IAEA Post Graduate Educational Course in Radiation Protection and Safety of Radiation Sources

Intervention for Chronic and Emergency Exposure Situations

International Cooperation

Safety Conventions

Lecture

Introduction

- The Agency is the depository of several international Conventions, covering safety, safeguards, and liability issues
- Four Conventions are relevant to nuclear and radiological emergencies
- An overview of those conventions will be given

Content

- General overview
- Safety Conventions
- Summary

Overview

- States must comply with the rules and principles of General International Law
- Sources of International Law
  - General Principles
  - Conventions
  - International Customary rules
  - Judicial decisions as a means to determine International Law

Conventions



- Convention on Early Notification of a Nuclear Accident
- Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency
- Convention on Nuclear Safety
- Vienna Convention on Civil Liability for Nuclear Damage

Objectives of the Conventions

- Minimize radiological consequences of a radiation accident
- Mitigate the consequences of such accident
- Protect life, property and the environment
- Achieve a high level of nuclear safety worldwide

States Parties to Conventions

Conventions	Parties
Notification	86
Assistance	82
Nuclear Safety	53
Vienna	32

Status in year 2000

FAO, WHO and WMO are full Parties

Early Notification Convention

- Objective: To provide relevant information about nuclear accidents as early as possible in order that transboundary radiological consequences can be minimized
- The Convention entered into force in October 1986

Facilities and Activities

- Any nuclear reactor wherever located
- Any nuclear fuel cycle facility
- Any radioactive waste management facility
- The transport and storage of nuclear fuels or radioactive wastes
- The manufacture, use, storage, disposal and transport of radioisotopes for agricultural industrial, medical and related scientific and research purposes, and
- The use of radioisotopes for power generation in space objects

Obligations

- The provision and transmission of information places obligations on
  - State Parties and
  - The International Atomic Energy Agency (IAEA) Secretariat



State Party Response Obligation

- Forthwith notify, directly or through the IAEA, those States, which are or may be physically affected and the IAEA of the nuclear accident, its nature, the time of occurrence and its exact location where appropriate
- Promptly provide the States directly or through the IAEA, with such available information relevant to minimizing the radiological consequences in those States

IAEA Response Obligation

- Immediately after being notified IAEA will:
  - Verify
  - Authenticate
  - Forthwith notify

  potentially affected states and relevant international organisations

IAEA Response Obligation – Cont'd

- Promptly provide information about:
  - Time and location of release
  - Nature, facility and assumed cause
  - Meteorological conditions, environmental monitoring data
  - Protective actions

Obligations in Preparedness

- IAEA: the collection and dissemination information concerning - experts, equipment and materials
- State Parties: to make known the point of contact that is responsible for the issuing and receiving the notification

Contact Point

- Each party makes known to IAEA Secretariat its Contact Point(s)
- Warning Point must be available continuously (24 h/day and 7 days/week)
- IAEA maintains up-to-date point-of-contact list and provides it to all parties

Assistance Convention

- Objective: State Party may call for assistance in the event of a nuclear accident or radiological emergency to minimize its consequences and to protect life, property and the environment
- Entered into force in February 1987

State Parties

- State party may call for assistance :
  - In a nuclear accident or radiological emergency
  - To minimize its consequences and to protect life, property and the environment

IAEA Functions

- IAEA shall :
  - Make available appropriate resources
  - Transmit the request to other state parties and international organisations
  - Co-ordinate the assistance on an international level, if so requested

Operational Matters

- Direction, control, co-ordination and supervision
- Local facilities and services
- Protection of personnel, equipment and materials
- Immunity from seizure of equipment
- Ownership of equipment
- Decontamination of equipment
- Cost of assistance and reimbursement
- Liabilities
- Privileges and immunities

Operational Matters – Cont'd

- Exemption from taxation and duties
- Facilitation of entry, stay and departure
- Compensation for death or injury to personnel
- Facilitation of transit
- Assumption of responsibility for third party claims
- Public statements
- Confidentiality and dispute procedure

Nuclear Safety Convention

- Objectives: to legally commit participating States operating land-based nuclear power plants to maintain a high level of safety by meeting bench marks to which States would subscribe
- The Convention entered into force on October 1996

Vienna Convention

- Objective: establishing a comprehensive liability regime
- Convention entered into force in November 1977 (adopted in 1963)
- To improve the regime
  - The Paris Convention
  - The Joint Protocol
  - The Protocol to Amend the Vienna Convention (adopted September 1997)
  - Convention on Supplementary Compensation for Nuclear Damage (adopted September 1997)

Summary

- States must comply with the rules and principles of General International Law and International Environmental Law
- The Agency is the depository of several Conventions covering safety, safeguards, and liability issues

Where to Get More Information

- On the following web address

http://www.iaea.org/worldatom/Documents/Legal/

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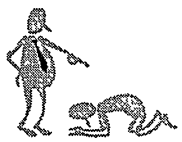

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Intervention for Chronic and Emergency Exposure Situations

International Cooperation

The Role of IAEA

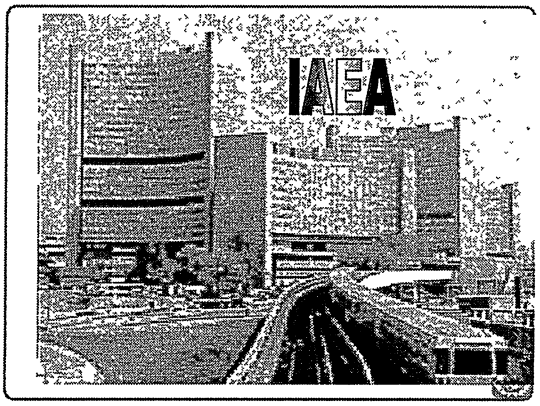
Lecture

Introduction

- In this lesson we shall cover the role of the International Atomic Energy Agency in the area of emergency preparedness and response

Content

- Background to IAEA
- Emergency Preparedness and Response Unit
- Response preparedness
- Concept of operations
- Summary



Basic facts

- Specialised agency within United Nations system
- Created 1957
- 133 Member States
- Headquarters in Vienna, Austria
- Serves as:
  - World's central intergovernmental forum for scientific and technical co-operation in nuclear field
  - International inspectorate for application of nuclear safeguards and verification measures covering civilian nuclear programmes

The IAEA Policymaking Organs

- General conference
  - Representatives of 133 member states
- Board of governors
  - 35 members:
    - ▲ 13 designated by the board and
    - ▲ 22 elected by general conference
- Jointly these
  - Decide programme and budget
  - Appoint director general

Human and Financial Resources

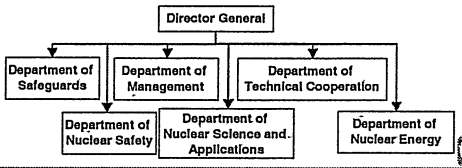
- Budget (e.g. 2000)
  - Direct expenses (regular) = US $226 million
  - Technical assistance = US $70 million
  - Extra-budgetary = US $14 million
- Personnel
  - More then 900 professional staff
  - Around 1300 general support staff
    - ▲ Total of more then 2200 staff world-wide



The IAEA Secretariat

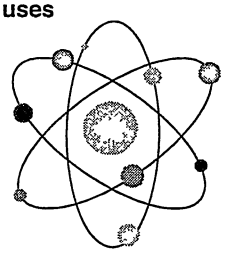


- Headed by director general
  - Chief administrative officer
  - Term of four years
  - 6 deputy directors general



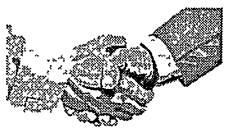
IAEA Main Functions

- Verification of peaceful uses
- Promotion of safety
- Transfer of technology



Statutory Functions
Promotion of Safety

- International safety regime
  - Conventions
  - Safety standards
  - Provisions for applications of standards



Legally Binding Conventions



- Early notification of a nuclear accident
- Assistance in the case of a nuclear accident or radiological emergency
- Civil liability for nuclear damage
  - Joint protocol relating to the application of the Vienna convention and the Paris convention (with OECD)
- Nuclear safety

International Safety Standards

- International basic safety standards on protection against ionizing radiation and for the safety of radiation sources (1996)
  - Co-sponsored by FAO, WHO, NEA(OECD), PAHO, ILO, IAEA



Provisions for Applications of Standards

- Technical documents and reports
- Standard training material
- Technical co-operation projects
- Services

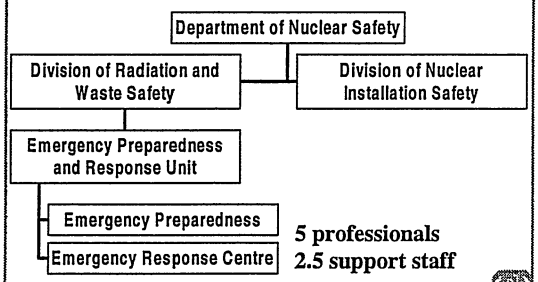
Emergency Response Authorities

- Statutory responsibilities
- Legal responsibilities
  - Convention on early notification of a nuclear accident
  - Convention on assistance in the case of a nuclear accident or radiological emergency
- Inter-agency agreements
  - General with WHO, FAO, WMO, ILO, IMO, ICAO, UNESCO, UNIDO
  - Specific with UN-OCHA on emergency response

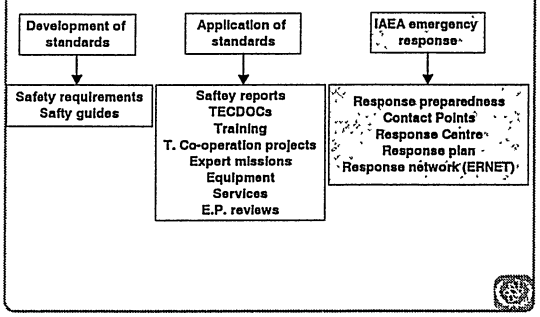
Emergency Preparedness and Response Unit

- Founded in November 1997
- Aim: to integrate the Agency's emergency preparedness and response activities
- Located at IAEA Headquarters in Vienna (B building, 7th floor)

Emergency Preparedness and Response Unit (EPRU)



Activities of EPRU



Technical Co-operation Projects

- Regional
  - Europe
  - East Asia, South America
- National

Services

- EPREV - Emergency Preparedness Review Team
- Expert missions
- Equipment
- ERNET - Emergency Response Network

Emergency Response Network - ERNET

- Qualified emergency response teams from member states
- Performance requirements manual

IAEA Response Objectives

Obligations & Assumed Responsibilities

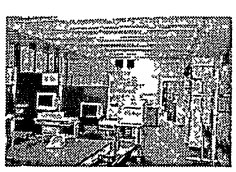
- Fulfill all obligations of conventions
- Authenticate and verify rumours
- Provide authoritative information on request
- Ensure Member States' representatives are briefed
- Frequent, reliable and accurate releases of information to media in co-ordination with other international organisations
- Interact with other organisations to co-ordinate response

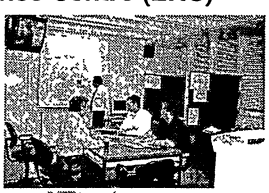
Initial Response Organization

- 24-hr contact point for notification & requests for assistance
  - Duty Emergency Response Manager
  - Duty officers
    - Nuclear and Radiation Safety
    - Logistic Support
    - Public Information
      - Screen incoming information
      - Authenticate and verify
      - Decide on the ERC activation level



Emergency Response Centre (ERC)

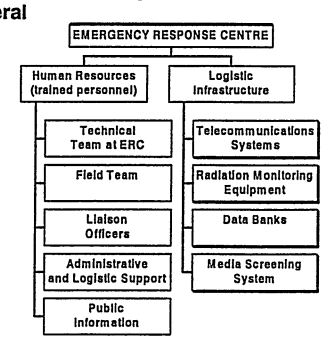






Resources and Capabilities

ERC General



Resources and Capabilities

Staff

Trained personnel (Total of 53)

Technical Team (5 per shift)

Liaison Officers (4 per shift)

Public Information (2 per shift)

Field Team (Minimum of 3)

Adm.&Logistic (8 per shift)

48 staff members from Nuclear Safety Department
5 from Public Information Division

Staff Major Duties

- Technical assessment of information received
- Liaison with Member States, International Organisations and Missions
- Public and media liaison
- Sending and receiving notification/information
- Field operations (within 24 hrs)
  - ▲ ERNET (Emergency Response Network)

Resources and Capabilities

Administrative/Logistic

- The Emergency Response Manager on duty has authority to activated as necessary the IAEA's Emergency Response System
- Emergency response fund of $500,000
- Databases
  - ■ Contact points, expertise, equipment, technical data
- Standing arrangements for laboratory, dosimetry and medical services

Resources and Capabilities

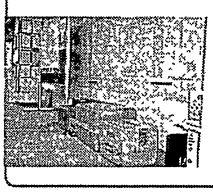
Telecommunications

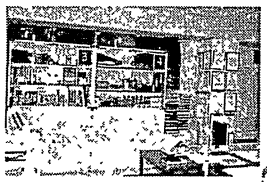
- Telecommunications system which includes satellite field communications
- Internet capabilities
- Media screening systems

Resources and Capabilities

Radiation Monitoring Equipment & Supplies

- Radiation survey instruments
- Personal protection equipment
- General supplies





Training, Drills and Exercises

- All response staff regularly trained:
  - ■ General overview
  - ■ Function-specific training
- Standard training material tied to procedures
- Training records and programme
- Communications drills
- Exercises



Emergency Exercises

- Assistance exercises
  - Radiological emergency field exercises for response assistance teams
- Information exchange exercises

Early Notification of a Nuclear Accident



- Accident state notifies Agency
- IAEA authenticates and verifies notification
- IAEA provides notification and additional verified information to States Parties, Member States and relevant international organisations

Early Notification of a Nuclear Accident

- Liaises with accident state, affected states, other states and international organisations
- Analyses information and answers requests for information from Parties
- Frequent, accurate media releases



Assistance in Radiological Emergency



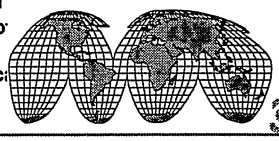
- State reports problem to ERC
- IAEA
  - Assesses available information
  - Offers its good offices or assistance if required
  - Co-ordinates and provides assistance to requesting state(s)





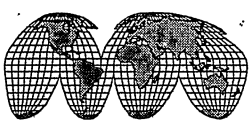
Emergency Assistance
Provided in 1999

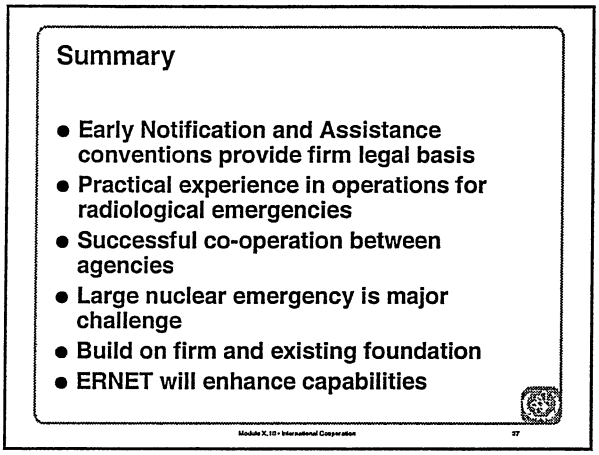
- Istanbul, Turkey: Jan
  - Medical advice
  - In situ verification
  - Radiological survey
- Lima, Peru: March
  - Medical advice
  - In situ verification
  - Review of cause o accident
  - Arrange for medic treatment abroad
- Accra, Ghana: Nov
  - In situ verification
  - Source retrieval
  - Review of cause of accident

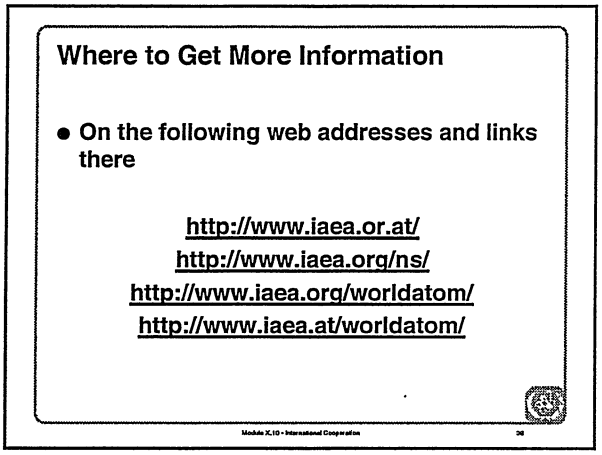


Emergency Assistance
Provided in 2000

- Ndola, Zambia: Jan
  - Radiation safety advice
- Bangkok, Thailand: March
  - Medical advice
  - In situ verification




Summary
• Early Notification and Assistance conventions provide firm legal basis
• Practical experience in operations for radiological emergencies
• Successful co-operation between agencies
• Large nuclear emergency is major challenge
• Build on firm and existing foundation
• ERNET will enhance capabilities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IAEA Emergency Response Network

Lecture

Introduction

- For many years the IAEA has provided assistance to Member States related to nuclear or radiological emergencies
- As part of this IAEA strategy a new concept of a world-wide Emergency Response Network (ERNET) was put forward by the IAEA in 1998
- The concept, structure and requirements for ERNET will be discussed in this lesson

Module X.10 • International Cooperation 2

Content

- ERNET response operations
  - Concept of operations
  - ERNET response activities
- ERNET preparedness
  - Organisation, roles and responsibilities
  - Emergency Response Teams (ERTs)
  - IAEA requirements for ERTs
- ERNET membership application
- Summary

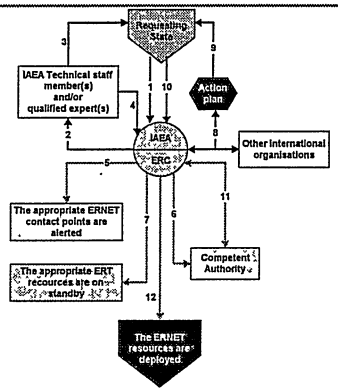
Module X.10 • International Cooperation 3

Objectives

- The ERNET is a network, which provides a world-wide emergency assistance to address a broad number of situations needing rapid response in order to mitigate the consequences of a nuclear accident or radiological emergency
- The ERNET focuses primarily on the early evaluation of the radiological consequences of an accident, possible health effects and the provision of medical care to overexposed persons

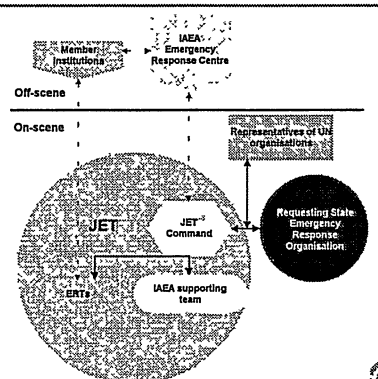
Module X.10 • International Cooperation 4

Concept of Operations



Module X.10 • International Cooperation 5

Joint Emergency Team



Module X.10 • International Cooperation 6

ERNET Response Activities

- The ERNET response activities include:
  - radiation monitoring
  - radionuclide identification
  - source recovery
  - assessment of radiological consequences
  - assessment medical consequences
  - logistic support for JET operations

Organisation

- The ERNET consists of the Member Institutions
- The commitment of each Member Institution to the ERNET is for a minimum of three years
- Each Member Institution nominates an ERT Coordinator who is responsible for coordinating all activities associated with the ERT(s) response capabilities and preparedness
- The Member Institution works in close cooperation with the Member State Competent Authority

Coordination

- The IAEA's Emergency Preparedness and Response Unit (EPRU) serves as a focal point of the ERNET preparedness
- EPRU coordinates all the necessary infra-structural planning for the ERNET in co-ordination with other international organisations as appropriate

Emergency Response Teams

- The ERNET recognises the following types of ERTs:
  - Aerial Survey Team (AST)
  - Radiation Monitoring Team (RMT)
  - Radionuclide Identification Team (RIT)
  - Source Recovery Team (SRT)
  - Assessment and Advisory Team (AAT)
  - Medical Support Team (MST)
  - Bioassay Team (BIT)
  - Radiopathology Team (RPT)
  - Biodosimetry Team (BDT)

ERT's Tasks

- The general tasks for the ERT's are:
  - to assess the radiological situation
  - to render safe and perform stabilisation activities including where appropriate source recovery
  - to provide medical advice and/or consultation, medical assistance as necessary and public health advice

Aerial Survey Team (AST)

- The AST should be able to:
  - quickly detect, locate and identify lost or orphan radiation source(s) by aerial survey over large areas
  - obtain information on large area surface contamination by radionuclide specific measurements
  - provide in a timely fashion results and all other collected data to the JET Command as requested according to established procedures and worksheets

Radiation Monitoring Team (RMT)

- The RMT should be able to:
  - detect, locate and demarcate small area(s) of contamination, lost or orphan source(s) by ground survey
  - propose immediate protective actions, if necessary
  - monitor personnel, object and equipment contamination
  - monitor dose rates
  - perform sampling

Radionuclide Identification Team (RIT)

- The RIT should be able to:
  - identify and quantify specific radionuclide
  - determine radionuclide specific ground contamination
  - perform sampling and sample preparation
  - measure radionuclide concentration in samples (air, soil, water, foodstuffs, etc.)

Source Recovery Team (SRT)

- The SRT should be able to:
  - organise source recovery operations
  - handle sources with specialised devices
  - provide temporary shielding and render the source safe
  - provide advice on source transportation and storage, if required

Assessment and Advisory Team (AAT)

- The AAT should be able to:
  - collect, assess, validate and map the results performed by field teams
  - make external dose calculation for individuals or critical groups
  - model, calculate and evaluate radiological consequences
  - recommend strategies for measurement, protective actions, recovery operations, decontamination and waste management

Medical Support Team (MST)

- The MST should be able to:
  - evaluate the medical consequences of the radiological accident
  - provide medical advice or consultation and assist with medical care
  - provide advice and recommend actions for decontamination and prevention of further radiation exposures of the population
  - provide advice on public health actions

Bioassay Team (BIT)

- The BIT should be able to:
  - identify and determine levels of specific radionuclides using in-vivo bioassay techniques
  - identify and determine levels of specific radionuclides in biological materials
  - interpret the data in terms of committed effective dose
  - interpret data during decorporation treatment, evaluate its efficiency, assess committed doses taking treatment into consideration

Radiopathology Team (RPT)

- The RPT should be able to:
  - obtain the appropriate tissue samples through biopsy or autopsy procedures;
  - prepare samples for histopathological analysis, and
  - conduct the evaluation of the samples.

Biodosimetry Team (BDT)

- The BDT should be able to:
  - obtain the appropriate samples
  - prepare samples
  - conduct the analysis and evaluation

Training, Drills and Exercises

- The Member Institution has to ensure that adequate training is available for and undertaken by all members of the ERTs including leadership qualities for the ERT Leaders
- Training requirements which have to be adhered to by the Member Institution
  - specific and appropriate mandatory training courses have to be identified for each member of the ERT
  - a schedule for the training sessions, drills and exercises shall be developed
  - a training record has to be maintained by each ERT Coordinator

Quality Assurance Programme

- The Member Institution is responsible for implementing and maintaining a quality assurance programme (QAP) to ensure the IAEA requirements are fulfilled
- The programme has to be documented in a quality assurance manual (QAM)
- The QAM has to include elements such as policies, organisation, procedures, standards, human resources and logistics

Financial Arrangements

- It is expected that the Member State will provide financial support to maintain the ERNET preparedness and response capabilities of its Member Institutions
- Some financial support for the ERNET activities may be arranged through the IAEA
- In the event of a nuclear or radiological emergency, the financial principles of the response operations will be in accordance with Article 7 of the Assistance Convention

Membership Application Requirements

- Requirements are structured as follows:
  - Prerequisites for membership application
  - Membership application
  - Membership application technical review process
  - Membership recognition

Membership Recognition

- After the successful outcome of the review process, the IAEA will formally nominate the Applying Institution as the Member Institution of the ERNET for the ERT under consideration
- The validity of the membership is initially for a period of three years and thereafter is renewable subject to demonstrating compliance with the membership requirements
- The Member Institution shall be awarded the right to publicly display that it is a member of the ERNET

Administrative and Technical Requirements

- Details of administrative and technical requirements for the ERT in the context of IAEA ERNET are divided into
  - Common requirements
  - Specific requirements

Specific Requirements

- Specific technical requirements are grouped in four areas
  - expertise
  - staffing
  - equipment
  - additional requirements

Summary

- IAEA Emergency Response Network (ERNET) consists of suitably qualified emergency response teams from Member States organised as a global network for rapid international emergency response in the case of a nuclear accident or radiological emergency based on regional emergency capabilities

Where to Get More Information

- Call or write to

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