

THE REGULATORY EVALUATION OF RADIATION PROTECTION TRAINING PROGRAMMES AT CANADIAN NUCLEAR POWER PLANTS

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ABSTRACT

The responsibility for providing the necessary assurance that the use of nuclear energy in Canada does not pose undue risk to health, safety, security and the environment is vested with the Atomic Energy Control Board (AECB). This responsibility has led the Operator Certification Division of the AECB to develop methods to obtain assurance that nuclear power plant operations personnel are well trained and adequately competent to perform their duties. The features of the AECB approach to evaluation of training programmes based on a Systematic Approach to Training is described. An overview of the Canadian nuclear power plants' radiation protection qualification levels is given. The developing evaluation process is contributing to the improvement of licensee radiation protection training programmes. This is making possible the transfer of part of the responsibility for licensed personnel radiation protection qualification assessment to the licensees, thus enabling a reduction in the Operator Certification Division formal qualification activities.

INTRODUCTION

The federal agency responsible for the regulation of the nuclear industry in Canada is the Atomic Energy Control Board (AECB). Its mission is to provide assurance that the use of nuclear energy in Canada will not cause undue risk to health, safety, security or the environment. The health and safety of the more than 10,000 workers in seven Canadian nuclear power plants (NPPs), and the general public who may be affected by the operation of these reactors, is a primary concern of the AECB. Assurance of adequate radiation protection of the general public is acquired by approval of the design, and surveillance of the operation and maintenance of the reactors. The safety of the plant workers, responsible for good operation and maintenance, is achieved by adherence to good radiation protection practices.

Regulatory evaluation of NPP staff competence is vested with the Operator Certification Division (OCD). The mandate of OCD is to obtain assurance that all NPP operations personnel are well trained and competent to perform all their duties, including adhering to the radiation protection requirements.

NEW APPROACH

The quality of the training programmes in place has been verified to some extent by the AECB since 1962, but only since 1991, have radiation protection training protection programmes received specific attention through systematic regulatory evaluations against pre-determined standards. For many years the principal focus of the regulators was the training given to the two licensed positions in the NPPs: Control Room Operator (CRO) and Shift Supervisor (SS).

Indeed a pre-requisite to being granted approval to fill a position the passing of an AECB written examination in radiation protection. For these two positions, the emphasis is being shifted from the direct AECB examination of candidates at the end of their training, to the regulatory evaluation of the radiation protection training programmes together with licensee administered testing. However, certain areas of radiation protection knowledge for these two positions, for example, emergency response and effluent discharges, which could more directly affect the public, will continue to be examined by the AECB.

The basic radiation protection principle adopted at Canadian NPPs is that all operations personnel shall be able to provide effectively for their own radiation protection. This requires that personnel be fully aware of their roles and responsibilities with respect to access rights at their NPP, and that they be able to plan and perform work in a radioactive environment, using the appropriate protection as necessary. Consequently, all operations personnel must be suitably trained to protect themselves against potential radiological hazards. The new approach undertaken by the AECB also includes the evaluation of radiation protection training programmes for all operations personnel.

RADIATION PROTECTION QUALIFICATION LEVELS

Colour is used by the utilities to indicate the qualification level of personnel and is prominently displayed on the thermoluminescent dosimeter badge. The levels are "Red", for a person with no training in radiation protection at the site, followed by "Orange", "Yellow", and "Green", the highest level of qualification. The Orange level provides sufficient training to allow a plant worker or contractor unescorted access to areas of the station where levels of radioactivity are expected to be very low. A worker with this qualification can only do radioactive work under the supervision of a fully qualified person (Green). The Yellow badge is the intermediate qualification and provides the knowledge and skills necessary for a person to work in an environment where radiation might be present (levels of 10 μ Sv or more). The associated training includes work planning, dosimetry, radiation detection instrumentation and use of protective clothing. The Green badge is held by experienced individuals who must ensure the radiation protection of other lesser qualified individuals performing radiation work. The Green badge qualification is the entry level requirement to the training of licensed control room personnel.

THE EVALUATION PROCESS

The AECB expects that all NPP radiation protection initial and continuing training programmes conform to a Systematic Approach to Training (SAT). This widely accepted approach is described in detail in IAEA-TECDOC-525¹. It is an effective and efficient process to provide job competency since it requires that training be designed to meet job performance requirements. The AECB uses a three phase model to describe SAT: 1) Preparation phase, 2) Implementation phase, 3) Evaluation phase. The first phase includes an analysis of the job and tasks requiring training (assessed through the frequency, importance to safety and difficulty of the task) and the design and development of the training material. The second phase, involves the selection of instructors, delivery of training and the testing of trainees. Finally, the third phase covers the use of feedback to maintain and improve the training programme.

In order to use a consistent approach when evaluating training programmes, the AECB has recently developed the following three-step method: 1- Identify and check the adequacy of utility Requirements/Guidance for training programmes, 2-Review the supporting training documentation, 3- Determine if training is implemented in accordance with the documented process. The first two steps are completed at the AECB office. The last one is performed at site and involves observation of training in the classroom (radiation protection principles and practices), laboratory and on-the-job (instrumentation, protective clothing, access control), and interviews with staff and management. The tools used to assess the quality of training are derived from the AECB Objectives and Criteria for Regulatory Evaluations of NPP Training Programmes² which are based on SAT. The classroom and field observations as well as interview questionnaires are derived from this document. An interim report is presented before leaving the site, and a final report is later sent to the utility indicating where actions are required in order for the programme to be more effective. To gain assurance of the adequacy of the training, the three step method is used to evaluate all levels of radiation protection qualification at all stations. Attending all training sessions would be an overwhelming task. Therefore, the approach favoured is to select a cross-section of the programme. As an example, for a typical course, a few tasks would be chosen for which the learning objectives, training material, lesson plans, course notes, facilities, delivery and practice sessions, as well as the associated areas of the written and field tests for this task would be reviewed using the guide mentioned above. To better assess the preparation phase, an evaluation team member periodically attends the meetings of a licensee's Radiation Protection Training Group whose current primary role is revising the formal job and task analysis. During interviews, questioning covers all aspects of training, which allows the evaluation team to assess all phases of the training process.

CONCLUSION

The regulatory evaluation process, by expecting that the licensee radiation protection training programmes be in accordance with the SAT process, results in a training programme focussed solely on the job requirements. From the perspective of the licensee, this increases the programme effectiveness and efficiency by eliminating the components of the training that do not contribute to worker competency, thus saving resources. From a regulatory perspective, these evaluation activities, using a three-step process and criteria based on SAT, provide further evidence that, as a result of the training programmes, the plant workers will have the necessary skills and knowledge to perform their job duties effectively and safely. This additional assurance gained by the AECB through training programme evaluation is also making possible the transfer of part of the responsibility for licensed personnel radiation protection qualification assessment to the licensees, thus allowing a reduction in the Operator Certification Division examination activities.

REFERENCES

1. IAEA-TECDOC-525, "Guidebook on Training to Establish and Maintain the Qualifications and Competences of Nuclear Power Plant Personnel".
2. AECB Objectives and Criteria for Regulatory Evaluations of NPP Training Programmes, Internal Document (Operator Certification Division), June 30, 1995 .