



International Safety Research Inc. Nuclear Emergency Response Management

WHAT ARE NUCLEAR EMERGENCIES?

A nuclear emergency is one that involves the nuclear fuel cycle (e.g. uranium, plutonium, thorium) and the potential for criticality, such as in a reactor. Generally, these events can cause the release to the environment of fission products consisting of noble gas, iodine, particulates and even actinides. A nuclear accident can also occur when a nuclear weapon detonates with partial nuclear yield.

WHY NUCLEAR EMERGENCY RESPONSE MANAGEMENT TRAINING?

The aftermath of a nuclear emergency can prove disastrous if response efforts are poorly managed. The way to overcome this is to ensure critical decisions regarding emergency assessment, command & control, operations and protective actions be based on technical and operational expertise. This is where nuclear emergency response management training comes into play. It provides responders with the confidence and competence needed to effectively deal with a nuclear emergency.

WHAT IS THE PURPOSE OF THIS COURSE?

This course provides participants with clear and practical tools for making decisions with respect to the emergency classification of nuclear events and the need for protective actions for workers and the public. It covers the rationale behind these decision-making tools and spells out the planning and preparedness requirements needed to implement them. It also gives the method for deploying and utilizing these assets. Participants will apply the concepts taught throughout the course by way of workshops and practical exercises.

WHAT IS THE BASIS FOR THIS COURSE?

This course is largely based on the latest guidance from the IAEA on emergency procedures and response including Safety Series 109 - *Intervention Criteria in a Nuclear or Radiation Emergency*, TECDOC 953 - *Methods for the Development of Emergency Response Preparedness for Nuclear or Radiological Accidents* and TECDOC 955 -

Generic Assessment Procedures for Determining Protective Actions During a Reactor Accident.

WHO WOULD BENEFIT FROM THIS COURSE?

This course is intended for on-site and off-site decision-makers, technical advisors and survey teams who could be involved in a nuclear power plant emergency.

WHAT IS INTERNATIONAL SAFETY RESEARCH INC.?

International Safety Research Inc. (ISR) is a Canadian firm with international experience in risk assessment and emergency response. International Safety Research Inc. (ISR) provides services worldwide in the technological areas of nuclear safety, radiation protection, emergency preparedness and response, safety management systems, and CBRNE counter-terrorism response. ISR helps organizations identify, develop, implement and test the tools and knowledge needed to effectively deal with small and large-scale safety management programs. Since its incorporation in 1998, ISR has carried out nuclear emergency response projects in:

The Netherlands	South Africa	Finland	Kuwait
Canada	Brazil	Algeria	Ukraine
France	Romania	Egypt	Slovenia
Austria	Hungary	Iran	Philippines
Korea	Indonesia	China	Thailand

ISR focuses on the technological aspects of risk, safety and emergency management when helping organizations identify, develop, implement and test the tools and knowledge that are needed to maintain effective small and large-scale safety management programs.

NUCLEAR EMERGENCY RESPONSE TRAINING

Module 1: Introduction

Module 2: Radioactivity and radiation

- ❑ General hazards (internal or external) of radiation types
- ❑ Radioactive half-life

Module 3: Health effects

- ❑ Effects of radiation on cells
- ❑ Understanding of equivalent dose and effective dose

Module 4: Exposure pathways

- ❑ Exposure to external and internal irradiation
- ❑ Understand cloudshine, groundshine, hullshine, inhalation and ingestion

Module 5: Dose limits and NER policies

- ❑ NER regulatory requirements from DGNS
- ❑ Dose limits for civilians (CNSC)

Module 6: Radiation detection

- ❑ Capabilities and limitations of electronic dosimeters, portal monitors, and other related radiation detection equipment

Module 7: NPV design and reactor technology

- ❑ Submarine and surface NPV general layout
- ❑ Nuclear fission and fission products

Module 8: NPV accidents

- ❑ Broad categories of accidents (LOCA, seawater cooling failure)
- ❑ Release pathways to environment



Module 9: NCV design and nuclear weapon technology

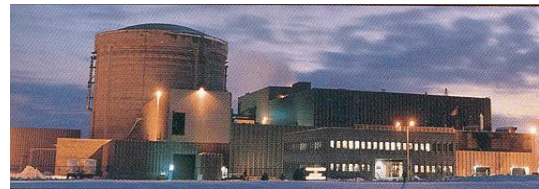
- ❑ General layout of submarine NCV
- ❑ Description of missiles and warheads

Module 10: NCV accidents

- ❑ Credible accident scenarios
- ❑ Explosive and pyrophoric dispersal

Module 11: Protection of the public and workers

- ❑ Protection principles
- ❑ Urgent protective actions



Module 12: Dose assessment

- ❑ Review of total dose concept from various pathways

Module 13: Intervention levels

- ❑ Avertable dose
- ❑ Intervention levels

Module 14: Protection of emergency workers

- ❑ Review of emergency dose limits

Module 15: NER planning principles

- ❑ Goals of emergency planning and emergency response strategy concept

Module 16: Detection and classification of accidents

- ❑ Emergency levels



Module 17: On-site NER organization

- Organization chart
- Roles and responsibilities

Module 18: Off-site NER organization

- Identify various emergency organizations

Module 19: Public affairs

- Role and mandate of public affairs

Module 20: Communicating with off-site authorities

- Expectations on the part of public authorities

Module 21: Three Mile Island accident

- Understand what went wrong in terms of communication between on-site and off-site authorities

Module 22: Base NER plan

- Concept of operation

Module 23: Survey

- Understand the purpose of emergency surveys



Module 24: Test

- Questions on every module

Module 25 to 26: Command post exercises

- Deal with a realistic simulated case of a simple emergency, followed by a more complex situation

Module 27: Emergency response software

- System overview of two emergency response software

Module 28: Incident command system (ICS) response organization

- Requirements and structure