AECB COMPLIANCE PROCEDURES FOR NUCLEAR POWER PLANTS

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1. Introduction

In an AECB report entitled "The Licensing Process for Nuclear Power Reactors" (AECB-1139) the author described the licensing steps leading from selection of a site for a nuclear power plant up to receipt of an operating licence. This paper is intended to describe briefly the process by which the AECB gains assurance that a nuclear power plant is operated in a safe manner.

2. Objectives

The primary objective of inspection of a nuclear power plant by staff of the AECB is to ensure that a licensee operates a plant in accordance with the conditions which have been identified in an operating licence. By reference, an operating licence incorporates other documents prepared by the licensee which also dictate the manner in which a licensee will and must conduct his business. These reference documents include:

(a) Safety Report
(b) Operating Policies and Principles
(c) Radiation Protection Regulations
(d) Radiation Protection Procedures (one section only referenced).
Establishing whether a licensee is in compliance with particular licence conditions can vary from being very simple to requiring a great deal of judgement. It is very simple for instance to establish whether a licensee routinely complies with the condition which specifies the minimum number of AECB authorized operators who must be in the control room. It can be very difficult, on the other hand, to establish whether a licensee has always complied with the following condition which appears in each operating licence:

"Except with the prior approval of the AECB Operations Directorate, no change shall be made in equipment or procedure that, in the judgement of the Station Manager or Board Officers, involves possible hazards different in nature or greater in magnitude or probability than those stated or implied in the Safety Report or other submissions to the Board".

3. AECB Project Officers

It is the practice of the Atomic Energy Control Board to have project officers located at each of the nuclear power plants to do the necessary inspections. (The exception to this practice is the NPD plant where regular inspections are done by a project officer who is resident in Ottawa). The number of project officers varies from two to four depending on whether it is a single unit or multi-unit plant. These officers are provided with office accommodations by the licensee. Their inspections are done during normal office hours; that is from 8 a.m. to 5 p.m., Monday to Friday.
The qualifications of people who have been hired to fill the posts of project officers have varied widely. All project officers to date have been university graduates with a science or engineering degree. Some have possessed masters degrees or doctoral degrees. Their relevant experience included work as shift supervisors at research reactors, power reactor designers, power reactor safety analysts, heat transfer specialists or technical engineers at operating power plants. The AECB does not have a formal training program for personnel who are hired as project officers. Instead, under appropriate supervision, the individuals receive on-the-job training in systems design and operation, accident analysis and radiation protection theory and practice. In some cases, project officers do avail themselves of formal training courses being given by the licensee.

4. Inspection Methods

Inspection of a plant and gathering of information fall into three general categories:

(a) Physical inspection
(b) Review of licensee internal documents
(c) Reports prepared by the licensee for the AECB.

There is, of course, a fourth category which is informal discussions with the operators, technical engineers, health physicists and station management. The intent in all cases is for the project officer to gain an in-depth understanding
of the state of a plant and the operating practices.

(a) **Physical Inspections**

Physical inspections are limited to the extent that they are visual inspections of those components which are located in accessible areas of the plant. These inspections include:

i) Control panels in the control room or in the field to ascertain whether safety-related components are in the proper state, that operating conditions are normal and that protective settings are correct.

ii) Containment status, particularly to establish that air-locks are functioning properly.

iii) Operation of effluent monitoring systems.

iv) General survey for external radiation hazards.

(b) **Review of Licensees' Internal Documents**

In the course of operating a nuclear power plant licensees prepare a wide range of documents which are intended for the exclusive use of the licensee's staff. The practice of our licensees has been to allow AECB officers complete access to these documents. These documents include:

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i) Control room operator log books which list all changes which have been made in the state of the plant and any unusual occurrences.

ii) Radiological log book which gives the results of all surveys of radiological hazards.

iii) Operating Memoranda which identify any special operating procedures or precautions which have been approved by the station management.

iv) Work permits which identify all maintenance work and the precautions which were taken.

v) Deficiency reports which are filed by an Operator when he detects a fault. When the fault is corrected, the cause of the fault and corrective action is noted on the form.

vi) Maintenance log books and call-up cards which identify any preventative maintenance and calibration of instruments.

vii) Significant Event Reports including all those which are not directly related to safety.

viii) Proposed Change Forms which identify changes which will be made to system
designs. Some of these forms are submitted for approval by the AECB but the vast majority are only for information of AECB officers.

ix) In-Service Reports which periodically summarize the problems encountered with systems.

x) Training material which is made available to operating staff.

(c) Reports prepared for the AECB

Operating licences specify conditions under which reports to the AECB would be required. These include:

i) Degradation or incipient failure of components whose failure would increase the hazard to the public or operating staff.

ii) Identified errors in the Safety Report.

iii) Failure of equipment or procedure which could lead to a significant release of radioactive material from the station.

iv) Failures in safety systems which could substantially prevent the systems from performing as required.

v) A person receiving a dose in excess of legal limits.

vi) Actual or attempted breaches of security.

vii) A summary report of station operation on an annual basis.
4. **Follow-up Procedures**

The previous section describes how AECB Project Officers obtain information on the performance of the plant. Most of the information tends to confirm that licensees are operating in conformance with the written requirements of the operating licence. Where corrective or follow-up action is required this may be communicated in one of three ways:

(a) **Oral communication**

For minor matters it is often appropriate for an AECB Project Officer to discuss the events with the Station Manager or the Production Manager (the two most senior Operations personnel on site) and agree on the follow-up action.

(b) **Written Requests**

For more significant matters or those where corrective action might not be taken immediately, the matter would first be discussed with the Station Manager and followed up with a written request. Such written requests are recorded by the AECB Project Officer on a list of "Action Items Outstanding". Copies of this list are forwarded to station management and are periodically reviewed with management to ensure that appropriate action is underway.

Licensees are required to submit an annual report covering the operation of a nuclear power plant during the previous calendar year. This report is reviewed
by Board staff and discussed with station management. At this annual review meeting the status and progress on outstanding action items are addressed.

(c) **Generic Requests**

The follow-up procedures discussed in a) and b) above applied to situations where the communication is between the senior AECB person and the senior Operations person at the nuclear plant. In some cases, where similar follow-up action is necessary at a number of plants the requests are made on a head office to head office basis. Examples of such requests have been:

i) Re-analysis of ECCS effectiveness

ii) Improvements to availability of safety systems

iii) Review of operating plants in light of events at Three Mile Island.