

RADIATION SAFETY TRAINING FOR URANIUM WORKERS

Bhawani Pathak

**Canadian Centre for Occupational Health and Safety
Hamilton, Ontario, Canada**

ABSTRACT

In cooperation with Denison Mines and the Atomic Energy Control Board (AECB), the Canadian Centre for Occupational Health and Safety has developed an interactive computerized radiation safety training program for uranium mine and mill workers. It consists of modules designed to provide the radiation safety training required by the Uranium and Thorium Mining Regulations (1988) of the AECB. The style and the technical level of the subject matter in these modules is appropriate for communicating scientific information to people in the "real-world" workplaces - the employers and the employees.

INTRODUCTION

Employee education and training are essential parts of any radiation protection program. The purpose of such training is to ensure that radiation workers perform their tasks in accordance with an established code of practice and in a way which poses no danger to health and safety.

The Uranium and Thorium Mining Regulations of the Canadian Atomic Energy Control Board (AECB) require that employees in uranium mines and mills receive appropriate radiation safety training. The scope of the subject matter of the training is also specified in these regulations. We developed and produced computerized training modules to fulfill the above training requirements. These modules serve two basic purposes. First, the trainer can use them as a training aid in a class room situation. Second, the trainees can use them at their own pace to review the subject matter and update themselves. In this way these modules provide the trainee an opportunity for interactive learning.

The modules were developed by the Canadian Centre for Occupational Health and Safety (CCOHS) in collaboration with the staff and Joint Health and Safety Committee at Denison Mines and the Atomic Energy Control Board.

LEARNING OBJECTIVES

The objective of this training package is to develop a heightened awareness about radiation protection among employees and enable them to take remedial action in their day-to-day work and in the event of an accident.

The modules are not intended to serve as a substitute for a trainer. Instead, they are intended to serve as a learning aid for the trainees and an instructional tool for the trainer. Movement and development of ideas and images on the screen encourage the trainees to talk about their own work situations. The trainer plays the role of an organizer and discussion leader as well as a source of technical information.

For persons with basic radiation protection training, the modules serve as a resource for self study and periodic refresher training. As well, the "Test Your Knowledge" module can be used for a quick review and self evaluation.

CONTENTS

The subject matter of this training package is designed to address the radiation safety issues of uranium miners, including the distribution of radioactive material in the mines and techniques for the evaluation and control of radiation exposure.

The training is divided into four modules which combine colourful graphics, animation and text in a comprehensive training package.

A fifth module called **"Test Your Knowledge"** is presented in a question and answer format. The purpose of this format is to guide the trainee through a review of the four modules.

An illustrated **Glossary** of technical terms is included for reference as the sixth module.

The contents of modules are outlined below.

Module I: An Introduction to Radiation

- What is radiation
- Types of radiation
- Sources of radiation
- How people are exposed
- How radiation is measured
- Harmful effects
- Exposure in mines
- Protecting ourselves

Module II: Properties and Hazards of Radiation

- Radiation emission
- The atom
- Half-life
- Types of ionizing radiation
- Radioactive dust
- Radiation exposure of uranium workers
- Lungs and dust
- What is risk

Module III: Principles of Radiation Protection

Dose limit
Minimizing external dose
Minimizing internal dose
Monitoring radiation
Workers' radiation doses
Monitoring methods
Units of measurement
Personal protective equipment
Medical surveillance

Module IV: Uranium and Thorium Mining Regulations

Uranium mining and the AECB
Regulatory control
Uranium and Thorium Mining Regulations
Joint employer-employee responsibility
Code of practice
Compliance procedures
Employer and worker obligations
Whom to contact

Module V: Test Your Knowledge

This module contains review questions on the first four modules. The questions are presented as multiple choice. When the user provides his answer, the computer displays whether or not the selected answer was correct and also displays the correct answer with appropriate illustration.

Module VI: Glossary

This module provides an illustrated definition of technical terms in a sample and non-technical language.

COMPUTER CONFIGURATION REQUIREMENTS

All the modules utilize the videotex technology based on the NAPLPS (North American Presentation Level Protocol Standard).

Equipment requirements are as follows:

- ° IBM or compatible PC, XT, 286, 386 or 486 with at least 640K RAM and either a) or b) of the following:
- a) EGA interface card with 256K on card and an EGA colour monitor or
- b) Norpak PCD6 or PCX6+ card and a RGB colour monitor

NEEDS FOR FUTURE DEVELOPMENT

Recent advances in computer technology enable the production of multimedia and multilingual training modules with text, sound, photo scanned images, animation and high resolution graphics.

The CCOHS plans to upgrade and convert the existing training modules for both the Macintosh and IBM platforms and standards. Work is in progress to develop radiation safety training modules specific to other selected occupational categories. These training modules will provide the user with the fundamentals necessary for working with radiation emitting equipment and radioactive materials. All these training modules will be available from CCOHS on a compact disc along with other training packages.

REFERENCES

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