EPR-
ERNET
2002

EMERGENCY PREPAREDNESS
AND RESPONSE

IAEA Emergency Response Network

ERNET

DATE EFFECTIVE: **1 DECEMBER 2002**

INTERNATIONAL ATOMIC ENERGY AGENCY

IAEA SAFETY RELATED PUBLICATIONS

IAEA SAFETY STANDARDS

Under the terms of Article III of its Statute, the IAEA is authorized to establish standards of safety for protection against ionizing radiation and to provide for the application of these standards to peaceful nuclear activities.

The regulatory related publications by means of which the IAEA establishes safety standards and measures are issued in the **IAEA Safety Standards Series**. This series covers nuclear safety, radiation safety, transport safety and waste safety, and also general safety (that is, of relevance in two or more of the four areas), and the categories within it are **Safety Fundamentals**, **Safety Requirements** and **Safety Guides.**

- **Safety Fundamentals** (blue lettering) present basic objectives, concepts and principles of safety and protection in the development and application of nuclear energy for peaceful purposes.
- **Safety Requirements** (red lettering) establish the requirements that must be met to ensure safety. These requirements, which are expressed as 'shall' statements, are governed by the objectives and principles presented in the Safety Fundamentals.
- **Safety Guides** (green lettering) recommend actions, conditions or procedures for meeting safety requirements. Recommendations in Safety Guides are expressed as 'should' statements, with the implication that it is necessary to take the measures recommended or equivalent alternative measures to comply with the requirements.

The IAEA's safety standards are not legally binding on Member States but may be adopted by them, at their own discretion, for use in national regulations in respect of their own activities. The standards are binding on the IAEA in relation to its own operations and on States in relation to operations assisted by the IAEA.

OTHER SAFETY RELATED PUBLICATIONS

Under the terms of Articles III and VIII.C of its Statute, the IAEA makes available and fosters the exchange of information relating to peaceful nuclear activities and serves as an intermediary among its Member States for this purpose.

Reports on safety and protection in nuclear activities are issued in other series, in particular the **IAEA Safety Reports Series**, as informational publications. Safety Reports may describe good practices and give practical examples and detailed methods that can be used to meet safety requirements. They do not establish requirements or make recommendations.

Other IAEA series that include safety related sales publications are the **Technical Reports Series,** the **Radiological Assessment Reports Series** and the **INSAG Series**. The IAEA also issues reports on radiological accidents and other special sales publications. Unpriced safety related publications are issued in the **TECDOC Series**, the **Provisional Safety Standards Series**, the **Training Course Series,** the **IAEA Services Series** and the **Computer Manual Series**, and as **Practical Radiation Safety Manuals** and **Practical Radiation Technical Manuals**.

EPR–ERNET (2002)

Emergency Preparedness and Response

IAEA Emergency Response Network *ERNET*

INTERNATIONAL ATOMIC ENERGY AGENCY

This publication has been prepared by the:

Emergency Preparedness and Response Unit
Radiation Safety Section
International Atomic Energy Agency
Wagramer Strasse 5
P.O. Box 100
A-1400 Vienna, Austria

IAEA EMERGENCY RESPONSE NETWORK
IAEA, VIENNA, 2003
EPR-ERNET (2002)

Printed by the IAEA in Austria
April 2003

Foreword

The Parties to the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency have undertaken to co-operate among themselves and with the IAEA in facilitating the prompt provision of assistance in the event of a nuclear or radiological emergency, in order to mitigate its consequences.

In September 2000 the General Conference of the IAEA in resolution GC(44)/RES/16: *"encouraged Member States to implement instruments for improving their response, in particular their contribution to international response, to nuclear or radiological emergencies as well as to participate actively in the process of strengthening international, national and regional capabilities for responding to nuclear or radiological emergencies and to make those capabilities more consistent and coherent."*

As part of the IAEA's strategy for supporting the practical implementation of the Assistance Convention and this resolution, the Secretariat of the IAEA is establishing a global Emergency Response Network (ERNET) of teams suitably qualified to respond rapidly and, in principle, on a regional basis, to nuclear or radiological emergencies.

The First Meeting of the Competent Authorities identified under the Convention on Early Notification of a Nuclear Accident and the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency, held in Vienna on June 2001, recommended that the Secretariat of the IAEA formally invite States to nominate teams to join ERNET. The General Conference of the IAEA subsequently in GC(45)/RES/10 encouraged Member States to follow up on the recommendations of the Competent Authorities Meeting and, in January 2002, the Secretariat of the IAEA formally invited Member States to nominate teams to join ERNET.

In September 2002, the General Conference of the IAEA in resolution GC(46)/RES/9 encouraged IAEA Member States… to consider joining the ERNET.

This manual sets out the criteria and requirements to be met by members of ERNET. It is intended for use by institutions in Member States in developing, applying and maintaining their emergency response capabilities and in implementing quality assurance programmes within the context of ERNET.

The manual is worded on the assumption that a State's Competent Authority designated as the body responsible for reacting to nuclear or radiological emergencies which occur outside the jurisdiction of their own State will be the State's Contact Point for receiving requests for assistance from the IAEA under the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency.

EDITORIAL NOTE

The views expressed do not necessarily reflect those of the governments of States that are IAEA Member States and/or Parties to either or both of the Convention on Early Notification of a Nuclear Accident and the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency, or of other relevant international intergovernmental organizations, or of the governments of other States.

Although great care has been taken to maintain the accuracy of information contained in this manual, neither the IAEA nor its Member States assume any responsibility for consequences that may arise from its use.

NOTES FOR THE USER

This manual enters into effect on 1 March 2003. This manual supersedes the previous version of this manual – EPR-ERNET(2000). All copies of that publication should now be removed from operational response systems and either archived or destroyed. This version contains some minor editorial changes, additional clarifications, updated technical requirements, and new Appendix C with the criteria for ERT acceptance.

The IAEA's Emergency Preparedness and Response Unit is ready to provide any clarification on the implementation of the arrangements described here, and may be contacted through the details provided in Appendix B of this manual.

Contents

DEFINITIONS

Action plan is a plan for the provision of assistance, including all financial, diplomatic, organizational and logistical aspects, formulated and proposed by the IAEA in co-ordination with other international organizations as appropriate.

Applying Institution is any legally identifiable institution from an IAEA Member State applying for membership of ERNET through the Member State Competent Authority/Abroad.

Assistance Convention is the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency.

Competent Authority/Abroad is the single Authority nominated by a State Party that is authorized to receive a request for assistance from the IAEA.

Emergency Trials, Drills and Exercises (ConvEx) are organized by the IAEA in co-operation with Member States to verify the preparedness arrangements for response according to specific objectives.

Early Notification Convention is the Convention on Early Notification of a Nuclear Accident.

Emergency Preparedness and Response Unit (EPRU), Division of Radiation and Waste Safety of the Department of Nuclear Safety, is the IAEA's official branch responsible for the development of standards for emergency planning and preparedness and their implementation and for supervision of the IAEA's Emergency Response Centre preparedness activities.

Emergency Response Centre (ERC) serves as a centre for management and co-ordination of the IAEA's response to nuclear or radiological emergencies. The ERC is located at the IAEA's Headquarters in Vienna, Austria.

Emergency Response Network (ERNET) is the IAEA's global network composed of the ERC and the Member Institutions.

Emergency Response Organization of a State is the authority in the State responsible for the mitigation of the emergency.

Emergency Response Team (ERT) is a group of technically qualified and equipped personnel from a Member Institution that may be called upon to provide assistance in a requesting State.

ERT Co-ordinator is an individual nominated by a Member Institution to be responsible for co-ordinating all activities of the ERTs of the Member Institution. He or she is the ERC's single official counterpart in the Member Institution.

ERT Leader is the individual appointed by the relevant Member Institution to head an ERT.

Joint Emergency Team (JET) is composed of the IAEA staff member(s) in the field, one or more ERTs and supporting personnel.

Joint Emergency Team Command (JETC) is the co-ordinating body on scene for the Joint Emergency Team. It is composed of the head IAEA staff member in the field and the ERT Leader(s).

JET Chairperson is the IAEA staff member(s) in the field appointed by the ERC to head the JET Command. The Chairperson manages the on-scene international emergency response within the context of the ERNET and co-ordinates its implementation with the requesting State's Emergency Response Organization.

Member Institution is an institution that has at least one ERT and has been accepted by the IAEA as a member of the ERNET.

GLOSSARY

Assessment The process, and the result, of analysing systematically the hazards associated with sources and practices, and associated protection and safety measures, aimed at quantifying performance measures for comparison with criteria.

Audit A documented activity performed to determine by investigation, examination and evaluation of objective evidence the adequacy of, and adherence to, established procedures, instructions, specifications, codes, standards, administrative or operational programmes and other applicable documents, and the effectiveness of implementation.

Calibration The set of operations which establish, under specified conditions, the relationship between values indicated by a measuring instrument or measuring system, or values represented by a material measure, and the corresponding known values of a measurand; a measurement of, or adjustment to, an instrument, component or system to ensure its accuracy or response is acceptable.

Compliance assurance A systematic programme of measures intended to ensure that the requirements specified are met.

Drill Supervised, hands-on training for members of an emergency response organization conducted to develop and maintain key emergency response skills. Drills are usually narrower in scope than exercises and can be used to train a specific area of response and/or to train for integrated response of the emergency organization. Drills can be used to correct deficiencies identified in exercises.

Exercise An evaluation of major portions of emergency response capabilities. Exercises usually involve simulated emergency conditions carried out for the purpose of testing, evaluating, training and/or demonstrating emergency management systems and individual components and capabilities, to identify areas and weaknesses that could affect the response to an actual emergency.

Intercomparison measurement Measurement campaign organized to check the quality of different monitoring teams or laboratories.

Monitoring The measurement of radiological or other parameters for reasons related to the assessment or control of exposure to radiation, and the interpretation of such measurements.

Orphan source A source which poses a sufficient radiological hazard to warrant regulatory control, but which is not under regulatory control either because it has never been so, or because it has been abandoned, lost, misplaced, stolen or otherwise transferred without proper authorization.

Qualified expert An individual who, by virtue of certification by appropriate boards or societies, professional licences or academic qualifications and experience, is duly recognized as having expertise in a relevant field of specialization, e.g. medical physics, radiation protection, occupational health, fire safety, quality assurance or an engineering or safety speciality.

Quality assurance	Planned and systematic actions necessary to provide adequate confidence that an item or service will satisfy given requirements for quality.
Quality assurance manual	A document stating the quality policy, quality system and quality practices of an organization. The quality assurance manual may call up other documentation relating to the organization's quality arrangements.
Quality assurance programme	The organizational structure, responsibilities, procedures, processes and resources for implementing quality management.
Radiological survey	An evaluation of the radiological conditions and potential hazards associated with the production, use, transfer, release, disposal, or presence of radioactive material or other sources of radiation.
Verification	The process of determining whether the quality or performance of a product or service is as stated, as intended or as required.

ABBREVIATIONS

AAT	Assessment and Advisory Team
AST	Aerial Survey Team
BDT	Biodosimetry Team
BIT	Bioassay Team
CONVEX	Emergency Tests and Exercises organized by the IAEA in co-operation with Member States to verify the preparedness arrangements for response according to specific objectives.
ENATOM	IAEA Emergency Notification and Assistance Technical Operations Manual
EPRU	IAEA Emergency Preparedness and Response Unit
ERC	IAEA Emergency Response Centre
ERNET	IAEA Emergency Response Network
ERT	Emergency Response Team
IAEA	International Atomic Energy Agency
JET	IAEA Joint Emergency Team
JETC	Joint Emergency Team Command
MST	Medical Support Team
REMPAN	Radiological Emergency Medical Preparedness and Assistance Network of World Health Organization
RIT	Radionuclide Identification Team
RMT	Radiation Monitoring Team
RPT	Radiopathology Team
SRT	Source Recovery Team

Section 1

1. INTRODUCTION

1.1. Background

The current IAEA framework with regard to response to a nuclear or radiological emergency consists of:

a) Emergency Conventions [1];

b) International Basic Safety Standards [2];

c) Safety Requirements GS-R-2 [3];

d) IAEA Safety publications on emergency preparedness and response [4–17];

e) Documentation of the IAEA Emergency Preparedness and Response Unit;

f) relevant documents of other international organizations such as World Health Organization [17], World Meteorological Organization, Food and Agriculture Organization of the United Nations and the United Nations Office for Co-ordination of Humanitarian Affairs; and bilateral/multilateral agreements and arrangements.

The Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency [1] (hereinafter the 'Assistance Convention'), which entered into force on 27 October 1986, places specific legal obligations on the States Parties to this Convention as well as defining the legal responsibilities and functions of the IAEA. Under this Convention, the Agency must respond, in accordance with its Statute and as provided for in this Convention, to a requesting State Party's or a Member State's request for assistance in the event of a nuclear or radiological emergency by:

a) making available appropriate resources allocated for this purpose;

b) transmitting promptly the request to other States and international organizations which, according to the Agency's information, may possess the necessary resources; and

c) if so requested by the requesting State, co-ordinating the requested assistance at the international level.

The States Parties request the IAEA (in accordance with article 5 of the Assistance Convention and without prejudice to other provisions of this Convention) to perform the following functions inter alia:

a) transmit requests for assistance and relevant information in the event of a nuclear or radiological emergency;

b) make available to a State Party or a Member State requesting assistance in the event of a nuclear or radiological emergency appropriate resources allocated for the purpose of conducting an initial assessment of the accident or emergency;

c) offer its good offices to the States Parties and Member States in the event of a nuclear or radiological emergency;

d) establish and maintain liaison with relevant international organizations for the purposes of obtaining and exchanging relevant information and data, and make a list of such organizations available to States Parties, Member States and the aforementioned organizations".

For many years, the IAEA has provided assistance to Member States in relation to nuclear and radiological emergencies. This assistance has included:

a) authenticated and verified information about a nuclear or radiological emergency;

b) technical advice on emergency planning, preparedness and response;

c) radiological surveys;

d) source recovery;

e) in situ verification of radiological conditions and provision of related technical advice; and

f) provision of medical advice and assistance in cases of real or suspected radiation exposure.

The assistance has been provided through the IAEA's Emergency Response Centre (ERC), established in 1986, which was designated by the IAEA Director General as the IAEA's focal point for response to any nuclear or radiological emergency.

Following various regional initiatives (in Asia-Pacific in 1996, in Africa in 1998 and in Latin America in 1999) with respect to mutual assistance in the case of a nuclear or radiological emergency, and following an IAEA internal review of its own emergency response plan and procedures, the concept of a worldwide Emergency Response Network (ERNET) that can make equipped Emergency Response Teams (ERTs) available to a requesting Member State was put forward by the IAEA Secretariat.

1.2. Concept of the Emergency Response Network

The ERNET is a network that provides worldwide emergency assistance in a range of situations necessitating rapid response in order to mitigate the consequences of a nuclear or radiological emergency.

The ERNET focuses primarily on early evaluation of radiological consequences of an accident and possible health effects, and the provision of medical care to overexposed persons.[1]

The ERNET exists to respond to a specific need and does not affect the co-operation arrangements defined in any bilateral and/or multilateral agreements between States.

The magnitudes and severities of accidents and emergencies for which ERNET response may be requested vary considerably. The following lists the main types of accidents and emergencies to be anticipated:

a) accidents with actual or potential release of radioactive substances to the environment;

b) accidents involving radioactive materials in transport by land, waterways, sea or air;

c) loss, unauthorized removal or misuse of radioactive materials;

d) other emergencies involving radioactive materials and/or sources of ionizing radiation;

e) the crash of a spacecraft containing radioactive material; and

f) any other emergency resulting in radiation exposure and/or contamination[2].

The major purpose of the ERNET is to strengthen the IAEA's capability to provide assistance and advice and/or to co-ordinate the provision of assistance as specified within the framework of the Assistance Convention. ERNET will also complement other IAEA initiatives to promote emergency preparedness and response capabilities for nuclear or radiological emergencies among the IAEA Member States in accordance with the IAEA-TECDOC-953 [3].

1.3. Objectives of the manual

This manual will serve to realize this concept and assist in the formation of a network of Member Institutions capable of providing specialized teams, with appropriate

[1] The in-depth diagnosis, treatment, rehabilitation and follow-up of overexposed persons are addressed within the framework of the World Health Organization, which has established the network of collaborating centres for radiation emergency medical preparedness and assistance (REMPAN).

[2] Reactors or other nuclear activities not specified in Article 1 of the Convention on Early Notification in the case of a Nuclear Accident [2] may also be reported. Five nuclear weapons States have declared that in respect to this Convention they will notify such accidents. The terms of the Assistance Convention do not exclude assistance in the event of any such accidents.

training and ability to respond quickly and effectively to any nuclear or radiological emergency on request.

The use of this manual is intended to facilitate:

a) international assistance in relation to nuclear or radiological emergencies;

b) co-operation between Member States, their Competent Authorities and ERNET Member Institutions;

c) the exchange of information and experience; and

d) harmonization of methods and procedures for emergency preparedness and assistance.

The manual is intended for use by the Member States and Member Institutions in developing, implementing and maintaining their capabilities and quality assurance programme within the context of the ERNET.

1.4. Scope of the manual

The manual is issued within the framework of the Assistance Convention under which the IAEA is authorized to co-ordinate and/or to provide assistance to a State Party or a Member State in connection with a nuclear or radiological emergency.

The manual sets out:

a) the concept and the structure of the ERNET;

b) functions, responsibilities and activities within the ERNET;

c) ERNET response operations and preparedness;

d) conditions of membership and application procedure, and

e) the IAEA prerequisites for the Emergency Response Teams (ERT) within the ERNET.

1.5. Structure of the manual

The manual is divided into four sections with three appendices. After the introduction to the ERNET concept in Section 1, the principles for ERNET operations are explained in Section 2. Section 3 presents the required capabilities for ERNET preparedness. The requirements for application, approval and recognition for ERNET membership are covered in Section 4. Appendix A addresses the details of the administrative and technical requirements for each type of ERT while an Application Form for membership of ERNET is reproduced in Appendix B. Appendix C gives criteria for acceptance for applying institution, ERT staff, and for ERT equipment.

Section 2

2. OPERATIONS OF THE EMERGENCY RESPONSE NETWORK

2.1. Concept of operations

When a State needs assistance in the event of a nuclear or radiological emergency, whether or not such an event originates on its territory or under its jurisdiction or control, it may, in accordance with the Assistance Convention, request assistance from the IAEA according to the ENATOM Manual (Step[3] 1).

The requesting state is responsible for the overall direction, support and supervision of any assistance within its territory in accordance with Article 3 of the Assistance Convention.

Once assistance is requested, the IAEA's ERC will be the focal point for response and will co-ordinate the ERNET resources that may be allocated.

After receiving a request for assistance, the ERC will evaluate the situation and provide initial advice to national authorities. The ERC may send technical staff member(s) or qualified expert(s) to evaluate the situation and to recommend to the ERC the deployment of ERNET resources (Steps 2, 3 and 4).

The ERC will alert the appropriate ERNET point(s) of contact in the Member Institutions and will notify the Competent Authority/Abroad in the Member Institution's respective country according to established procedures (Steps 5 and 6).

If the situation warrants, the ERC will request details of resource availability from the appropriate ERNET Member Institution(s) (Step 7).

The ERNET Member Institution(s) will inform the ERC regarding availability of its ERT resources for assistance and if required the ERT resources will be placed on standby (Step 7).

[3] Steps are identified in the flowchart in Fig. 1.

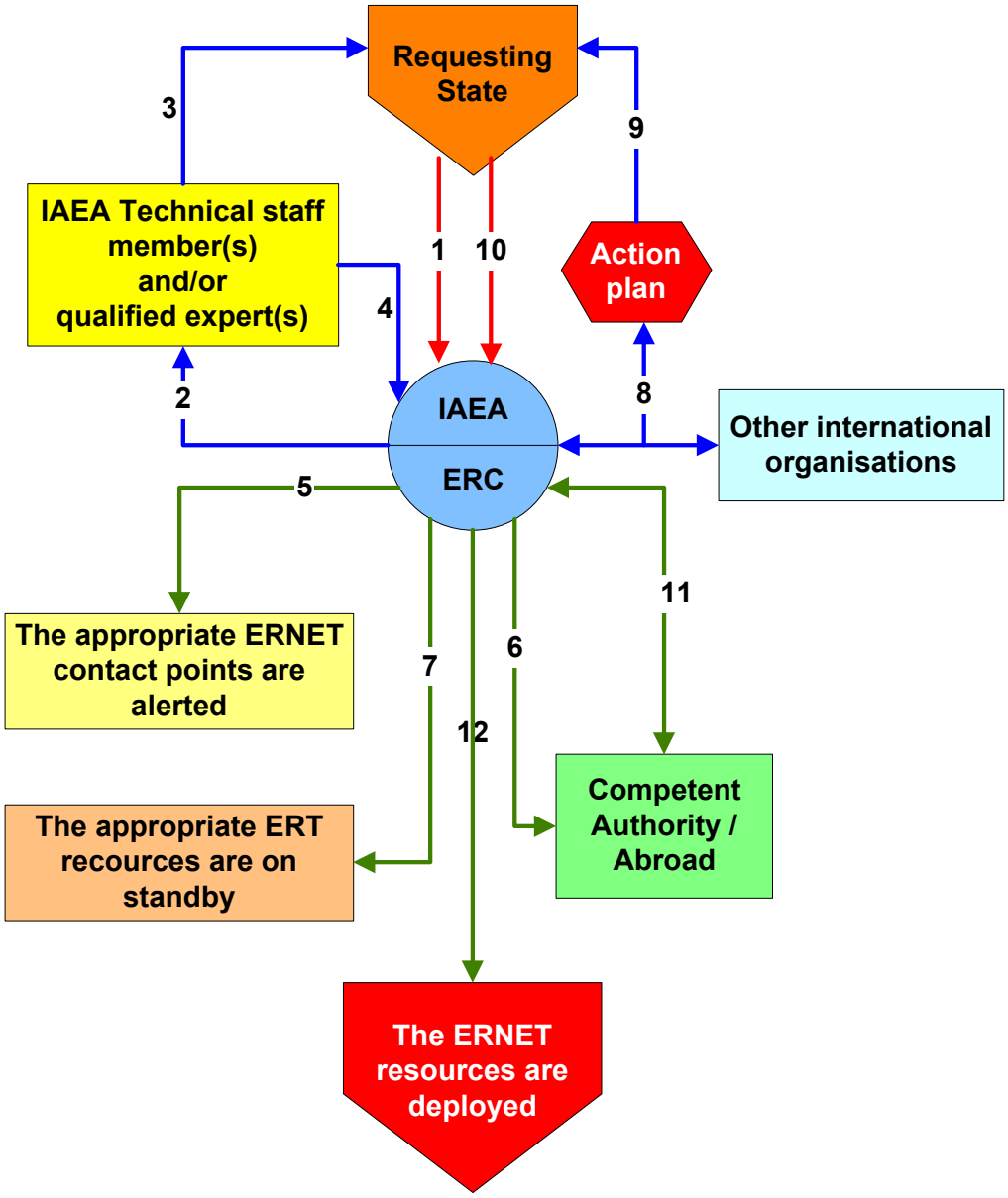

Figure 1. The concept of operations in an emergency.

An action plan of assistance will be developed by the ERC in co-ordination with other international organizations, as appropriate (Step 8). The action plan includes all technical, financial, diplomatic, organizational and logistical aspects.

The IAEA will then contact the requesting State's authority to propose the action plan for assistance (Step 9).

Upon acceptance of the action plan by the requesting State (Step 10), the ERC will obtain deployment authorization from the ERT's country Competent Authority/Abroad (Step 11). The ERNET resources will then be deployed by the ERC (Step 12). Additional ERNET resources may be placed on standby.

2.2. Joint Emergency Team

To respond to a request, the Joint Emergency Team (JET) is formed to provide the required assistance. It is composed of the IAEA staff member(s) in the field, one or more ERT members and the IAEA supporting team.

JET Command manages and co-ordinates JET assistance in the field. It is composed of the head IAEA staff member in the field and the ERT Leaders. Figure 2 illustrates the JET organizational scheme and command interfaces.

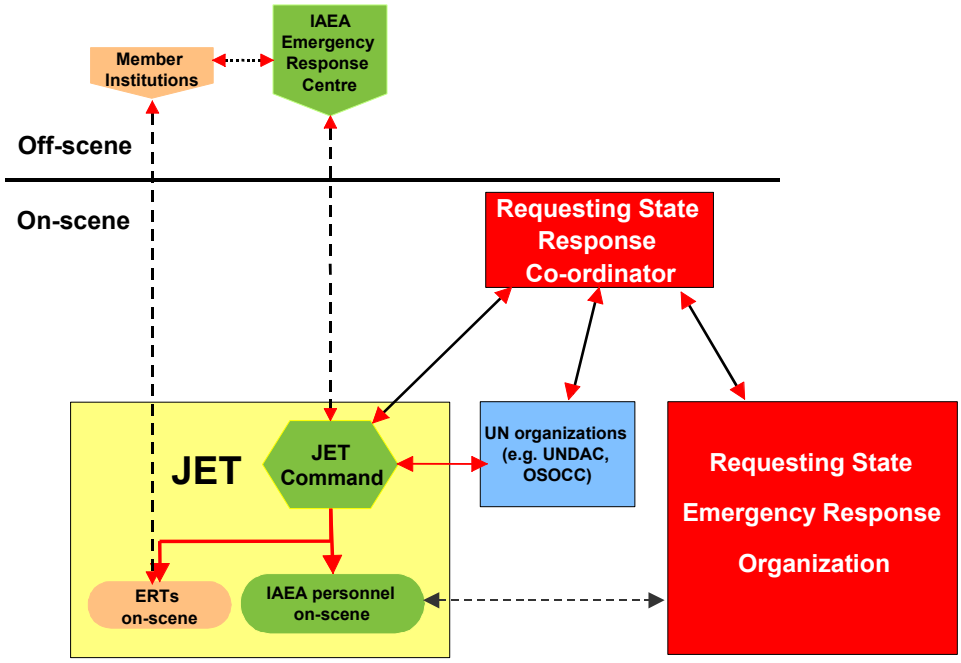

Figure 2. Joint Emergency Team (JET) response scheme.

The JET and the JET Command are headed by the same Chairperson. Before deployment, the Chairperson is appointed by the ERC from among IAEA staff members. The Chairperson manages the international emergency response on the scene in the context of ERNET and co-ordinates it with the requesting State's Emergency Response Organization (however named).

The JET Chairperson is responsible for directing and co-ordinating the JET activities, and for establishing and maintaining communications with the requesting State's officials, the representatives of relevant UN organizations, the ERC and the ERT Leader(s).

The JET Chairperson has the responsibility for proposing changes to the action plan, in consultation with the requesting State, and seeking approval from the ERC and the requesting State before the changes are implemented.

The ERT Leaders are responsible for accomplishing the activities according to the priorities set by the JET Chairperson. They are directly subordinated to the JET Chairperson, must routinely communicate their team's status and must ensure that all activities are performed in a safe manner.

During operations in the requesting State, all response work will be co-ordinated by the JET Command, in close co-operation with the requesting State's Emergency Response Organization (however named).

The ERT(s) in the JET framework are responsible for implementing the accepted action plan in accordance with established procedures.

In an emergency response, priority will be placed on the safety of personnel and members of the public. It is the responsibility of each ERT Leader to ensure that all response work is performed in a safe manner by following procedures which at minimum should meet appropriate IAEA standards. Team members should follow all applicable rules and procedures for protection and safety and should use their personal monitoring devices and protective equipment in a correct manner.

The requesting State may declare at any time the end of the requested IAEA assistance. The JET resources will be demobilized according to the instructions of the JET Chairperson.

2.3. ERNET response activities

The ERNET response activities include radiation monitoring, radionuclide identification, source recovery, assessment of radiological and medical consequences, and logistical support for JET operations.

Radiation monitoring

Radiation monitoring activities include environmental and source monitoring, sampling and sample handling, and reporting of measurement data. These activities may be performed with ground based field instruments and/or aerial platforms.

Radionuclide identification

Radionuclide identification includes in situ gamma spectrometry and/or analyses of laboratory samples. These activities may be performed with ground based field instruments and/or aerial platforms.

Source recovery

Source recovery includes the activities necessary to render safe radioactive sources and to stabilize the situation.

Assessment

Assessment activities include evaluation of the monitoring data and the use of models or other techniques to evaluate the radiological consequences of the accident, including assessments of individual external and internal doses. These activities can be conducted in the field, at Member Institutions or in co-operation with other organizations. The activities also include provision of advice and recommendations on minimizing the consequences of the accident.

Medical activities

Medical activities include: evaluation of the medical consequences: provision of advice or consultation to attending medical staff or assistance with medical care as necessary; assistance in decontamination or decorporation; and the provision of advice on public health issues. The activities also include radiopathology, bioassay and biodosimetry studies as appropriate.

Logistics

Logistical support for JET operations includes transportation, communication, accommodation, sanitation and provision of food and water as necessary.

Section 3

3. PREPAREDNESS OF THE EMERGENCY RESPONSE NETWORK

3.1. Organization, roles and responsibilities

The ERNET consists of the Member Institutions. The minimum commitment of each Member Institution to the ERNET is for three years.

Each Member Institution must be organized and must operate in such a way that upon receiving the IAEA's request for its supporting emergency capabilities these can be rapidly and efficiently deployed.

Each Member Institution must nominate an ERT Co-ordinator who must be responsible for co-ordinating all activities associated with the ERT(s) response capabilities and preparedness.

Responsibilities of the Member Institution

Each Member Institution must be responsible for the following:

a) maintaining specific emergency response team(s) at immediate readiness for deployment;

b) specifying and documenting the responsibilities, authorities and interrelations of all personnel who manage, perform or verify work affecting the quality of the emergency response of the ERTs;

c) maintaining its technical and response capabilities for at least three years from their acceptance as a Member Institution of the ERNET;

d) maintaining the established communication links within the ERNET;

e) maintaining its own quality assurance programme and complying with ERNET requirements;

f) participating, as appropriate, in relevant programmes co-ordinated by the IAEA relating to emergency response preparedness;

g) participating in the periodically scheduled IAEA meetings concerning the ERNET;

h) participating in intercomparison measurement programmes organized by the IAEA, if requested;

i) participating in periodically scheduled IAEA Convention Exercises, CONVEX;

j) providing internal training consistent with the IAEA standards and technical materials in order to promote emergency response preparedness and planning infrastructure; and

k) preparing and presenting to the IAEA through the Member State Competent Authority/Abroad an annual report on the Institution's ERNET activities.

Each Member Institution should be willing to provide appropriate assistance with the preparation of IAEA documents on emergency response preparedness.

The Member Institution works in close co-operation with the Member State's Competent Authority/Abroad.

Types of teams

The ERNET recognizes the following types of ERTs:

a) Aerial Survey Team (AST);

b) Radiation Monitoring Team (RMT);

c) Radionuclide Identification Team (RIT);

d) Source Recovery Team (SRT);

e) Assessment and Advisory Team (AAT);

f) Medical Support Team (MST);

g) Bioassay Team (BIT);

h) Radiopathology Team (RPT);

i) Biodosimetry Team (BDT).

Each Member Institution must be able to field at least one of the above ERTs.

If any Member Institution fails to comply with any requirement concerning the ERNET or any ERT, it must immediately inform the IAEA through the Member State's Competent Authority regarding its change in status.

Competent Authority/Abroad

The functions of the Competent Authority/Abroad in the context of the ERNET are expected to be as follows:

a) to serve as a Member State's Contact Point for receiving requests for assistance;

b) to assist in the selection of Member Institutions within the Member State;

c) to maintain the communication links within the ERNET;

d) to participate in CONVEX exercises and ERNET meetings and other activities, if appropriate, relevant to the ERNET, and

e) to co-ordinate Member State reports to the IAEA on ERNET activities.

3.2. ERNET co-ordination

The IAEA's Emergency Preparedness and Response Unit (EPRU) co-ordinates all the necessary infrastructural planning for the ERNET in co-operation with other international organizations as appropriate.

The EPRU serves as a focal point of the ERNET preparedness and is responsible for the following:

a) approving ERNET membership by verifying the compliance of Applying Institutions' emergency capabilities with the prerequisites addressed in this manual;

b) establishing and maintaining the communication links within the ERNET;

c) establishing and maintaining its own quality assurance programme;

d) scheduling and organizing meetings and consultancies concerning the ERNET for interested Member States;

e) convening regularly scheduled mandatory meetings for all Member Institutions;

f) scheduling and organizing periodically co-ordinated drills and exercises for the ERTs;

g) periodically providing information, in the form of newsletters or by any other available means, on the current status and activities of the ERNET; and

h) monitoring the status of readiness of each ERT.

Resources, in particular personnel, will be made available to EPRU to implement and effectively maintain the ERNET.

The ERT Co-ordinator must serve as the single ERNET point of contact within each Member Institution. Communication links between the EPRU and Member Institutions must be established through this point of contact.

3.3. Competences of the Emergency Response Teams

The general tasks for the ERTs are:

a) to assess the radiological situation;

b) to render safe and perform stabilization activities, including where appropriate source recovery; and

c) to provide medical advice and/or consultation, medical assistance as necessary and advice on public health.

The ERT Co-ordinator must be responsible for ensuring that each ERT is prepared so as to accomplish the ERNET activities appropriate to that team.

Specific tasks for each ERT will be specified on the basis of on-scene assessment of the situation by the JET Chairperson.

The ERT must be provided with all items of equipment necessary for the efficient performance of emergency tasks in compliance with Appendix A.

The ERT must use appropriate methods and procedures for all emergency tasks and related activities within its competence, including monitoring, initial dose assessment, sampling, sample handling and preparation, estimation of uncertainty of measurements and analysis of results in compliance with the IAEA requirements.

The ERT must, where possible, select methods that have been described in IAEA publications [6–8]. Where it is necessary to employ methods that have not been established in IAEA publications, the Member Institutions must provide documentation to describe the method's technical basis, operational guidelines and limitations.

The ERT must maintain documented instructions in English on the use and operation of all relevant equipment and procedures for the handling and preparation of samples, and for measurements, monitoring, survey and assessment methods. All procedures, manuals and reference data relevant to the work of the ERT must be maintained up to date and must be readily available for use.

The Aerial Survey Team (AST) should be able:

a) to quickly detect, locate and identify lost or orphan radiation source(s) by aerial survey over large areas;

b) to obtain information on large area surface contamination by radionuclide specific measurements and/or dose rate measurements; and

c) to provide in a timely fashion results and all other collected data to the JET Command as requested according to established procedures and worksheets.

The expected achievements of AST are, as appropriate:

a) the detection, location and identification of lost or orphan radiation sources; and

b) the preparation of large area contour maps based on measured data, such as ground concentrations, dose rates and integrated doses.

The Radiation Monitoring Team (RMT) should be able:

a) to detect, locate and demarcate small area(s) of contamination and lost or orphan source(s) by ground survey;

b) to propose immediate protective actions, if necessary;

c) to monitor contamination of personnel, items of equipment and other objects;

d) to monitor dose rates; and

e) to perform sampling.

The expected achievements of RMT are:

a) the detection and location of lost or orphan radiation sources;

b) definition and demarcation of small areas of contamination; and

c) dose rate mapping and/or contamination mapping.

The Radionuclide Identification Team (RIT) should be able:

a) to identify and quantify specific radionuclides;

b) to determine radionuclide specific ground contamination;

c) to perform sampling and sample preparation; and

d) to measure radionuclide concentration in samples (air, soil, water, foodstuffs, etc.).

The expected achievements of *RIT* are :

a) a detailed analysis of the radionuclide composition of ground contamination; and

b) detailed analysis of radionuclide compositions and concentrations in various environmental samples.

The Source Recovery Team (SRT) should be able:

a) to organize source recovery operations;

b) to handle sources with specialized devices;

c) to provide temporary shielding and render the source safe; and

d) to provide advice on source transportation and storage, if requested.

The expected achievements of SRT are to render secure and safe any unshielded source(s).

The Assessment and Advisory Team (AAT) should be able:

a) to collect, assess, validate and map the results obtained by field teams;

b) to make external dose calculations for individuals or critical groups;

c) to model, calculate and evaluate radiological consequences; and

d) to recommend strategies for measurement, protective actions, recovery operations, decontamination and waste management.

The expected achievements of AAT are:

a) diagnosis of real and/or potential radiological consequences of the emergency;

b) prognosis of the evolution of the emergency; and

c) recommendations on protective actions and source recovery operations including waste management.

The Medical Support Team (MST) should be able:

a) to evaluate the medical consequences of the radiological accident;

b) to provide medical advice or consultation and assist with medical care as necessary to overexposed persons in accordance with the type of radiological emergency: (i) persons with clinical signs and symptoms of acute radiation syndrome; (ii) persons with external contamination; (iii) persons with internal contamination, (iv) persons with local radiation injuries; and (v) persons with combined injuries (radiation injuries plus conventional injuries);

c) if continued care of the patient(s) in the requesting country is not feasible, the MST will recommend to the JET and national authorities to co-ordinate the transfer of the patient(s) to a specialized centre(s) outside the country, in consideration of the potential impact on the patient's psychological status[4]; and

[4] The written informed consent of the patient(s) is required prior to transferal to another country.

d) to provide advice and recommend actions if necessary for decontamination and prevention of further radiation exposures of the population; provide advice on public health actions.

The expected achievements of MST are:

a) assurance of adequate medical care for overexposed and/or contaminated patients;

b) minimization of medical and public health effects; and

c) collection of information needed for further analysis of medical consequences of the emergency.

Bioassay Team (BIT) should be able:

a) to identify and determine levels of specific radionuclides using in vivo bioassay techniques (whole body and organ counting and external counting at wound sites);

b) to identify and determine levels of specific radionuclides in body excreta and in other biological materials such as nasal swabs, hair, blood;

c) to interpret the data in terms of committed effective dose, using appropriate models endorsed by the IAEA or the ICRP or individual retention functions; and

d) to interpret data during decorporation treatment, evaluate its efficiency, assess committed doses taking treatment into consideration.

The expected achievements of BIT are:

a) identified and quantified internally deposited radionuclides;

b) dose estimates due to internally deposited radionuclides;

c) estimates of the reduction of committed doses and risks by treatment; and

d) reconstruction of the accident.

Radiopathology Team (RPT) should be able to:

a) to obtain the appropriate tissue samples through biopsy or autopsy procedures;

b) to prepare samples for histopathological analysis; and

c) to conduct the evaluation of the samples.

The expected achievements of RPT are:

a) timely and detailed radiopathological evaluation; and

b) prepared and archived radiopathological samples cross-referenced to specific patients.

The Biodosimetry Team (BDT) should be able:

a) to obtain appropriate samples;

b) to prepare samples; and

c) to conduct their analysis and evaluation.

The expected achievements of BDT are[5]:

a) dose estimates obtained through biodosimetry; and

b) prepared and archived biodosimetry samples cross-referenced to specific patients.

3.4. Training, drills and exercises

The Member Institution must ensure that adequate training is available for and undertaken by all members of the ERTs including training in leadership qualities for the ERT Leaders.

The following are training requirements which must be adhered to by the Member Institution and made available to the EPRU for review:

a) specific and appropriate mandatory training courses must be identified for each member of the ERT;

b) a schedule for the training sessions, drills and exercises must be developed; and

c) a training record must be maintained by each ERT Co-ordinator and filed for each member of the ERT.

All or part of the above can be fulfilled through participation in an existing training programme where this is deemed to meet the ERT's requirements (prerequisites).

The Member Institution must be responsible for ensuring that members of the ERTs are trained and retrained in their respective areas as follows:

[5] Cell cultures will be prepared and microscopic analyses will be performed in Member Institutions' dedicated biodosimetry laboratories.

a) airborne survey techniques: at least once every two years;

b) gamma and contamination mapping: at least once every two years;

c) environmental and source monitoring techniques: annually;

d) in situ determination of radionuclide concentrations: at least once every two years;

e) contamination monitoring techniques: annually;

f) sampling techniques and sample management: annually;

g) source recovery techniques: annually;

h) dose assessment techniques: annually;

i) decontamination methods and techniques: annually;

j) evaluation and treatment of radiation health effects: at least once every two years;

k) in vivo, in vitro and dose assessment techniques: annually;

l) radiopathology techniques: annually;

m) biodosimetry techniques: annually.

Drills must be developed by the Member Institution; these must cover techniques acquired during the training and must be conducted at least once every year.

Exercises must be designed by the Member Institution; these must cover techniques acquired during the drills and must be conducted at least once every two years.

Selected Member Institutions must make every effort to participate in the CONVEX, which must be conducted at least once every three years.

3.5. Quality assurance programme

The Member Institution must be responsible for implementing and maintaining a quality assurance programme to ensure that the requirements stated in this manual are fulfilled. The programme must be documented in a quality assurance manual which must include elements such as policies, organization, procedures, human resources and logistics.

The quality assurance manual must also contain:

a) a quality assurance policy, which will enable the Member Institution to standardize, verify and evaluate the requirements;

b) the organization and management structure of the Member Institution and its radiological emergency response capability;

c) job descriptions and required qualification of all members of the ERT;

d) the Member Institution's scope of competence as relevant to each ERT;

e) procedures for emergency response operations, including processes to follow for decision making, and the capability for exchanging information;

f) procedures for calibration, verification and maintenance of equipment; and

g) procedures for control and revision of documentation.

The Member Institution must arrange for internal audits of the activities of its ERT(s) at least once every two years. The results of the internal audits must be forwarded to the EPRU to demonstrate that the ERT(s) continue(s) to comply with the requirements for the membership of the ERNET.

Records must be kept and maintained by the Member Institution of the relevant qualifications, training, skills and experience of all members (including managers) of the ERTs.

The ERNET module of the quality assurance programme must be reviewed every three years by the EPRU to ensure its continued effectiveness. The IAEA may recommend changes or improvements, as necessary.

3.6. Financial arrangements

It is expected that the Member State will provide financial support to maintain the preparedness and response capabilities for ERNET of its Member Institutions.

Some financial support for ERNET activities may be provided through the IAEA's regular budget or Technical Co-operation Programme or from other IAEA resource.

The IAEA acts as an intermediary to help mobilize resources among other international or national organizations for the ERNET activities.

In the event of a nuclear or radiological emergency, the financial principles of the response operations must be in accordance with Article 7 of the Assistance Convention.

The IAEA will cover the expenses for the initial mobilization and deployment of the ERTs in the field. If the IAEA cannot cover these initial expenses (for reasons of timing, for example), the Member Institutions will cover the expenses, which will be reimbursed.

Member Institutions voluntarily deploy ERTs following authorization from each respective country's Competent Authority/Abroad.

Member Institutions must be responsible for maintaining basic health and life insurance, or otherwise assume financial liability, for each team member. The use, loss or theft of equipment and supplies is the responsibility of each respective Member Institution and the IAEA assumes no liability.

Section 4

4. REQUIREMENTS FOR ERNET MEMBERSHIP: APPLICATION, APPROVAL AND RECOGNITION

4.1. Prerequisites for membership application

The following are prerequisites for ERNET membership application:

a) the Member State should be a signatory to the Assistance Convention;

b) the Applying Institution must be a legal entity;

c) the Applying Institution requires the authorization of the Member State to apply for ERNET membership;

d) the Member State's Competent Authority/Abroad must endorse the application of the Applying Institution;

e) the Member State should underwrite costs associated with membership or the Applying Institution should demonstrate financial support from an alternative source; and

f) the Applying Institution needs to demonstrate relevant practice and previous experience in areas needed for the ERNET activities.

4.2. Membership application

Applicants must complete in full the Application Form as in Appendix B, in which all information provided by the Member Institution will be treated in full confidence.

The ERNET membership application will contain the following information:

a) the name of the Applying Institution, ERT Co-ordinator and contact details;

b) membership team category applied for;

c) statement of endorsement by Member State Competent Authority/Abroad;

d) indication of financial support for resources required under ERNET for a three year period;

e) detailed specification of Applying Institution's technical qualifications and capability (in accordance with the IAEA requirements for each team category);

f) a nominal list of experienced staff with curricula vitae (resumés) and equipment lists;

g) statement of ability to comply with rapid response requirements of the ERNET;

h) statement of minimum time for ERT response;

i) statement of compliance with the ERNET terms of reference and conditions of membership;

j) undertaking to conduct and/or participate in regular training, drills and exercises and ERNET meetings;

k) supporting documentation including the quality assurance programme; and

l) willingness to be audited by EPRU responsible officer(s) or nominees.

4.3. Technical review process for membership application

The following process applies:

a) An appropriately qualified IAEA application review board will review the application details against the IAEA requirements as established in this manual;

b) experts nominated by the IAEA may visit the Applying Institution and perform a review according to the IAEA requirements;

c) the review board must provide a statement of level of compliance for each requirement (pass or fail) and a statement on overall compliance (pass or fail);

d) depending on the outcome of the review, the Applying Institution may be requested to provide a proposal for a programme to address any deficiencies; this should include a time scale for completion; and

e) on completion of any remedial programme as in (e) the application will be reassessed by the IAEA review board[6].

4.4. Membership approval and recognition

After the successful outcome of the review process and approval of the Application, the IAEA will formally recognize the Applying Institution as a 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 will be awarded the right to display publicly that it is a member of the ERNET.

[6] A standard review procedure will be adopted to ensure a fair and equitable appraisal and applicants who fail the review process will be offered the opportunity for reconsideration.

4

References

[1] INTERNATIONAL ATOMIC ENERGY AGENCY, Convention on Early Notification of a Nuclear Accident and Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency, Legal Series No. 14, IAEA, Vienna (1987).

[2] INTERNATIONAL ATOMIC ENERGY AGENCY, FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS, INTERNATIONAL LABOUR ORGANISATION, OECD NUCLEAR ENERGY AGENCY, PAN AMERICAN HEALTH ORGANIZATION, WORLD HEALTH ORGANIZATION, International Basic Safety Standards for Protection against Ionizing Radiation and for the Safety of Radiation Sources, Safety Series No. 115, IAEA, Vienna (1996).

[3] INTERNATIONAL ATOMIC ENERGY AGENCY, FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS, INTERNATIONAL LABOUR ORGANISATION, OECD NUCLEAR ENERGY AGENCY, PAN AMERICAN HEALTH ORGANIZATION, UN OFFICE FOR THE CO-ORDINATION OF HUMANITARIAN AFFAIRS, WORLD HEALTH ORGANIZATION, Preparedness and Response for a Nuclear or Radiological Emergency, Safety Requirements No. GS-R-2, IAEA, Vienna (2002).

[4] INTERNATIONAL ATOMIC ENERGY AGENCY, Method for the Development of Emergency Response Preparedness for Nuclear or Radiological Accidents, IAEA-TECDOC-953, Vienna (1997).

[5] INTERNATIONAL ATOMIC ENERGY AGENCY, Intervention Criteria in a Nuclear or Radiation Emergency, Safety Series No. 109, IAEA, Vienna (1994).

[6] INTERNATIONAL ATOMIC ENERGY AGENCY, Generic Assessment Procedures for Determining Protective Actions during a Reactor Accident, IAEA-TECDOC-955, Vienna (1997).

[7] INTERNATIONAL ATOMIC ENERGY AGENCY, Generic Procedures for Assessment and Response during a Radiological Emergency, IAEA-TECDOC-1162, Vienna (2000).

[8] INTERNATIONAL ATOMIC ENERGY AGENCY, Generic Procedures for Monitoring in a Nuclear or Radiological Emergency, IAEA-TECDOC-1092, Vienna (1999).

[9] INTERNATIONAL ATOMIC ENERGY AGENCY, Emergency Planning and Preparedness for Accidents Involving Radioactive Materials Used in Medicine, Industry, Research and Teaching, Safety Series No. 91, IAEA, Vienna (1989).

[10] INTERNATIONAL ATOMIC ENERGY AGENCY, Regulations for the Safe Transport of Radioactive Material, 1996 Edition (Revised), Safety Standards Series No. TS-R-1, IAEA, Vienna (2000).

[11] INTERNATIONAL ATOMIC ENERGY AGENCY, Explanatory Material for the IAEA Regulations for the Safe Transport of Radioactive Material (1985 Edition) – Second Edition (As Amended 1990), Safety Series No. 7, IAEA, Vienna (1990).

[12] INTERNATIONAL ATOMIC ENERGY AGENCY, Advisory Material for the IAEA Regulations for the Safe Transport of Radioactive Material (1985 Edition), Third Edition (As Amended 1990), Safety Series No. 37, IAEA, Vienna (1990).

[13] INTERNATIONAL ATOMIC ENERGY AGENCY, Emergency Planning and Preparedness for Re-entry of a Nuclear Powered Satellite, Safety Series No. 119, IAEA, Vienna (1996).

[14] INTERNATIONAL ATOMIC ENERGY AGENCY, Assessment and Treatment of External and Internal Radionuclide Contamination, IAEA-TECDOC-869, IAEA, Vienna (1996).

[15] INTERNATIONAL ATOMIC ENERGY AGENCY, Medical Handling of Accidentally Exposed Individuals, Safety Series No. 88, IAEA, Vienna (1988).

[16] INTERNATIONAL ATOMIC ENERGY AGENCY, Diagnosis and Treatment of Radiation Injuries, Safety Reports Series No. 2, IAEA, Vienna (1998).

[17] INTERNATIONAL ATOMIC ENERGY AGENCY, Planning the Medical Response to Radiological Accidents, Safety Reports Series No. 4, IAEA, Vienna (1998).

[18] WORLD HEALTH ORGANIZATION, Proc. Seventh Co-ordination Meeting of World Health Organization Centres in Radiation Emergency Medical Preparedness and Assistance Network — REMPAN, WHO/IRD, Rio de Janeiro (1997).

Contributors to drafting and review

CONSULTANTS MEETING
Vienna
14–18 December 1998

Cruz Suárez, R.	International Atomic Energy Agency, Vienna
Gayral, J. P.	Commissariat à l'Energie Atomique, CEA/DAM, France
Gourmelon, P.	Institut de Protection et de Sûreté Nucléaire, CEA-IPSN/DPHD, France
Kunst, J.J.	Nuclear Regulatory Authority, ARN, Argentina
Martinčič, R. *(Chairperson)*	J. Stefan Institute, Slovenia
Nogueira de Oliveira, C. *(Scientific Secretary)*	International Atomic Energy Agency, Vienna
Ouvrard, R.	International Atomic Energy Agency, Vienna
dos Santos, R.	National Nuclear Energy Commission, CNEN, Brazil
Rivera, C.	Remote Sensing Laboratory, Las Vegas, USA
Rousseau, D.	Institut de Protection et de Sûrete Nucléaire, CEA-IPSN/DIR, France
Souchkevitch, G.	World Health Organization, Geneva
Turai, I.	International Atomic Energy Agency, Vienna

CONSULTANTS MEETING
Ljubljana, Slovenia
10–13 April 1999

Martinčič, R.	J. Stefan Institute, Slovenia
Nogueira de Oliveira, C. *(Scientific Secretary)*	International Atomic Energy Agency, Vienna

TECHNICAL COMMITTEE MEETING
Vienna
7–11 June 1999

Aaltonen, H.	Radiation and Nuclear Safety Authority (STUK), Finland
Baudin, B.	Atomic Energy Control Board, Canada
Burkart, K.	Forschungszentrum Karlsruhe, Germany
Chao, Z.	Department of Nuclear Safety and Emergencies, Beijing, China
Cruz Suárez, R.	International Atomic Energy Agency, Vienna
Desbazeille, M. H.	Ministère de l'Intérieur — MARN, France
Gayral, J. P.	Commissariat à l'Energie Atomique, CEA/DAM, France

Karlberg, O.	Swedish Radiation Protection Institute (SSI), Sweden
Martinčič, R. *(Chairperson)*	J. Stefan Institute, Slovenia
Nogueira de Oliveira, C. *(Scientific Secretary)*	International Atomic Energy Agency, Vienna
Powers, J.T.	US Department of Energy, USA
Pradeepkumar, K.S.	Bhabha Atomic Research Centre, India
Qu, J.	Institute of Nuclear Energy Technology, Tsinghua University, China
dos Santos, R.	National Nuclear Energy Commission, CNEN, Brazil
Rousseau, D.	Institut de Protection et de Sûrete Nucléaire, CEA-IPSN/DIR, France
Souchkevitch, G.	World Health Organization, Geneva
Ugletveit, F.	Norwegian Radiation Protection Authority, Norway
Vegueria, J. P.	Centro Nacional de Seguridad Nuclear, Cuba
Zupka, D.	UN Office for Co-ordination of Humanitarian Affairs, Geneva
Woods, D.	Australian Nuclear Science & Technology Organization (ANSTO), Australi

CONSULTANTS MEETING
Vienna
13–17 December 1999

Buglova, E.	International Atomic Energy Agency, Vienna
Cabanne, N.	Service de Protection contre les Rayonnements, CEA-VALDUC, France
Gayral, J.P. *(Chairperson)*	Commissariat à l'Energie Atomique, CEA/DAM, France
Granada, M.J.	General Direction of Civil Protection, Madrid, Spain
Hunt, J.	National Nuclear Energy Commission, CNEN, Brazil
Martinčič, R.	J. Stefan Institute, Slovenia
Nogueira de Oliveira, C. *(Scientific Secretary)*	International Atomic Energy Agency, Vienna
Ricks, R.	Oak Ridge Institute of Science and Education, USA
Rousseau, D.	Institut de Protection et de Sûreté Nucléaire, CEA-IPSN/DIR, France
Weatherill, B.	Emergency Response, AWE, Aldermaston, UK

Appendix A

Details of administrative and technical requirements

for the Emergency Response Teams
in the context of the IAEA Emergency Response Network

A

Requirements common to all emergency response teams

1. The following is an indicative list of prerequisites that must be defined and maintained by the Member Institution for its ERT personnel:
- **a)** valid passports;
- **b)** current general immunizations;
- **c)** medically approved physical condition for field operations;
- **d)** preapproved travel orders (if required by the Member Institution's government);
- **e)** pertinent responder information (blood type, emergency contact, allergies, languages); and
- **f)** signed statement indicating voluntary participation from each participant.

2. The following is an indicative list of written plans and procedures that must be maintained as part of the quality assurance programme for the ERT:
- **a)** notification and recall rosters and procedures — to include the process of notification, and the telephone/pager numbers of the potential responder personnel;
- **b)** personnel and equipment deployment procedures — to include the process of transporting personnel, and packaging the equipment and transporting it to the emergency location;
- **c)** list of deployable equipment — to include shipping information for hazardous material, customs forms and other security related requirements as necessary;
- **d)** procedures for all field response operations — to include the processes that each ERT will follow to perform the assigned tasks;
- **e)** Emergency Operation Document/Home Team Procedures (however named) — to include the process of co-ordinating the deployment of the ERT and supporting the ERT while in the field both logistically and technically (technical support may include providing technical advice, relaying messages and providing technical data as required);
- **f)** redeployment of personnel and equipment procedures — to include the process of co-ordinating the transportation of personnel and equipment from the emergency site to their home base; and
- **g)** procedures to ensure adequate protection of the ERT against ionizing radiation.

3. General support usually provided by the Member Institution:
- **a)** communications equipment to support the deployed ERT in their internal communication and communication with home base;
- **b)** electrical generators to operate the field equipment;
- **c)** food and water for the first 72 hours;
- **d)** personal protective equipment for the first 72 hours;
- **e)** tents, sleeping bags, and clothing for bad weather;
- **f)** video and digital cameras;
- **g)** logistical support and communications personnel for each ERT (the number of logistics and communications personnel is determined by the ERT needs); and
- **h)** adequate transportation facilities (to be provided by the requesting party).

A

REQUIREMENTS FOR AERIAL SURVEY TEAM (AST)

Expertise

The AST must have sufficient competence and experience within the following areas:

a) airborne gamma spectrometry;
b) airborne dose rate monitoring;
c) gamma mapping;
d) adapting the measuring technique to the aircraft;
e) operating systems under flying conditions;
f) contamination assessment and evaluation of unknown situation(s);
g) basic radiation protection and health physics; and
h) contamination monitoring for personnel and equipment.

Staffing

The AST must be staffed with at least four members having the following qualifications:

- the AST Leader with broad knowledge and experience in all aspects from (a) to (h) above, managerial experience, ability to communicate in English;
- all team members with proficiency in (a), (b), (c), (g) and (h);
- two members with additional proficiency in (d) and (e);
- one member with additional proficiency in (f); and
- supporting personnel with basic radiation protection knowledge.

Equipment

The following is an indicative list of equipment for AST (equipment marked with * is optional):

Instrumentation and software

*	AST.1	airborne gamma ray spectrometry system
	AST.2	airborne dose rate monitoring system
	AST.3	navigation system with worldwide coverage (GPS or equivalent)
	AST.4	data recording system connected to navigation system
	AST.5	data presentation system (e.g. GIS software); mapping

Radiation survey instruments and check sources

	AST.6	multipurpose gamma/beta survey monitor (2 pcs)
	AST.7	alpha/beta contamination monitor or probe
	AST.8	personal contamination monitor
	AST.9	set of check sources
*	AST.10	portable air sampler
*	AST.11	aerosol filters
*	AST.12	charcoal (or zeolite) cartridges

Personal protection equipment and supplies per team member

	AST.13	self reading dosimeter
	AST.14	permanent dosimeter
	AST.15	protective overalls
	AST.16	overshoes
	AST.17	full face mask with filter
	AST.18	cotton gloves
	AST.19	vinyl gloves
	AST.20	thyroid blocking agent
	AST.21	identification badge
	AST.22	torch

General supplies

	AST.23	portable radio with adjustable communication frequencies
	AST.24	cellular phone
	AST.25	PC (notebook)
	AST.26	binoculars (10 ×magnification)

A

	AST.27	spare batteries
	AST.28	critical spare parts
	AST.29	field repair tools
*	AST.30	liquid nitrogen
	AST.31	first aid kit
	AST.32	decontamination kit
	AST.33	plastic sheets
	AST.34	plastic bags (different sizes)
	AST.35	paper tissues
	AST.36	plastic tapes
	AST.37	tags for contaminated equipment
	AST.38	waste bags
	AST.39	writing pad
	AST.40	administrative supplies
	AST.41	logbook
	AST.42	cases for shipment

Supporting documentation

	AST.43	equipment operational manuals
	AST.44	monitoring procedures
	AST.45	assessment procedures
	AST.46	reference data

Additional requirements

a) helicopter or fixed wing aircraft with crew (provided by requesting or requested party);
b) hangar to shelter the aircraft (provided by the requesting party);
c) aircraft fuel supplies (provided by requesting party);
d) adequate mechanical interfaces to fix the measuring system onto the aircraft (provided by requesting or requested party);
e) maps (paper and/or digital) of the areas to be surveyed (provided by the requesting party); and
f) pilot with ability to communicate in English.

The actual equipment and staffing of AST when deployed will depend on the assistance requested.

A

REQUIREMENTS FOR RADIATION MONITORING TEAM (RMT)

Expertise

The RMT must have sufficient competence and experience within the following areas:

a) environmental and source monitoring techniques;
b) contamination monitoring techniques;
c) gross contamination mapping;
d) dose rate monitoring;
e) sampling strategies and sampling techniques; and
f) basic radiation protection and health physics.

Staffing

The RMT must be staffed with at least three members having the following qualifications:

- the RMT Leader with knowledge and broad experience in all aspects, managerial experience, ability to communicate in English; and
- all team members with proficiency in all aspects from (a) to (e) and enhanced experience in (f).

Equipment

The following is an indicative list of equipment for RMT (equipment marked with * is optional):

Instrumentation and software

*	RMT.1	car-borne gamma dose rate monitoring system
	RMT.2	navigation system with worldwide coverage (GPS or equivalent)
*	RMT.3	data recording system connected to navigation system
	RMT.4	data presentation system (e.g. GIS software); mapping
*	RMT.5	dose assessment software

Radiation survey instruments and sources

	RMT.6	multipurpose gamma/beta survey monitor (3 pcs)
	RMT.7	telescopic gamma probe
	RMT.8	alpha/beta contamination monitor or probe (2 pcs)
	RMT.9	personal contamination monitor
	RMT.10	neutron dose rate meter
	RMT.11	set of check sources

Personal protection equipment and supplies per team member

	RMT.12	self-reading dosimeter
	RMT.13	permanent dosimeter
	RMT.14	protective overalls
	RMT.15	overshoes
	RMT.16	dust masks
	RMT.17	respirator or full face mask with filter
	RMT.18	cotton gloves
	RMT.19	vinyl gloves
	RMT.20	rubber gloves
	RMT.21	thyroid blocking agent
	RMT.22	decontamination kit
	RMT.23	identification badge
	RMT.24	torch

Sampling and sample preparation equipment

*	RMT.25	portable air sampler — 12 V
	RMT.26	portable air sampler — mains/generator operated
	RMT.27	aerosol filters
	RMT.28	charcoal (or zeolite) cartridges
	RMT.29	soil sampling device
	RMT.30	filter paper for smears

RMT.31 shovel
RMT.32 funnel
RMT.33 knives and spoons
RMT.34 measuring tape
RMT.35 plastic bags
RMT.36 plastic containers
RMT.37 plastic bottles
RMT.38 sample tags
RMT.39 sampling location markers
RMT.40 small, portable electronic scale

General supplies

RMT.41 portable radio with adjustable communication frequencies
RMT.42 cellular phone
RMT.43 PC (notebook)
RMT.44 binoculars (10 ×magnification)
RMT.45 stopwatch
RMT.46 spare batteries
RMT.47 critical spare parts
RMT.48 field repair tools
RMT.49 first aid kit
RMT.50 plastic sheets
RMT.51 plastic bags (different sizes)
RMT.52 paper tissues
RMT.53 plastic tapes
RMT.54 tags for contaminated equipment
RMT.55 waste bags
RMT.56 set of warning signs
RMT.57 writing pads
RMT.58 administrative supplies
RMT.59 logbook
RMT.60 set of worksheets
RMT.61 cases for shipment

Supporting documentation

RMT.62 equipment operational manuals
RMT.63 monitoring procedures
RMT.64 assessment procedures
RMT.65 sampling procedures
RMT.66 sample preparation procedures
RMT.67 reference data

A

Additional requirements

- maps (paper and/or digital) of the areas to be surveyed (provided by the requesting party).

The actual equipment and staffing of RMT when deployed will depend on the assistance requested.

REQUIREMENTS FOR RADIONUCLIDE IDENTIFICATION TEAM (RIT)

Expertise

The RIT must have sufficient competence and experience within the following areas:

a) in situ gamma spectrometry;
b) sampling strategies and sampling techniques;
c) sample preparation techniques;
d) laboratory gamma spectrometry;
e) gross alpha and beta contamination in samples;
f) tritium determination; and
g) basic radiation protection and health physics.

Staffing

The RIT must be staffed with at least four members having the following qualifications:

- the RIT Leader with broad knowledge and experience in all aspects from (a) to (g), managerial experience, ability to communicate in English;
- all team members with proficiency in (g);
- one member with additional proficiency in (a) and (d);
- one member with additional proficiency in (b) and (c); and
- one member with additional proficiency in (e) and (f).

Equipment

The following is an indicative list of equipment for RIT (equipment marked with * is optional):

Instrumentation and software

	RIT.1	HpGe in situ gamma ray spectrometry system
*	RIT.2	mobile laboratory gamma spectrometry system
*	RIT.3	gross alpha/beta proportional counter with shielding
*	RIT.4	liquid scintillation counter for tritium measurement
	RIT.5	navigation system with worldwide coverage (GPS or equivalent)
*	RIT.6	data recording system connected to navigation system
*	RIT.7	dose assessment software

Radiation survey instruments and sources

	RIT.8	multipurpose gamma/beta survey monitor
	RIT.9	alpha/beta contamination monitor or probe
	RIT.10	personal contamination monitor
*	RIT.11	neutron dose rate meter
	RIT.12	set of check sources
*	RIT.13	reference set of point sources

Personal protection equipment and supplies per team member

	RIT.14	self-reading dosimeter
	RIT.15	permanent dosimeter
	RIT.16	protective overalls
	RIT.17	overshoes
	RIT.18	dust masks
	RIT.19	respirator or full face mask with filter
	RIT 20	cotton gloves
	RIT.21	vinyl gloves
	RIT.22	rubber gloves
	RIT.23	thyroid blocking agent
	RIT.24	decontamination kit
	RIT.25	identification badge
	RIT.26	torch

Sampling and sample preparation equipment

*	RIT.27	portable air sampler — 12 V
	RIT.28	portable air sampler — mains/generator operated

A

RIT.29	aerosol filters
RIT.30	charcoal (or zeolite) cartridges
RIT.31	soil sampling devise
RIT.32	filter paper for smears
RIT.33	shovel
RIT.34	funnel
RIT.35	knives and spoons
RIT.36	measuring tape
RIT.37	plastic bags
RIT.38	plastic containers
RIT.39	plastic bottles
RIT.40	sample tags
RIT.41	sampling location markers
RIT.42	small, portable electronic scale

General supplies

RIT.43	portable radio with adjustable communication frequencies
RIT.44	cellular phone
RIT.45	PC (notebook)
RIT.46	binoculars (10 ×magnification)
RIT.47	stopwatch
RIT.48	spare batteries
RIT.49	critical spare parts
RIT.50	field repair tools
RIT.51	liquid nitrogen
RIT.52	first aid kit
RIT.53	plastic sheets
RIT.54	plastic bags (different sizes)
RIT.55	paper tissues
RIT.56	plastic tapes
RIT.57	tags for contaminated equipment
RIT.58	waste bags
RIT.59	set of warning signs
RIT.60	writing pads
RIT.61	administrative supplies
RIT.62	logbook
RIT.63	set of worksheets
RIT.64	cases for shipment

Supporting documentation

RIT.65	equipment operational manuals
RIT.66	measurement procedures
RIT.67	monitoring procedures
RIT.68	assessment procedures
RIT.69	sampling procedures
RIT.70	sample preparation procedures
RIT.71	reference data

Additional requirements

a) mobile radiological laboratory (to be provided by the Member Institution); and

b) maps (paper and/or digital) of the areas to be surveyed (provided by the requesting party).

The actual equipment and staffing of RIT when deployed will depend on the assistance requested.

REQUIREMENTS FOR SOURCE RECOVERY TEAM (SRT)

Expertise

The SRT must have sufficient competence and experience within the following areas:

a) dose rate monitoring;
b) contamination monitoring techniques;
c) design and use of industrial and medical sources;
d) intervention in areas with high dose rates;
e) radiation protection and health physics; and;
f) source recovery techniques including shielding issues.

Staffing

The SRT must be staffed with three members having the following qualifications:

- the SRT Leader with broad knowledge and experience in all aspects from (a) to (f), but not (c) managerial experience, ability to communicate in English;
- all team members with proficiency in (e);
- one member with additional proficiency in (c); and
- two members with additional proficiency in (a) and (d, f).

Equipment

The following is an indicative list of equipment for SRT (equipment marked with * is optional):

Radiation survey instruments and sources

	SRT.1	multipurpose gamma/beta survey monitor (2 pcs)
	SRT.2	telescopic gamma probe (2 pcs)
	SRT.3	alpha/beta contamination monitor
	SRT.4	personal contamination monitor
*	SRT.5	neutron dose rate meter
	SRT.6	set of check sources

Specialized equipment

	SRT.7	telescopic manipulators (2 pcs)
*	SRT.8	simple robots with remote control

Personal protection equipment and supplies per team member

	SRT.9	self-reading dosimeter
	SRT.10	permanent dosimeter
	SRT.11	protective overalls
	SRT.12	overshoes
	SRT.13	dust masks
*	SRT.14	respirator or full face mask with filter
	SRT.15	cotton gloves
	SRT.16	vinyl gloves
	SRT.17	rubber gloves
	SRT.18	decontamination kit
	SRT.19	identification badge
	SRT.20	torch

General supplies

	SRT.21	portable radio with adjustable communication frequencies
	SRT.22	cellular phone
	SRT.23	PC (notebook)
	SRT.24	binoculars (10 ×magnification)
	SRT.25	stopwatch
	SRT.26	spare batteries
	SRT.27	critical spare parts
	SRT.28	field repair tools
	SRT.29	first aid kit
	SRT.30	plastic sheets
	SRT.31	plastic bags (different sizes)

A

SRT.32	paper tissues
SRT.33	plastic tapes
SRT.34	tags for contaminated equipment
SRT.35	waste bags
SRT.36	set of warning signs
SRT.37	writing pads
SRT.38	administrative supplies
SRT.39	logbook
SRT.40	set of worksheets
SRT.41	cases for shipment

Supporting documentation

equipment operational manuals
monitoring procedures
source recovery procedures
reference data

Additional requirements

None.

The actual equipment and staffing of SRT when deployed will depend on the assistance requested.

REQUIREMENTS FOR ASSESSMENT AND ADVISORY TEAM (AAT)

Expertise

The AAT must have sufficient competence and experience within the following areas:

- **a)** design and operation of nuclear installations or radiological devices both in normal and incidental/accidental conditions;
- **b)** atmospheric dispersion and radioecology;
- **c)** external and internal dose assessment (all pathways) and sanitary impact assessment;
- **d)** protective actions;
- **e)** emergency management;
- **f)** communication technology; and
- **g)** basic radiation protection and health physics.

The emergency may be assessed both at the Member Institution and in the field. The capability requirements are described for the whole assessment staff, wherever its location. The AAT is composed of staff members who are in the field.

Staffing

The AAT must be staffed with at least five members having the following qualifications:

- the AAT Leader with broad knowledge and experience in all aspects from (a) to (g) but not (f), managerial experience, ability to communicate in English;
- all members with proficiency in (g);
- one member with proficiency in (f);
- one member with additional proficiency in (a);
- two members with additional proficiency in (b), (c) and (d).

Equipment

The following is an indicative list of equipment for AAT (equipment marked with * is optional):

Software

	AAT.1	plume dispersion modeling
	AAT.2	dose assessment software (external, internal)
	AAT.3	data presentation system (mapping e.g. GIS software)

Long range communication links (with Member Institutions)

*	AAT.4	satellite phones
*	AAT.5	satellite databases exchange
	AAT.6	high frequency radio phones and fax
	AAT.7	Internet and WEB technology links
	AAT.8	portable radio with adjustable communication frequencies

Personal protection equipment and supplies per team member

	AAT.9	self-reading dosimeter
	AAT.10	permanent dosimeter
*	AAT.11	protective overalls
*	AAT.12	overshoes
*	AAT.13	dust masks
	AAT.14	cotton gloves
	AAT.15	vinyl gloves
*	AAT.16	rubber gloves
*	AAT.17	decontamination kit
	AAT.18	identification badge
	AAT.19	torch

General supplies

AAT.20	PC (notebook)
AAT.21	spare batteries
AAT.22	first aid kit
AAT.23	writing pads
AAT.24	administrative supplies
AAT.25	logbook
AAT.26	cases for shipment

Additional requirements

None.

The actual equipment and staffing of AAT when deployed will depend on the assistance requested.

REQUIREMENTS FOR MEDICAL SUPPORT TEAM (MST)

Expertise

The MST must have sufficient competence and experience within the following areas:

a) treatment of overexposed or/and contaminated persons;
b) decontamination and decorporation methods for people; and
c) sampling techniques and sample management for biological samples.

Staffing

The MST must be staffed with at least six members having the following qualifications:

- the MST Leader (physician) with experience in haematology, oncology, burn therapy, radiation therapy or nuclear medicine therapy and broad knowledge in the other items, managerial experience, ability to communicate in English;
- one member (physician) with similar proficiency;
- one member (physician) with similar proficiency in pediatrics,
- one member (health physics) with knowledge and experience in external decontamination and sampling techniques;
- one member (medical support) with knowledge in patient treatment, decontamination, and sampling techniques, and
- one member (support personnel) with basic radiation biology/radiation protection knowledge.

Equipment

The following is an indicative list of equipment for MST (equipment marked with * is optional):

Instrumentation

	MST.1	set of standard surgical instruments
	MST.2	equipment for blood transfusion
	MST.3	disposable syringes
	MST.4	blood cell counter
	MST.5	microscope
	MST.6	equipment for preparing blood smears
	MST.7	containers for collecting biological samples (blood, urine, etc.)
	MST.8	containers for biological sample collection and storage
	MST.9	phlebotomy kits
	MST.10	ambubag and mask
	MST.11	defibrillator, batteries and charger

First aid kit

	MST.12	analgesics
	MST.13	cardiogenic drugs
	MST.14	antihypotensive or antihypertensive drugs
	MST.15	antiemetics
	MST.16	antibiotics
	MST.17	diuretics
	MST.18	topical antibiotic cream
	MST.19	rehydration salts

Radiation survey instruments

	MST.20	multipurpose gamma/beta monitor (2 pcs)
	MST.21	beta/gamma surface contamination monitor (2 pcs)
	MST.22	alpha/beta surface contamination monitor
*	MST.23	area monitor
	MST.24	check sources

A

Personal protection equipment and supplies per team member

MST.25 self reading dosimeter
MST.26 permanent dosimeter
MST.27 protective overalls
MST.28 overshoes
MST.29 cotton gloves
MST.30 vinyl gloves
MST.31 rubber gloves

General supplies

MST.32 portable radio with adjustable communication frequencies
MST.33 cellular phone
MST.34 PC (notebook)
MST.35 spare batteries
MST.36 critical spare parts
MST.37 plastic sheets
MST.38 surgical clothing
MST.39 sheets and blankets
MST.40 portable stretchers
MST.41 plastic bags (different sizes)
MST.42 plastic tapes
MST.43 tags and adhesive labels
MST.44 medical information forms
MST.45 radiation accident patient form
MST.46 drapes
MST.47 waste bags
MST.48 administrative supplies
MST.49 cases for shipment
MST.50 torch
MST.51 radiation warning signs
MST.52 identification badges

Decontamination kit

MST.53 5% sodium hypochlorite solution
MST.54 5% $NaHSO_3$
MST.55 0.2 N H_2SO_4
MST.56 saturated solution of potassium permanganate
MST.57 HCl solution 0.1 N
MST.58 sterile water for wound and skin decontamination
MST.59 sterile eyewash solution
MST.60 surgical cotton rolls
MST.61 cotton applicators for nasal swabs
MST.62 masking tape
MST.63 indelible felt pens for marking contaminated spots
MST.64 brushes
MST.65 paraffin gauze dressings
MST.66 swabs
MST.67 nail brushes
MST.68 nasal catheters
MST.69 hair clippers, razors, shaving soap and brush
MST.70 detergents

Decorporation kit

MST.71 required substances (see table below)

Target radionuclides	**Substance**
Caesium	Prussian Blue
Strontium	Alginate
Radium	Aluminium phosphate
Uranium	Isotonic sodium bicarbonate
Transuranics, lanthanides, manganese, iron, cobalt, zirconium, ruthenium	CaDTPA
Calcium, strontium, barium, radium	Calcium glauconite
Cobalt	Cobalt glauconite
Strontium	Strontium glauconite or lactate
Iodine	Potassium iodine
Strontium, radium	Aluminium phosphate
Strontium, radium	Barium sulphate
Strontium, radium	Magnesium sulphate
Mercury, lead, polonium	Dimercaprol or dimervaptopropansulphorate
Iron, plutonium	Deferoxamine
Copper, iron, mercury, lead, gold, other heavy metals	Penicillamine
Tritium	Diuretics

Supporting documentation

MST.72 operational manuals
MST.73 procedure document
MST.74 report form for patient transportation
MST.75 list of WHO/REMPAN collaborating centres

Additional requirements (to be provided by requesting or requested party):

MST.76 mobile hospital
MST.77 tents
MST.78 heating apparatus
MST.79 empty plastic containers (20–30 litres capacity)

Additional requirements

None.

The actual equipment and staffing of MST when deployed will depend on the assistance requested.

A

REQUIREMENTS FOR BIOASSAY TEAM (BIT)

Expertise

The BIT must have sufficient competence and experience within the following areas:

a) in vitro and in vivo bioassay;
b) personnel contamination monitoring techniques;
c) interpretation of bioassay data, biokinetic modelling from individual retention data, ICRP biokinetic models, individual dose assessment methodologies; and
d) radiation protection.

Staffing

The BIT must be staffed with at least four members having the following qualifications:

- the BIT Leader (health physics) with experience in radiation protection, radiation monitoring, bioassay techniques, interpretation of bioassay data, managerial experience, and ability to communicate in English;
- one member (health physics) with similar proficiency; and
- two members (health physics technician) with knowledge in bioassay monitoring techniques, radiation protection and personnel contamination monitoring.

Equipment

The following is an indicative list of equipment for BIT (equipment marked with * is optional):

Instrumentation and software

	BIT.1	in vivo counting equipment (portable)
	BIT.2	NaI(Tl) spectrometer (transportable in vitro laboratory)
	BIT.3	multipurpose gamma/beta survey monitor
	BIT.4	beta/gamma surface contamination monitor (2 pcs)
	BIT.5	alpha/beta surface contamination monitor, (2 pcs)
*	BIT.6	area monitor with beta shield (2 pcs)
	BIT.7	check sources
	BIT.8	biokinetic model(s)
	BIT.9	data recording system
	BIT.10	dose assessment (internal)

Personal protection equipment and supplies per team member

	BIT.11	self-reading dosimeter
	BIT.12	permanent dosimeter
	BIT.13	protective overalls
	BIT.14	overshoes
	BIT.15	cotton gloves
	BIT.16	vinyl gloves
	BIT.17	rubber gloves

General supplies

	BIT.18	cellular phone
	BIT.19	PC (notebook)
	BIT.20	spare batteries
	BIT.21	critical spare parts
	BIT.22	plastic bottles (1 L)
	BIT.23	plastic containers (0.5 L)
	BIT.24	plastic bags
	BIT.25	plastic tapes
	BIT.26	administrative supplies
	BIT.27	cases for shipment
	BIT.28	identification badge

Supporting documentation

	BIT.29	in vitro bioassay procedures
	BIT.30	In vivo bioassay procedures
	BIT.31	dose assessment procedures
	BIT.32	operational manuals for equipment

A

Additional requirements

None.

The actual equipment and staffing of BIT when deployed will depend on the assistance requested.

REQUIREMENTS FOR RADIOPATHOLOGY TEAM (RPT)

Expertise

The RPT must have sufficient competence and experience within the following areas:

a) radiopathology, and
b) basic radiation protection.

Staffing

The RPT must be staffed with at least 2 members having the following qualifications:

- the RPT Leader (radiopathologist) with experience in human radiation pathology, managerial experience, and ability to communicate in English, and
- one member (support personnel) with experience in general pathology laboratory procedures.

Equipment

The following is an indicative list of equipment for RPT (equipment marked with * is optional):

Instrumentation

RPT.1	biopsy and autopsy instruments
RPT.2	tissue sample containers and labels
RPT.3	fixation fluids

Radiation survey instruments

RPT.4	multipurpose gamma/beta survey monitor
RPT.5	check sources

Personal protection equipment and supplies per team member

RPT.6	self-reading dosimeter
RPT.7	permanent dosimeter
RPT.8	protective clothing

General supplies

RPT.9	cellular phone
RPT.10	spare batteries
RPT.11	plastic bags and tapes
RPT.12	administrative supplies
RPT.13	cases for shipment
RPT.14	identification badge

Supporting documentation

RPT.15	operational manuals for equipment
RPT.16	tissue sampling procedures
RPT.17	pathology procedures

Additional requirements

None.

The actual equipment and staffing of RPT when deployed will depend on the assistance requested.

A

REQUIREMENTS FOR BIODOSIMETRY TEAM (BDT)

Expertise

The BDT must have sufficient competence and experience within the following areas:

a) biological dosimetry, and
b) basic radiation protection.

Staffing

The BDT must be staffed with at least 2 members having the following qualifications:

- the BDT Leader (cytogeneticist) with experience in human radiation cytogenetics, managerial experience, and ability to communicate in English;
- one member (support personnel) with experience in general cytogenetic procedures.

Equipment

The following is an indicative list of equipment for BDT (equipment marked with * is optional)::

Instrumentation and software

BDT.1	blood collection kits
BDT.2	cool packs
BDT.3	data recording system
BDT.4	dose assessment software

Radiation survey instruments

BDT.5	multipurpose gamma/beta survey monitor
BDT.6	check sources

Personal protection equipment and supplies per team member

BDT.7	self-reading dosimeter
BDT.8	permanent dosimeter
BDT.9	protective clothing

General supplies

BDT.10	cellular phone
BDT.11	spare batteries
BDT.12	plastic bags
BDT.13	plastic tapes
BDT.14	administrative supplies
BDT.15	cases for shipment
BDT.16	identification badges

Supporting documentation

BDT.17	operational manuals for equipment
BDT.18	procedure document

Additional requirements

None.

The actual equipment and staffing of BDT when deployed will depend on the assistance requested.

A

Appendix B

Appendix B

Application Forms for membership of the IAEA Emergency Response Network

B

B

How to apply for membership of the ERNET

Any request to apply for the membership of the ERNET must be sent to the following address:

Emergency Preparedness and Response Unit (EPRU)
International Atomic Energy Agency
Wagramerstrasse 5
P.O. Box 100
A-1400 Vienna, Austria

For further details contact EPRU:

Tel: +43 1 2600 22025

Fax: +43 1 2600 7 29309

e-mail: eru3@iaea.org

The Applying Institution must send to the above address a file with the following documents:

1. An official letter, signed by a responsible manager of the Applying Institution, expressing intentions to become a member of the ERNET and the category(ies) of Emergency Response Team(s) (ERT) applied for as described in Section 3.1, 'Types of Teams'.
2. An official letter of the State's Competent Authority/Abroad endorsing the Applying Institution's intentions.
3. Properly completed application forms:
   a) General Information (Part 1, Application Form *ERNET-F-01*);
   b) Compliances with the IAEA Emergency Response Network requirements for each applying ERT (Part 2, Application Form *ERNET-F-02*); and
   c) Emergency Response Preparedness for each applying ERT (Part 3, Application Form *ERNET-F-03*).

B

APPLICATION

FOR MEMBERSHIP OF THE IAEA EMERGENCY RESPONSE NETWORK

PART 1: GENERAL INFORMATION

1. APPLYING INSTITUTION:

Name: _____

Address: _____

_____

2. ERT CO-ORDINATOR:

Name: _____

Address: _____

_____

Telephone: _____ Fax: _____

e-mail: _____

3. EMERGENCY RESPONSE TEAM CATEGORY APPLIED FOR* :

☐ Aerial Survey Team	☐ Source Recovery Team	☐ Radiopathology Team
☐ Radiation Monitoring Team	☐ Assessment and Advisory Team	☐ Biodosimetry Team
☐ Radionuclide Identification Team	☐ Bioassay Team	☐ Medical Support Team

4. LOCATION(S) OF THE ERT(S) (City):

Place and date _____ Signature: _____

(Responsible Manager)

*Copies of the other two forms, ERNET-F-02 and ERNET-F-03, should be completed separately for each category of ERT.

APPLICATION

FOR MEMBERSHIP OF THE IAEA EMERGENCY RESPONSE NETWORK

PART 2: COMPLIANCES WITH THE IAEA REQUIREMENTS FOR EACH ERT*

The ERT Category: _____

1. Statement of compliance with the ERNET conditions of membership.

2. Demonstration of financial resources provided for the ERT(s) for a 3 year period.

3. Statement of willingness to conduct and/or participate in regular training, drills, exercises and meetings.

4. Statement of willingness to be audited by EPRU responsible officer(s).

5. Detailed specifications
(To be attached to this form)

- Applying Institution's technical qualifications and capabilities
- List of equipment
- Details of nominated ERT staff with CVs
- List of supporting documentation

Place and date:_____ Signature: _____
(Responsible Manager)

* Each Applying Institution shall provide the following information in any kind of documentation using one of the official languages of the IAEA (Arabic, Chinese, English, French, Russian, Spanish). Nevertheless an English version would be required..

APPLICATION

FOR MEMBERSHIP OF THE IAEA EMERGENCY RESPONSE NETWORK

PART 3: EMERGENCY RESPONSE PREPAREDNESS FOR EACH ERT

1. CONTACT POINT

Organization: _____

Command post: _____

Working hours

Telephone : _____ Fax : _____

e-mail : _____

Outside working hours

(Complete if different from working hours)

Telephone : _____ Fax : _____

e-mail : _____

2. PROCEDURE TO CONTACT

(Complete if special procedure is required)

3. ERT RESPONSE TIMES

Time for preparation (ready to leave its base after being alerted): _____ [h]

Time to reach the nearest international airport: _____ [h]

Nearest international airport: _____

4. STAFF AND EQUIPMENT

Number of ERT members: _____

Equipment:

a) number of boxes to be transported: _____
b) weight: _____ [kg]
c) volume: _____ [m^3]

Specialized vehicle(s) (mobile laboratories):

a) use: _____
b) type: _____
c) weight: _____
d) dimensions: _____
e) capability to be airlifted (by cargo aircraft, type to be named): _____
_____

Vehicle(s) for transportation of the ERT:

a) number: _____
b) type (car, van, truck, etc.): _____

5. LIMITATIONS

State any factor (such as weather or environmental conditions) that could limit or modify ability of the ERT to perform the emergency tasks.

Place and date:_____ Signature: _____

(Responsible Manager)

Appendix C

Criteria for acceptance

C

CRITERIA FOR ACCEPTANCE FOR TECHNICAL QUALIFICATIONS AND CAPABILITIES OF APPLYING INSTITUTIONS

An overall evaluation of technical qualifications and capabilities of applying institutions will be performed based on a statement setting forth the institution's technical qualifications and capabilities. The statement should include, but not be limited to: Mission Statement, years of continuous operations, and established QA policy.

	Criteria
Mission Statement	Technical qualifications and capabilities in compliance, in a broad sense, with the objectives of a specific ERT for which the institution is applying
Years of operations	Minimum 5 years
QA system or equivalent	Accreditation for the applied field of proficiency, or established system of quality assurance and quality control

C

C

CRITERIA FOR ACCEPTANCE FOR ERT STAFF

Evaluation of ERT staff will be performed based on the criteria that follow. In addition, the assurance that the following documents are ready for each team member will be required.

a) valid passport;

b) current general immunisation;

c) medically approved physical conditions for field operations;

d) pertinent responder information (blood type, emergency contact, allergies, languages); and

e) signed statement indicating voluntary participation.

Levels of education, training, and experience used as criteria for acceptance are defined as follows:

	Official document/Criteria
Education	
Secondary or high school equivalent	Certificate
Bachelor degree	Diploma or equivalent
Medical degree	Diploma or equivalent
Specialisation	Permit, licence, certificate
Post-graduate degree	Diploma or equivalent
Level of training	
Basic knowledge	Workshop (1 to 2 weeks)
Advanced knowledge	Advanced course (1 to 6 month)
In-depth knowledge	Post-graduate degree or specialisation
Laboratory practice	On-job training of minimum 6 months (laboratory work under supervision)
Clinical practice	Minimum 3 years of clinical work
Field practice	On-job training of minimum 3 months (field work under supervision)
Experience	
Basic	6 months working experience
Practical	1 year working experience
Enhanced	3 years working experience
Day-to-day	5 years working experience

ERT Category: *Aerial Survey Team* – **AST**
Minimum staffing: **4 members**

Team Leader

Education	Official document
Bachelor degree in natural sciences (physics, chemistry, other)	Diploma or equivalent

EXPERTISE (According to EPR-ERNET 2000)	Level of Training	Experience
Airborne gamma spectrometry	Field practice	Enhanced
Airborne dose rate monitoring	Field practice	Enhanced
Gamma mapping	Field practice	Enhanced
Adapting measuring technique to the aircraft	Basic knowledge	Basic
Operating systems under flying conditions	Basic knowledge	Basic
Contamination monitoring for personnel and equipment	Field practice	Practical
Contamination assessment and evaluation of unknown situations	Field practice	Practical
Radiation protection	Basic knowledge	Basic
Health physics	Basic knowledge	Basic

Managerial experience: day-to-day *English language:* speak, read, write

Two team members

Education	Official document
Secondary or high school equivalent	Certificate

EXPERTISE (According to EPR-ERNET 2000)	Level of Training	Experience
Airborne gamma spectrometry	Field practice	Enhanced
Airborne dose rate monitoring	Field practice	Enhanced
Gamma mapping	Field practice	Enhanced
Adapting measuring technique to the aircraft	Field practice	Enhanced
Operating systems under flying conditions	Field practice	Enhanced
Contamination monitoring for personnel and equipment	Field practice	Practical
Contamination assessment and evaluation of unknown situations	Field practice	Practical
Radiation protection	Advanced knowledge	Practical
Health physics	Basic knowledge	Practical

One team member

Education	Official document
Secondary or high school equivalent	Certificate

EXPERTISE (According to EPR-ERNET 2000)	Level of Training	Experience
Airborne gamma spectrometry	Field practice	Enhanced
Airborne dose rate monitoring	Field practice	Enhanced

Gamma mapping	Field practice	Enhanced
Adapting measuring technique to the aircraft	Basic knowledge	Practical
Operating systems under flying conditions	Basic knowledge	Practical
Contamination monitoring for personnel and equipment	Field practice	Practical
Contamination assessment and evaluation of unknown situations	Advanced knowledge	Enhanced
Radiation protection	Advanced knowledge	Practical
Health physics	Basic knowledge	Practical

ERT Category: *Radiation Monitoring Team* – **RMT**
Minimum staffing: **3 members**

Team Leader

Education	Official document
Bachelor degree in natural sciences (physics, chemistry, other)	Diploma or equivalent

EXPERTISE (According to EPR-ERNET 2000)	Level of Training	Experience
Environmental and source monitoring techniques	Field practice	Practical
Contamination monitoring techniques	Field practice	Practical
Gross contamination mapping	Field practice	Practical
Dose rate monitoring	Field practice	Practical
Sampling strategies	Basic knowledge	Practical
Sampling techniques	Basic knowledge	Basic
Radiation protection	Advanced knowledge	Enhanced
Health physics	Advanced knowledge	Practical

Managerial experience: day-to-day *English language:* speak, read, write

Two team members

Education	Official document
Secondary or high school equivalent	Certificate

EXPERTISE (According to EPR-ERNET 2000)	Level of Training	Experience
Environmental and source monitoring techniques	Field practice	Enhanced
Contamination monitoring techniques	Field practice	Enhanced
Gross contamination mapping	Field practice	Enhanced
Dose rate monitoring	Field practice	Day-to-day
Sampling strategies	Field practice	Enhanced
Sampling techniques	Field practice	Day-to-day
Radiation protection	Advanced knowledge	Enhanced
Health physics	Basic knowledge	Basic

ERT Category: *Radionuclide Identification Team* – **RIT**
Minimum staffing: **4 members**

Team Leader

Education	Official document
Post-graduate in physics or chemistry	Diploma or equivalent

EXPERTISE (According to EPR-ERNET 2000)	Level of Training	Experience
In-situ gamma spectrometry	Field practice	Practical
Sampling strategies and sampling techniques	Advanced knowledge	Basic
Sample preparation techniques	Basic knowledge	Basic
Laboratory gamma spectrometry	In-depth knowledge	Enhanced
Gross alpha and beta contamination of samples techniques	Advanced knowledge	Enhanced
Tritium determination techniques	Basic knowledge	Basic
Radiation protection	Basic knowledge	Basic
Health physics	Basic knowledge	Basic

Managerial experience: day-to-day *English language:* speak, read, write

One team member

Education	Official document
Bachelor degree in physics or chemistry	Diploma or equivalent

EXPERTISE (According to EPR-ERNET 2000)	Level of Training	Experience
In-situ gamma spectrometry	Field practice	Day-to-day
Sampling strategies and sampling techniques	Field practice	Enhanced
Sample preparation techniques	Laboratory practice	Enhanced
Laboratory gamma spectrometry	Advanced knowledge	Day-to-day
Gross alpha and beta contamination of samples techniques	Basic knowledge	Practical
Tritium determination techniques	Basic knowledge	Practical
Radiation protection	Basic knowledge	Basic
Health physics	Basic knowledge	Basic

One team member

Education	Official document
Secondary or high school equivalent	Certificate

EXPERTISE (According to EPR-ERNET 2000)	Level of Training	Experience
In-situ gamma spectrometry	Basic knowledge	Practical
Sampling strategies and sampling techniques	Field practice	Day-to-day
Sample preparation techniques	Laboratory practice	Day-to-day
Laboratory gamma spectrometry	Basic knowledge	Enhanced
Gross alpha and beta contamination of samples techniques	Basic knowledge	Practical

Tritium determination techniques	Basic knowledge	Practical
Radiation protection	Basic knowledge	Basic
Health physics	NA	NA

One team member

Education	Official document
Secondary or high school equivalent	Certificate

EXPERTISE (According to EPR-ERNET 2000)	Level of Training	Experience
In-situ gamma spectrometry	NA	NA
Sampling strategies and sampling techniques	Basic knowledge	Practical
Sample preparation techniques	Basic knowledge	Practical
Laboratory gamma spectrometry	Laboratory practice	Practical
Gross alpha and beta contamination of samples techniques	Laboratory practice	Day-to-day
Tritium determination techniques	Laboratory practice	Day-to-day
Radiation protection	Basic knowledge	Basic
Health physics	NA	NA

ERT Category: *Source Recovery Team* – **SRT**
Minimum staffing: **3 members**

Team Leader

Education	Official document
Bachelor degree in natural sciences (physics, engineering, other)	Diploma or equivalent

EXPERTISE (According to EPR-ERNET 2000)	Level of Training	Experience
Dose rate monitoring	Field practice	Practical
Contamination monitoring techniques	Field practice	Practical
Design and use of industrial and medical sources	Advanced knowledge	Practical
Intervention in areas with high dose rates	Field practice	Enhanced
Radiation protection	Field practice	Practical
Health physics	Basic knowledge	Practical

Managerial experience: day-to-day *English language:* speak, read, write

Two team members

Education	Official document
Secondary or high school equivalent	Certificate

EXPERTISE (According to EPR-ERNET 2000)	Level of Training	Experience
Dose rate monitoring	Field practice	Practical
Contamination monitoring techniques	Field practice	Practical
Design and use of industrial and medical sources	Advanced knowledge	Practical
Source recovery techniques including shielding issues	Field practice	Practical
Intervention in areas with high dose rates	Field practice	Practical
Radiation protection	Field practice	Practical
Health physics	Basic knowledge	Basic

ERT Category: *Assessment and Advisory Team* – **AAT**
Minimum staffing: **5 members**

Team Leader

Education	Official document
Post-graduate degree in natural sciences (physics, chemistry, other)	Diploma or equivalent

EXPERTISE (According to EPR-ERNET 2000)	Level of Training	Experience
Design and operation of nuclear installations	Advanced knowledge	Enhanced
Design and operation of radiological devices	Advanced knowledge	Enhanced
Atmospheric diffusion and radioecology	Advanced knowledge	Enhanced
External dose assessment	Field practice	Enhanced
Internal dose assessment	Advanced knowledge	Enhanced
Sanitary impact assessment	Advanced knowledge	Enhanced
Protective actions	Advanced knowledge	Day-to-day
Emergency management	Field practice	Day-to-day
Communication technology	Basic knowledge	Basic
Radiation protection and health physics	Advanced knowledge	Enhanced

Managerial experience: day-to-day *English language:* speak, read, write

Two team members

Education	Official document
Bachelor degree in natural sciences	Diploma or equivalent

EXPERTISE (According to EPR-ERNET 2000)	Level of Training	Experience
Design and operation of nuclear installations	Advanced knowledge	Practical
Design and operation of radiological devices	Advanced knowledge	Day-to-day
Atmospheric diffusion and radioecology	Advanced knowledge	Day-to-day
External dose assessment	Field practice	Day-to-day
Internal dose assessment	Advanced knowledge	Enhanced
Sanitary impact assessment	Advanced knowledge	Enhanced
Protective actions	Field practice	Enhanced
Emergency management	Field practice	Enhanced
Communication technology	Basic knowledge	Practical
Radiation protection and health physics	Advanced knowledge	Enhanced

One team member

Education	Official document
Bachelor degree in physics	Diploma or equivalent

EXPERTISE (According to EPR-ERNET 2000)	Level of Training	Experience
Design and operation of nuclear installations	Advanced knowledge	Practical

Design and operation of radiological devices	Advanced knowledge	Enhanced
Atmospheric diffusion and radioecology	Advanced knowledge	Enhanced
External dose assessment	Field practice	Enhanced
Internal dose assessment	Advanced knowledge	Enhanced
Sanitary impact assessment	Advanced knowledge	Enhanced
Protective actions	Field practice	Enhanced
Emergency management	Field practice	Enhanced
Communication technology	Advanced knowledge	Basic
Radiation protection and health physics	Advanced knowledge	Enhanced

One team member

Education	**Official document**
Bachelor degree in physics	Diploma or equivalent

EXPERTISE (According to EPR-ERNET 2000)	**Level of Training**	**Experience**
Design and operation of nuclear installations	Advanced knowledge	Day-to-day
Design and operation of radiological devices	Advanced knowledge	Enhanced
Atmospheric diffusion and radioecology	Advanced knowledge	Enhanced
External dose assessment	Field practice	Enhanced
Internal dose assessment	Advanced knowledge	Enhanced
Sanitary impact assessment	Advanced knowledge	Enhanced
Protective actions	Field practice	Enhanced
Emergency management	Field practice	Enhanced
Communication technology	Basic knowledge	Basic
Radiation protection and health physics	Advanced knowledge	Enhanced

ERT Category: *Medical Support Team* – **MST**
Minimum staffing: **6 members**

Team Leader

Education	Official document
Medical degree	Active medical licence

EXPERTISE (According to EPR-ERNET 2000)	Level of Training	Experience
Treatment of exposed persons	Clinical practice	Day-to day
Treatment of contaminated persons	Advanced knowledge	Enhanced
External decontamination techniques	Advanced knowledge	Enhanced
Decorporation methods	Advanced knowledge	Enhanced
Radiation biology	Advanced knowledge	Enhanced
Sampling techniques and management for biological samples	Advanced knowledge	Enhanced
Radiation protection	Basic knowledge	Practical
Health physics	Basic knowledge	Practical

Managerial experience: day-to-day *English language:* speak, read, write

One team member

Education	Official document
1. Degree in nursing 2. Specialisation in medical technology	1. Nursing licence 2. Certificate

EXPERTISE (According to EPR-ERNET 2000)	Level of Training	Experience
Treatment of exposed persons	Advanced knowledge	Enhanced
Treatment of contaminated persons	Advanced knowledge	Enhanced
External decontamination techniques	Advanced knowledge	Enhanced
Decorporation methods	Basic knowledge	Practical
Radiation biology	Basic knowledge	Practical
Sampling techniques and management for biological samples	Advanced knowledge	Enhanced
Radiation protection	Advanced knowledge	Enhanced
Health physics	Basic knowledge	Practical

One team member (assistant to team leader)

Education	Official document
Medical degree	Active medical licence

EXPERTISE (According to EPR-ERNET 2000)	Level of Training	Experience
Treatment of exposed persons	Clinical practice	Day-to day
Treatment of contaminated persons	Advanced knowledge	Enhanced
External decontamination techniques	Advanced knowledge	Enhanced
Decorporation methods	Advanced knowledge	Enhanced

Radiation biology	Advanced knowledge	Enhanced
Sampling techniques and management for biological samples	Advanced knowledge	Enhanced
Radiation protection	Basic knowledge	Practical
Health physics	Basic knowledge	Practical

One team member

Education	Official document
1. Bachelor or medical degree 2. Specialisation in health and medical physics	1. Diploma or equivalent 2. Degree or board certification

EXPERTISE (According to EPR-ERNET 2000)	Level of Training	Experience
Treatment of exposed persons	NA	NA
Treatment of contaminated persons	NA	NA
External decontamination techniques	Advanced knowledge	Enhanced
Decorporation methods	NA	NA
Radiation biology	Advanced knowledge	Enhanced
Sampling techniques and management for biological samples	In-depth knowledge	Enhanced
Radiation protection	In-depth knowledge	Day-to-day
Health physics	In-depth knowledge	Day-to-day

One team member

Education	Official document
Post-graduate degree	Diploma or equivalent

EXPERTISE (According to EPR-ERNET 2000)	Level of Training	Experience
Treatment of exposed persons	NA	NA
Treatment of contaminated persons	NA	NA
External decontamination techniques	Advanced knowledge	Enhanced
Decorporation methods	NA	NA
Radiation biology	In-depth knowledge	Day-to-day
Sampling techniques and management for biological samples	Advanced knowledge	Enhanced
Radiation protection	Advanced knowledge	Enhanced
Health physics	Advanced knowledge	Enhanced

One team member

Education	Official document
Medical degree	Active medical licence

EXPERTISE (According to EPR-ERNET 2000)	Level of Training	Experience
Treatment of exposed children	Advanced knowledge	Enhanced
Treatment of contaminated children	Advanced knowledge	Enhanced
External decontamination techniques	Advanced knowledge	Enhanced
Decorporation methods	Advanced knowledge	Enhanced

Radiation biology	Advanced knowledge	Enhanced
Sampling techniques and management for biological samples	Advanced knowledge	Enhanced
Radiation protection	Basic knowledge	Practical
Health physics	Basic knowledge	Practical

ERT Category: *Bioassay Team* – **BIT**
Minimum staffing: **4 members**

Team Leader

Education	Official document
Bachelor degree in physics, chemistry or biology	Diploma or equivalent

EXPERTISE (According to EPR-ERNET 2000)	Level of Training	Experience
In vitro and in vivo bioassay techniques	Laboratory practice	Practical
Interpretation of bioassay data	Field practice	Enhanced
Personal contamination monitoring techniques	Laboratory practice	Practical
Radiation protection	Field practice	Practical

Managerial experience: day-to-day *English language:* speak, read, write

Two team members

Education	Official document
Secondary or high school equivalent	Certificate

EXPERTISE (According to EPR-ERNET 2000)	Level of Training	Experience
In vitro and in vivo bioassay techniques	Field practice	Practical
Interpretation of bioassay data	NA	NA
Personal contamination monitoring techniques	Field practice	Practical
Radiation protection	Field practice	Practical

One team member

Education	Official document
Bachelor degree in physics, chemistry or biology	Diploma or equivalent

EXPERTISE (According to EPR-ERNET 2000)	Level of Training	Experience
In vitro and in vivo bioassay techniques	Laboratory practice	Practical
Interpretation of bioassay data	Field practice	Enhanced
Personal contamination monitoring techniques	Laboratory practice	Practical
Radiation protection	Field practice	Practical

ERT Category: *Radiopathology Team* – **RPT**
Minimum staffing: **2 members**

Team Leader

Education	Official document
Medical degree	Certificate in pathology or equivalent

EXPERTISE (According to EPR-ERNET 2000)	Level of Training	Experience
Human pathology	Clinical practice	Day-to-day
Human radiation pathology	In-depth knowledge	Enhanced
Pathology laboratory techniques	In-depth knowledge	Day-to-day
Radiation protection	Basic knowledge	Practical
Health physics	Basic knowledge	Practical

Managerial experience: day-to-day *English language:* speak, read, write

Team member

Education	Official document
Bachelor degree in natural sciences	Diploma or equivalent

EXPERTISE (According to EPR-ERNET 2000)	Level of Training	Experience
Human pathology	Laboratory practice	Day-to-day
Human radiation pathology	NA	NA
Pathology laboratory techniques	Laboratory practice	Day-to-day
Radiation protection	Basic knowledge	Practical
Health physics	NA	NA

C

ERT Category: *Biodosimetry Team* – **BDT**
Minimum staffing: **2 members**

Team Leader

Education	Official document
Post-graduate degree in biology	Diploma or equivalent

EXPERTISE (According to EPR-ERNET 2000)	Level of Training	Experience
Human radiation cytogenetics	Laboratory practice	Day-to-day
General cytogenetic techniques	Laboratory practice	Practical
Radiation protection	Advanced knowledge	Basic
Health physics	Laboratory practice	Enhanced

Managerial experience: day-to-day *English language:* speak, read, write

Team member

Education	Official document
1. Bachelor degree in biology 2. Specialisation in cytogenetics	1. Diploma or equivalent 2. Certificate

EXPERTISE (According to EPR-ERNET 2000)	Level of Training	Experience
Human radiation cytogenetics	NA	NA
General cytogenetic techniques	Laboratory practice	Practical
Radiation protection	Basic knowledge	Basic
Health physics	NA	NA

C

CRITERIA FOR ACCEPTANCE FOR ERT EQUIPMENT

The ERT must be provided with all items of equipment necessary for the efficient performance of emergency tasks.

The ERT must use appropriate methods and procedures for all emergency tasks and related activities within its competence, including monitoring, initial dose assessment, sampling, sample handling and preparation, estimation of uncertainty of measurements and analysis of results in compliance with the IAEA requirements.

The ERT must, where possible, select methods that have been published. However, all measuring methods and techniques used by ERTs should be validated.

In general, the evaluation of ERT equipment and resources in the process of acceptance will be performed based on the criteria that follow.

ERT Category: *Aerial Survey Team* – **AST**

Measuring instrumentation

Type of instrument	No. of items	Physical quantity measured	Unit[a]	MDA[b] or range	Remarks
Airborne gamma ray spectrometry system	1	Surface activity concentration	Bq/m²	1 kBq/m² for Cs-137	Radionuclide-specific
Airborne dose rate monitoring system	1	Dose rate	Sv/h	0.1 μSv/h	Connected to navigation system
Multipurpose gamma/beta survey monitor	2	Dose rate	Sv/h	0.1 μSv/h – 1 Sv/h	
Alpha/beta contamination monitor	1	Surface activity concentration	Bq/m², cps	Beta: 1, alpha: 0.1 Bq/cm²	Sensitive area: ≥ 100 cm²
Personal contamination monitor	1	Surface activity concentration	Bq/m², cps	Beta/gamma: 1 Bq/cm²	Earphones option
Self-reading dosimeter	4	External gamma dose	Sv or Gy	1 μSv – 10 Sv	Alarm function available
		Gamma dose rate	Sv/h	5 μSv/h – 1 Sv/h	
Permanent dosimeter	4	External gamma dose	Sv or Gy	10 μSv – 10 Sv	TLD or film badge

[a] or equivalent
[b] minimum detectable activity

Calibration period: annual
Quality control checks: prior and following the use
Maintenance period: biannual

Software

Type of software	Criteria
Data recording system connected to navigation system	All software used should be either commercially available or validated.
Data presentation system (e.g. GIS system); mapping	New maps should be easily imported into the system.

Other equipment

Item	Criteria
Personal protection supplies	Should be standard field protective closing and respiratory protective devices suitable for the hazard level presented. All supplies must be within manufacturer's expiration date in a quantity suitable for the limits of the mission as indicated by the IAEA, but not for less than three days.
General supplies	Should be within manufacturer's expiration date and in a quantity suitable for the limits of the mission as indicated by the IAEA, but not less than three days.

ERT Category: *Radiation Monitoring Team* – **RMT**

Measuring instrumentation

Type of instrument	No. of items	Physical quantity measured	Unit[a]	MDA[b] or range	Remarks
Car-borne gamma dose rate monitoring system	1	Dose rate	Sv/h	0.05 μSv /h – 1 Sv/h	Connected to navigation system
Multipurpose gamma/beta survey monitor	3	Dose rate	Sv/h	0.1 μSv/h – 1 Sv/h	Window option
Telescopic gamma probe	1	Dose rate	Sv/h	0.1 μSv/h – 10 Sv/h	
Alpha/beta contamination monitor	2	Surface activity concentration	Bq/m², cps	Beta: 1, alpha: 0.1 Bq/cm²	Sensitive area: ≥ 100 cm²
Personal contamination monitor	1	Surface activity concentration	Bq/m², cps	Beta/gamma: 1 Bq/cm²	Earphones option
Neutron dose rate meter	1	Neutron dose rate	Sv/h, cps	1 μSv/h	Energy: thermal to 14 MeV
Self-reading dosimeter	3	External gamma dose	Sv or Gy	1 μSv – 10 Sv	Alarm function available
		Gamma dose rate	Sv/h	5 μSv/h – 1 Sv/h	
Permanent dosimeter	3	External gamma dose	Sv or Gy	10 μSv – 10 Sv	TLD or film badge

[a] or equivalent
[b] minimum detectable activity

Calibration period: annual
Quality control checks: prior and following the use
Maintenance period: biannual

Software

Type of software	Criteria
Data recording system connected to navigation system	All software used should be either commercially available or validated. New maps should be easily imported into the system.
Data presentation system (e.g. GIS system); mapping	
Dose assessment software	

Other equipment

Item	Criteria
Personal protection supplies	Should be standard field protective closing and respiratory protective devices suitable for the hazard level presented. All supplies must be within manufacturer's expiration date in a quantity suitable for the limits of the mission as indicated by the IAEA, but not for less than three days.
Sampling and sample preparation equipment	Should be suitable for emergency sampling and sample preparation.
General supplies	Should be within manufacturer's expiration date and in a quantity suitable for the limits of the mission as indicated by the IAEA, but not less than three days.

ERT Category: *Radionuclide Identification Team* – **RIT**

Measuring instrumentation

Type of instrument	No. of items	Physical quantity measured	Unit[a]	MDA[b] or range	Remarks
HpGe in-situ gamma ray spectrometry system	1	Surface activity concentration	Bq/m²	1 MBq/m² of Cs-137	Calibrated also for samples
Mobile laboratory gamma spectrometry system	1	Activity concentration	Bq/L, Bq/kg	See reference	Portable; with shielding
Gross alpha/beta proportional counter	1	Activity concentration	Bq/m³, Bq/kg	1 Bq alpha, 2 Bq beta	Portable; with shielding
Liquid scintillation counter	1	Activity concentration	Bq/L, Bq/kg	See reference	Portable
Multipurpose gamma/beta survey monitor	1	Dose rate	Sv/h	0.05 µSv/h – 100 mSv/h	
Alpha/beta contamination monitor	1	Surface activity concentration	Bq/m², cps	Beta: 1, alpha: 0.1 Bq/cm²	Sensitive area: ≥ 100 cm²
Personal contamination monitor	1	Surface activity concentration	Bq/m², cps	Beta/gamma: 1 Bq/cm²	Earphones option
Neutron dose rate meter	1	Neutron dose rate	Sv/h, cps	1 µSv/h	Energy: thermal to 14 MeV
Self-reading dosimeter	4	External gamma dose	Sv or Gy	1 µSv – 10 Sv	Alarm function available
		Gamma dose rate	Sv/h	5 µSv/h – 1 Sv/h	
Permanent dosimeter	4	External gamma dose	Sv or Gy	10 µSv – 10 Sv	TLD or film badge

[a] or equivalent
[b] minimum detectable activity

Reference: Generic procedures for monitoring in a nuclear or radiological emergency, IAEA-TECDOC-1092, June 1999

Calibration period: annual
Quality control checks: prior and following the use
Maintenance period: biannual

Software

Type of software	Criteria
Data presentation system (e.g. GIS system); mapping	All software used should be either commercially available or validated.
Dose assessment software	New maps should be easily imported into the system.

Other equipment

Item	Criteria
Personal protection supplies	Should be standard field protective closing and respiratory protective devices suitable for the hazard level presented. All supplies must be within manufacturer's expiration date in a quantity suitable for the limits of the mission as indicated by the IAEA, but not for less than three days.
Sampling and sample preparation equipment	Should be suitable for emergency sampling and sample preparation.
General supplies	Should be within manufacturer's expiration date and in a quantity suitable for the limits of the mission as indicated by the IAEA, but not less than three days.

ERT Category: *Source Recovery Team* – **SRT**

Measuring instrumentation

Type of instrument	No. of items	Physical quantity measured	Unit[a]	MDA[b] or range	Remarks
Multipurpose gamma/beta survey monitor	2	Dose rate	Sv/h	0.1μSv /h – 1 Sv/h	
Telescopic gamma probe	2	Dose rate	Sv/h	0.1 μSv/h – 10 Sv/h	
Alpha/beta contamination monitor	1	Surface activity concentration	Bq/m², cps	Beta: 1, alpha: 0.1 Bq/cm²	Sensitive area: ≥ 100 cm²
Personal contamination monitor	1	Surface activity concentration	Bq/m², cps	Beta/gamma: 1 Bq/cm²	Earphones option
Neutron dose rate meter	1	Neutron dose rate	Sv/h, cps	1 μSv/h	Energy: thermal to 14 MeV
Self-reading dosimeter	3	External gamma dose	Sv or Gy	1 μSv – 10 Sv	Alarm function available
		Gamma dose rate	Sv/h	5 μSv/h – 1 Sv/h	
Permanent dosimeter	3	External gamma dose	Sv or Gy	10 μSv – 10 Sv	TLD or film badge

[a] or equivalent
[b] minimum detectable activity

Calibration period: annual
Quality control checks: prior and following the use
Maintenance period: biannual

Other equipment

Item	Criteria
Personal protection supplies	Should be standard field protective closing and respiratory protective devices suitable for the hazard level presented. All supplies must be within manufacturer's expiration date in a quantity suitable for the limits of the mission as indicated by the IAEA, but not for less than three days.
Specialized equipment	No specific criteria at present.
General supplies	Should be within manufacturer's expiration date and in a quantity suitable for the limits of the mission as indicated by the IAEA, but not less than three days.

ERT Category: *Assessment and Advisory Team* – **AAT**

Measuring instrumentation

Type of instrument	No. of items	Physical quantity measured	Unit[a]	MDA[b] or range	Remarks
Self-reading dosimeter	5	External gamma dose	Sv or Gy	1 μSv – 10 Sv	Alarm function available
		Gamma dose rate	Sv/h	5 μSv/h – 1 Sv/h	
Permanent dosimeter	5	External gamma dose	Sv or Gy	10 μSv – 10 Sv	TLD or film badge

[a] or equivalent
[b] minimum detectable activity

Calibration period: annual
Quality control checks: prior and following the use
Maintenance period: biannual

Software

Type of software	Criteria
Plume dispersion modelling	All software used should be either commercially available or validated. New maps should be easily imported into the system.
Data presentation system (e.g. GIS system); mapping	
Dose assessment software (external, internal)	

Other equipment

Item	Criteria
Personal protection supplies	Should be standard field protective closing and respiratory protective devices suitable for the hazard level presented. All supplies must be within manufacturer's expiration date in a quantity suitable for the limits of the mission as indicated by the IAEA, but not for less than three days.
Long range communication links	No specific criteria at present.
General supplies	Should be within manufacturer's expiration date and in a quantity suitable for the limits of the mission as indicated by the IAEA, but not less than three days.

ERT Category: *Medical Support Team* – **MST**

Measuring instrumentation

Type of instrument	No. of items	Physical quantity measured	Unit[a]	MDA[b] or range	Remarks
Multipurpose gamma/beta survey monitor	1	Dose rate	Sv/h	0.1μSv/h – 1 Sv/h	
Beta/gamma surface contamination monitor	1	Surface activity concentration	Bq/m², cps	Beta/gamma: 1 Bq/cm²	
Alpha/beta surface contamination monitor	1	Surface activity concentration	Bq/m², cps	Beta: 1, alpha: 0.1 Bq/cm²	Sensitive area: ≥ 100 cm²
Area monitor	1	Gamma dose rate	Sv/h	0.1 μSv/h – 100 mSv/h	Portable
Self-reading dosimeter	6	External gamma dose	Sv or Gy	1 μSv – 10 Sv	Alarm function available
		Gamma dose rate	Sv/h	5 μSv/h – 1 Sv/h	
Permanent dosimeter	6	External gamma dose	Sv or Gy	10 μSv – 10 Sv	TLD or film badge

[a] or equivalent
[b] minimum detectable activity

Calibration period: annual
Quality control checks: prior and following the use
Maintenance period: biannual

Other equipment and resources

Item	Criteria
Personal protection supplies	Should be standard field protective closing and respiratory protective devices suitable for the hazard level presented. All supplies must be within manufacturer's expiration date in a quantity suitable for the limits of the mission as indicated by the IAEA, but not for less than three days.
Specialized equipment	Should be standard medical equipment
Medicaments and substances	Should be within manufactures expiration date.
General supplies	Should be within manufacturer's expiration date and in a quantity suitable for the limits of the mission as indicated by the IAEA, but not less than three days.

ERT Category: *Bioassay Team* – **BIT**

Measuring instrumentation

Type of instrument	No. of items	Physical quantity measured	Unit[(a)]	MDA[(b)] or range	Remarks
In vivo counting equipment (portable)	1	Activity (in the body)	Bq	Cs-137: 0.4 kBq	Calibrated for persons from the age of 1 year old to adult
NaI(Tl) spectrometer (portable)	1	Activity concentration	Bq/L, Bq/kg	Cs-137: 4 Bq/L	In vitro laboratory; energy range 100–3000 keV
Gamma/beta surface contamination monitor	2	Surface activity concentration	Bq/m^2, cps	Beta/gamma: 1 Bq/cm^2	
Alpha/beta surface contamination monitor	2	Surface activity concentration	Bq/m^2, cps	Beta: 1, alpha: 0.1 Bq/cm^2	Sensitive area: ≥ 100 cm^2
Area monitor	2	Gamma dose rate	Sv/h	0.1 μSv/h – 100 mSv/h	Portable
Self-reading dosimeter	4	External gamma dose	Sv or Gy	1 μSv – 10 Sv	Alarm function available
		Gamma dose rate	Sv/h	5 μSv/h – 1 Sv/h	
Permanent dosimeter	4	External gamma dose	Sv or Gy	10 μSv – 10 Sv	TLD or film badge

[(a)] or equivalent
[(b)] minimum detectable activity

Calibration period: annual
Quality control checks: prior and following the use
Maintenance period: biannual

Software

Type of software	Criteria
Biokinetic model(s)	All software used should be either commercially available or validated.
Data recording system	
Dose assessment (internal)	

Other equipment

Item	Criteria
Personal protection supplies	Should be standard field protective closing and respiratory protective devices suitable for the hazard level presented. All supplies must be within manufacturer's expiration date in a quantity suitable for the limits of the mission as indicated by the IAEA, but not for less than three days.
General supplies	Should be within manufacturer's expiration date and in a quantity suitable for the limits of the mission as indicated by the IAEA, but not less than three days.

ERT Category: *Radiopathology Team* – **RPT**

Measuring instrumentation

Type of instrument	No. of items	Physical quantity measured	Unit[a]	MDA[b] or range	Remarks
Multipurpose gamma/beta survey monitor	1	Dse rate	Sv/h	0.05 μSv/h – 100 mSv/h	
Self-reading dosimeter	2	External gamma dose	Sv or Gy	1 μSv – 10 Sv	Alarm function available
		Gamma dose rate	Sv/h	5 μSv/h – 1 Sv/h	
Permanent dosimeter	2	External gamma dose	Sv or Gy	10 μSv – 10 Sv	TLD or film badge

[a] or equivalent
[b] minimum detectable activity

Calibration period: annual
Quality control checks: prior and following the use
Maintenance period: biannual

Other equipment and resources

Item	Criteria
Personal protection supplies	Should be standard field protective closing and respiratory protective devices suitable for the hazard level presented. All supplies must be within manufacturer's expiration date in a quantity suitable for the limits of the mission as indicated by the IAEA, but not for less than three days.
Specialized equipment and substances	No specific criteria for specialized equipment at present; substances should be within manufactures expiration date.
General supplies	Should be within manufacturer's expiration date and in a quantity suitable for the limits of the mission as indicated by the IAEA, but not less than three days.

ERT Category: *Biodosimetry Team* – **BDT**

Measuring instrumentation

Type of instrument	No. of items	Physical quantity measured	Unit[a]	MDA[b] or range	Remarks
Multipurpose gamma/beta survey monitor	1	Gamma dose rate	Sv/h	0.05 μSv/h – 100 mSv/h	
Self-reading dosimeter	2	External gamma dose	Sv or Gy	1 μSv – 10 Sv	Alarm function available
		Gamma dose rate	Sv/h	5 μSv/h – 1 Sv/h	
Permanent dosimeter	2	External gamma dose	Sv or Gy	10 μSv – 10 Sv	TLD or film badge

[a] or equivalent
[b] minimum detectable activity

Calibration period: annual
Quality control checks: prior and following the use
Maintenance period: biannual

Software

Type of software	Criteria
Data recording system	All software used should be either commercially available or validated.
Dose assessment software (external, internal)	

Other equipment

Item	Criteria
Personal protection supplies	Should be standard field protective closing and respiratory protective devices suitable for the hazard level presented. All supplies must be within manufacturer's expiration date in a quantity suitable for the limits of the mission as indicated by the IAEA, but not for less than three days.
Specialized equipment	No specific criteria at present.
General supplies	Should be within manufacturer's expiration date and in a quantity suitable for the limits of the mission as indicated by the IAEA, but not less than three days.

C

CRITERIA FOR ACCEPTANCE FOR ERT SUPPORTING DOCUMENTATION

The ERT must maintain documented instructions in English on the use and operation of all relevant equipment and procedures for the handling and preparation of samples, and for measurements, monitoring, survey, and assessment methods. All procedures, manuals, and reference data relevant to the work of the ERT must be maintained up to date and must be readily available for use.

Supporting documentation should consist of ERT response plan, equipment operational manuals, and procedures written in a QA or equivalent form. The following is an indicative list of procedures that should be in place as appropriate for the category of ERT (but not be limited to).

Code	Document or procedure title
Organisational procedures	
ERNET-01	ERT Emergency Response Plan (ERT Emergency Operation Document)
ERNET-02	ERT Annual Programme of Drills and Exercises
ERNET-03	ERT Team Communicating Instructions – Communication Protocol
ERNET-04	Notifying and Alerting ERNET Emergency Response Teams
ERNET-05	Activation and Deployment of ERNET Emergency Response Teams and Equipment
ERNET-06	ERT Equipment and Vehicle Arrangements for Intervention
QA procedures	
QA-01	Procedure Development and Procedure Management
QA-02	Use of ERT Resources
QA-03	Internal Audits and Management Review
QA-04	ERT Staff Qualification and Training Requirements
QA-05	Management of Complaints and Nonconformity
QC procedures	
QC-01	Calibration of Proportional Counter for Air Filters
QC-02	Calibration of Proportional Counter for Water Samples
QC-03	Proportional Counter Quality Control Checks
QC-04	Calibration of Liquid Scintillation Counter
QC-05	Liquid Scintillation Counter Quality Control Checks
QC-06	Energy Calibration of Ge Spectrometers
QC-07	Efficiency Calibration of Ge Spectrometers
QC-08	Gamma Spectrometers Quality Control Checks
QC-09	Calibration of Radiation Monitors
QC-10	Radiation Monitors Quality Control Checks
QC-11	Assuring Quality of Measuring Results
QC-12	Sample Handling
QC-14	Equipment Control and Maintenance
QC-15	Data Recording System
	Measurements
Sampling procedures	
SA-01	Emergency Sampling of Air, Soil, Milk, Food, Pasture and Water
SA-02	In-vitro Bioassay Sampling
SA-03	Sampling for Cytogenic Dosimetry
SA-04	Preparation for In-vivo Bioassay
Sample preparation procedures	

Code	Document or procedure title
PR-01	Sample Preparation for Laboratory Gamma Spectrometry
PR-02	High Activity Sample Preparation for Laboratory Gamma Spectrometry
PR-03	Emergency Sample Preparation for Gamma Spectrometry
PR-04	Sample Preparation for Tritium Analysis
PR-05	Sample Preparation for Histopatological Analysis
Survey and measuring procedures	
ME-01	Emergency Worker Personal Protection Guide
ME-02	Personal Dosimetry
ME-03	Radiological Survey of Victim(s) on-scene
ME-04	Gross Alpha and Beta in Air and Water Samples
ME-05	Detection, Location and Identification of Lost or Orphan Source
ME-06	Source Monitoring
ME-07	Source Monitoring by Aerial Survey
ME-08	Surface Contamination Survey
ME-09	Contamination Monitoring by Aerial Survey
ME-10	On Route Monitoring
ME-11	Plume Survey
ME-12	Gamma Spectrometry in Mobile Radiological Laboratory
ME-13	In-situ Gamma Spectrometry
ME-14	Rapid Thyroid Monitoring
ME-15	Tritium Analysis
ME-16	Source Recovery/Removal of Radioactive Material
ME-17	Personal Contamination Monitoring
ME-18	Basic Instructions for Personal, Equipment and Vehicle Decontamination
Assessment procedures	
AS-01	External Dose Assessment
AS-02	Internal Dose Assessment
AS-03	Assessment of Exposed and/or Contaminated Patient(s)
AS-04	Mapping
AS-05	Plume Modelling
AS-06	Measurement Accuracy Assessment
Equipment checklists	
EQ-01	Equipment Common to all Teams
EQ-02	AST Equipment
EQ-03	RMT Equipment
EQ-04	RIT Equipment
EQ-05	SRT Equipment
EQ-06	AAT Equipment
EQ-07	MST Equipment
EQ-08	BIT Equipment
EQ-09	RPT Equipment
EQ-10	BDT Equipment