory arrangements exist in any country for compensation for injury or damage resulting from the production, processing, carriage, storage, use or disposition of nuclear material in that country, including any such injury or damage occasioned in Canada, he may declare that country to be a reciprocating country for the purposes of this Act.

Rules implementing compensation arrangements with reciprocating countries

(3) The Governor in Council may, with respect to a reciprocating country, make such rules as he considers necessary to implement any arrangement between Canada and the reciprocating country relating to compensation for injury or damage resulting from the production, processing, carriage, storage, use or disposition of nuclear material.

PARTIE III

DISPOSITIONS GÉNÉRALES

Obligation de Sa Majesté

32. (1) Sous réserve du paragraphe (2), la présente loi lie Sa Majesté du chef du Canada ou d'une province.

Présomption

(2) Lorsque Sa Majesté du chef du Canada exploite une installation nucléaire, elle est, pour l'application de la présente loi, à l'exception des articles 15 et 20, réputée en être l'exploitant. S.R., ch. 29(1re suppl.), art. 33.

Pas de recours lorsque les blessures ou les dommages ont été occasionnés à l'étranger

33. (1) Sauf disposition contraire des règles établies en vertu du paragraphe (3), un exploitant n'est pas responsable des blessures ou dommages occasionnés à l'extérieur du Canada :

a) qui sont attribuables à une violation de l'obligation qui lui est imposée par la présente loi;

b) desquels il peut être responsable en conformité avec la loi locale à l'étranger ayant trait à la responsabilité des blessures ou dommages résultant de la production, de la transformation, du transport, de l'entreposage, de l'utilisation ou de la disposition de substances nucléaires;

aucun tribunal au Canada n'est compétent pour accueillir une demande ou accorder quelque réparation ou dédommagement procédant de ces blessures ou dommages occasionnés à l'extérieur du Canada ou qui s'y rapportent.

Pays bénéficiant de la réciprocité

(2) Lorsque le gouverneur en conseil est d'avis que des arrangements satisfaisants existent dans un pays en vue d'indemniser les blessures ou les dommages résultant de la production, de la transformation, du transport, de l'entreposage, de l'utilisation ou de la disposition des substances nucléaires dans ce pays, y compris les blessures et dommages occasionnés au Canada, il peut déclarer que ce pays bénéficie de la réciprocité pour l'application de la présente loi.

Règles mettant en œuvre les arrangements conclus avec des pays bénéficiant de la réciprocité

(3) Le gouverneur en conseil peut, à l'égard de tout pays bénéficiant de la réciprocité, établir les règles qu'il estime nécessaires en vue de mettre en œuvre tout arrangement conclu entre le Canada et le pays bénéficiant de la réciprocité, relatif à l'indemnisation des blessures ou dommages résultant de la production, de la transformation, du transport, de l'entreposage, de l'utilisation ou de la disposition de substances nucléaires.

Idem

(4) A rule made under subsection (3) may modify any provision of Part I of this Act relating to liability or the jurisdiction of courts, to the extent that the Governor in Council considers necessary in order to give effect to an arrangement described in that subsection. R.S., c. 29(1st Supp.), s. 34.

Idem

(4) Une règle établie en vertu du paragraphe (3) peut modifier toute disposition de la partie I relative à la responsabilité ou à la compétence des tribunaux, dans la mesure où le gouverneur en conseil l'estime nécessaire afin de donner effet à un arrangement visé dans ce paragraphe. S.R., ch. 29(1er suppl.), art. 34.

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Atomic Energy Control Board
P.O. Box 1046
Ottawa, Canada
K1P 5S9

Commission de contrôle de l'énergie atomique
C.P. 1046
Ottawa, Canada
K1P 5S9

Office Consolidation

Atomic Energy Control Regulations

With amendments to:
February 25, 1988

WARNING NOTE: Users of this Office Consolidation are advised that it is prepared for convenience of reference only and as such has no official sanction. The original Regulations and amendments thereto should be consulted for all purposes of interpreting and applying the law.

Canada

Ce document est aussi disponible en français.

REGULATIONS MADE PURSUANT TO THE ATOMIC ENERGY CONTROL ACT

Short Title

1. These Regulations may be cited as the **Atomic Energy Control Regulations.**

Interpretation

2.(1) In these Regulations,

"Act" means the Atomic Energy Control Act; (Loi)

"atomic radiation worker" means any person who in the course of his work, business or occupation is likely to receive a dose of ionizing radiation in excess of any dose specified in column III of Table 1 to Schedule II, or an exposure to radon daughters in excess of an exposure specified in column II of Table 2 to Schedule II; (travailleur sous rayonnements) Amended SOR/85-1039

"designated" means designated by an order of the Board published in the Canada Gazette; (désigné)

"fissionable substance" means any prescribed substance that is, or which can be obtained, a substance capable of releasing atomic energy by nuclear fission; (substance fissile)

"inspector" means any person appointed as an inspector pursuant to subsection 12(1); (inspecteur)

"ionizing radiation" means any atomic or sub-atomic particle or electromagnetic wave emitted or produced directly or indirectly by a prescribed substance or nuclear facility and having sufficient energy to produce ionization; (rayonnement ionisant)

"licence" means a licence issued by the Board; (permis)

"medical adviser" means any person appointed as a medical adviser pursuant to subsection 15(1); (conseiller médical)

"nuclear facility" means a nuclear reactor, a sub-critical nuclear reactor, a particle accelerator, a uranium or thorium mine or mill, a plant for the separation, processing, re-processing or fabrication of fissionable substances, a plant for the production of deuterium or deuterium compounds, a facility for the disposal of prescribed substances and includes all land, buildings and equipment that are connected or associated with such reactor, accelerator, plant or facility; (établissement nucléaire) Amended SOR/78-58

"particle accelerator" [Revoked - SOR/79-422 22 May, 1979]

"prescribed item" means an item, other than items 8001, 8005 and 8050 included in Group 8 of the Export Control List made pursuant to the Import and Export Permits Act or an item included in item 10003 of that List that relates to equipment and materials described in Group 8; (article prescrit) — Amended SOR/79-422

"radon daughters" means the following short-lived radioactive decay products of radon-222: polonium-218 (radium A), lead-214 (radium B), bismuth-214 (radium C) and polonium-214 (radium C'); (produits de filiation du radon) — Amended SOR/78-58

"rem" means a dose of ionizing radiation that has the same biological effects as 200-250 kilovolt x-rays whose energy is absorbed by the body or any tissue or organ thereof in an amount of 0.01 joule per kilogram; (rem)

"scheduled quantity" means that quantity of a radioactive isotope of any element

(a) set out in Part I of Schedule I, or

(b) calculated in accordance with Part II of that Schedule, whichever is applicable; (quantité réglementaire)

"working level" or "WL" means the amount of any combination of radon daughters in one litre of air that will release 1.3×10^5 mega electron volts of alpha particle energy during their radioactive decay to lead-210 (radium D); (unité alpha ou WL) — Amended SOR/78-58

"working level month" or "WLM" means the exposure resulting from the inhalation of air containing one working level of radon daughters for one working month, where one working month equals 170 working hours. (unité alpha-mois ou WLM) — Amended SOR/78-58

(2) For the purpose of the definition "prescribed substances" in section 2 of the Act, radioactive isotopes of all elements and any substances containing such isotopes are designated as being capable of releasing atomic energy, or as being requisite for the production, use or application of atomic energy.

(3) For the purpose of the definition "rem" in subsection (1), ionizing radiation shall be deemed to have the biological effects designated.

Application

2.1 These Regulations, other than paragraph 5(1)(a), subsection 5(2) and section 23, do not apply in respect of naturally occurring radioactive prescribed substances where the substances — Amended SOR/88-144

(a) are present in a mineral or other material; and

(b) have not been related to an activity associated with the development, application and use of atomic energy.

PART I

PRESCRIBED SUBSTANCES AND ITEMS

3. Subject to section 6, no person shall, unless exempted in writing by the Board, produce, mine, prospect for, refine, use sell or possess for any purpose any prescribed substance except in accordance with a licence issued pursuant to section 7.

4. Subject to section 6 and subsection 18.1(5), no person shall, unless exempted in writing by the Board, use, sell or possess any device or equipment containing radioactive prescribed substances except in accordance with a licence issued pursuant to section 7. Amended SOR/83-459

5.(1) No person shall Amended SOR/88-144

(a) import any prescribed substance,

(b) export any prescribed substance, or

(c) export any prescribed item,

except in accordance with a licence issued pursuant to section 7.

(2) A licence referred to in subsection (1) shall be produced by or on behalf of the licensee to a collector of customs at the port of entry into or exit from Canada of the prescribed substance or prescribed item, as the case may be, or at such other place as is designated by the deputy Minister of National Revenue for Customs and Excise, before the prescribed substance or the prescribed item is released for import or export.

6.(1) No licence is required by any person engaged in

(a) the transport of goods for hire or reward in respect of the transport of any prescribed substance or of any device or equipment containing radioactive prescribed substances or any temporary storage of such substance, device or equipment necessary for such transport;

(b) prospecting for prescribed substances if such prospecting does not involve the removal of more than 10 kilograms of uranium or thorium from any deposit thereof in any one calendar year.

(2) Subject to section (3), no licence is required in respect of

(a) a substance containing uranium or thorium in percentages less than 0.05 per cent by weight;

(b) any use, sale or possession of a substance containing uranium or thorium if such use, sale or possession does not involve more than 10 kilograms of uranium or thorium in any calendar year.;

(c) any use, sale or possession of a substance containing deuterium if

(i) such substance does not contain hydrogen having a greater concentration of deuterium than is normally found in nature, or

(ii) such use, sale or possession does not involve more than 10 kilograms of deuterium in any calendar year where such substance does contain hydrogen having a greater concentration of deuterium than is normally found in nature;

(d) a substance containing naturally occurring radioactive isotopes of elements of atomic number less than 80 and in no greater concentration than is normally found in nature;

(e) a substance containing radioactive isotopes of elements of atomic number less than 90 if

(i) the quantity of such isotopes per kilogram of substance does not exceed the scheduled quantity, and

(ii) any such isotopes on the surface of the substance are not, in the opinion of the Board or a designated officer, readily dispersible and the quantity of such isotopes on the surface of the substance does not exceed one-tenth of the scheduled quantity per square metre of substance;

(f) sources of ionizing radiation containing radioactive isotopes of elements of atomic number less than 90 if

(i) the quantity of such isotopes in each such source does not exceed the scheduled quantity, and

(ii) not more than 10 sources are required in any calendar year;

(g) any device incorporating a substance containing radioactive isotopes of elements of atomic number less than 90 or of the americium isotope Am-241 if

(i) the total quantity of such isotopes per device does not exceed 10 times the scheduled quantity, and

(ii) the design of the device and the method of incorporating the radioactive isotopes are approved by the Board or a designated officer; and — Amended SOR/86-252

(h) any incandescent mantle containing thorium.

(3) Nothing in subsection (2) authorizes the use or possession for any purpose without a licence of any substance containing

(a) uranium isotope U-233; or

(b) uranium having a greater concentration of the isotope U-235 than is normally found in nature.

7.(1) The Board or a designated officer may issue a licence for any purpose referred to in section 3 or in respect of any device or equipment referred to in section 4 upon receipt of a written application from the person requiring such licence.

(2) An application for a licence for any purpose referred to in section 3 or in respect of any device or equipment referred to in section 4 shall set out such of the following information as the Board or a designated officer may require: Amended SOR/86-252

(a) the nature and quantity of the prescribed substance and the purpose for which it is required;

(b) the maximum quantity of the prescribed substance likely to be required at any one time for the purpose set out in the application;

(c) a description of the premises in which the prescribed substance is to be located and of any equipment in connection with which it is to be used;

(d) a description of the measures to be taken to prevent theft, loss or any unauthorized use of the prescribed substance;

(e) a description of the measures to be taken, including any plan in case of accident, to prevent the receipt by any person of a dose of ionizing radiation or of an exposure to radon daughters in excess of any dose or exposure specified in respect of such person in Schedule II; Amended SOR/78-58

(f) a description of the method of disposing of the radioactive prescribed substance;

(g) a description of the qualifications, training and experience of any person who is to use the prescribed substance; and

(h) any other information necessary to evaluate the application.

(3) A licence issued by the Board or a designated officer pursuant to subsection (1) may contain such conditions as the Board or the designated officer deems necessary in the interests of health, safety and security and, without limiting the generality of the foregoing, may include conditions respecting Amended SOR/86-252

(a) the measures to be taken to prevent the receipt by any person of a dose of ionizing radiation or of an exposure to radon daughters in excess of any dose or exposure specified in respect of such person in Schedule II; Amended SOR/78-58

(b) the monitoring devices and other methods for measuring the dose of ionizing radiation or the exposure to radon daughters received by any person;

(c) instructions to be given to atomic radiation workers respecting the hazards of ionizing radiation and the procedures to be followed to limit exposure to ionizing radiation;

(d) the maximum quantity and concentration of radioactive or other hazardous material that may be discharged into the air and water as a result of the use of the prescribed substance;

(e) the method of disposing of the radioactive prescribed substance;

(f) the measures to be taken to prevent theft, loss or any unauthorized use of the prescribed substance; and

(g) the qualifications, training and experience of any person who is to use or supervise the use of the prescribed substance or any device or equipment to which the licence applies.

(4) Subject to subsection (5), the Board or a designated officer may issue a licence for any purpose referred to in section 5 upon receipt of a written application from the person requiring such licence.

(5) A licence to export a prescribed substance shall not be issued unless the Board is satisfied that the price and quantity of the prescribed substance in respect of which the application referred to in subsection (4) is made meet the criteria, if any, respecting price levels and quantities that may be specified in the public interest in a direction given to the Board by the Minister.

PART II

NUCLEAR FACILITIES

8. Unless exempted in writing by the Board, no person shall operate a nuclear facility except in accordance with a licence issued pursuant to section 9.

9.(1) Subject to section 10, the Board may issue a licence to operate a nuclear facility upon receipt by the Board of a written application setting out such of the following matters as the Board may require:

(a) a description of the operating procedures of the nuclear facility;

(b) a description of the measures to be taken, including any plan in case of accident, to prevent the receipt by any person of a dose of ionizing radiation or of an exposure to radon daughters in excess of any dose or exposure specified in respect of such person in Schedule II or to prevent or minimize other hazards involved in the operation of the nuclear facility; Amended SOR/78-58

(c) a description of the measures to be taken to prevent theft, loss or any unauthorized use of any prescribed substance involved in the operation of the nuclear facility;

(d) a description of the measures to be taken to ensure the physical security of the nuclear facility;

(e) a description of the qualifications, training and experience of any person involved in the operation of the nuclear facility;

(f) information respecting any arrangements that have been made to compensate any person for injury or damage resulting from the operation of the nuclear facility; and

(g) any other information necessary to evaluate the application.

(2) A licence issued by the Board pursuant to subsection (1) may contain such conditions as the Board deems necessary in the interests of health, safety and security and, without limiting the generality of the foregoing, may include conditions respecting

(a) the measures to be taken to prevent the receipt by any person of a dose of ionizing radiation or of an exposure to radon daughters in excess of any dose or exposure specified in respect of such person in Schedule II or to prevent or minimize other hazards involved in the operation of the nuclear facility; Amended SOR/78-58

(b) the monitoring devices and other methods for measuring the dose of ionizing radiation or the exposure to radon daughters received by any person;

(c) the methods for detecting and recording the presence and amount of ionizing radiation;

(d) the maximum quantity and concentration of radioactive or other hazardous material that may be discharged from the nuclear facility;

(e) the method of disposing of radioactive or other hazardous material resulting from the operation of the nuclear facility;

(f) the measures to be taken to prevent theft, loss or any unauthorized use of any prescribed substance located at the nuclear facility; and

(g) the qualifications, training and experience required in respect of any person involved in the operation of the nuclear facility.

(3) The Board may issue one licence in respect of two or more nuclear facilities located in the same vicinity where it considers that only one licence is necessary.

10.(1) Subject to subsection (2), the Board shall not issue a licence referred to in section 9, unless

(a) the approval in writing of the Board to construct or acquire the nuclear facility has previously been obtained; and

(b) the Board has received evidence satisfactory to it of compliance with the conditions, if any, of such approval.

(2) The Board may issue a licence pursuant to section 9 without the approval referred to in subsection (1) if it considers that no approval is necessary.

(3) The approval described in subsection (1) may be granted by the Board upon written application setting out

(a) a description of the site, design and construction of the nuclear facility;

(b) an assessment of the hazards that may result from the operation of the nuclear facility and a description of the measures to be taken to prevent or minimize such hazards; and

(c) any other information that the Board may require.

(4) the approval described in subsection (1) may be subject to such conditions as the Board deems necessary in the interests of health, safety and security respecting the site, design and construction of the nuclear facility.

PART III

RECORDS AND INSPECTION

11.(1) Every person to whom a licence has been issued shall

(a) where the licence has been issued pursuant to section 7, keep all necessary records in respect of the prescribed substance that is the subject matter of the licence to show

(i) the nature, form and quantity in which the licence under which such substance was obtained,

(ii) the location thereof,

(iii) the names of all persons involved in the use and handling thereof, and

(iv) where such substance has been disposed of, full particulars of such disposal, whether by sale or otherwise, and the licence, if any, under which such disposal was made:

(b) where the licence has been issued pursuant to section 9,

(i) keep all records required by paragraph (a) in respect of any prescribed substance at the nuclear facilty, and

(ii) keep all necessary records to show the maintenance and operation of the nuclear facility; and

(c) keep all necessary records to show the dose of ionizing radiation or the exposure to radon daughters received by any person as a result of the use of the prescribed substance or the operation of the nuclear facility, as the case may be; Amended SOR/78-58

(d) keep all reports of medical examinations that are required pursuant to subsection 17(1); and

(e) keep such other records as the Board or a designated officer may require in the interests of health, safety and security. Amended SOR/86-252

(2) The Board may require any person to whom a licence has been issued to deposit the records required to be kept under paragraph (1)(c) or a copy thereof with any person or agency specified in writing by the Board.

(3) No person shall destroy or otherwise dispose of any records required to be kept under subsection (1) except in accordance with the written authority of the Board.

Inspectors

12.(1) The Board or a designated officer may appoint as an inspector any person who, in its or his opinion, is qualified to be so appointed

(a) to inspect any premises on which a prescribed substance is located or a nuclear facility is being constructed or operated;

(b) to inspect records in respect of any prescribed substance or nuclear facility that are required to be kept by these Regulations in order to establish whether the health and safety requirements of these Regulations are or have been complied with;

(c) for the purpose of complying with the terms of any international agreement to which Canada is a party; or

(d) for any other purpose relating to the enforcement of these Regulations.

(2) An inspector shall be furnished with a certificate of his appointment, setting out

(a) the purpose for which he has been appointed and the place or area in respect of which he has been appointed, and

(b) the period for which he has been appointed to act as an inspector,

and may at all reasonable times enter any place to which his certificate relates for the purpose of carrying out any inspection specified in the certificate and shall, if so required, produce the certificate to the person in charge thereof.

(3) Where

(a) any loss or theft of any prescribed substance,

(b) any occurrence described in section 21, or

(c) any breach of these Regulations or a condition of any licence

has occurred, an inspector appointed for the purpose described in paragraph (1)(a) and for the place or area in which the loss, theft, occurrence or breach has taken place may direct

(d) the person holding the appropriate licence to submit a report respecting

(i) the circumstances of the loss or theft of the prescribed substance or of the occurrence or the breach of these Regulations or the condition of the licence, as the case may be, and

(ii) any remedial action to be taken in respect thereof; and

(e) such action to be taken as he deems necessary to remedy the breach of these Regulations or the condition of the licence, as the case may be, and to minimize the consequences, if any, of the occurrence.

PART IV

SECURITY

13.(1) Except where otherwise authorized or with the approval of the Board, no person shall knowingly disclose to any other person

(a) information relating to those properties of fissionable substances that are of special importance in nuclear weapons;

(b) with respect to plants for the separation of isotopes of fissionable substances, nuclear reactors primarily intended for large scale production of fissionable substances and nuclear power units primarily intended for military purposes, information relating to

(i) the design and operation thereof,

(ii) specifications for substances and equipment specially designed and adapted for use in connection therewith, and

(iii) specifications for and quantities of fissionable substances produced by such plants, nuclear reactors and nuclear power units; and

(c) details for the design, production and operation of nuclear weapons.

(2) Subsection (1) does not apply to the communication of information that has previously been published in scientific or technical journals, official publications or official press releases.

Protected Places

14.(1) The Board may, by order published in the Canada Gazette, designate any place as a protected place

(a) for the purpose of keeping secret information respecting the production, use and application of, and research and investigation with respect to, atomic energy; or

(b) for the purpose of protecting persons and property, where in the opinion of the Board special precautions are necessary for that purpose.

(2) The order designating a place as a protected place pursuant to subsection (1) shall contain a metes and bounds description of the place designated and such terms and conditions as the Board deems necessary for a purpose described in subsection (1).

(3) No person shall enter or be in any place designated pursuant to subsection (1) except in accordance with the terms and conditions contained in the order referred to in subsection (1).

(4) A police officer, police constable or other person employed for the preservation or maintenance of public order may search any person who is in a place designated pursuant to subsection (1) but a woman shall only be searched by a woman.

(5) If authorized by the Board or by the person in charge of a place designated pursuant to subsection (1), any police officer, police constable or other person employed for the preservation or maintenance of public order may remove any person from such place.

PART V

HEALTH AND SAFETY

Medical Advisers

15.(1) The Board or a designated officer may with respect to any place or area appoint any of the following persons as medical advisers to act jointly or separately, as the case may be, for the purpose of these Regulations:

(a) a senior medical officer nominated by the Radiation Protection Bureau of the Department of National Health and Welfare and a senior medical officer nominated by the department of any province concerned with radiation protection acting jointly;

(b) a senior medical officer nominated jointly by the Radiation Protection Bureau of the Department of National Health and Welfare and the department of any province concerned with radiation protection;

(c) a senior medical officer nominated by Atomic Energy of Canada Limited; and

(d) a senior medical officer nominated by the Surgeon General of the Canadian Armed Forces.

(2) Any person appointed as a medical adviser pursuant to subsection (1) shall be furnished with a certificate of appointment setting out

(a) the place or area in respect of which he has been appointed; and

(b) the period for which he is appointed as a medical adviser.

(3) A medical adviser may

(a) make recommendations to the Board, with respect to the place or area for which he has been appointed, respecting the nature, extent and frequency of medical examinations of atomic radiation workers;

(b) make recommendations to the Board respecting the continued employment as an atomic radiation worker of any person who has received a dose of ionizing radiation or an exposure to radon daughters in excess of any dose or exposure specified in respect of such worker in Schedule II or who is unfit to be employed as an atomic radiation worker for any medical reason; Amended SOR/78-58

(c) inspect all records required to be kept pursuant to paragraphs 11(1(c) and (d);

(d) with respect to any premises in which a prescribed substance is located or with respect to any nuclear facility, review procedures for the treatment of atomic radiation workers in the event of the receipt of a dose of ionizing radiation or an exposure to radon daughters in excess of any dose or exposure specified in respect of such workers in Schedule II; Amended SOR/78-58

(e) carry out such inspections as are reasonable to identify any person who may have received a dose of ionizing radiation or exposure to radon daughters in excess of any dose or exposure specified in respect of such person in Schedule II; and

(f) upon receipt of a report described in subsection 21(1) recommend such additional medical examinations as he deems necessary.

Radiation Safety Adviser

16.(1) The Board or a designated officer may, with respect to any place or area, appoint any person who in its or his opinion, is qualified so to be appointed or any committee to advise on radiation safety and, without limiting the generality of the foregoing, may appoint

(a) an officer nominated by the Radiation Protection Bureau of the Department of National Health and Welfare;

(b) an officer of a division of Atomic Energy of Canada Limited concerned with radiation protection and nominated by the company; or

(c) an officer nominated by any department or agency of the Government of Canada or of a province that is concerned with radiation protection.

(2) Any person appointed pursuant to subsection (1) shall be furnished with a certificate of appointment setting out

(a) the purpose for which he is appointed;

(b) the place or area in respect of which he is appointed; and

(c) the period for which he is appointed.

(3) Any person or committee appointed pursuant to subsection (1) shall, with respect to the place or area for which such person or committee has been appointed,

(a) review at the request of the Board applications for licences under these Regulations;

(b) make recommendations to the Board respecting

(i) the granting of licences,

(ii) the conditions to be included in any licence to prevent or limit exposure of any person to ionizing radiation,

(iii) any changes in any list of atomic radiation workers submitted pursuant to paragraph 17(3)(b); and

(c) review reports submitted pursuant to sections 20 and 21 and make recommendations respecting any changes in the conditions of any licence.

Atomic Radiation Workers

17.(1) Any person who employs atomic radiation workers shall ensure that each such worker

(a) is informed at the time that such worker is employed that he is an atomic radiation worker within the meaning of these Regulations;

(b) undergoes a medical examination of such nature and extent and with such frequency as may be prescribed in or by the conditions contained in any licence that are applicable to such worker; and

(c) if that worker is a woman, is informed of the obligation imposed upon her by subsection 19(4). Amended SOR/85-335

(2) No person shall employ as an atomic radiation worker any person

(a) who is under 18 years of age;

(b) whose health or radiation exposure record is such that, in the opinion of the Board or a designated officer and on the recommendation of the medical adviser, he should not be employed as an atomic radiation worker; or

(c) whose qualifications, training and experience do not comply with the conditions contained in any licence that are applicable to him.

(3) Any person who employs atomic radiation workers shall

(a) specify in writing as atomic radiation workers those persons in his employ that he considers to be atomic radiation workers, and maintain a list of all such workers; and

(b) if requested by the Board or a designated officer, submit a copy of the list referred to in paragraph (a) and all amendments thereto to the Board and the radiation safety adviser appointed under section 16 in respect of the place where such workers are employed. Amended SOR/86-252

(4) [Revoked - SOR/85-1039 31 October, 1985]

(5) [Revoked - SOR/85-1039 31 October, 1985]

Industrial Radiography

18. In this section and section 18.1 to 18.23, Amended SOR/83-459 and SOR/86-252

"approved examination" means an examination on radiation safety in industrial radiography approved by the Board or a designated officer; (<u>examen approuvé</u>)

"exposure device" means a device containing a prescribed substance for the purpose of carrying out radiography; (<u>dispositif d'exposition</u>)

"licensee" means a person to whom a licence is issued for the use or possession of an exposure device; (détenteur de permis)

"operate", in respect of an exposure device, includes locking or unlocking the exposure device, coupling a source assembly to a drive cable, moving a source capsule and removing from and inserting into the exposure device any prescribed substance; (utiliser)

"qualified operator" means a person who has successfully completed an approved examination; (opérateur qualifié)

"source capsule" means any component of an exposure device that exclusively encases a prescribed substance and that is designed to prevent leakage or escape of the prescribed substance and includes the prescribed substance; (source)

"trainee" means a person permitted by a licensee pursuant to section 18.1 to operate an exposure device under the supervision of a trainee supervisor; (stagiaire)

"trainee supervisor" means a qualified operator appointed by a licensee pursuant to section 18.11 to supervise a trainee in the operation of an exposure device. (surveillant)

18.1 (1) Subject to subsections (2) to (4), no licensee shall permit any other person to use or possess an exposure device whose use or possession is the subject of his licence except as authorized under his licence.

(2) A licensee may permit a qualified operator to operate an exposure device if

(a) the licensee is able at all times to exercise control or supervision over the operation by the qualified operator of the exposure device; and

(b) the qualified operator

(i) is knowledgeable in the safe operation of the exposure device including the use of safety equipment normally associated with the exposure device, the principles of radiation protection and the procedures to be followed in the event of an accident involving the exposure device,

(ii) is familiar with these Regulations and the terms and conditions of the licensee's licence, and

(iii) is not prohibited by these Regulations from operating the exposure device.

(3) A licensee may, for the purpose of training a person to become a qualifiifed operator, permit that person to operate an exposure device under the supervision of a trainee supervisor.

(4) A licensee may permit a person to possess an exposure device for the purpose of transporting the exposure device to any place.

(5) Any person who is permitted by a licensee pursuant to subsection (2), (3) or (4) to operate or possess an exposure device is exempt from the licensing requirements of section 4.

18.11 (1) A licensee may appoint a qualified operator to supervise a trainee in the operation of an exposure device if

(a) the qualified operator is, in the opinion of the licensee, qualified by reason of his knowledge, training and experience to supervise another person in the safe operation of the exposure device; and

(b) the licensee requests the qualified operator to supervise the trainee in the operation of the exposure device and the qualified operator gives his written consent to act accordingly.

(2) A request made by a licensee under paragraph (1)(b) shall be in writing and shall

(a) state the name of the trainee;

(b) state the make and model of the exposure device;

(c) direct the attention of the qualified operator to this section and section 18.16; and

(d) include a copy of the licence issued in respect of the exposure device.

18.12 (1) Every licensee shall, in respect of an exposure device whose use or possession is the subject of his licence,

(a) keep a copy of his licence conspicuously posted at this place of business;

(b) keep a copy of his licence available for inspection at the premises or site at which the exposure device is present;

(c) attach securely to the exposure device by means of metal fasteners a durable steel or brass tag inscribed with the name of the prescribed substance contained in the exposure device, the activity of the prescribed substance and the date of measurement of that activity;

(d) affix securely to the exposure device a durable and readily visible and legible sign that sets out his name, address and telephone number;

(e) affix securely to any room, enclosure or vehicle in which the exposure device is stored a durable, readily visible and legible sign that sets out his name, address and telephone number and that he should be contacted in the event of any emergency involving the exposure device; and

(f) prepare, to the satisfaction of the Board or a designated officer, written instructions respecting the normal and safe operation of the exposure device and respecting the steps to be followed if

(i) an operator of the exposure device is unable, through reasonable and normal effort on his part, to cause the source capsule to return to its proper shielded position,

(ii) the source capsule is separated from the exposure device outside the normal course of operation,

(iii) the source capsule or exposure device is lost, is stolen or is damaged to an extent that could impair its normal use, or

(iv) an occurrence described in section 21 comes to the attention of an operator of the exposure device.

(2) Every licensee shall, on permitting any person to operate an exposure device whose use or possession is the subject of his license,

(a) provide that person with a copy of the written instructions prepared in respect of the exposure device pursuant to paragraph (1)(f);

(b) ascertain that that person is familiar with and understands the written instructions referred to in paragraph (a);

(c) provide that person, through any arrangement that is satisfactory to that person, with

(i) all survey meters, tools, equipment or materials that he is required, under these Regulations, to possess before he operates the exposure device, and

(ii) a sufficient number of forms to record all information that he is required to record pursuant to paragraph 18.17(1)(c); and

(d) provide that person with all dosimeters that he is required, under these Regulations, to possess before he operates the exposure device.

(3) Every licensee shall, in respect of an exposure device whose use or possession is the subject of his license, on receipt of a written request from the Board or a designated officer, notify the Board or designated officer of the time and location at which the exposure device is to be operated.

18.13 (1) Every licensee shall, in respect of an exposure device whose use or possession is the subject of his licence,

(a) keep the exposure device locked and securely stored when it is not in use;

(b) maintain the exposure device in good operating condition by regular and adequate inspection and maintenance including regular and adequate inspection and maintenance of any source assembly, source guide tube, locking mechanism, drive cable mechanism or pump that forms part of the exposure device;

(c) test the exposure device for leakage of the prescribed substance contained therein every six months and subsequent to any incident that may have damaged the source capsule and remove the exposure device from use if the leakage is determined to have exceeded 200 becquerels;

(d) measure the radiation at all parts of the surface of the exposure device following the insertion of a prescribed substance into the exposure device and remove the exposure device from use if the measurement exceeds two millisieverts per hour; and

(e) determine on a regular and adequate basis the radiation dosage recorded on all thermoluminescent and film dosimeters worn by persons who operate the exposure device.

(2) [Revoked - SOR/86-252 27 February, 1986]

(3) No licensee shall

(a) use any source capsule assembly or drive cable assembly in or with an exposure device unless it is approved by the Board or a designated officer and designed for that purpose; or

(b) modify any source capsule assembly, shielding, or lock in an exposure device except as approved by the Board or a designated officer.

18.14 (1) Every licensee shall, in respect of an exposure device whose use or possession is the subject of his licence, limit the dose of ionizing radiation received as a result of such use or possession by any person, other than an atomic radiation worker or an employee of the licensee or of a person with whom the licensee has a contract for the services of the licensee, to 0.1 millisieverts in one week and 0.5 millisieverts in one year.

(2) The measures taken for the purpose of complying with section (1) shall include

(a) the placing of a sufficient number of signs described in subsection 22(4) at the perimeter of the area within which

(i) the exposure device is located, and

(ii) the dose rate from the exposure device, as measured when the source is in the exposure position, is greater than 0.1 millisieverts per hour,

to provide adequate warning to any person who may enter the area that radiography is carried out within the area; and

(b) where it is not possible for a qualified operator, trainee or trainee supervisor, when operating or supervising the operation of the exposure device, to keep watch for any person who may enter the area referred to in paragraph (a), the erecting of a sufficient number of barricades at the perimeter of the area or the posting of a sufficient number of security personnel near the perimeter of the area to prevent any person who is not an atomic radiation worker from entering the area.

(3) Where an exposure device is operated by a qualified operator or trainee on the premises of the licensee or of a person with whom the licensee has a contract for the services of the licensee and the licensee is unable to demonstrate to the satisfaction of the Board or a designated officer that the measures taken pursuant to subsection (2) are sufficient to limit the dose of ionizing radiation in accordance with subsection (1), the dose rate from the exposure device shall not exceed 2.5 microsieverts per hour measured at the perimeter of the area within which the movement of persons can be controlled by the qualified operator or by the trainee and the trainee supervisor.

18.15 (1) No person shall operate an exposure device unless

(a) he is a qualified operator or is, while operating the exposure device, under the continuous visual observation and supervision of a trainee supervisor;

(b) he has

(i) in his possession or immediately available to him a copy of the written instructions prepared in respect of the exposure device pursuant to paragraph 18.12(1)(f), and

(ii) in his possession a properly functioning gamma radiation survey meter that

(A) is suitable for measuring gamma radiation emitted by the source capsule in the range from 20 microsieverts to 100 millisieverts per hour with a margin of error of no more than 20 per cent of the true dose rate,

(B) incorporates facilities for testing the batteries that provide its power, and

(C) has been adequately calibrated within the 12 month period preceding the operation of the exposure device;

(c) where the exposure device is operated with a source guide tube, he has in his possession or immediately available to him the following, namely,

(i) material of a composition and construction sufficient to attenuate by a factor of at least 100 all gamma radiation emitted by the source capsule when the material is directly positioned over the exposed source capsule,

(ii) tools suitable for severing the source guide tube and drive cable from the remainder of the exposure device, and

(iii) tongs with a handle at least 1.5 m long suitable for safely handling the source capsule if it is separated from the exposure device outside the normal course of operation;

(d) he carries or wears a thermoluminescent or film dosimeter

(i) of a type and at a location suitable for recording any radiation dosage to his body, and

(ii) supplied by a dosimetry service approved by the Board;

(e) he wears a direct reading dosimeter of a type and worn in a manner suitable for indicating a radiation dosage to his body up to two millisieverts;

(f) he wears, if he is a trainee, an alarming dosimeter

(i) of a type and worn in a manner suitable for indicating a radiation dosage to his body up to two millisieverts, and

(ii) that emits an audible warning signal at a pre-set integrated dose less than two millisieverts or emits an audible warning signal whose frequency or intensity increases in proportion to an increase in the dose rate;

(g) he examines, immediately prior to operating the exposure device, the locking mechanism of the exposure device and, if present as a component part of the exposure device, the cranking device, drive cable, pneumatic pump, shutter mechanism, source coupling and source guide tube and determines that they each function properly; and

(h) he determines, immediately prior to operating the exposure device, that there is a sufficient number of suitably marked signs or barricades placed in the area where the exposure device is located or a sufficient number of security personnel posted in that area to prevent the inadvertent entry of any person who is not an atomic radiation worker into an area in which the radiation exposure dosages may exceed the dosages referred to in subsections 18.14(1) to (3).

(2) No person shall operate an exposure device if his capacity to operate the exposure device is impaired by drug or alcohol.

18.16 (1) No trainee supervisor shall permit a trainee to operate an exposure device unless he is satisfied that

(a) the trainee is knowledgeable in the operation of the exposure device to an extent that he is able to safely operate the exposure device;

(b) the trainee is not prohibited by section 18.15 from operating the exposure device; and

(c) no danger to the health or safety of any person will result from the operation by the trainee of the exposure device.

(2) Where a trainee supervisor permits a trainee to operate an exposure device, the trainee supervisor shall maintain a continuous visual observation and supervision of the trainee during the operation of the exposure device and if, during that operation, the trainee breaches any provision of these Regulations, the trainee supervisor shall immediately remove the exposure device from the possession of the trainee or shall prevent the trainee from further operating the exposure device.

(3) A trainee supervisor shall report forthwith to the licensee

(a) any occurrence described in paragraph 18.12(1)(f), subsection 18.18(1) or section 18.19 that involves a trainee under his supervision; and

(b) any breach of these Regulations by a trainee under his supervision.

(4) No person other than a trainee supervisor shall supervise a trainee in the operation of an exposure device.

18.17(1) Every person who operates an exposure device shall

(a) determine, by using a survey meter, that the source capsule has returned to the proper shielded position in the exposure device after each operation of the exposure device;

(b) take every reasonable precaution to ensure that the dose of ionizing radiation received as a result of such operation by any person, other than an atomic radiation worker or an employee of the licensee or of a person with whom the licensee has a contract for the service of the licensee, is limited to 0.1 millisieverts in one week and 0.5 millisieverts in one year;

(c) after each operation of the exposure device or at the end of each day of operation, record the maximum reading of radiation dosage indicated on the direct reading dosimeter worn by him during the operation of the exposure device or on the day of operation;

(d) lock and securely store the exposure device at the end of each day of operation of the exposure device;

(e) lock the exposure device whenever the exposure device is not under his care and control; and

(f) secure the source capsule in the proper shielded position before moving the exposure device.

(2) Every person who is permitted by a licensee to possess an exposure device for the purpose of transporting it to any place shall keep it securely stored during its transportation to that place.

18.18 (1) Any person who, in the course of operating an exposure device, observes on a direct reading dosimeter a radiation dosage measurement greater than two millisieverts shall immediately cease operating the exposure device and shall not operate any other exposure device until it has been ascertained that he has not received any dose of ionizing radiation in excess of any dose rate specified in respect of him in Schedule II.

(2) No person shall operate an exposure device whose operation was ceased pursuant to subsection (1) unless it has been ascertained that the radiation dosage measured to be greater than two millisieverts was not caused by a defect or malfunction of the exposure device or, if the dosage was caused by a defect or malfunction of the exposure device, the defect or malfunction has been corrected.

18.19 No person shall operate an exposure device that does not function in an ordinary manner or whose radiation dose rate at any part of its surface is determined to exceed two millisieverts per hour.

18.20 (1) No person who is permitted by a licensee pursuant to section 18.1 to operate or possess an exposure device shall remove any prescribed substance from or insert any prescribed substance into the exposure device unless he

(a) is requested in writing by the licensee to do so and gives his written consent;

(b) [Revoked SOR/86-252 27 February, 1986]

(2) Every person who removes any prescribed substance from or inserts any prescribed substance into an exposure device shall measure the radiation levels and radiation exposure dosages during the course of and forthwith after the completion of the removal or insertion and submit the measurements to the licensee.

18.21 No person who is permitted by a licensee pursuant to section 18.1 to operate or possess an exposure device shall modify the source capsule assembly, shielding or lock in the exposure device.

18.22 (1) Every person who is permitted by a licensee pursuant to section 18.1 to operate or possess an exposure device shall

(a) subject to subsection (3), submit to the licensee at the end of each semi-monthly period all thermoluminescent and film dosimeters worn by him during the period;

(b) submit to the licensee at the end of each semi-monthly period all records made by him pursuant to paragraph 18.17(1)(c) during the period; and

(c) report forthwith to the licensee any occurrence described in paragraph 18.12(1)(f), subsection 18.18(1) or section 18.19 involving his operation or possession of the exposure device.

(2) In addition to the reporting requirements set out in sections 20 and 21, every licensee shall, in respect of an exposure device whose use or possession is the subject of his licence, report forthwith to an inspector

(a) any malfunctioning of the exposure device that could result in an increase in the level of radiation measurable at any part of the surface of the exposure device;

(b) any occurrence described in paragraph 18.12(1)(f) involving the exposure device; and

(c) any removal from use of the exposure device pursuant to paragraph 18.13(1)(c) or (d).

(3) The Board or a designated officer may approve a monthly period for the submission referred to in paragraph (1)(a) where

(a) the person permitted by the licensee to operate or possess the exposure device does so only in a room designed for the operation of an exposure device; and

(b) the licensee is and has been in compliance with subsection 19(1).

18.23 (1) Every licensee shall, in respect of an exposure device whose use or possession is the subject of his licence, keep the following records:

(a) a record of the name of the manufacturer, the model number, the serial number, the activity of the prescribed substance, the dates and places of use and the date of procurement and disposal of the exposure device and each source capsule;

(b) a record of the names of all persons whom he has permitted to operate or possess the exposure device and the dates of such operation or possession;

(c) a record of all requests made by him pursuant to subsection 18.11(1) and 18.20(1) and all written consents thereto;

(d) a record of every test, measurement, inspection, maintenance or calibration taken or carried out in respect of the exposure device pursuant to these Regulations;

(e) a record for each operator of the exposure device of any measurements submitted to him by the operator pursuant to these Regulations;

(f) a record for each operator of the exposure device of the radiation dosages received by the operator as determined from thermoluminescent or film dosimeters and from direct reading dosimeters required to be carried or worn by the operator pursuant to these Regulations.

(2) Every licensee required by subsection (1) to keep records shall

(a) retain those records until the expiration of three years from the end of the calendar year in which they are made; and

(b) provide a copy of those records to the Board on the written request of the Board or a designated officer.

(3) Where a licensee intends to dispose of any records referred to in subsection (1) after the expiration of the period in respect of which those records are required to be kept, the licensee shall

(a) give the Board reasonable notice of his intention to dispose of those records; and

(b) deposit those records or a copy thereof with the Board on the written request of the Board or a designated officer.

Permissible Doses

19. (1) Every person in possession of a radioactive prescribed substance or operating a nuclear facility shall limit the dose of ionizing radiation or exposure to radon daughters received by any person as a result of such possession or operation to any dose or exposure specified in Schedule II or the lower dose or exposure prescribed pursuant to subsection (2) in respect of that person. Amended SOR/78-58

(2) Where, on the recommendation of a medical adviser, it appears necessary in the interests of health and safety to do so, the Board or a designated officer may, with respect to any atomic radiation worker, prescribe a lower permissible dose of ionizing radiation or a lower permissible exposure to radon daughters than that specified in Schedule II for that worker and shall forthwith give notice thereof by registered mail to the person in possession of the radioactive prescribed substance or operating the nuclear facility who employs that worker.

(3) Where an atomic radiation worker has received a dose of ionizing radiation or an exposure to radon daughters in excess of any dose specified in Schedule II or prescribed pursuant to subsection (2) in respect of that worker, he shall not engage in further work that is likely to add significantly to the amount of ionizing radiation or to the amount of exposure to radon daughters that he has received until the Board or a designated officer approves thereof. Amended SOR/85-1039

(4) Every woman shall Amended SOR/85-335

(a) if she becomes pregnant while she is engaged by an employer as an atomic radiation worker, inform the employer of her pregnancy as soon as she becomes aware of it; or

(b) if she is aware that she is pregnant when an employer engages her as an atomic radiation worker, forthwith inform the employer of her pregnancy.

(5) An employer who is informed pursuant to subsection (4) of the pregnancy of any atomic radiation worker shall forthwith inform any licensee in respect of whose business the employee is working of the pregnancy.

Loss or Theft of Prescribed Substances

20. (1) Every person in possession of a prescribed substance or operating a nuclear facility in which a prescribed substance is located shall, in the event of any loss or theft of such prescribed substance in a quantity exceeding 10 times the scheduled quantity, make a report of such loss or theft within 24 hours to the inspector appointed for the place or area in which the loss or theft occurred and shall as soon as possible thereafter send a complete report of such loss or theft to the Board, such inspector and the person, if any, appointed pursuant to section 16 as radiation safety adviser for the place or area in which the loss or theft occurred.

(2) For the purpose of subsection (1), loss does not include any loss necessarily incidental to any authorized use of the prescribed substance.

Reporting Occurrence

21. (1) Every person

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(a) in charge of a nuclear facility,

(b) in charge of a device or of equipment containing radioactive prescribed substances, or

(c) in possession of a radioactive prescribed substance

shall, in the event of an occurrence that results or is likely to result in the receipt by any person of a dose of ionizing radiation or of an exposure to radon daughters in excess of any dose or exposure specified in respect of such person in Schedule II,

(d) report such occurrence within 24 hours to the inspector appointed for the place or area in which the occurrence has taken place;

(e) as soon as possible after the occurrence, send a complete report of such occurrence to the Board, to the inspector referred to in paragraph (d) and to the person or committee appointed pursuant to section 16 to advise on radiation safety in respect of the place or area in which the occurrence has taken place; and

(f) if the occurrence has resulted in the receipt by any person of a dose of ionizing radiation or of an exposure to radon daughters in excess of any dose or exposure specified in Schedule II, send a copy of the report referred to in paragraph (e) to the medical adviser appointed for the place or area in which the occurrence has taken place.

(2) In the event of any occurrence described in subsection (1), the person in charge of a nuclear facility or the equipment containing the prescribed substance or the person in possession of the prescribed substance, as the case may be, shall

(a) immediately take all appropriate measures to prevent or minimize exposure of any person to ionizing radiation or radon daughters resulting from such occurrence; and

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(b) comply with any instructions that may be given by the inspector appointed for the place or area in which the occurrence has taken place.

Signs

22. (1) No person shall use a container to store or otherwise hold radioactive prescribed substances, except where such container forms part of the machinery attached to the manufacturing or processing equipment of a nuclear facility, unless there appears on such container

(a) the radiation warning symbol set out in Schedule III and the words "RADIATION-DANGER-RAYONNEMENT", clearly and prominently displayed on the outside thereof; and

(b) information with respect to the nature, form, quantity and date of measurement of the radioactive isotopes in the container.

(2) Subsection (1) does not apply to any container

(a) in which a quantity of radioactive isotopes less than the scheduled quantity is present;

(b) used temporarily to store radioactive isotopes under the supervision and in the presence of an atomic radiation worker; or

(c) used exclusively for shipping substances containing radioactive isotopes and labelled in accordance with the requirements set out in section 23.

(3) Where the container described in subsection (a) ceases to be used to store or otherwise hold radioactive isotopes, the person in charge of the container shall remove therefrom the radiation warning symbol set out in Schedule III and the words set out in paragraph (1)(a).

(4) Every person in charge of an area, room or enclosure in which

(a) radioactive isotopes are present in a quantity in excess of 100 times the scheduled quantity, or

(b) a person could receive a dose of ionizing radiation at a rate exceeding 0.0025 rem per hour,

shall mark such area, room or enclosure with a durable sign bearing

(c) the radiation warning symbol set out in Schedule III,

(d) the words "RADIATION-DANGER-RAYONNEMENT", and

(e) information with respect to the nature and extent of the radiation hazard.

(5) Any person in charge of an area, room or enclosure described in subsection (4) shall remove the sign described in that subsection if

(a) radioactive isotopes in excess of the quantity referred to in paragraph (4)(a) are no longer present in such area, room or enclosure; or

(b) such area, room or enclosure ceases to be a place where a person could receive a dose of ionizing radiation at a rate in excess of that set out in paragraph (4)(b).

Shipping Radioactive Prescribed Substances

23. (1) No person shall ship any radioactive prescribed substances unless the shipment complies with the requirements respecting the packaging, labelling and safety marking set out in the Transport Packaging of Radioactive Materials Regulations and, with respect to any other aspect of the shipment, with the requirements prescribed Amended SOR/83-739

(a) by any body having jurisdiction by statute over the proposed mode of transport; or

(b) by the Canadian Transport Commission, if no requirements have been prescribed by any body described in paragraph (a).

(2) Notwithstanding subsection (1), the Board may exempt any shipment of radioactive prescribed substances from the provisions of paragraph (1)(b) upon such conditions as the Board may specify.

PART VI

GENERAL

Precautions

24. (1) Every person operating a nuclear facility or carrying on a business or undertaking involving the use of a prescribed substance shall, in addition to any other requirements of these Regulations,

(a) take all reasonable precautions in relation to the nuclear facility or the prescribed substance to protect persons and property from injury or damage;

(b) at all appropriate times provide necessary devices for detecting and measuring ionizing radiation and radon daughters at the nuclear facility or at the place of such business or undertaking; Amended SOR/78-58

(c) at all appropriate times provide such devices, articles of clothing and equipment as are necessary for the protection of any person at the nuclear facility or at the place of such business or undertaking;

(d) take all reasonable precautions to prevent an escape of radioactive material from the premises; and

(e) in the event of an escape of radioactive material from the premises, provide adequate warning to any person who may reasonably be affected by such escape.

(2) Every person employed in or in connection with a nuclear facility or a business or undertaking involving the use of a prescribed substance shall, in the course of his employment,

(a) take all reasonable and necessary precautions to ensure his own safety and the safety of his fellow employees; and

(b) at all appropriate times, use such devices, wear such articles of clothing and make use of such equipment as are intended for his protection and furnished to him by his employer or required pursuant to the conditions in any licence that is applicable to him.

Abandonment or Disposal of Prescribed Substances

25. No person shall abandon or dispose of any prescribed substance except

(a) in accordance with the conditions in any licence that is applicable to the prescribed substance and that is in force; or

(b) in accordance with the written instructions of the Board or a designated officer. Amended SOR/86-252

Disclosure of Information by the Board

26. [Revoked - SOR/85-1039 31 October, 1985]

Revocation, Suspension or Amendment

27. (1) Subject to subsections (2) and (3), the Board or a designated officer may, by notice in writing to the holder of any licence, revoke or suspend the licence or amend the terms and conditions thereof.

(2) A notice under subsection (1) is not required if the revocation, suspension or amendment of the terms and conditions is at the request of the holder of the licence.

(3) The Board or a designated officer shall not issue a notice pursuant to subsection (1) unless the holder of the licence

(a) has been informed in writing of the reasons for the proposed issue of the notice and, in the case of an amendment of the terms and conditions thereof, the proposed amendments; and

(b) has been given reasonable opportunity to be heard by the Board after receiving the information referred to in paragraph (a).

(4) Notwithstanding subsection (3), the Board or a designated officer may, by notice in writing stating the reasons therefor, suspend a licence without giving the holder thereof an opportunity to be heard where it is considered necessary to do so in the interests of health, safety or security.

(5) Where a licence has been suspended under subsection (4), the holder of the licence may within 10 days of the date of receipt of the notice of suspension submit a request in writing to the Board to hold an inquiry into the reasons for such suspension.

(6) On receipt of a written request referred to in subsection (5), the Board shall

(a) hold an inquiry within 30 days of the receipt of such request; and

(b) provide the holder of the licence at least 7 days notice in writing of the time and place of the inquiry.

(7) At the conclusion of an inquiry under subsection (5), the Board may

(a) revoke the licence;

(b) revoke the suspension thereof; or

(c) extend the suspension thereof until the conditions prescribed by the Board have been complied with.

(8) Where a licence is suspended under subsection (4) and a request has been made to hold an inquiry under subsection (5), the licensee may at any time prior to the date for the holding of the inquiry waive the requirement for the holding of the inquiry.

28. Where

(a) a breach of any of the terms and conditions of a licence has occurred,

(b) the holder of a licence intends to surrender his licence, or

(c) a licence has been revoked or suspended pursuant to subsection 27(1) or suspended pursuant to subsection 27(4),

the Board or a designated officer may, in writing, require the holder of the licence to take such measures as are considered necessary for the protection of persons and property until such time as the breach has been rectified or the activities being carried out under the authority of the licence have been properly terminated.

29. Any notice, document or other writing required by these Regulations to be given to any person shall be deemed to have been given where the notice, document or other writing has been sent by registered mail to the latest known address of such person.

Transitional

30. Any licences that are issued under the Atomic Energy Control Regulations approved by Order in Council P.C. 1960-348 (SOR/60-119) of March 17, 1960, as amended, and that are in force on June 4, 1974 shall be deemed to have been issued by the Board under these Regulations and shall remain in force for the term of the licence subject to these Regulations.

SCHEDULE I

(s. 2)

PART I

"microcurie" means that quantity of a radioactive isotope that is disintegrating at the rate of 37,000 disintegrations per second.

Scheduled Quantities of Radioactive Prescribed Substances

Single Isotopes	Microcuries
Actinium 227	0.1
Antimony 124	10
Arsenic 74	10
Barium 140	10
Beryllium 7	100
Bismuth 207	10
Bismuth 210	1
Bromine 82	10
Cadmium 109	10
Calcium 45	10
Carbon 14	100
Cerium 144	1
Cesium 134	10
Cesium 137	10
Chlorine 36	10
Chromium 51	100
Cobalt 58	10
Cobalt 57	10
Cobalt 60	10
Copper 64	100
Copper 67	100
Gold 198	10
Hydrogen 3	1000
Iodine 123	100
Iodine 125	1
Iodine 131	1
Iodine 132	10
Indium 113	100
Indium 114	10
Iridium 192	10
Iron 55	100
Iron 59	10
Krypton 85	100
Lanthanum 140	10
Lead 210	0.1
Manganese 54	10
Manganese 56	10
Mercury 197	100
Mercury 203	10
Molybdenum 99	10
Nickel 63	10

Phosphorus 32	10
Polonium 210	0.1
Potassium 42	10
Promethium 147	10
Radium 226	0.1
Rubidium 86	10
Scandium 46	10
Selenium 75	10
Silver 110	10
Sodium 22	10
Sodium 24	10
Strontium 85	10
Strontium 89	10
Strontium 90	0.1
Sulphur 35	10
Technetium 99	10
Technetium 99^{m}	100
Tin 133	10
Thallium 204	10
Xenon 133	100
Xenon 135	100
Yttrium 87	10
Yttrium 90	10
Zinc 65	10

Except as otherwise specified by the Board:

Isotopes of elements of atomic number greater than 89	0.1
Other isotopes not referred to above	1

PART II

Two or more isotopes

The scheduled quantity shall be determined by the equation

$$\frac{A_1}{M_1} \text{ plus } \frac{A_2}{M_2} \text{ plus } \frac{A_3}{M_3} \text{ plus...equals 1}$$

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.

SCHEDULE II

Amended SOR/85-335

Maximum Permissible Doses and Exposures (1, 2)

Table 1

Maximum Permissible Doses (3)

Column I	Column II		Column III
	Atomic Radiation Workers		
Organ or Tissue	Rems per quarter of a year	Rems per year	Any Other Person Rems per year
Whole body, gonads, bone marrow	3(4)	5(4)	0.5
Bone, skin, thyroid	15	30	3(5)
Any tissue of hands, forearms, feet and ankles	38	75	7.5
Lungs (6) and other single organs or tissues	8	15	1.5

Table 2

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Maximum Permissible Exposures To Radon Daughters (6)

Column I		Column II
Atomic Radiation Workers		Any Other Person
WLM per quarter of a year	WLM per year	WLM per year (7)
2	4	0.4

Notes to Schedule II

(1) The maximum permissible doses and exposures specified in this Table do not apply to ionizing radiation — Amended SOR/78-58

(a) received by a patient in the course of medical diagnosis or treatment by a qualified medical practioner; or

(b) received by a person carrying out emergency procedures undertaken to avert danger to human life.

(2) The Board may, under extraordinary circumstances, permit single or accumulated doses or exposures up to twice the annual maximum permissible doses or exposures for atomic radiation workers. Such variance will not be granted

(a) if appropriate alternatives are available;

(b) for irradiation of the whole body or abdomen of women of reproductive capacity; or

(c) for irradiation of the whole body, gonads or bone marrow if the average dose received from age 18 years up to and including the current year exceeds 5 rems per year.

(3) In determining the dose, the contribution from sources of ionizing radiation both inside and outside the body shall be included.

(4) The dose to the abdomen of a pregnant atomic radiation worker after the licensee is informed of the pregnancy of that worker shall not exceed a total of 1 rem, accumulated at a rate of not more than 0.06 rem per two weeks. — Amended SOR/85-335

(5) The dose to the thyroid of a person under the age of 16 years shall not exceed 1.5 rems per year.

(6) For exposures to radon daughters, the maximum permissible exposures (in working level months) apply instead of the maximum permissible doses for the lungs (in rems).

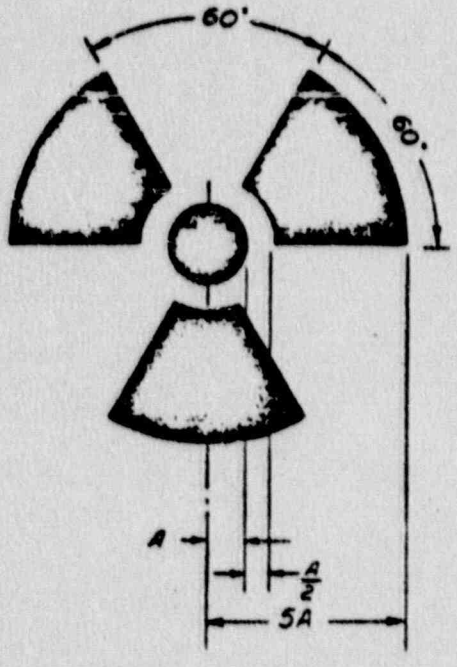
(7) The WLM unit is not appropriate for exposures in the home or in other non-occupational situations. In such situations, the maximum permissible annual average concentration of radon daughters attributable to the operation of a nuclear facility shall be 0.02 WL.

SCHEDULE III

(s. 22)

Radiation Warning Symbol

1. For the purpose of section 22 of the Regulations, the following radiation warning symbol shall be used:



A = Radius of Central Disc.

NOTE: Construction lines do not appear in actual symbol.

2. The symbol shall be as prominent as is practical, and of a size consistent with the size of the equipment or material to which it is affixed or attached, and shall be of such size as to permit the symbol to be read from a safe distance, but the proportions set out in section 1 are to be maintained.

3. Unless the circumstances do not permit, the symbol shall be oriented with one blade pointed downward and centered on the vertical axis.

4. Appropriate wording used in association with the radiation symbol to indicate the nature of the source of radiation, type of radiation, limits of occupancy and similar precautionary information, shall not be superimposed on the symbol.

5. The three blades and the centre disc of the symbol shall be

(a) coloured reddish purple (magenta) or black, and

(b) located on a yellow background,

and the colours shall be similar to those shown in Canadian Standards Association "Specification for a Radiation Symbol, Z69-1960.