

# IAEA Response and Assistance Network

DATE EFFECTIVE: 1 AUGUST 2018



**IAEA**

International Atomic Energy Agency

# IAEA SAFETY STANDARDS AND RELATED PUBLICATIONS

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**EPR-RANET 2018**

**Emergency Preparedness  
and Response**

**IAEA**  
**Response and Assistance**  
**Network**

**DATE EFFECTIVE: 1 AUGUST 2018**

This publication has been prepared by the:

Incident and Emergency Centre  
International Atomic Energy Agency  
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# Foreword

The Parties to the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency (the ‘Assistance Convention’) have undertaken to cooperate between themselves and with the IAEA to facilitate the timely provision of assistance in the case of a nuclear accident or radiological emergency, in order to mitigate its consequences. Article 2, Paragraph 4 of the Assistance Convention states: *“States Parties shall, within the limits of their capabilities, identify and notify the Agency of experts, equipment and materials which could be made available for the provision of assistance to other States Parties in the event of a nuclear accident or radiological emergency as well as the terms, especially financial, under which such assistance could be provided.”*

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 and radiological emergencies” as well as “to participate actively in the process of strengthening international, national and regional capabilities for responding to nuclear and radiological emergencies and to make those capabilities more consistent and coherent”.

As part of the IAEA’s strategy of supporting the practical implementation of the Assistance Convention, in 2000, the IAEA Secretariat established a global Emergency Response Network (ERNET) of teams suitably qualified to respond to nuclear or radiological emergencies rapidly and, in principle, on a regional basis. The IAEA Secretariat published IAEA Emergency Response Network — ERNET (EPR-ERNET) in 2000, which set out the criteria and requirements to be met by members of the network. An updated edition was published in 2002.

The Second Meeting of the Representatives of 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 in June 2003, recommended that the IAEA Secretariat convene a Technical Meeting to formulate recommendations aimed at improving participation in the network. Participants in a Technical Meeting held in March 2004 developed a new concept for the network and a completely new draft of the publication. In July 2005, the Third Meeting of Competent Authorities accepted the new draft as resolving the critical issues that had been hindering participation. To reflect the new concept of the network, it was decided to change the name of the network to Response Assistance Network (RANET), and EPR-RANET 2006 was issued as the third edition of the assistance network publication.

EPR-RANET 2010 and EPR-RANET 2013 were the next editions of the publication. The 2010 edition contained minor changes in the concept of the network. The functional areas of assistance were restructured to facilitate easier registration, the name of the network was changed to Response and Assistance Network, and the responsibilities and duties of the Assistance Mission Leader were added. The 2013 edition of the publication incorporated a new functional area to address on-site assistance and advice following emergencies at nuclear installations. Although assistance under the Assistance Convention was not requested, and RANET was not used, in response to the Fukushima Daiichi accident in March 2011, subsequent evaluation of the event identified areas where RANET could be enhanced. These were captured in the IAEA Action Plan on Nuclear Safety (GOV/2011/59-GC(55)/14), which was endorsed by the General Conference of the IAEA in September 2011.

In January 2012, the IAEA Secretariat convened a consultancy meeting on the extension of RANET capabilities under the IAEA's Action Plan on Nuclear Safety. The purpose of the consultancy was to discuss the enhancement of RANET pursuant to the Action Plan, to agree on the methods to implement these enhancements, and to continue to encourage States to register their National Assistance Capabilities under RANET.

The meeting concluded that "there is a need to fully utilize RANET, as envisaged by the Assistance Convention". The IAEA's Incident and Emergency Centre (IEC), the meeting emphasized, "should consider including, in the functional areas of RANET, assessment and advice to requesting States on on-site response activities to mitigate the impact of emergencies at nuclear facilities".

The IAEA Action Plan on Nuclear Safety tasks the IAEA Secretariat with providing:

"Member States, international organizations and the general public with timely, clear, factually correct, objective and easily understandable information during a nuclear emergency on its potential consequences, including analysis of available information and prognosis of possible scenarios based on evidence, scientific knowledge and the capabilities of Member States."

The IAEA Secretariat has concluded that the RANET mechanism can be used to assist in the implementation of this task.

Testing the assistance arrangements during a ConvEx-3 exercise in 2013 and an analysis of questionnaires distributed among RANET Members in 2016 demonstrated the need to further strengthen the network by adding some new capabilities to provide the requested assistance in nuclear or radiological emergencies, regardless of their origin, as well as a new functional area of geographic data mapping of radiation monitoring data in nuclear or radiological emergencies.

The present publication is a revised version of EPR-RANET 2013 and is worded based on the assumption that the relevant Competent Authority or Authorities of a State will be authorized to make and receive requests for, and to accept offers of, assistance in the event of a nuclear or radiological emergency, regardless of its origin, which could be a natural event, a human error, a mechanical or other failure, a nuclear security event, or any other cause

This publication is intended for the relevant Competent Authority or Authorities of a State and for organizations that have response capabilities that could be made available for international assistance. It contains guidance on actions to be performed by States providing and requesting international assistance. The Competent Authorities need to review this publication and apply the guidelines, taking into account confidentiality of information, response time, resources (financial, personnel, equipment) and any other constraints. All States Parties to the Assistance Convention are invited to join RANET.

The IAEA officer responsible for this publication was K. Smith of the IAEA's Incident and Emergency Centre.

## EDITORIAL NOTE

The views expressed do not necessarily reflect those of the governments of States that are IAEA Member States and/or Parties to 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 publication, neither the IAEA nor its Member States assume any responsibility for consequences that may arise from its use.

## NOTES FOR THE USER

This publication should be applicable as of 1 August 2018. It supersedes all previous versions of the EPR-RANET publication. All copies of previous editions of EPR-RANET should be removed from operational response systems and either archived or destroyed.

This edition contains changes to reflect recent developments in RANET. The changes include:

- The addition of a new National Assistance Capability to address assistance and advice on geographic data mapping in nuclear or radiological emergencies regardless of their origin;
- The addition of new capabilities to provide requested assistance in nuclear or radiological emergencies, regardless of their origin;
- Modifications to the concept of operations, which build on and streamline the version in EPR-RANET 2013;
- Description of the RANET database available on the IAEA's Unified System for Information Exchange in Incidents and Emergencies (USIE);
- Updated Sample RANET Assistance Action Plan (Appendix B);
- Changes to the registration form to reflect the recent developments in RANET;
- Three new appendices: the international ATA Carnet document for customs equipment documentation, an example request for assistance; and an example offer of assistance.

The EPR-RANET 2018 has no attachments.

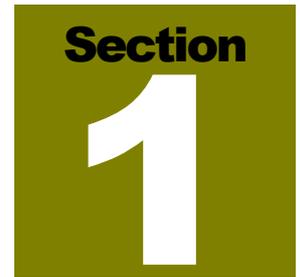
The IAEA's Incident and Emergency Centre is ready to provide any clarification on the implementation of the arrangements described here.



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# 1. INTRODUCTION

## 1.1. Objectives

This publication describes the mechanism for:

- Facilitating the provision of international assistance in a nuclear or radiological emergency, regardless of its origin;
- Cooperation between States, their Competent Authorities and the IAEA Secretariat in case international assistance is requested;
- Promoting and supporting cooperation between States to coordinate the provision of assistance to a requesting State;
- Harmonization of response capabilities of States offering assistance under the Response and Assistance Network (RANET).

The publication may also assist Competent Authorities and other response organizations in their efforts to establish and/or maintain their own emergency response capabilities.

## 1.2. Scope

This publication is issued under the authority of the Director General of the IAEA:

- Based on the legal framework of the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency (the Assistance Convention) [1].
- In the case of a nuclear or radiological emergency, as statutory functions, to act, upon request by a State, as an intermediary for the purposes of securing the performance of services or the supplying of materials, equipment or facilities by one Member State for another.

The publication sets out the following:

- The RANET concept and the mechanism for requesting and providing assistance;
- The responsibilities and activities within RANET;
- The basic arrangements for international assistance;
- The roles and responsibilities of the State requesting assistance;
- The roles and responsibilities of the State(s) providing assistance;

- RANET preparedness and response arrangements;
- The prerequisites for RANET membership, conditions and instructions for registration;
- The technical guidelines for internationally compatible assistance.

The RANET operational mechanism may also be used for the provision of international assistance in situations when a State requests assistance in capabilities that are not described in this publication.

The publication does not contain procedures for implementation of assistance. However, it specifies the expected products of assistance.

### **1.3. Structure**

This publication is divided into six sections. Following the introduction in Section 1, the RANET concept, objectives, scope and responsibilities are described in Section 2. Section 3 presents the concept of operations of RANET. Section 4 explains the National Assistance Capabilities as well as the registration process and preparedness arrangements. Section 5 describes the content of an Assistance Action Plan (AAP), and Section 6 presents technical guidelines for each RANET functional area.

EPR-RANET 2018 has also ten supporting appendices:

- A Instructions on how to register National Assistance Capabilities in RANET with the Registration Form;
- B A sample of an Assistance Action Plan;
- C An example list of suggested RANET documentation;
- D An indicative list of medical resources;
- E Minimum equipment specifications;
- F Guidance on assistance outputs/products;
- G A list of responsibilities and tasks of Team Leaders;
- H International ATA Carnet document for customs equipment documentation;
- I An example request for assistance;
- J An example offer of assistance.

## 1.4. Explanation of terms as used in this publication<sup>1</sup>

<b>Accident</b>	Any unintended event, including operating errors, equipment failures and other mishaps, the consequences or potential consequences of which are not negligible from the point of view of protection or safety.
<b>Assessment Mission</b>	An Assessment Mission (e.g. a fact-finding mission) is an initial mission deployed to collect and assess information; to perform an initial evaluation of the situation and to recommend whether activation of a RANET Assistance Mission is necessary.
<b>Assistance Action Plan – AAP</b>	A plan for the provision of assistance, including all financial, diplomatic, organizational and logistical aspects, formulated and proposed by the IAEA in coordination with the requesting State, States providing assistance and relevant international organizations as appropriate.
<b>Assistance Mission</b>	An Assistance Mission is performed by a group of qualified experts and can consist of a Field Assistance Team (FAT), External Based Support (EBS) function(s) or Joint Assistance Team (JAT) comprising a combination of FAT and/or EBS to address nuclear or radiological emergencies, regardless of their origin, providing advice, assessment, medical support, monitoring or other specialized assistance under RANET.
<b>Assistance Mission Leader</b>	The individual identified and agreed upon by all parties of the Assistance Action Plan (AAP) to head an Assistance Mission. He/she manages the on-scene international assistance within the context of RANET and coordinates its implementation with the requesting State. In the case of a JAT, the Assistance Mission Leader performs the role of the Chairperson of the JAT Command.
<b>Assistance Officer</b>	Upon receiving a request for assistance, the IAEA Secretariat, through the Emergency Response Manager (ERM) appoints an Assistance Officer. This individual ensures a coordinated response to the request(s) for emergency assistance. In coordination with the ERM, the Assistance Officer manages the deployment of any IAEA Assessment Mission and/or Assistance Mission.
<b>Assisting State</b>	A State that has agreed to provide assistance to a requesting State or to the IAEA Secretariat.
<b>ATA Carnet</b>	A Carnet or ATA Carnet is an international customs and temporary export–import document. It is used to clear customs in 86 countries and territories without paying duties and import taxes on merchandise that will be re-exported within 12 months. Carnets are also known as Merchandise Passports or Passports for Goods.
<b>Competent Authority</b>	A contact point in a State or international organization which has the competency and responsibility to notify/report a nuclear or radiological emergency to the IAEA; or which has the competency and responsibility to

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<sup>1</sup> The definitions included within this document are without prejudice to the Assistance Convention.

receive notifications from other States or the IAEA on nuclear or radiological emergencies which could affect its State; or which has the competency and responsibility to make and receive requests for, and to accept offers of, assistance.

<b>Confidentiality</b>	The property that information is not made available or disclosed to unauthorized individuals, entities or processes [2].
<b>Emergency</b>	A non-routine situation or event that necessitates prompt action, primarily to mitigate a hazard or adverse consequences for human life, health, property or the environment. This includes nuclear and radiological emergencies and conventional emergencies such as fires, release of hazardous chemicals, storms or earthquakes. It includes situations for which prompt action is warranted to mitigate the effects of a perceived hazard [3].
<b>Emergency Response Manager – ERM</b>	The individual who assures a coordinated emergency response, including requests for emergency assistance. The ERM manages the IAEA Secretariat’s emergency response actions; ensures that an assessment of possible radiological consequences and prognosis of likely event progression are carried out; and ensures that actual or potentially affected States, relevant international organizations and the IAEA Secretariat’s staff are kept informed. The ERM manages the deployment of any IAEA Assessment Mission and/or Assistance Mission.
<b>Exercise</b>	Any practical implementation of response plans and procedures in a simulated situation. This includes drills, table top exercises, partial and full-scale exercises as well as field exercises. The preparation and conduct of each exercise varies in complexity, scope and objectives.
<b>External Based Support – EBS</b>	Technical advice and analytical expertise to address nuclear or radiological emergencies, regardless of their origin, provided from home offices or other offsite locations. This support is not deployed to the event scene.
<b>EBS Leader</b>	The individual or role identified in the AAP as the official leader/liaison of an External Based Support providing assistance.
<b>Field Assistance Team – FAT</b>	A group of technically qualified and equipped personnel that may be called upon to provide in situ assistance in a requesting State.
<b>FAT Leader</b>	The individual who is identified in the AAP as the leader of a Field Assistance Team.
<b>Intercomparison Exercise</b>	Measurement campaign organized to check the quality of different monitoring teams or laboratories.
<b>Joint Assistance Team – JAT</b>	An Assistance Mission composed of more than one Field Assistance Team.
<b>Joint Assistance Team Command</b>	The coordinating body on the scene composed of all Field Assistance Team leaders. The Assistance Mission Leader is the Chairperson of the JAT Command.

<b>National Assistance Capability(ies) – NAC(s)</b>	A State’s identified experts, equipment and materials that can be made available by a State either by deployment to the event scene (FAT) or reach-back resource made available from home offices or other offsite location (EBS).
<b>NAC coordinator</b>	An individual appointed or a role assigned by the State to coordinate preparedness and assistance activities of its NACs as defined in RANET.
<b>National Warning Point</b>	A Contact Point that is staffed or able to be alerted at all times for promptly responding to, or initiating a response to, an incoming notification, advisory message, request for assistance or request for verification of a message as appropriate, from the IAEA.
<b>Offering State</b>	A State that has offered assistance that has not yet been accepted. If/when the offered assistance is accepted, the offering State is referred to as an assisting State (see above).
<b>Relevant international organization</b>	An international intergovernmental organization that, according to the information provided to the IAEA, has a significant legal or statutory role and/or capability to provide advice or assistance in the event of a nuclear or radiological emergency; member of the Inter-Agency Committee on Radiological and Nuclear Emergencies (IACRNE).
<b>Requesting State</b>	A State that has requested assistance.

## 1.5. Abbreviations

<b>AAAR</b>	After Action Assistance Report
<b>AAP</b>	Assistance Action Plan
<b>AMS</b>	Accelerator Mass Spectrometry
<b>BAL</b>	British anti-Lewisite (Dimercaprol)
<b>BWR</b>	Boiling Water Reactor
<b>CA</b>	Competent Authority
<b>ConvEx</b>	A regime of emergency exercises organized by the IAEA in cooperation with States to verify the arrangements for responding under the Early Notification Convention and/or the Assistance Convention
<b>EBS</b>	External Based Support
<b>EPR</b>	Depending on the context, Electron Paramagnetic Resonance or the IAEA’s Emergency Preparedness and Response series of documents, of which this document is one
<b>ERM</b>	Emergency Response Manager
<b>ESR</b>	Electron Spin Resonance
<b>FAT</b>	Field Assistance Team

<b>FBR</b>	Fast Breeder Reactor
<b>FISH</b>	Fluorescence in situ hybridization
<b>GCR</b>	Gas Cooled Reactor
<b>GPS</b>	Global Positioning System
<b>IAEA</b>	International Atomic Energy Agency
<b>ICP-MS</b>	Inductively coupled plasma mass spectrometry
<b>ICRP</b>	International Commission on Radiological Protection
<b>IEC</b>	IAEA's Incident and Emergency Centre
<b>IEComm</b>	IAEA Operations Manual for Incident and Emergency Communication
<b>IND</b>	Improvised Nuclear Device
<b>JAT</b>	Joint Assistance Team
<b>LWGR</b>	Light Water Cooled Graphite Moderated Reactor
<b>NAC(s)</b>	National Assistance Capability(ies)
<b>NI</b>	Nuclear Installation
<b>NWP</b>	National Warning Point
<b>OFA</b>	Offer of Assistance
<b>OSL</b>	Optically Stimulated Luminescence
<b>PC</b>	Personal Computer
<b>PHWR</b>	Pressurized Heavy Water Reactor
<b>PPE</b>	Personal Protective Equipment
<b>PWR</b>	Pressurized Water Reactor
<b>RANET</b>	IAEA Response and Assistance Network
<b>RBE</b>	Relative Biological Effectiveness
<b>RBMK</b>	High-Power Channel-Type Reactor
<b>RFA</b>	Request for Assistance
<b>RR</b>	Research Reactor
<b>TIMS</b>	Thermal ionization mass spectrometry
<b>USIE</b>	Unified System for Information Exchange in Incidents and Emergencies
<b>UTC</b>	Coordinated Universal Time
<b>WWER</b>	Water cooled, water moderated power reactor
<b>XRF</b>	X-ray fluorescence spectrometry

## 2. RESPONSE AND ASSISTANCE NETWORK

The Assistance Convention states that, *“If a State Party needs assistance in the event of a nuclear accident or radiological emergency, whether or not such accident or emergency originates within its territory, jurisdiction or control, it may call for such assistance from any other State Party, directly or through the Agency, and from the Agency ...”*;

and

*“Each State Party shall make known to the Agency and to other States Parties, directly or through the Agency, its Competent Authorities and point of contact authorized to make and receive requests for and to accept offers of assistance.”*

### 2.1. Background

The international emergency preparedness and response system is based on:

- The legal framework provided by the Early Notification and Assistance Conventions [1];
- The Statute of the IAEA [4];
- IAEA Safety Standards Series No. SF-1, Fundamental Safety Principles, No. SF-1, Principle 9 [5];
- IAEA Safety Standards Series No. GSR Part 7, Preparedness and Response for a Nuclear or Radiological Emergency, Requirement 17 [3];
- IAEA Nuclear Security Series No. 20, Objective and Essential Elements of a State’s Nuclear Security Regime, Essential Elements 6 and 11 [6];
- Arrangements and agreements made by and between Member States and the Secretariat, and by and between relevant international organizations to improve the system;
- Preparedness arrangements to maintain the capability to respond to nuclear or radiological emergencies, regardless of their origin [3, 7–9];
- Arrangements for the exchange of official information for notifying, identifying, assessing, and responding to a nuclear or radiological emergency among States, relevant international organizations and the Secretariat [10].

Assistance provided in the past has included:

- Provision of official information to requesting States on nuclear or radiological emergencies, regardless of their origin;
- Provision of technical advice on nuclear and radiological emergency preparedness and response;
- Provision of technical advice for searching and recovering radioactive sources that were stolen or lost;
- Provision of means to facilitate the implementation of: (a) radiological surveys; (b) source/radionuclide identification; (c) source recovery; and (d) in situ verification of radiological conditions and the respective technical advice;
- Provision of dose reconstruction following the exposure of individuals to sources of ionizing radiation;
- Provision of medical advice and assistance in cases of a confirmed or unconfirmed radiation exposure;
- Sharing official information with Member States regarding a threat to a nuclear facility in the State based on request from that State.

In order to meet States Parties' obligations under the Assistance Convention and the IAEA functions in relation to the Assistance Convention and its Statute, it has been recognized that appropriate mechanisms need to be organized. RANET is intended, inter alia, to strengthen the worldwide capability to provide assistance and advice and/or to coordinate the provision of assistance as specified within the framework of the Assistance Convention for nuclear or radiological emergencies, regardless of their origin, as well as for other nuclear or radiological emergencies.

## **2.2. Objectives of RANET**

The aim of RANET is to facilitate:

- The provision of requested international assistance;
- The harmonization of emergency assistance capabilities;
- The exchange of relevant information and feedback of experience related to the provision of international assistance.

In addition, RANET complements other IAEA initiatives to promote emergency preparedness and response among its Member States.

## **2.3. Concept of RANET**

RANET provides a compatible and integrated network for the provision of international assistance to minimize the actual or potential radiological consequences of a nuclear or radiological emergency to protect human life, health, property and the environment. It also facilitates the provision of advice and assistance to the requesting State regarding on-scene response activities to regain control of the situation and mitigate the consequences.

RANET facilitates response to specific requests for assistance in accordance with the Assistance Convention and also applies to other nuclear or radiological emergencies.

RANET does not affect the cooperation defined in any bilateral and/or multilateral agreements between States.

## 2.4. Scope of RANET

RANET is a network for providing international assistance, upon request from a State, following a nuclear or radiological emergency, regardless of its origin. RANET is applicable for:

- Nuclear accidents<sup>2</sup> or radiological emergencies in the context of the Early Notification Convention and the Assistance Convention;
- Other nuclear or radiological emergencies;
- Radiological consequences that exceed a State's response capabilities.

RANET is not a network for preparedness, except as defined in the Assistance Convention Article 5b.

RANET does not and will not at any time replace national/State responsibility in emergency preparedness and response.

## 2.5. Responsibilities

### 2.5.1. States

It is important that States develop and maintain national response capabilities and arrangements, commensurate with identified hazards and threats.

States should make known to the IAEA and to other States, directly or through the IAEA, their Competent Authorities authorized to make requests for, and accept offers of, assistance and their 24-hour point of contact (i.e. National Warning Point).

Identified Competent Authorities should be authorized to make and receive requests for, and to accept offers of, assistance. The relevant permanent mission to the IAEA may also make requests for assistance and receive offers of assistance.

Assistance during a nuclear or radiological emergency could be offered and provided not only through RANET but also via other existing international or bilateral mechanisms. Therefore, the Competent Authorities or the State's permanent mission should coordinate at the national level the process of requesting/offering assistance.

If a State needs assistance in the event of a nuclear or radiological emergency, whether or not such an event originates on its territory or is under its jurisdiction or control, it may request assistance from or through the IAEA. If the response to an emergency exceeds the State's capabilities, it may submit a request for assistance.

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<sup>2</sup> Related to any nuclear reactor wherever it is located; any nuclear fuel cycle facility; any radioactive waste management facility; the transport and storage of nuclear fuels or radioactive wastes; the manufacture, use, storage, disposal and transport of radioisotopes for agricultural, industrial, medical and related scientific and research purposes; and the use of radioisotopes for power generation in space objects.

States participating in RANET are responsible for identifying expertise, equipment and materials that could be made available to assist another State in a nuclear or radiological emergency. The expertise, equipment and materials comprise the State's National Assistance Capabilities (NACs) that can be activated to provide assistance either by deployment to the scene or from an external base.

States which have registered the capabilities and resources of private entities in RANET need to ensure that certifications of the registered capabilities and resources are current and authorized for their intended use (see Section 4.5 'Registration of Private Entity Resources').

### **2.5.2. Requesting State**

A State requesting assistance is responsible for specifying the scope and type of assistance required and, where practicable, providing the IAEA with such information as may be necessary for the assisting party/parties<sup>3</sup> to determine the extent to which the request can be met. In the event that it is not practicable for the requesting State to specify the scope and type of the assistance required, the requesting State, as appropriate, consults with the assisting party/parties and the IAEA Secretariat to decide upon the scope and type of assistance required.

States are responsible for developing arrangements for requesting and receiving international assistance. Such arrangements should be coordinated, integrated and documented in the State's emergency response plans, and should be included in the State's overall national emergency preparedness and response framework.

States should strive to achieve compatible arrangements to ensure effective international assistance.

Once a State has requested assistance, the following actions are envisaged to be taken by the requesting State, where applicable:

- Participating in the development of the Assistance Action Plan (AAP) for the requested assistance and finalizing the proposed AAP for implementation in a timely manner;
- The overall direction, control, coordination and supervision of any assistance within its territory;
- Ensuring that the implementation of the AAP will be conducted in a safe and secure manner;
- Providing, to the extent of its capabilities, local facilities and services for the proper and effective provision of the assistance;
- Ensuring the protection of personnel, equipment and materials<sup>4</sup> brought into its territory by or on behalf of the assisting party for such purpose;
- Providing, as necessary, technical, financial, diplomatic, organizational and logistical support as designated in the AAP for the requested assistance;

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<sup>3</sup> The assisting party/assisting parties can be another State/other States and/or international organization(s). In the following, the use of the term "assisting State(s)" is meant to reflect this understanding.

<sup>4</sup> Article 9 of the Assistance Convention [1].

- Declaring the termination of assistance in consultation with all parties to the AAP;
- Providing relevant medium and long term information related to the status of the situation addressed during the Assistance Mission (e.g. follow-up).

### **2.5.3. Assisting States**

Identified Competent Authorities and permanent mission to the IAEA should be authorized to offer and approve the provision of requested assistance.

States that have registered their NACs in RANET are responsible for:

- Designating NAC coordinator(s).
- Ensuring that the National Warning Point (NWP) and the Competent Authorities have appropriate procedures for responding to a request for assistance.
- Maintaining NAC resources registered in RANET.
- Conducting periodic reviews on continued availability of NAC resources, and updating registration at a minimum frequency of once every two years, or if resources or areas of expertise undergo significant changes.
- Participating, as appropriate, in IAEA meetings concerning RANET.
- Ensuring awareness of RANET within their national structures and promoting its use and development.
- Placing NAC resources on standby, if available, to provide the requested assistance.
- Coordinating the assistance with their ministry of foreign affairs/permanent mission to the IAEA.
- Identifying the individual(s) who have the delegated responsibility to sign the AAP in a timely manner.
- Identifying any terms, especially financial, for the provision of assistance in the AAP.
- Being prepared to participate in the development and approval of the AAP in a timely manner. This includes the identification of an Assistance Mission Leader, as appropriate, in coordination with all parties.
- Identifying and activating/deploying NACs.
- Providing on-scene and/or externally based assistance according to the AAP.
- Ensuring coordination with the requesting State, assisting State(s), the IAEA Secretariat and any deployed or externally based assistance.
- Demobilizing NAC resources upon termination.

### **2.5.4. The IAEA Secretariat**

Upon receiving a request for assistance, the IAEA Secretariat, through its Incident and Emergency System (IES)<sup>5</sup>, appoints an Assistance Officer.

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<sup>5</sup> The IAEA's IES covers the Secretariat's emergency preparedness and response arrangements to a nuclear or radiological emergency irrespective of whether it arises from an accident, natural disaster, negligence, malicious acts, or any other cause within the Agency's mandate.

The Assistance Officer is responsible for:

- Evaluating the assistance request to determine if the required capabilities are registered in RANET;
- Determining if the assistance requested is feasible and can be provided by countries identified by the IAEA Secretariat (in cases where the requested capabilities are not registered in RANET);
- Recommending the deployment of an Assessment Mission to the requesting State to further assess the situation;
- Recommending specific RANET capabilities, if appropriate;
- Alerting appropriate NWP(s) and requesting coordination with the Competent Authorities/NAC coordinator(s);
- Receiving and, as appropriate, reviewing offers of assistance and forwarding the offers to the requesting State;
- Ensuring timely development of an AAP, including identification of an Assistance Mission Leader, as appropriate, in coordination with all parties;
- Liaising with the requesting State and States offering assistance to reach agreement on the AAP and coordinating any proposed changes;
- Establishing and maintaining communication links with the Assistance Mission and States providing assistance, as appropriate;
- Providing financial, organizational and logistical support, as appropriate;
- Declaring the official termination of an Assistance Mission;
- Establishing follow-up activities if deemed appropriate.

The IAEA Secretariat has the following additional responsibilities for maintaining RANET.

- Reviewing NACs and other resources submitted for registration in RANET;
- Documenting and registering all endorsed NACs and other resources of States;
- Maintaining the RANET database of registered capabilities, resources and expertise;
- Promoting RANET and reporting annually on RANET's status and activities;
- Conducting RANET workshops and meetings;
- Biennially requesting certification of continued NAC resource availability;
- Facilitating the conduct of exercises, where practicable within existing national, regional and international exercise regimes;
- Gathering and reviewing information on registered NACs, for example through liaising with the NAC coordinator, observation of NACs during national or international exercises, participation in Assistance Missions and/or the conduct of RANET Review Missions;
- Facilitating the exchange of lessons (within RANET) identified in Assistance Missions.

### 3. CONCEPT OF OPERATIONS

RANET is a network of States that are capable and willing to provide, upon request, specialized assistance by appropriately trained, equipped and qualified personnel with the ability to respond in a timely and effective manner to nuclear or radiological emergencies, regardless of their origin.

If a State needs assistance in the event of a nuclear or radiological emergency, whether or not such an event originates on its territory or is under its jurisdiction or control, it may request assistance from or through the IAEA.

The State's permanent mission to the IAEA, or Competent Authority, is the Government representative that is expected to request assistance. To facilitate the effective provision of assistance, it is expected that a State will request assistance through one of the following communication channels, listed by preference:

- (1) Submitting the Request for Assistance (RFA) form on the IAEA's Unified System for Information Exchange in Incidents and Emergencies (USIE);<sup>6</sup>
- (2) Fax to the IEC through the 24/7 communication channel;
- (3) Telephone to the IEC through the 24/7 line.

The request for assistance needs to include the scope and type of assistance required as follows:

- (a) Information about the nuclear or radiological emergency: location, time of its occurrence (UTC and local time), name and full address of organization in charge of response actions, and name and contact details of person assigned to liaise with the IAEA Secretariat;
- (b) Type(s) of emergency assistance required: nuclear installation assessment and advice, source search and recovery, radiation survey, sampling and analysis, assessment and advice, decontamination, medical support, dose assessment.

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<sup>6</sup> Note: Only Competent Authorities may submit an RFA via USIE. See Appendix I: Example Request for Assistance.

### 3.1. Operations

Upon receiving an official assistance request, the IAEA's Incident and Emergency Centre (IEC), according to the IAEA's IES (see Section 2.5.4), becomes the focal point for the facilitation and coordination of international assistance. The request for assistance is reviewed by the ERM to determine if the assistance being requested is for a nuclear or radiological emergency, and an appropriate Assistance Officer (or team) is appointed.

The Assistance Officer reviews the request to determine if the requested expertise and capabilities are registered in RANET.

If the requested capabilities are not registered in RANET, the Assistance Officer may contact States who have previously demonstrated the requested capabilities in emergency exercises/response. In complex situations and if the scope of assistance cannot be clarified, the Assistance Officer may recommend deployment of an Assessment Mission to the requesting State to further assess the needs for assistance. The Assessment Mission, if deployed, will evaluate the situation, provide immediate advice as needed, and recommend activation of appropriate assistance capabilities.

The IAEA Assistance Mission with the involvement of RANET will be tailored to the specific situation; e.g. it may include deployment of assets as well as provision of advice or assistance from an external base.

If the activation of NAC resources is recommended, the Assistance Officer will alert the appropriate National Warning Point(s) and request coordination with relevant Competent Authorities/NAC coordinator(s)<sup>7</sup>. The Competent Authorities/NAC coordinator(s) will inform the Assistance Officer regarding the availability of their resources for assistance and, if available, an Offer of Assistance (OFA) will be submitted via USIE, email or fax (see Appendix J: Example Offer of Assistance). This concept is outlined in Fig. 1.

The IAEA Secretariat, taking into account any confidentiality requirements associated with the assistance request(s), only shares the Request for Assistance (RFA) with States that have the registered NACs and/or were identified in the RFA by the requesting State. The sharing of the RFA(s) is carried out on USIE to enable prompt sharing of information between relevant counterparts.

The Assistance Officer will then liaise with the requesting State and offering States, as necessary, to determine which assistance is accepted and to establish the exact nature of the Assistance Mission and development of the AAP.

In circumstances where the IAEA Secretariat requests NAC resource assistance in support of its own operations (e.g. within the implementation of the Agency's role in assessment and prognosis), the same process of alerting the appropriate National

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<sup>7</sup> The Competent Authority appoints an NAC coordinator to ensure readiness of NAC resources and to maintain contacts with the IAEA's IEC and the Competent Authorities/NAC coordinators involved.

Warning Point(s) and requesting assistance with relevant Competent Authorities/NAC coordinator(s) will be followed.

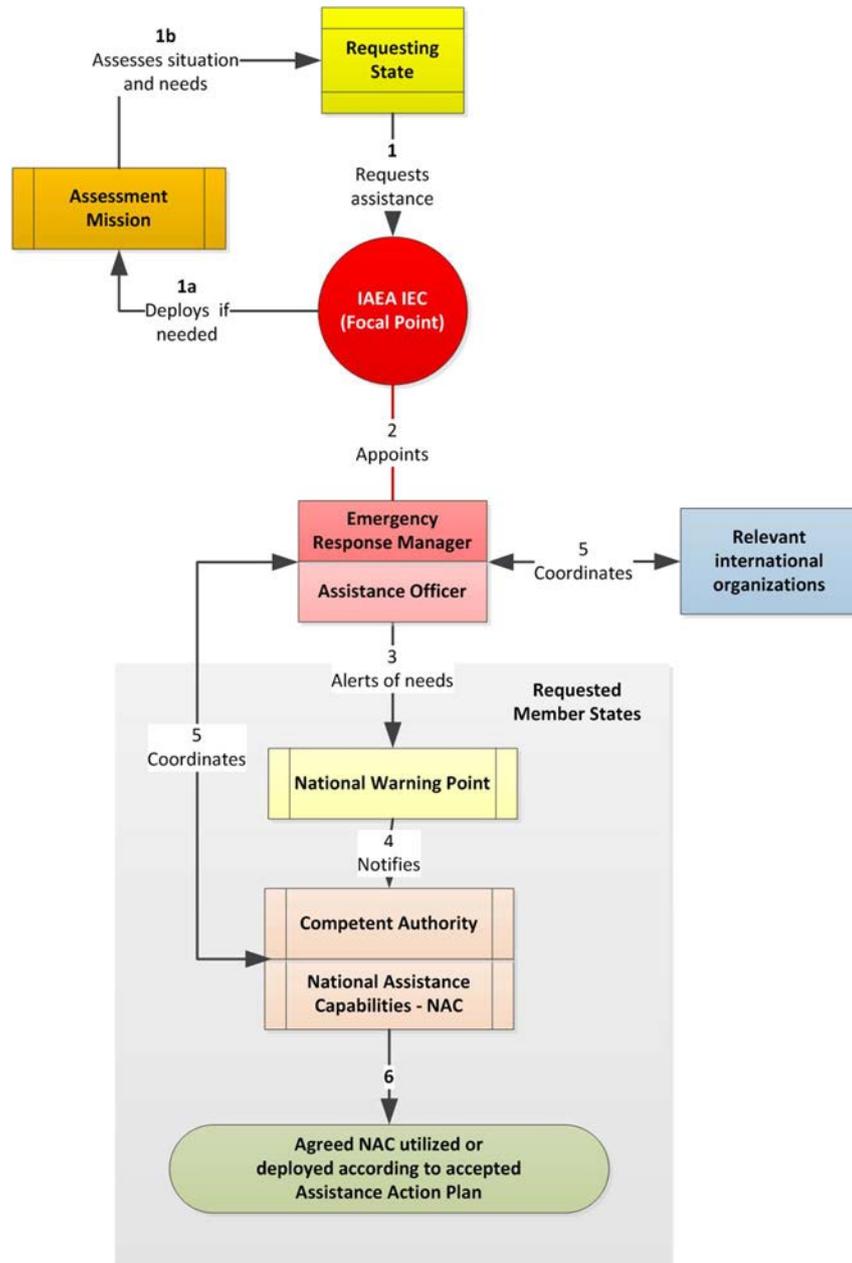


Fig. 1. Outline of the RANET concept. A State sends request for assistance to the IAEA’s IEC (Focal Point) (1). The Emergency Response Manager (ERM) determines the type of assistance required. The ERM appoints Assistant Officer (or team) accordingly. (2). If needed, an IAEA Assessment Mission (1a) is deployed to assess assistance needs (1b). If activation of RANET assets is deemed necessary, Assistance Officer alerts National Warning Point(s) (3), which notifies appropriate Competent Authorities (4). Competent Authorities/NAC coordinator(s) then coordinate provision of assistance with Assistance Officer (5). If appropriate, Assistance Officer also coordinates provision of assistance with relevant international organization(s). Agreed assistance capabilities are utilized or deployed according to the accepted Assistance Action Plan (6).

## 3.2. IAEA Assistance Mission

An Assistance Mission is performed by a group of qualified experts and can be in the form of a Field Assistance Team (FAT), an External Based Support (EBS) or a Joint Assistance Team (JAT) comprising a combination of FAT and/or EBS to provide advice, assessment, medical support, monitoring or other specialized assistance following nuclear or radiological emergencies, regardless of their origin.

The findings from an Assessment Mission, if previously deployed, are incorporated into the Assistance Mission.

Depending on the objectives and scope of the Assistance Mission, the exact nature and title of the mission will be specified in the Assistance Action Plan (AAP) developed and agreed upon for that mission.

Team Leaders (Assistance Mission Leader, FAT Leader(s) and/or EBS Leader(s)) will be identified and agreed upon by all parties to the AAP. The Team Leader(s) will be responsible for all assistance activities and ensure(s) coordination with the requesting State, assisting State(s), the IAEA Secretariat and any External Based Support<sup>8</sup>.

Where an Assistance Mission is implemented as a JAT, the JAT Command, composed of all FAT Leaders, including an IAEA Secretariat representative, manages all on-scene JAT assistance and ensures coordination with the requesting and assisting State(s), any External Based Support(s) and the IAEA Secretariat as appropriate.

The identified Team Leader(s) must have the necessary technical and managerial experience to support and assist the requesting State. The Team Leader(s) also must have the expertise to oversee the operation and the ability to communicate within the given command structure. The person has to:

- Lead and manage the Assistance Mission, FAT or EBS and ensure that all technical tasks are performed according to the AAP;
- Ensure the safety and security of the team members;
- Provide the support needed to achieve the mission's objectives;
- Liaise with and regularly contact the respective Team Leader(s), identified State representatives and the IAEA Secretariat as appropriate.

## 3.3. Assistance Action Plan

An Assistance Action Plan (AAP) for the requested assistance will be developed by the Assistance Officer (or team) in coordination with the requesting State, State(s) providing assistance and, as appropriate, relevant international organization(s). This plan will specify the assistance needed and state whether the assistance will be deployed and/or provided from an external base. The AAP includes all technical, financial, diplomatic, organizational and logistical aspects of the assistance to be provided and is signed by all

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<sup>8</sup> See Appendix G for details.

participating parties, (i.e. requesting State, assisting State(s), IAEA Secretariat and, as appropriate, relevant international organizations).

When developing the AAP, specialized techniques, existing agreements and arrangements/collaboration between the States may be considered in the composition of the Assistance Mission.

The AAP will also specify the composition of the team(s) performing the mission, including the Assistance Mission Leader, EBS Leader and FAT Team Leaders.

The Assistance Mission Leader will be nominated by the IAEA's IEC before deployment, based on agreement among all assisting parties, taking into account the mission objectives and the composition of the team(s).

Upon acceptance of the AAP by the requesting State, the assisting States' Competent Authorities/NAC coordinators will be notified, and activation of NAC resources will be requested. Changes to the AAP must be coordinated with all parties before the changes are implemented.

Details of the AAP are described in Section 5, and an example of an AAP is presented in Appendix B.

### **3.4. NAC activation**

NAC activation will be in accordance with the AAP for an Assistance Mission.

Upon activation, the Team Leader will initiate the development of a mission plan to ensure that the team is able to perform its assigned AAP tasks. Mission planning needs to identify/address:

- The problem;
- The assistance task(s) assigned;
- Known constraints (e.g. safety, security, logistical);
- Equipment needs;
- Personnel needs;
- Other resources (FAT and/or EBS);
- Resource support needs (e.g. aircraft, vehicles, base location, power).

In the case of a JAT, all mission plans are incorporated into the overall JAT mission plan.

Mission planning is a process that will need to continue throughout the mission until all assigned tasks have been completed.

The concept of an Assistance Mission is outlined in Fig. 2.

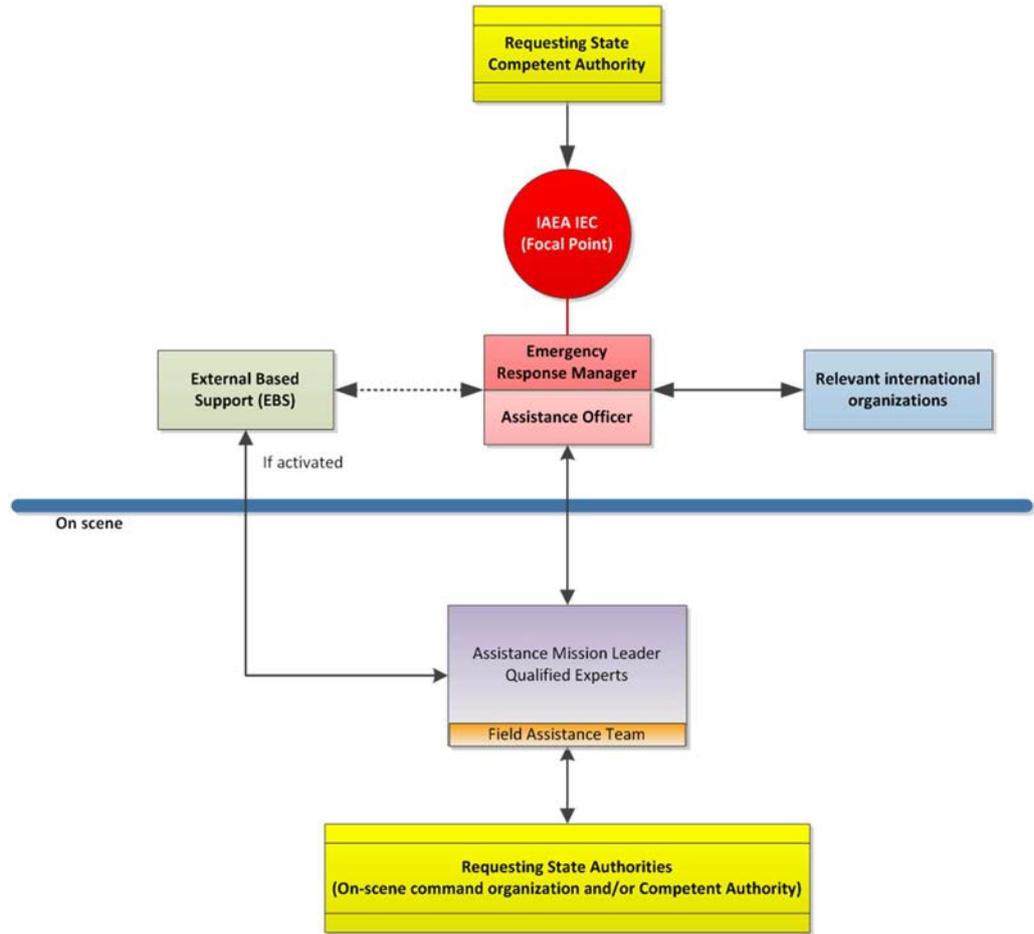


Fig. 2. The concept of an IAEA Assistance Mission.

**3.4.1. Field Assistance Team (FAT)**

A FAT is a group of technically qualified and equipped experts deployed to provide the requested assistance.

A FAT Leader will be identified in the AAP.

**3.4.2. External Based Support (EBS)**

External Based Support provides any reach-back or off-scene capabilities to a requesting State, FAT or JAT. Such support can be expert advice on assessment, monitoring, analytical methods, medical support or other specialized emergency response function. This support is not deployed to the event scene but is provided from another location, such as the assisting party offices, laboratories or other locations.

An EBS Leader will be identified for each activated EBS.

**3.4.3. Joint Assistance Team (JAT)**

In more complex situations, a Joint Assistance Team is formed. The exact nature of the JAT will be specified in the AAP developed and agreed upon for that mission. The JAT consists of all deployed FAT(s) and/or EBS(s).

The coordination of the RANET assistance on the scene is performed by the JAT Command, which is composed of all FAT Leaders. The Assistance Mission Leader, who is identified and agreed upon by all parties to the AAP, performs the role of Chairperson of the JAT Command<sup>9</sup>. The IAEA Secretariat assists the Assistance Mission Leader in the fulfilment of duties, including technical support to deployed assets and liaison with local counterparts, and, if appropriate, provides IAEA Secretariat media expertise in support of the mission. The concept of an Assistance Mission as a Joint Assistance Team is outlined in Fig. 3.

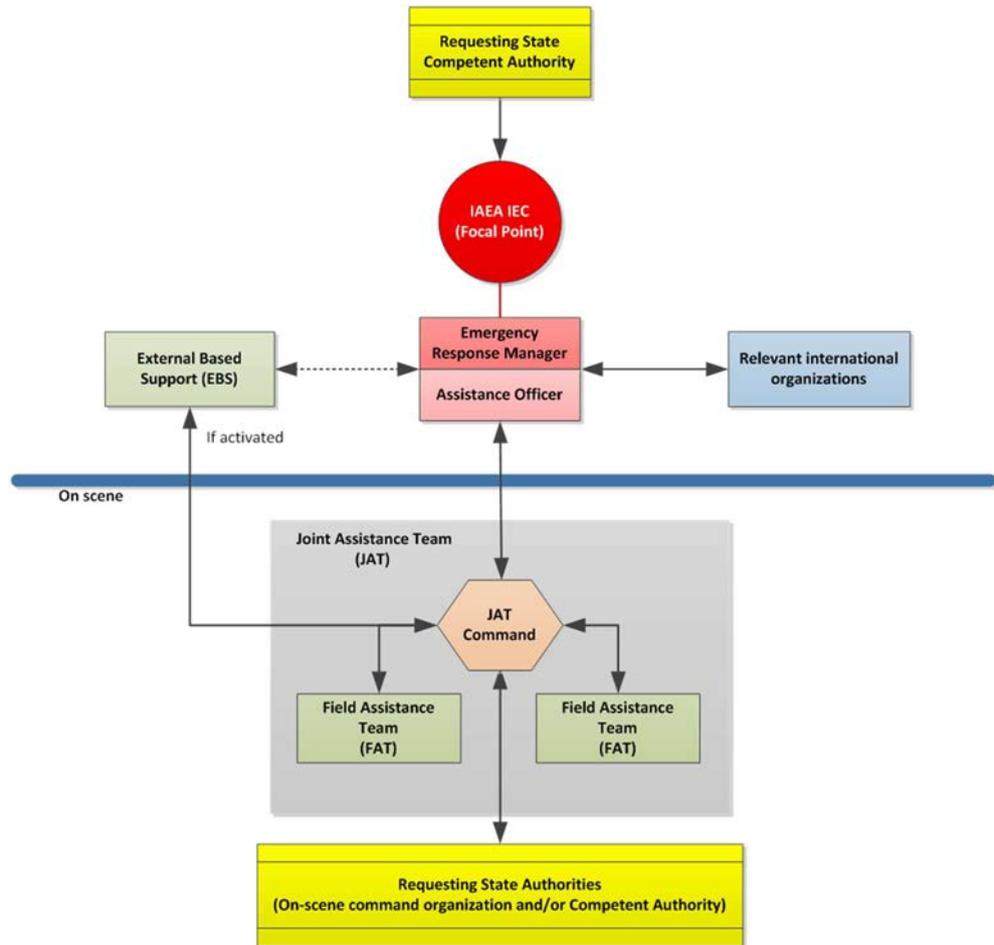


Fig. 3. The concept of an Assistance Mission as a Joint Assistance Team.

### 3.5. Field operational safety and security

The Assistance Mission Leader or the JAT Command implements the activities set by the AAP. They are responsible to ensure that all activities are performed in a safe and secure manner by following procedures, which at a minimum meet the appropriate IAEA safety standards [11] and United Nations Department of Safety and Security (UNDSS) guidance.

<sup>9</sup> See Appendix G for his/her responsibilities and duties.

In an emergency response, priority will be placed on the safety and security of personnel and members of the public. Operations and/or activities in conditions that are unsafe or not secure, or possibly unsafe or not secure, will not be conducted. Where any such situations are identified, the JAT Command or the Assistance Mission Leader will coordinate with the appropriate authorities and entities to identify an acceptable, safe/secure solution for the conduct of the identified activities.

### **3.6. Assistance termination**

The requesting State or any of the assisting parties may at any time, after appropriate consultations and by notification in writing, request the termination of assistance received or provided. Once such a request has been made, the involved parties consult to make arrangements for the proper conclusion of the assistance.

The termination of assistance could be through any of the following:

- All AAP tasks have been certified as completed as per the AAP.
- The requesting State may declare at any time the end of the requested assistance.
- An assisting State may terminate or withdraw its assistance at any time.
- The IAEA may declare at any time the end of assistance due to failure to resolve conditions or practices that are unsafe or not secure, or the failure of the requesting State to comply with the AAP.
- Partial demobilization of resources may occur as the individual AAP tasks are completed.

Upon termination of the assistance, the NAC resources will be demobilized.

### **3.7. Assistance reports**

Upon completion of any assistance, up to two reports may be required: the After Action Assistance Report and the Assistance Report. For smaller missions, the IAEA Secretariat may determine, in consultation with the requesting State, that only an Assistance Report may be required.

#### **3.7.1. After Action Assistance Report**

The Assistance Mission Leader or the JAT Chairperson and the responsible person(s) for the EBS prepare the After Action Assistance Report (AAAR). The AAAR will contain a description of the event, actions taken, recommendations and conclusions. In most instances, the AAAR will be submitted within one week of the termination of the assistance. However, the one week deadline may be extended in major emergencies as agreed by all parties. The AAAR will be submitted to the IAEA Secretariat for distribution to the requesting State and the States providing assistance.

The AAAR will be released upon agreement by the involved parties and the IAEA Secretariat. The AAAR will be distributed to all parties to the AAP.

### 3.7.2. Assistance Report

Within 60 days, the IAEA Secretariat will produce a final Assistance Report in coordination with the requesting State and all involved parties to fully describe the event's history, response actions taken, resolution of the situation, recommendations for future actions (if any) and lessons identified. In cases where the assistance requested and provided was limited (for instance, no Assistance Mission was deployed, only EBS assistance was required), and where it has been determined that a less comprehensive report is sufficient, the IAEA Secretariat may agree to a shorter timeframe for the issuance of the report to all parties involved in the Assistance Mission.

The Assistance Report will be distributed only to the requesting State and the assisting parties (States, international organizations), unless otherwise agreed. Upon agreement by the involved parties and the IAEA Secretariat, the Assistance Report will be distributed to all parties to the AAP.

The IAEA Secretariat will, with the consent of the involved parties, make the Assistance Report available, in confidence, to other members of RANET. The shared version of the Assistance Report may be modified to remove any private or sensitive material as may be required.

The IAEA Secretariat may, with the consent of the involved parties, make a public version of the Assistance Report available.

## 3.8. Financial arrangements

The financial principles of the response operations to a nuclear accident or radiological emergency must be in accordance with Article 7 of the Assistance Convention, and it is expected that these principles will also be applied in the response to other nuclear or radiological emergencies. States offering assistance need to consider any financial requirements in advance and specify the financial requirements in the offer of assistance, as appropriate, taking into account the considerations in Article 7 of the Assistance Convention.

Some financial support for RANET assistance activities may be provided through the IAEA's regular budget or from other IAEA resources. The IAEA may cover the expenses for the initial mobilization and deployment of the Assessment and/or Assistance Mission. If the IAEA cannot cover these initial expenses (for reasons of timing, for example), the States may cover the expenses, which may be reimbursed at a later stage<sup>10</sup>.

States are also responsible for maintaining insurance, or otherwise, without prejudice to Article 10 of the Assistance Convention, assume financial liability, for the responders and the equipment that they deploy.

The IAEA assumes no liability for personnel or equipment of States providing assistance.

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<sup>10</sup> This approach is consistent with the provision of assistance, and associated financial support, to non-Member States as outlined in IAEA Board of Governors documents GOV/2810 and GOV/2818.



## Section

## 4

## 4. NATIONAL ASSISTANCE CAPABILITIES

Article 2, Paragraph 4 of the Assistance Convention states: “*States Parties shall, within the limits of their capabilities, identify and notify the Agency of experts, equipment and materials which could be made available for the provision of assistance to other States Parties in the event of a nuclear accident or radiological emergency as well as the terms, especially financial, under which such assistance could be provided.*”

States Parties may meet this obligation under the Assistance Convention by identifying NACs that could be made available to assist another State and registering them in RANET. NACs consist of qualified experts/expertise, equipment, materials and other resources that can be activated to provide assistance either by deployment to the event scene or from an external base, such as assisting State offices, hospitals, laboratories or other locations. States which register their NACs in RANET may also register additional resources that could be made available to another State.

NACs are registered only through the relevant Competent Authority. Capabilities and resources of private entities being registered in RANET need to be certified and registered through this Competent Authority.

Registration of capabilities in RANET does not automatically obligate the registered State to provide assistance. When requested, the relevant Competent Authority will decide on the availability of its assets and its ability to assist.

States Parties are obliged, and other States encouraged, to identify and report to the IAEA, within the limits of their capabilities, the resources which could be made available for the provision of assistance to a requesting State, as well as the terms under which these resources may be obtained (e.g. through donation, loan or procurement).

States that are not Party to the Assistance Convention are encouraged to identify NACs and register them in RANET.

### 4.1. NAC activities and functional areas

To ensure effective assistance, whether by advice, external based support, and/or deployed assets, NACs may be called upon to, inter alia:

- Assess, advise on and assist in the on-site response activities to mitigate the impact of nuclear or radiological emergencies;

- Search and recover radioactive sources;
- Detect, locate, identify and characterize radioactive material and contamination;
- Assess and evaluate radiological consequences;
- Provide advanced nuclear analyses;
- Provide modelling and prognosis capability;
- Provide technical advice and recommendations;
- Initiate stabilization activities, including, where appropriate, decontamination;
- Provide medical advice and/or consultation, medical assistance as necessary and advice on public health;
- Provide sampling, measurements and analysis.

The technical guidelines in Section 6 define the basis for the development of compatible and integrated NAC resources. Guidelines are given for the following NAC Functional Areas:

- Nuclear Installation Assessment and Advice (NAA);
- Source Search and Recovery (SSR);
- Radiation Survey (RS);
- Sampling and Analysis (SA);
- Radiological Assessment and Advice (RAA);
- Decontamination (DE);
- Medical Support (MS);
- Dose Assessment (DA).

The relevant Competent Authorities needs to review the guidelines to help identify the available expertise and resources that they possess as NACs.

## **4.2. NAC expertise, resources and preparedness**

States registering in RANET identify and register the expertise that they possess as part of their NACs, which could be made available to provide assistance following a nuclear or radiological emergency, regardless of its origin. The Competent Authority ensures that the identified expert(s) is/are suitably qualified and experienced, along with appropriate NAC preparedness, so as to be able to provide international assistance as part of a field deployment and/or EBS.

### **4.2.1. NAC expertise and resources**

Examples of the expertise may be grouped into, but are not limited to, the following:

- Nuclear installation safety;
- Radiation safety;
- Measurement techniques;
- Internal and external dosimetry;
- Radiation medicine;
- Evaluation and assessment;
- Operation of specialized technology;
- Scene management;
- Advanced nuclear analyses.

The NAC expertise is complemented by suitable equipment and materials that are necessary for the delivery of the requested assistance. It is recommended that these resources be identified and registered as part of the NACs.

States are also encouraged to identify and register the resources that they may be able to provide to a requesting State, as well as the terms under which these resources may be obtained (e.g. through donation, loan or procurement).

These may include, but are not limited to:

- Radiation survey instruments;
- Personal dosimetry (active and passive);
- Medical equipment and supplies;
- Measurement systems;
- Personal protective equipment;
- Electrical generators and supplies;
- Cooling and purification systems;
- Criticality control materials;
- Ventilation systems;
- Specialized resources (e.g. robotics, aircraft, shielding);
- General supplies to support field activities.

Where States register resources that may be offered to other States, they are encouraged to provide the necessary details, specifications, method of transportation and estimated quantities of these resources, so that a requesting State can assess the suitability of these resources depending on the nature of the event and the resources that may be required. This additional information may be provided as attachments to the RANET registration form or, once registered, entered directly into the RANET database.

#### **4.2.2. NAC preparedness**

The organization(s) providing assistance need(s) to ensure that all the deployable personnel are/have:

- Fit for duty;
- Valid passports;
- Current immunizations<sup>11</sup>;
- Medically approved physical condition for field operations;
- Pre-approved travel orders (if required by the Competent Authorities);
- Pertinent responder information (blood type, emergency contact, allergies, languages spoken, dosimetry records);
- A signed statement indicating willingness to respond.

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<sup>11</sup> Necessary immunizations vary among countries. It is beneficial that the NACs know what immunizations each of their experts have, so as to be able to assess, at the time, their suitability to participate in an Assistance Mission or JAT.

The assisting organization is expected to provide, if necessary (indicative list):

- Communications equipment;
- Electrical generators to operate the field equipment;
- Food and water for the first 72 hours<sup>12</sup>;
- Personal protective equipment for the first 72 hours;
- Tents, sleeping bags and clothing for bad weather;
- Devices with the capability to record still and video images.

The Competent Authority is also responsible for ensuring that the organizations providing assistance have quality control programmes in place (e.g. documented procedures and instructions for all registered capabilities under RANET). All procedures, manuals and reference data relevant to the work of the NACs need to be maintained up to date and be readily available for use. The following is an indicative list of procedures to be maintained as part of the preparedness programme for the NACs:

- Notification and recall rosters and procedures — to include the process of notification and the telephone/pager numbers of the potential responder personnel;
- Personnel and equipment deployment procedures — to include administrative approvals, financing of travel, insurance, the process of transporting personnel, and packaging of the equipment and its transportation to the assistance location;
- List of deployable equipment — to include shipping information for hazardous material, customs forms (ATA Carnet) and other security related requirements as necessary;
- Procedures for all field response operations — to include the processes that each deployable asset will follow to perform the assigned tasks;
- Emergency Operation Document/Home Team Procedures (however named) for field deployment — to include the process of coordinating and supporting the deployment both logistically and technically<sup>13</sup>;
- Redeployment of personnel and equipment procedures — to include the process of coordinating the transportation of personnel and equipment from the event site to their home base;
- Procedures to ensure adequate protection of the personnel against ionizing radiation.

The assisting organizations and Competent Authority are also expected to identify, in advance, suitable processes through which the NACs can promptly ship equipment and resources between States. NACs that have registered as FAT and/or that have registered resources that could be deployed to provide assistance are encouraged to obtain an ATA Carnet for all resources that may be deployed. An ATA Carnet is an international customs and export–import document that is used to clear customs, in ATA Carnet participating countries, without paying duties and import taxes on the deployed resources. The ATA Carnet system is administered by the World Customs Organization

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<sup>12</sup> Only in cases when infrastructure in stricken area is non-existent/destroyed.

<sup>13</sup> Technical support may include providing technical advice, relaying messages and providing technical data as required.

and is needed to export/import equipment when leaving and returning to the assisting State as well as entering and leaving the requesting State.

A list of documentation examples is provided in Appendix C, and examples of pre-deployment tasks are provided in Appendix G.

### **4.3. NAC readiness**

Each State which is registered in RANET is responsible for ensuring that NAC responding personnel are qualified, trained and equipped to perform the functions for which they have registered.

NACs must use appropriate methods and procedures for the registered competencies, and, where possible, methods selected are to be consistent with the guidance in IAEA publications [12–18] and the International Organization for Standardization [19].

When possible and appropriate, NACs will participate in international exercises such as ConvEx or intercomparison exercises.

Competent Authorities will provide to the IAEA Secretariat information on the effectiveness of the RANET network and on recommendations for improvements. The IAEA Secretariat will distribute this information with envisaged corrective actions to all States registered in RANET and to Assistance Officers within the IAEA's IES.

### **4.4. NAC registration**

#### **4.4.1. Prerequisites for registration**

The following are prerequisites for registration in RANET:

- The Competent Authority authorized to make, and receive requests for and to accept, offers of assistance must submit a completed registration form;
- NAC maintenance, preparedness and response are the responsibility of the State, in accordance with this publication.

#### **4.4.2. Registration**

The applying Competent Authority provides the following information:

- An application signed by the Competent Authority authorized to make and receive requests for, and to accept offers of, assistance;
- Information on National Assistance Capabilities (including description of the expertise and resources) in accordance with the technical guidelines in Section 6;
- A list of the organizations contributing to the NACs, including contact details, so that the IAEA may recognize their contribution to RANET.

Details of the RANET registration and instructions on how to register are presented in Appendix A.

The initial application for the registration needs to be sent to the IAEA Secretariat through the foreign ministry or the permanent mission<sup>14</sup>.

#### **4.4.3. Registration acceptance**

The IAEA Secretariat will review the application in accordance with specifications within this document. If it is deemed that the registration meets the specifications, the proposed NACs will be registered in RANET

If the application does not contain sufficient detail on the NACs or is not complete, the IAEA Secretariat will request the Competent Authority to submit the missing information. If it is determined that the NACs proposed for the RANET cannot be registered, a letter stating the reasons will be provided to the applying Competent Authority.

#### **4.4.4. RANET registry database**

The IAEA's IEC maintains a database of RANET registered NACs (expertise, equipment, materials and/or resources) that could be provided to requesting States and the IAEA Secretariat. The information related to the registered NACs is available through the USIE web site, with due regard to the principle of protection of sensitive information.

#### **4.4.5. Registration update**

Once registered, States have the responsibility to notify the IAEA's IEC if NAC resources and areas of expertise undergo significant changes or become unavailable. Also, any changes regarding the NAC coordinator are to be reported in a timely manner. These changes may be done directly online through the RANET database on USIE.

A State that wishes to discontinue membership in RANET notifies the IAEA's IEC through the official channels.

## **4.5. Registration of private entity resources**

When resources which could be made available for the provision of assistance to a requesting State include those of private entities, Competent Authorities must certify the suitability of any and all private entity resources before registering them in RANET.

Examples of the resources that may be registered include, but are not limited to, the following:

- Radiation survey instruments;
- Personal dosimetry (active and passive);
- Medical equipment and supplies;
- Measurement systems;
- Personal protective equipment;
- Electrical generators and supplies;
- Cooling and purification systems;

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<sup>14</sup> The Competent Authority is encouraged to send an advance copy of the registration directly to the IEC.

- Criticality control materials;
- Ventilation systems;
- Specialized resources (e.g. robotics, aircraft, shielding);
- General supplies to support field activities.

Where States register private entity resources that may be offered to other States, they are encouraged to provide the necessary details, specifications, methods of transportation and estimated quantities of these resources so that a requesting State can assess the suitability of these resources to mitigate the nuclear or radiological emergency depending on the nature of the event and the resources that may be required. If requested by the requesting State, the IAEA Secretariat may also coordinate with the assisting State and the offering State in assessing whether the resources are suitable. This additional information may be provided as attachments to the RANET registration form or, once registered, entered directly into the RANET database.

#### **4.6. RANET NAC Review**

Periodic reviews of registered RANET NACs may be conducted upon request of the State offering the NACs. The review is to be conducted by an IAEA team that may include experts from other States registered in RANET. The review team is endorsed by the State requesting the review.

The objectives of the RANET NAC reviews are to:

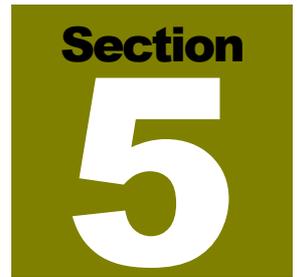
- Ensure that the registered capabilities can be effectively and efficiently utilized and performed as cited in the registration;
- Gather relevant information regarding the NACs so as to best utilize available RANET assets following a request for assistance;
- Review the current level of preparedness to provide international assistance;
- Harmonize international assistance by identifying and sharing examples of good practice;
- Identify improvements for States to enhance the NACs and Competent Authority preparedness to provide international assistance.

In addition, the RANET NAC Review may help States to identify other NAC resources that they may register in RANET.

The review may be performed through observation of the NACs during the conduct of exercises, the provision of assistance, the conduct of RANET Review Missions or a combination thereof. RANET Review Missions may be requested by States that have registered in RANET or are preparing the final stages of registration.

In circumstances where the review determines that a registered NAC may not be at a suitable level to provide international assistance, the NAC will be decertified from RANET. The IAEA Secretariat will provide the Competent Authority with recommendations and required remedial actions, which, if implemented, will ensure that the NAC can be recertified. It is the responsibility of the relevant organization(s) and the Competent Authorities to implement any remedial actions, including the financing of such actions.





## **5. RANET ASSISTANCE ACTION PLAN**

An Assistance Action Plan (AAP) is required for an Assistance Mission, Joint Assistance Team (JAT) and External Based Support (EBS). An AAP is not required for the provision of information or advice.

The AAP will be developed by the Assistance Officer in coordination with the Emergency Response Manager (ERM), the Assistance Mission Leader and the Competent Authorities/NAC coordinator(s) of the requesting State and the assisting State(s). The AAP will be agreed upon by all involved parties.

Upon acceptance of the AAP by the requesting State, the Assistance Officer will notify the Competent Authority(ies)/NAC coordinator(s) of the assisting State(s) and request the activation of NAC resources.

Changes to the AAP will be coordinated with all parties before the changes are implemented.

The instructions for preparing an AAP are set out below. A sample of an AAP is given in Appendix B.

### **5.1. Cover page**

This page will include:

- A title, indicating the name of the State requesting assistance;
- A subtitle, describing briefly the event for which assistance was requested;
- The date on which the plan was prepared;
- The date on which the plan became effective;
- The version number.

### **5.2. Relevant officials page**

This page will include:

- The name and signature of the IAEA official;
- The names, State(s), organization(s) and signature(s) of the assisting State official(s) who agreed to the terms of the AAP;

- The name(s), organization(s) and signature(s) of the representative(s) of the assisting international organization(s) who agreed to the terms of the AAP;
- The name, organization and signature of the requesting State's official who accepted the AAP.

### 5.3. Background

This section will include:

- The names of the State and organization requesting assistance;
- The date on which the IAEA's IEC received the request;
- The date, location and type of event for which assistance was requested;
- A description of what is known to date on the situation;
- The requesting State's status under the Assistance Convention (i.e. Party or non-Party).

### 5.4. Objective and scope

This section will include:

- A description of, and justification for, the type of assistance to be rendered;
- The expected starting and ending dates of the assistance;
- The scope of the assistance;
- Based on initial information, a potential list of activities to be performed; actual tasks, activities and priorities will be determined by on-scene assessments and continued updating of information.

### 5.5. Responsibilities

This section will include the respective responsibilities of the requesting State, the Assistance Mission team, the Assistance Mission Leader, the assisting party(ies) and the IAEA's IEC, as detailed in this publication.

The requesting State will, where applicable:

- Ensure that the AAP will be implemented in a safe and secure manner;
- Provide, as necessary, technical, financial, diplomatic, organizational and logistical support as designated in the AAP for the requested assistance;
- Grant the Assistance Mission team the necessary privileges, immunities and facilities to perform the necessary assistance functions;
- Grant the Assistance Mission team unfettered access to all persons, locations, facilities and information necessary for the successful implementation of the AAP.

The Assistance Mission team will:

- Accomplish the objectives and conduct the activities (overall work plan) set by the AAP;

- Provide the IAEA Secretariat with an authoritative and factual overview of the emergency and make recommendations for any further action(s).

The Assistance Mission Leader will:

- Maintain operational supervision over the Assistance Mission team and the equipment provided by or on behalf of the Assistance Mission team;
- Ensure that all activities are performed in a safe manner;
- Prepare an After Action Assistance Report within one week after completion of assistance.

The assisting party(ies) will:

- Provide the requested assistance, through the IAEA, to the requesting State.

The IAEA's IEC will:

- Prepare an Assistance Report in coordination with all involved parties;
- Serve as the focal point for the provision of the international assistance outlined in this AAP, providing the necessary coordination, administration and support to all parties.

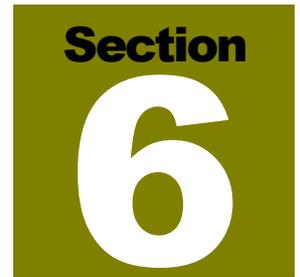
## 5.6. Other sections

The AAP will also have separate sections covering the following:

- Confidentiality of information and materials related to assistance;
- Public information;
- Field operational safety and security;
- Financial arrangements;
- Privileges and immunities;
- Assistance termination;
- Overall work plan reflecting an on-scene assessment to include a list of activities and proposed dates of when each activity will be conducted;
- Annex I: Assistance Mission Team Composition;
- Annex II: Relevant Contact Details.

Annex I includes details of the assisting State Team(s) and the capabilities and resources being utilized during the Assistance Mission. This includes names of the States and organizations providing assistance; and the names of (any) international organizations providing assistance. Annex II includes the names, functions, States and organizations of persons assigned to the Assistance Mission teams.





## 6. TECHNICAL GUIDELINES

National Assistance Capabilities are divided into functional areas. Each functional area is further divided into specific assistance capabilities. For each capability, the following specifications are given:

- Functions;
- Expertise;
- Resources;
- Examples of Products (expected results).

An indicative list of specific medical resources and the minimum equipment specifications are given in Appendices D and E, respectively. To ensure compatible and consistent results of assistance, expected results of assistance are specified in Appendix F and should follow the guidance outlined in EPR-Harmonized Assistance Capabilities 2017 [20].

## 6.1. Functional Area: Nuclear Installation Assessment and Advice

*Following a nuclear emergency at a nuclear installation, assistance may be requested to assess the nature of the event, the plant status and the possible evolution, and to provide advice to assist in the mitigation on the site. The use of specialized equipment and technology, such as robotics and unmanned aerial vehicles, may be required to perform some on-site mitigation tasks in areas that may be inaccessible to humans (e.g. due to high dose rates, high temperatures and unstable environments).*

*The specific type(s) of expertise need to be identified in Section 5 of the RANET Registration Form. For example: PWR, BWR, GCR, PHWR, LWGR, FBR, WWER, research reactor, fuel fabrication and/or fuel processing.*

<b>FAT</b>	primary or supporting function
<b>EBS</b>	primary or supporting function

	<b>Capability NAA-1: Nuclear Power Reactor Design Advice</b>
<b>Functions</b>	To assess the known conditions at a nuclear power reactor facility following an emergency and provide advice, from a design perspective, regarding: the status of the plant, the prognosis of possible evolution, the capabilities of available systems and possible design options for mitigating the situation and maintaining/regaining control of the installation.
<b>Expertise</b>	<p>The FAT and EBS have sufficient competence and experience in the following design areas: reactor/plant design, reactor physics, power and electrical systems, instrumentation and control, thermodynamics and cooling, thermohydraulics, materials behaviour and chemistry/chemical engineering.</p> <p>The EBS may also have sufficient competence and expertise in core and reactor accident modelling.</p>
<b>Resources</b>	<p>Information directly from the installation site and/or from various sources, which may include: plant design details and analysis, piping and instrumentation diagrams, instrument and equipment specifications and environmental qualifications, electrical schematics, technical drawings, design basis calculations and plant safety analysis report.</p> <p>Modelling software and systems to assist in the analysis and assessment of the plant status and different design options considered for mitigation.</p>
<b>Products</b>	<p>A list of key products includes:</p> <ul style="list-style-type: none"> <li>— Assessment of, and/or advice on, plant status;</li> <li>— Assessment of, and/or advice on, possible event evolution;</li> <li>— Advice on any reactor design features that may be utilized to mitigate the situation and maintain/regain control of the installation;</li> <li>— Advice on status of systems if the design basis accident conditions are exceeded.</li> </ul>

	<b>Capability NAA-2: Nuclear Power Reactor Operations Advice</b>
<b>Functions</b>	To assess the known conditions at a nuclear power reactor facility following an emergency and provide advice, from an operational perspective, regarding: the status of the plant, the interpretation of plant data and parameters, the status of safety related equipment, the operability of available systems, the prognosis of possible evolution and operational considerations for mitigating the situation and maintaining/regaining control of the installation.
<b>Expertise</b>	<p>The FAT and EBS have sufficient competence and experience in the operation of the specific type of nuclear power reactor in the following operational areas: reactor/plant operation, reactor physics, radiation protection, plant and equipment maintenance, instrumentation and control, thermodynamics and cooling, thermohydraulics and chemistry/chemical engineering.</p> <p>The EBS may also have sufficient competence in the programming and operation of plant simulators under different accident conditions.</p>
<b>Resources</b>	<p>Information directly from the nuclear power reactor site and/or from various sources, which might include: plant status, data and parameters, plant operation manuals, emergency action levels, severe accident management guidelines, plant design details, piping and instrumentation diagrams, instrument and equipment specifications and environmental qualifications, and electrical schematics.</p> <p>Simulator specific to the design of the nuclear installation.</p>
<b>Products</b>	<p>A list of key products includes:</p> <ul style="list-style-type: none"> <li>– Assessment of, and/or advice on, plant status, operability of available systems, and status of safety related systems;</li> <li>– Assessment of, and/or advice on, possible event evolution;</li> <li>– Advice on operational considerations for mitigating the situation and maintaining/regaining control of the installation.</li> </ul>

**Capability NAA-3: Nuclear Power Reactor Accident Analysis**

<b>Functions</b>	To perform an accident analysis at a nuclear installation based on the known plant status following an emergency to determine the potential event progression, assess potential actions for mitigating the situation and maintaining/regaining control of the installation and perform source term estimations.
<b>Expertise</b>	The FAT and EBS have sufficient competence and experience in performing safety and accident analyses for nuclear installations, the development and application of severe accident management guidelines and the calculation of source terms for different accident conditions at nuclear installations.
<b>Resources</b>	<p>Information directly from the event site and/or from various sources, which might include: plant status, data and parameters, assessments from NAA-1 and NAA-2 capabilities, design basis analysis, beyond design basis analysis, probabilistic safety analysis and success paths, safety analysis report, severe accident management guidelines and emergency plans.</p> <p>Modelling and analysis software and plant simulator specific to the design of the nuclear installation.</p>
<b>Products</b>	<p>A list of key products includes:</p> <ul style="list-style-type: none"> <li>– Advice on recovery/mitigation actions that are based on safety analysis and severe accident management guidelines;</li> <li>– Advice on the calculation of source terms associated with an actual, or potential, radioactive release;</li> <li>– Advice/assessment of potential actions for mitigating the situation and maintaining/regaining control of the installation.</li> </ul>

**Capability NAA-4: Research Reactor Assessment and Advice**

<b>Functions</b>	To assess the known conditions at a research reactor following an emergency and provide advice regarding: the status of the plant, the prognosis of possible event evolution, the capabilities of available systems and possible options for mitigating the situation and maintaining/regaining control of the installation based on the design of the research reactor.
<b>Expertise</b>	<p>The FAT and EBS have sufficient competence and experience in the following areas: research reactor design, reactor physics, power systems, instrumentation and control, thermodynamics and cooling, thermohydraulics, materials behaviour and chemistry/chemical engineering.</p> <p>The EBS may also have sufficient competence and expertise in core and reactor modelling.</p>
<b>Resources</b>	<p>Information directly from the research reactor facility, which might include: reactor design details and analysis, instrumentation and control diagrams, equipment specifications and environmental qualifications.</p> <p>Modelling software and systems to assist in the analysis and assessment of the reactor status and different design options considered for mitigation.</p>
<b>Products</b>	<p>A list of key products includes:</p> <ul style="list-style-type: none"><li>– Assessment of, and/or advice on, reactor status;</li><li>– Assessment of, and/or advice on, event evolution;</li><li>– Advice on design options for mitigating the situation and maintaining/regaining control of the reactor.</li></ul>

<b>Capability NAA-5:</b>	<b>Fuel Fabrication Facility Assessment and Advice</b>
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<b>Functions</b>	To assess and/or advise on the likely condition of nuclear material during an event involving the fuel fabrication process, including: criticality hazard analysis, chemical and radiological hazard assessment, advice related to the handling of UF <sub>6</sub> during an emergency, and suitable mitigation actions that may be required to maintain/regain control of a situation or protect the local population.
<b>Expertise</b>	The FAT and EBS have sufficient competence and experience in the design of fuel assemblies, processes involved in fuel fabrication, UF <sub>6</sub> management, fuel fabrication techniques/processes and criticality accident analysis.
<b>Resources</b>	<p>Information directly from the event site and/or from various sources, which might include: design drawings of fuel handling/fabrication facilities, design drawings of fuel assemblies and storage facilities, inventory of fresh fuel or related fabrication material and details regarding the specific technologies used at that facility.</p> <p>Software systems for performing calculations of source terms and criticality analysis.</p>
<b>Products</b>	<p>A list of key products includes:</p> <ul style="list-style-type: none"> <li>– Assessment of, and/or advice on, fuel conditions during fabrication;</li> <li>– Advice on fuel fabrication material behaviour and management;</li> <li>– Criticality calculations;</li> <li>– Chemical toxicity vs. radiological toxicity calculations;</li> <li>– Advice on handling UF<sub>6</sub>;</li> <li>– Source term calculations;</li> <li>– Advice on mitigating the situation and maintaining/regaining control of the installation.</li> </ul>

**Capability NAA-6: Spent Fuel Storage Assessment and Advice**

<b>Functions</b>	To assess and/or advise on the likely condition of nuclear material during an event with spent nuclear fuel in wet or dry storage, including: determining potential release source terms, thermal output, proper handling of material during an emergency and suitable mitigation actions that may be required to maintain/regain control of a situation.
<b>Expertise</b>	The FAT and EBS have sufficient competence and experience in the design of fuel assemblies, design of wet and dry storage containers and facilities, calculation of thermal loads and requisite countermeasures, handling techniques/processes and criticality accident analysis.
<b>Resources</b>	<p>Information directly from the event site and/or from various sources, which might include: design drawings of fuel handling equipment, design drawings of fuel assemblies and storage facilities, inventory of fresh and spent fuel, thermal output and thermal management capabilities.</p> <p>Software systems for performing calculations of source terms, criticality analysis and thermal evaluation.</p>
<b>Products</b>	<p>A list of key products includes:</p> <ul style="list-style-type: none"> <li>– Assessment of, and/or advice on, fuel conditions during storage (wet or dry);</li> <li>– Assessment of, and/or advice on, thermal output and required cooling capability;</li> <li>– Assessment of, and/or advice on, the container structure condition after a physical event (such as a building collapse or damage from a vehicle);</li> <li>– Criticality calculations;</li> <li>– Chemical toxicity vs. radiological toxicity calculations;</li> <li>– Source term calculations;</li> <li>– Advice on mitigating the situation and maintaining/regaining control of a storage installation.</li> </ul>

<b>Capability NAA-7:</b>	<b>Spent Fuel Reprocessing Assessment and Advice</b>
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<b>Functions</b>	To assess and/or advise on the likely conditions at a spent fuel reprocessing facility during an event, including: criticality hazard analysis, chemical and radiological hazard assessment, advice related to the handling of chemicals used in the reprocessing process during an emergency, and suitable mitigation actions that may be required to maintain/regain control of a situation or protect the local population.
<b>Expertise</b>	The FAT and EBS have sufficient competence and experience in the design of spent fuel reprocessing facilities, the chemical processes used in reprocessing, equipment involved in reprocessing, determining requisite countermeasures for accident scenarios and handling techniques for materials at different stages in the reprocessing process.
<b>Resources</b>	<p>Information directly from the event site and/or from various sources, which may include: facility layout, technical elements of the reprocessing process employed and readings from chemical management control systems.</p> <p>Software systems for performing calculations of source terms, criticality analysis and thermal evaluation.</p>
<b>Products</b>	<p>A list of key products includes:</p> <ul style="list-style-type: none"> <li>– Assessment of, and/or advice on, fuel/material conditions during different stages of the reprocessing process;</li> <li>– Advice on material behaviour and management;</li> <li>– Criticality calculations;</li> <li>– Chemical toxicity vs. radiological toxicity calculations;</li> <li>– Source term calculations;</li> <li>– Advice on mitigating the situation and maintaining/regaining control of the installation.</li> </ul>

	<b>Capability NAA-8:</b>	<b>Operation of Specialized Technology</b>
<b>Functions</b>	<p>To provide assistance through the operation of specialized equipment and technology, such as robotics and unmanned aerial vehicles, which may be required to perform some on-site mitigation tasks in areas that may be inaccessible to humans (e.g. due to high dose rates, high temperatures and unstable environments).</p> <p>Note: the use of this capability may also be applied to high activity source recovery operations.</p>	
<b>Expertise</b>	<p>The FAT has sufficient competence and experience in the programming and/or operation of specialized technology, such as remotely controlled equipment, robotics and unmanned aerial vehicles. Operators of robotics have the necessary training and ability to perform detailed manipulations through the use of remote control stations and cameras. The FAT expertise may also include design engineers and maintenance staff, who may be required to perform on-site maintenance and/or modifications to the equipment as per the needs of the emergency.</p> <p>The EBS includes support staff and designers who could provide support to the FAT with respect to the utilization and operation of the equipment.</p>	
<b>Resources</b>	<p>The FAT needs to be equipped with specialized equipment such as: remotely controlled equipment, robotics, unmanned aerial vehicles, etc. The type of equipment will depend upon the requested assistance.</p> <p>In general, the ground based resources need to be capable of operating in extreme conditions, such as high radiation, high and low temperatures and high humidity. It is recommended that the equipment have the capability to be remotely controlled and fitted with cameras that are capable of operating in very high dose rate environments, so that the operators can view the surrounding areas and perform the required tasks.</p> <p>FATs working in areas of elevated radiation will also require personal dosimetry and appropriate personal protective equipment.</p>	
<b>Products</b>	<p>A list of key products includes:</p> <ul style="list-style-type: none"> <li>— Operation of specialized technology to remotely perform tasks to assist in the on-site mitigation following a nuclear or radiological emergency.</li> </ul>	

## 6.2. Functional Area: Source Search and Recovery

*Search and recovery of lost or stolen radioactive sources and/or sources out of regulatory control, or screening areas for sources that may have been placed for malicious purposes; provision of advice and/or assistance in source recovery, transportation and safe and secure storage of the source(s), including organizing and/or conducting source recovery operations, if requested.*

<b>FAT</b>	primary function
<b>EBS</b>	supporting function (optional)

	<b>Capability SSR-1:</b>	<b>Foot/Manual/Ground Based Search</b>
<b>Functions</b>	To search or screen by walking through areas or buildings with appropriate portable radiation detection/survey instruments in order to detect, locate and identify radioactive source(s) or material and estimate the activity.	
<b>Expertise</b>	<p>The FAT has sufficient competence and experience in the following areas: use of equipment for the detection and identification of radioactive sources, data mapping, contamination assessment, intervention in areas with high dose rates, radiation protection and health physics, and contamination monitoring for personnel and equipment.</p> <p>The EBS has sufficient expertise for providing technical and operational advice and support in developing the search plan and evaluation of the search, including interpretation of spectrometric results.</p>	
<b>Resources</b>	The actual equipment and staffing of the FAT when deployed will depend on the assistance requested. The following is an indicative list of equipment for foot/manual/ground based source search and screening:	
<i>Radiation survey instruments</i>	Multipurpose gamma/beta survey monitor, telescopic gamma probe, alpha/beta contamination monitor, personal contamination monitor, personal dosimetry, neutron dose rate meter, hand-held radionuclide identifier, neutron fission meter;	
<i>Specialized equipment</i>	None;	
<i>General equipment and supplies</i>	Communication equipment (portable radio, phone), GPS, binoculars, personal protection equipment, maps.	
<b>Products</b>	<p>A list of key products includes:</p> <ul style="list-style-type: none"> <li>— Source location or confirmation of the absence of a source;</li> <li>— Data mapping;</li> <li>— Source identification and estimated activity;</li> <li>— Confirmation of the presence or absence of contamination;</li> <li>— Recommendations on follow-up actions.</li> </ul>	

	<b>Capability SSR-2:</b>	<b>Vehicle Based Search</b>
<b>Functions</b>	To search or screen an extended area using vehicle borne radiation detection/survey instruments in order to detect, locate and/or identify radioactive source(s) or material and estimate the activity.	
<b>Expertise</b>	<p>The FAT has sufficient competence and experience in the following areas: use of portable and vehicle based equipment for the detection and identification of radioactive sources and material, data mapping, contamination assessment, radiation protection and health physics, and contamination monitoring for personnel and equipment.</p> <p>The EBS has sufficient expertise for providing technical and operational advice and support in developing the search plan and evaluation of the search, including interpretation of spectrometric results.</p>	
<b>Resources</b>	The actual equipment and staffing of the FAT when deployed will depend on the assistance requested. The following is an indicative list of equipment for vehicle based source search and screening:	
<i>Radiation survey instruments</i>	Vehicle borne gamma dose rate and/or spectrometric survey system, multipurpose gamma/beta survey monitor, personal dosimetry, neutron dose rate meter, hand-held radionuclide identifier;	
<i>Specialized equipment</i>	Suitable vehicle;	
<i>General equipment and supplies</i>	Communication equipment (portable radio, phone), GPS, computer, GPS mapping capability, automatic data transfer capability.	
<b>Products</b>	<p>A list of key products includes:</p> <ul style="list-style-type: none"> <li>– Source location or confirmation of the absence of a source;</li> <li>– Data mapping;</li> <li>– Source identification and estimated activity;</li> <li>– Confirmation of the presence or absence of contamination;</li> <li>– Advice on follow-up actions.</li> </ul>	

**Capability SSR-3:****Aerial Search****Functions**

To search or screen a wide area using airborne (rotary or fixed wing aircraft, including unmanned aircraft) radiation detection/survey instruments in order to detect, locate and/or identify radioactive source(s) and estimate the activity.

**Expertise**

The FAT has sufficient competence and experience in the following areas: airborne gamma spectrometry, airborne dose rate monitoring, data mapping, adapting the measuring technique to the aircraft, operating systems under flying conditions, contamination assessment, basic radiation protection and health physics.

The EBS has sufficient expertise for providing technical and operational advice and support in developing the search plan and evaluation of the search, including interpretation of spectrometric results.

**Resources**

The actual equipment and staffing of the FAT when deployed will depend on the assistance requested. The following is an indicative list of equipment for airborne source search and screening:

*Radiation survey instruments*

Airborne gamma dose rate and/or spectrometric survey system (high sensitivity detectors) with adequate calibration for determining ground depositions and the gamma dose rate values associated with the ground depositions;

*Specialized equipment*

Fixed wing aircraft and/or rotary wing aircraft or unmanned aircraft (if appropriate) with proper qualified/certified pilot(s)/operator(s);

*General equipment and supplies*

Computer, GPS mapping capability, capability for the evaluation and analysis of measurement data, automatic data transfer capability, video camera for recording of the survey synchronized with the monitoring equipment.

**Products**

A list of key products includes:

- Source location or confirmation of the absence of a source;
- Data mapping;
- Source identification and estimated activity;
- Confirmation of the presence or absence of contamination;
- Advice on follow-up actions.

	<b>Capability SSR-4:</b>	<b>Maritime Search</b>
<b>Functions</b>	To search or screen a vessel, including its cargo, either in a port or at sea, on lakes, rivers, etc., using radiation detection/survey equipment and, if necessary, specialized equipment in order to detect, locate and identify radioactive source(s) and material and estimate the activity.	
<b>Expertise</b>	<p>The FAT has sufficient competence and experience in the following areas: use of equipment for the detection and identification of radioactive sources, data mapping, contamination assessment, radiation protection and health physics, intervention in areas with high dose rates, contamination monitoring for personnel and equipment, and shipboard safety measures.</p> <p>The EBS has sufficient expertise for providing technical and operational advice and support in developing the search plan and evaluation of the search, including interpretation of spectrometric results.</p>	
<b>Resources</b>	The actual equipment and staffing of the FAT when deployed will depend on the assistance requested. The following is an indicative list of equipment for maritime source search and screening:	
<i>Radiation survey instruments</i>	Multipurpose gamma/beta survey monitor, telescopic gamma probe, alpha/beta contamination monitor, personal contamination monitor, personal dosimetry, neutron dose rate meter, hand-held radionuclide identifier, neutron fission meter;	
<i>Specialized equipment</i>	Remotely controlled equipment, robotics, unmanned aerial vehicles;	
<i>General equipment and supplies</i>	Communication equipment (portable radio, phone), computer, personal protection equipment, plan of the vessel.	
<b>Products</b>	<p>A list of key products includes:</p> <ul style="list-style-type: none"> <li>– Source location or confirmation of the absence of a source;</li> <li>– Data mapping;</li> <li>– Source identification and estimated activity;</li> <li>– Confirmation of the presence or absence of contamination;</li> <li>– Advice on follow-up actions.</li> </ul>	

	<b>Capability SSR-5:</b>	<b>Source Recovery</b>
<b>Functions</b>	To advise on and/or assist in source recovery, transportation and safe and secure storage and/or the conduct of source recovery operations.	
<b>Expertise</b>	<p>The FAT has sufficient competence and experience in the following areas: dose rate monitoring, contamination monitoring (including personnel and equipment), design and use of industrial and medical sources, intervention in areas with high dose rates, radiation protection and health physics, recovery techniques including shielding, handling and transportation of radioactive sources and nuclear/radioactive material.</p> <p>The EBS has sufficient expertise for providing technical and operational advice and support in developing the recovery plan and to recommend specialized equipment.</p>	
<b>Resources</b>	The actual equipment and staffing of the FAT when deployed will depend on the assistance requested. The following is an indicative list of equipment for source recovery:	
<i>Radiation survey instruments</i>	Multipurpose gamma/beta survey monitor, telescopic gamma probe, alpha/beta contamination monitor, personal contamination monitor, personal dosimetry, neutron dose rate meter, hand-held radionuclide identifier;	
<i>Specialized equipment</i>	Telescopic manipulators, source shielding containers, simple robot with remote control;	
<i>General equipment and supplies</i>	Communication equipment (portable radio, phone), binoculars, personal protection equipment.	
<b>Products</b>	<p>A list of key products includes:</p> <ul style="list-style-type: none"> <li>— A source recovery plan;</li> <li>— Safe and secure source transportation and storage plan;</li> <li>— Safely recovered source;</li> <li>— Confirmation of the presence or absence of contamination;</li> <li>— Advice on follow-up actions.</li> </ul>	

### 6.3. Functional Area: Radiation Survey

*Monitoring and screening of areas, buildings, equipment, objects and/or persons for radioactive contamination in order to identify the need for and the extent of protective and other actions. Specifically, radiation survey includes: measurements of dose rates, measurements of contamination levels, identification of radionuclides, and quantification of activity concentrations. It also includes scene control in a nuclear or radiological emergency, regardless of its origin.*

<b>FAT</b>	primary function
<b>EBS</b>	supporting function (optional)

**Capability RS-1: Foot/Manual/Ground Based Survey**

**Functions** To detect, locate and demarcate contaminated area(s) or area(s) with elevated dose rates; to screen for radionuclides in support of major public events; to identify radionuclides; to survey persons, equipment and other objects for radioactive contamination.

**Expertise A** The FAT has sufficient competence and experience within the following areas: radiation monitoring techniques, contamination monitoring techniques, mapping of radioactive contamination, identification of radionuclides, screening strategies for radionuclides in support of major public events, operational and technical requirements for radiation/advanced nuclear analyses, contamination control, basic radiation protection and health physics.

**Expertise B** The EBS has sufficient expertise for providing technical and operational advice on survey strategies, interpretation of the monitoring results including interpretation of spectrometric results, and recommendations on protective and other actions.

In the case of (an) actual or suspected malicious act(s), the FAT has sufficient competence and experience in radiation safety and radiation control procedures in a crime scene environment.

In the case of (an) actual or suspected malicious act(s), the FAT includes crime scene recorders and custodians experienced in preparing an evidence collection plan that specifies:

- What is to be collected;
- How it is to be collected;
- By whom it is to be collected;
- What packaging is necessary for the collected evidence;
- Where and how the collected evidence is to be transported.

**Resources** The actual equipment and staffing of the FAT when deployed will depend on the assistance requested. The following is an indicative list of equipment for a foot/manual/ground based survey:

<i>Radiation survey instruments</i>	Energy compensated gamma dose rate meter, multipurpose gamma/beta survey monitor, alpha/beta contamination monitor, personal contamination monitor, personal dosimetry, neutron dose rate meter, hand-held radionuclide identifier, neutron fission meter;
<i>Specialized equipment</i>	None;
<i>General equipment and supplies</i>	Communication equipment (portable radio, phone), GPS, personal protection equipment, maps, GIS software, camera.

**Products**

A list of key products includes:

- Dose rate map(s);
- Contamination map(s);
- Location, level and type of surface contamination on persons, equipment and/or objects;
- Advice on follow-up actions.

In the case of (an) actual or suspected malicious act(s), key products may also include:

- Evidence collection plan;
- Advice on implementing an evidence collection plan.

	<b>Capability RS-2:</b>	<b>In Situ Gamma Spectrometry</b>
<b>Functions</b>	To identify and quantify gamma emitting radionuclides in the environment.	
<b>Expertise A</b>	<p>The FAT has sufficient competence and experience within the following areas: in situ gamma spectrometry, radiation monitoring techniques, contamination monitoring techniques, contamination control, basic radiation protection and health physics.</p> <p>The EBS has sufficient expertise for providing technical and operational advice on survey strategies, interpretation of the monitoring results including interpretation of spectrometric results (including in situ gamma spectrometry results) and recommendations on protective and other actions.</p>	
<b>Expertise B</b>	<p>In the case of (an) actual or suspected malicious act(s), the FAT has sufficient competence and experience in radiation safety and radiation control procedures in a crime scene environment.</p> <p>In the case of (an) actual or suspected malicious act(s), the FAT includes crime scene recorders and custodians experienced in preparing an evidence collection plan that specifies:</p> <ul style="list-style-type: none"> <li>– What is to be collected;</li> <li>– How it is to be collected;</li> <li>– By whom it is to be collected;</li> <li>– What packaging is necessary for the collected evidence;</li> <li>– Where and how the collected evidence is to be transported.</li> </ul>	
<b>Resources</b>	The actual equipment and staffing of a FAT when deployed will depend on the assistance requested. The following is an indicative list of equipment for undertaking in situ gamma spectrometry:	
<i>Radiation survey instruments</i>	In situ gamma spectrometry system, multipurpose gamma/beta survey monitor, alpha/beta contamination monitor, a personal contamination monitor, personal dosimetry;	
<i>Specialized equipment</i>	Liquid nitrogen if necessary;	
<i>General equipment and supplies</i>	Communication equipment (portable radio, phone), GPS, computer, personal protection equipment, maps, evaluation software for contamination.	
<b>Products</b>	<p>A list of key products includes:</p> <ul style="list-style-type: none"> <li>– Radionuclides identified in ground deposition;</li> <li>– Ground deposition of specific radionuclides at selected location(s);</li> <li>– Contamination map(s);</li> <li>– Advice on follow-up actions.</li> </ul> <p>In the case of (an) actual or suspected malicious act(s), key products may also include:</p> <ul style="list-style-type: none"> <li>– Evidence collection plan;</li> <li>– Advice on implementing an evidence collection plan.</li> </ul>	

**Capability RS-3:****Vehicle Based Survey****Functions**

To detect, locate and demarcate (an) extended contaminated area(s) or area(s) with elevated dose rates using vehicle borne radiation detection/survey instruments; to screen and identify radionuclides in the environment.

**Expertise A**

The FAT has sufficient competence and experience within the following areas: portable and vehicle based radiation monitoring techniques, contamination monitoring techniques, contamination mapping, contamination control, identification of radionuclides, basic radiation protection and health physics.

The EBS has sufficient expertise for providing technical and operational advice on survey strategies, interpretation of the monitoring results including interpretation of spectrometric results, contamination maps and recommendations on protective and other actions.

**Expertise B**

In the case of (an) actual or suspected malicious act(s), the FAT has sufficient competence and experience in radiation safety and radiation control procedures in a crime scene environment.

In the case of (an) actual or suspected malicious act(s), the FAT includes crime scene recorders and custodians experienced in preparing an evidence collection plan that specifies:

- What is to be collected;
- How it is to be collected;
- By whom it is to be collected;
- What packaging is necessary for the collected evidence;
- Where and how the collected evidence is to be transported.

**Resources**

The actual equipment and staffing of the FAT when deployed will depend on the assistance requested. The following is an indicative list of equipment for a vehicle based survey:

*Radiation survey instruments*

Vehicle borne gamma dose rate and/or a spectrometric survey system, multipurpose gamma/beta survey monitor, neutron dose rate meter, hand-held radionuclide identifier, personal dosimetry;

*Specialized equipment  
General equipment  
and supplies*

Suitable vehicle;

Communication equipment (portable radio, phone), GPS, computer, GPS mapping capability, data transfer capability.

**Products**

A list of key products includes:

- Dose rate map(s);
- Contamination map(s);
- Ground deposition of specific radionuclides;
- Advice on follow-up actions.

In the case of an actual or suspected malicious act(s), key products may also include:

- Evidence collection plan;
- Advice on implementing an evidence collection plan.

	<b>Capability RS-4:</b>	<b>Aerial Based Survey</b>
<b>Functions</b>	To detect, locate and demarcate (a) wide contaminated area(s) or area(s) with elevated dose rates using rotary or fixed wing aircraft (including unmanned aircraft) and airborne radiation detection/survey instruments; to screen and identify radionuclides in the environment.	
<b>Expertise</b>	<p>The FAT has sufficient competence and experience within the following areas: airborne gamma spectrometry, airborne dose rate monitoring, dose rate and/or contamination mapping, contamination assessment, basic radiation protection and health physics.</p> <p>The EBS has sufficient expertise for providing technical and operational advice on survey strategies, interpretation of the monitoring results including spectral analysis and evaluation, contamination maps and recommendations on protective and other actions.</p>	
<b>Resources</b>	The actual equipment and staffing of the FAT when deployed will depend on the assistance requested. The following is an indicative list of equipment for an airborne survey:	
<i>Radiation survey instruments</i>	Airborne gamma dose rate and/or spectrometric survey system (suitable sensitivity detectors);	
<i>Specialized equipment</i>	Fixed wing aircraft and/or a rotary wing aircraft or unmanned aircraft (if appropriate) with proper qualified/certified pilot(s)/operator(s);	
<i>General equipment and supplies</i>	Notebook, GPS mapping capability, capability for the evaluation and analysis of measurement data, data transfer capability, video camera oriented towards the terrain and synchronized with the monitoring equipment.	
<b>Products</b>	<p>A list of key products includes:</p> <ul style="list-style-type: none"> <li>– Dose rate map(s);</li> <li>– Contamination map(s);</li> <li>– Ground deposition of specific radionuclides;</li> <li>– Advice on follow-up actions.</li> </ul>	

**Capability RS-5:****Scene Control****Functions**

To provide guidance on mitigating the consequences of an emergency and implementing response actions at the scene; manage access into, within and out of a radiological event scene; ensure the following activities are performed, with attention to ensuring protection of the public and of response personnel: perimeter security, traffic control and access control.

In the case of (an) actual or suspected malicious act(s), to provide advice and guidance to secure the nuclear or other radioactive material at the scene; ensure that the release of a crime scene (after the collection of evidence has been completed) does not pose any radiological health hazards; ensure that a decision to release a crime scene for unrestricted use takes account of radiological and health hazard criteria, as required by the relevant Competent Authority and consistent with relevant laws and regulations.

**Expertise A**

The FAT is composed of perimeter security law enforcement, traffic control, radiation safety and radiation control personnel with knowledge and experience in applying specific procedures.

**Expertise B**

In the case of (an) actual or suspected malicious act(s), the FAT has sufficient competence and experience in scene control, radiation safety and radiation control procedures in a crime scene environment.

**Resources**

The actual staffing and equipment for the FAT will depend on the size of the scene, the radionuclides involved and conditions at the scene. In the case of (an) actual or suspected malicious act(s), resources are also dependent on whether the crime scene is released for restricted or unrestricted use.

In addition to basic law enforcement items to cordon off the area and maintain communication, equipment will include:

- Radiation detection instruments;
- Personal protective equipment (PPE);
- Decontamination equipment;
- Packaging and transport containers;
- Manipulators for remotely moving objects;
- Specialized equipment for examining objects, such as portable X ray units

In the case of (an) actual or suspected malicious act(s), equipment may also include:

- Manipulators for remotely handling evidence, packaging (for evidence) and transport containers (for evidence).

**Products**

Key products include:

- Advice on actions required to establish and maintain effective control over the nuclear or other radioactive material associated with the radiological scene;
- Advice on actions required to reduce any radiation hazard and other hazards posed to the general public, and to those personnel who need access to the scene;
- Advice regarding any continued radiation health hazards associated with the scene and if any, what protective actions are required to mitigate the hazards in order to enable the release of the scene for restricted or unrestricted use.

In the case of (an) actual or suspected malicious act(s), key products also include:

- A list of who had scene access, for what purpose and for how long;
- Advice on preservation of potential evidentiary items, both those that contain nuclear or other radioactive material and those not containing such material;
- Advice on establishing and maintaining effective control over the nuclear or other radioactive material associated with the radiological crime scene;
- Advice on actions required to reduce any radiation hazard and other hazards posed to those personnel who need access to the scene for evidence collection and scene security;
- Advice on any continued radiation health hazards associated with the crime scene and, if any, advice on protective actions required to mitigate the hazards in order to enable the release of the crime scene for restricted or unrestricted use;
- Recommendation (from law enforcement, radiation safety and radiation control personnel) to the Competent Authority regarding release of the crime scene once all evidence has been collected.

## 6.4. Functional Area: Sampling and Analysis

*Sampling of environmental media and nuclear or other radioactive material for analysis in fixed or mobile laboratories; identification and quantification of specific radionuclides; sample preparation, measurements and analysis in a fixed or mobile laboratory; examination of nuclear or other radioactive material, or of evidence that is contaminated with radionuclides. Also includes analysis of nuclear or other radioactive material to identify what the materials are; how, when and where they were made; and their intended use.*

<b>FAT</b>	primary function
<b>EBS</b>	supporting function (optional)

	<b>Capability SA-1:</b>	<b>Environmental Sampling</b>
<b>Functions</b>	To gather environmental samples such as air, soil, water, sediments, dietary products and other human food and pasture for subsequent laboratory measurements and analysis.	
<b>Expertise</b>	<p>The FAT has sufficient competence and experience within the following areas: sampling strategies, sampling techniques, sample types, sampling locations, sample handling and sample transportation, contamination control, basic radiation protection and health physics.</p> <p>The EBS has sufficient expertise for providing technical and operational advice on sampling strategies, sampling techniques, sample types, sampling locations, sample handling and sample transportation.</p>	
<b>Resources</b>	<p>The actual equipment and staffing of FAT when deployed will depend on the assistance requested. The following is an indicative list of equipment for environmental sampling:</p>	
<i>Radiation survey instruments</i>	Multipurpose gamma/beta survey monitor, alpha/beta contamination monitor, personal contamination monitor, personal dosimetry;	
<i>Specialized equipment</i>	Sampling equipment;	
<i>General equipment and supplies</i>	Communication equipment (portable radio, phone), GPS, GPS mapping capability, maps, packaging for sample material, labels, transportation if needed to be sent to another location.	
<b>Products</b>	<p>A key product is:</p> <ul style="list-style-type: none"> <li>– Environmental samples properly packaged and labelled.</li> </ul>	

**Capability SA-2:****Gamma Spectrometry****Functions**

To prepare samples for measurements and measure concentrations of gamma emitting radionuclides in the environmental samples using fixed or mobile radiation laboratory(ies).

**Expertise**

The EBS and/or FAT have sufficient competence and experience in the following areas: sample preparation techniques for gamma spectrometry, laboratory gamma spectrometry, contamination control and basic radiation protection.

**Resources**

The actual equipment and staffing will depend on the assistance requested. The following is an indicative list of equipment for gamma spectrometry:

*Radiation survey instruments*

Gamma spectrometers (mobile or fixed);

*Specialized equipment*

Spectrometer shielding, sample preparation equipment, analysing and evaluation software, reference gamma point sources, liquid nitrogen.

*General equipment and supplies*

Computers, Internet connection.

**Products**

A key product is:

- Gamma emitting radionuclide concentrations in the environmental samples.

**Capability SA-3:****Alpha Spectrometry****Functions**

To prepare samples for measurements and determine concentrations of alpha emitting radionuclides in the environmental samples using fixed or mobile radiation laboratory(ies).

**Expertise**

The EBS and/or FAT have sufficient competence and experience in the following areas: sample preparation techniques for alpha spectrometry, radiochemistry techniques, alpha spectrometry, contamination control and basic radiation protection.

**Resources**

The actual equipment and staffing will depend on the assistance requested. The following is an indicative list of equipment for alpha spectrometry:

*Radiation survey instruments*

Alpha spectrometers;

*Specialized equipment*

Spectrometer shielding, sample preparation equipment, analysing and evaluation software, reference alpha sources;

*General equipment and supplies*

Computers, Internet connection.

**Products**

A key product is:

- Alpha emitting radionuclide concentrations in the environmental samples.

	<b>Capability SA-4:</b>	<b>Beta Counting</b>
<b>Functions</b>	To prepare samples for measurements and determine concentrations of beta emitting radionuclides in the environmental samples using fixed or mobile radiation laboratory(ies).	
<b>Expertise</b>	The EBS and/or FAT have sufficient competence and experience within the following areas: sample preparation techniques for beta counting, radiochemistry techniques, beta counting, contamination control and basic radiation protection.	
<b>Resources</b>	The actual equipment and staffing of EBS and FAT will depend on the assistance requested. The following is an indicative list of equipment for beta counting:	
<i>Radiation survey instruments</i>	Gross alpha/beta proportional counters, liquid scintillation counters;	
<i>Specialized equipment</i>	Shielding, sample preparation equipment, analysing and evaluation software, reference beta sources;	
<i>General equipment and supplies</i>	Computers, Internet connection.	
<b>Products</b>	A key product is:	
	— Beta emitting radionuclide concentrations in the environmental samples.	

**Capability SA-5:****Evidence Management****Functions**

To advise on the collection of nuclear or other radioactive material items of potential evidentiary value at a scene and to ensure that it is in accordance with established evidence management procedures. In addition, to advise on/ensure the checking of all evidence for radioactive contamination; and to advise on the collection of nuclear or other radioactive material present at the scene and to ensure that it contributes to both evidence gathering and risk reduction.

**Expertise**

The FAT has sufficient competence and experience in radiation safety and radiation control procedures. In addition, the FAT needs to include crime scene recorders and custodians experienced in preparing an evidence collection plan that specifies:

- What is to be collected;
- How it is to be collected;
- By whom it is to be collected;
- What packaging is necessary for the collected evidence;
- Where and how the collected evidence is to be transported.

The EBS laboratory(ies) need(s) to be designated by the assisting State(s) as being capable of analysing nuclear or other radiological material.

**Resources**

The actual staffing and equipment for the FAT will depend on the nature of the hazards as well as the actions necessary to mitigate them. The staff will generally consist of radiation safety and radiation control personnel as well as, among others, hazardous material specialists, evidence recorders and evidence custodians.

In addition to basic law enforcement items to cordon off the area and maintain communication, equipment will include: radiation detection instruments, personal protective equipment (PPE), decontamination equipment, evidence collection, packaging and transport containers, manipulators for remotely moving objects, such as evidence, and specialized equipment for examining objects, such as portable X ray units.

**Products**

Key products include:

- Advice on the collection of nuclear or other radioactive material and evidence contaminated with radionuclides;
- Advice on checking evidence for radioactive contamination;
- Advice on performing an initial forensic examination at the scene;
- Advice on evidence packaging, transport and submission;
- Advice on interim storage site for evidence.

**Capability SA-6:****Advanced Nuclear Analysis****Functions**

To advise on and assist in the development of a forensic examination plan describing the requirements of the examination to be conducted; and the development of a forensic analytical plan describing the types of analysis to be performed in order to meet the requirements of the investigation and the sequencing of the advanced nuclear analyses [20].

To assist in the characterization of the nuclear or other radioactive material to determine its physical characteristics, chemical and elemental composition, and isotopic ratios through a range of relevant analyses to include identifying major, minor and trace constituents, as necessary.

**Expertise**

The FAT and EBS need to have competence and experience in advanced nuclear analysis science, radiation safety and radiation control procedures, as well as knowledge and experience in preparing an advanced nuclear analysis examination plan and advanced nuclear analysis analytical plan.

Additionally, the FAT needs to have competence and experience in:

- “Subsampling” (dividing the sample material), when necessary, prior to shipment to the advanced nuclear analysis laboratory; special subsampling protocols need to be followed in these instances;
- “Evidence distribution” to ensure proper methods that ‘maintain the chain of custody’ (use of sealing devices or tags) for transport of the forensic samples to the laboratories.

The EBS laboratory for advanced nuclear analyses needs to be designated by the assisting State(s) as being capable of accepting and analysing samples of nuclear and/or other radioactive material.

**Resources**

The actual staffing and equipment for the FAT will depend on the nature of the scene, the volume of samples collected and whether transport is required to multiple laboratories.

For the EBS, the actual staffing and equipment will be based on the laboratory methods and techniques and the timescale for completion of the analyses. Advanced nuclear analysis laboratory equipment typically includes:

- Imaging tools for high magnification images or maps of the material surface, able to provide information on sample heterogeneity and microstructure;
- Bulk analysis tools for characterization to determine the average properties of the material, including measurements of physical characteristics, chemical and elemental composition, and isotopic ratios;
- Microanalysis tools to identify and/or quantitatively analyse very small samples and characterize constituents of material.

**Products**

Key products are:

- Advanced nuclear analysis examination and analytical plans;
- Characterization of the nuclear or other radioactive material.

## 6.5. Functional Area: Radiological Assessment and Advice

*Assessment of radiological consequences of a perceived or actual hazard and likely evolution; advice on protective and other actions needed to minimize the consequences and/or to return to normality; and advice on security measures if the emergency was initiated by a malicious act. Information required to perform assessment and advice can be obtained from various sources, including the products of other functional areas, such as radiation survey, sampling and analysis, etc. In emergencies triggered by a malicious act, possible threats need to be part of the overall assessment.*

<b>FAT</b>	optional function
<b>EBS</b>	primary function

	<b>Capability RAA-1:</b>	<b>Atmospheric Dispersion</b>
<b>Functions</b>	To model atmospheric dispersion and deposition of radioactive material released into the atmosphere.	
<b>Expertise</b>	The EBS has sufficient competence and experience in the atmospheric dispersion modelling at local, regional and/or global scales.	
<b>Resources</b>	The following is an indicative list of resources: <ul style="list-style-type: none"> <li>– 24/7 access to established operational systems;</li> <li>– A capability to respond to events at any location;</li> <li>– A capability to perform atmospheric dispersion modelling on local, regional and/or global scales;</li> <li>– The means to deliver key products in an efficient way.</li> </ul>	
<b>Products</b>	A list of key products includes: <ul style="list-style-type: none"> <li>– Trajectories;</li> <li>– Plume arrival time;</li> <li>– Airborne radionuclide concentrations;</li> <li>– Time-integrated airborne radionuclide concentrations;</li> <li>– Total ground deposition;</li> <li>– Precipitation.</li> </ul>	

	<b>Capability RAA-2:</b>	<b>Hydrospheric Dispersion</b>
<b>Functions</b>	To model hydrospheric dispersion and sedimentation of radioactive material released into various water bodies.	
<b>Expertise</b>	The EBS has sufficient competence and experience in hydrospheric dispersion modelling of various water bodies.	
<b>Resources</b>	The following is an indicative list of resources: <ul style="list-style-type: none"> <li>– Access to established operational systems;</li> <li>– A capability to perform hydrospheric dispersion modelling;</li> <li>– The means to deliver key products in an efficient way.</li> </ul>	
<b>Products</b>	A list of key products includes: <ul style="list-style-type: none"> <li>– Radionuclide concentrations in water and on sediments;</li> <li>– Time-integrated waterborne radionuclide concentrations.</li> </ul>	

	<b>Capability RAA-3:</b>	<b>Radioecological Models</b>
<b>Functions</b>	To model the transport of radioactive material between different compartments of the environment.	
<b>Expertise</b>	The EBS has sufficient competence and experience in modelling radionuclide transport of radioactive material between different compartments of the environment.	
<b>Resources</b>	The following is an indicative list of resources: <ul style="list-style-type: none"> <li>– Access to established operational systems;</li> <li>– A capability to respond to events at any location;</li> <li>– A capability to perform radioecological modelling;</li> <li>– The means to deliver key products in an efficient way.</li> </ul>	
<b>Products</b>	A key product is: <ul style="list-style-type: none"> <li>– Estimated time dependent activity concentrations in environmental media.</li> </ul>	

	<b>Capability RAA-4:</b>	<b>Dose Predictions</b>
<b>Functions</b>	To model and predict doses in order to evaluate potential health and other impacts.	
<b>Expertise</b>	The EBS has sufficient competence and experience in the field of dispersion modelling, health physics, environmental measurements, nuclear safety and radiation protection.	
<b>Resources</b>	<p>The following is an indicative list of resources and means:</p> <ul style="list-style-type: none"> <li>– 24/7 access to established operational systems;</li> <li>– A capability to respond to events at any location;</li> <li>– A capability to predict doses by modelling;</li> <li>– The means to deliver key products in an efficient way.</li> </ul>	
<b>Products</b>	<p>A key product is:</p> <ul style="list-style-type: none"> <li>– Estimated time dependent exposures to the public, such as: external dose (cloud and ground shine dose), inhalation dose, ingestion dose, thyroid dose (age specific), total effective dose and collective dose.</li> </ul>	

	<b>Capability RAA-5:</b>	<b>Public Health Protection</b>
<b>Functions</b>	To provide advice and recommend protective actions and guidance for preventing or reducing radiation exposure to the affected population.	
<b>Expertise</b>	The EBS and/or FAT have sufficient competence and experience in assessing radiological consequences and recommending protective actions, both urgent and long term, and other appropriate guidance, including follow-up actions.	
<b>Resources</b>	<p>The actual equipment and staffing of the FAT will depend on the assistance requested. The following is an indicative list of resources and means:</p> <ul style="list-style-type: none"> <li>– Information directly from the event site and/or from various sources, which might include the products of other functional areas, such as radiation survey, environmental sampling and analysis, dose prediction and mitigation, etc.</li> </ul>	
<b>Products</b>	<p>A list of key products includes:</p> <ul style="list-style-type: none"> <li>– Advice on public health protection (e.g. sheltering, evacuation, potassium iodide distribution, food/water restriction);</li> <li>– Advice on radiation risk issues and related public health matters to relevant organizations and the media;</li> <li>– Advice on suitable follow-up actions (e.g. long term health surveillance, changes in land use, agriculture, limited access to some areas, epidemiological studies, etc.).</li> </ul>	

	<b>Capability RAA-6:</b>	<b>Remediation and Recovery</b>
<b>Functions</b>	To provide advice on the remediation of contaminated areas and recovery operations.	
<b>Expertise</b>	The EBS and/or FAT have sufficient competence and experience in recovery operations, management of radioactive waste remediation actions and health physics.	
<b>Resources</b>	The actual equipment and staffing of the FAT will depend on the assistance requested. The following is an indicative list of resources and means: <ul style="list-style-type: none"><li>– Information directly from the event site and/or from various sources, which might include the products of other functional areas, such as radiation survey, environmental sampling and analysis, dose prediction and mitigation, etc.</li></ul>	
<b>Products</b>	A key product is: <ul style="list-style-type: none"><li>– Advice on remediation and recovery operations.</li></ul>	

**Capability RAA-7:****Geographic Data Mapping****Functions**

To provide advice and assistance in geographical data collection, data analysis and data presentation (e.g. maps, charts, tables, etc.) to support decision making on protective actions and other response actions.

To provide advice and assistance on graphical presentation of data (e.g. maps, charts, etc.) for the general public.

**Expertise**

The EBS and/or FAT has/have sufficient competence and experience in:

- Area-wide geographical data collection, data processing, data analysis and data presentation;
- Use of GIS and remote sensing tools;
- Relational database management;
- Interpretation and application of map products.

Knowledge of protective actions and other response actions is also required.

**Resources**

The following is an indicative list of resources:

- Spatial database containing applicable layers (provided by the requesting State, the assisting State(s) and/or obtained from open sources), containing information such as:
  - Static layers containing local terrain features, infrastructure, administrative geographical boundaries, rivers, roads and national or regional borders, population density, communities, farms and industries, land use and crop calendar maps, map of pre-established sampling points and private or public services that need special consideration in the implementation of protective actions, such as schools, hospitals, retirement homes, prisons, etc.;
  - Event/response specific layers (subject to regular updates), containing information such as air dose rates, food and environmental monitoring point locations, related measurements, emergency resource locations, space and time dependent predictive modelling results, protective actions and other response actions (recommended/implemented), etc.
- GIS and remote sensing software and suitable computer hardware.
- Software/hardware for digitization and sharing of maps.
- In situ data description tools (positioning, off-line or on-line data collection).
- Map production tool(s) from any applicable layer such as static layers.
- Measurement plans and results, modelling results, etc.
- Map visualization tool(s) and means.
- Printer(s) (large paper format printing capability).

**Products**

Key products include:

- Street/building level scale maps (for indoor survey).
- Anomaly maps (showing elevated radiation levels or areas where a radioactive source may be located).
- Maps for the public, decision makers and/or experts with appropriate descriptive text. These maps may include:
  - Traditional static and interactive dynamic maps illustrating the ongoing situation and its possible development, such as temporal and spatial distribution of air dose rates, food and environmental contamination/dose predictions based on measurements/modelling;
  - Maps illustrating information in a manner that can be readily compared with the relevant operational criteria (with operational intervention levels (OILs) or other action guide-levels);
  - Maps illustrating recommended/implemented protective actions or other response actions;
  - Maps illustrating the measurement and sampling plan results or status.
- Information from geoprocessing of datasets, relevant statistics, charts and geographic layers for decision making and communicating with the public.

**NOTE:** All maps are to be delivered with appropriate resolution/descriptive text/title/legend/colour coding/scale bar/source references, assumptions, date and all relevant traceability information.

**Capability RAA-8:****Hazard and Threat Assessment****Functions**

To evaluate the hazards and threats posed by adversaries and devices/objects that might be encountered at the scene of an emergency; ensure/advise on the implementation of radiation protection measures at the scene, including radiation monitoring and documentation of individual radiation doses received by scene personnel.

**Expertise A**

The FAT has sufficient competence and experience in radiation safety and radiation control procedures, as well as knowledge and experience in preparing operational plans to include an event action plan and a scene safety plan.

**Expertise B**

If the scene is, or is suspected to be, a crime scene, the FAT needs to have sufficient competence and experience in hazard and threat assessment. The FAT needs to have evidence recorders and custodians experienced in: preparing evidence recovery logs; coordinating the preservation, packaging and description of evidence; receiving and recording all evidence; maintaining custody and control of evidence and chain of custody in relation to all evidence; and coordinating transmittal of evidence to qualified laboratories and/or case investigator(s).

**Resources**

The actual staffing and equipment for the FAT will depend on the nature of the hazards as well as the actions necessary to mitigate them. Staff will include radiation safety and radiation control personnel as well as hazardous material specialists, radiological assessors and evidence recorders.

**Products**

Key products include:

- Material identification as part of the common hazard and threat evaluation;
- Evaluation of hazards for the risks they might pose to routine operations at the scene, to personnel wearing equipment to protect themselves from radiation or devices/objects while at the scene, and to uncontrolled dispersal of nuclear or other radioactive material;
- A detailed event action plan that specifies the overall objectives, goals associated with these objectives, strategies and tactics to meet the goals, task assignments and relevant safety and medical guidance;
- A detailed scene safety plan describing the scene specific hazards as well as the risk reduction measures; it typically specifies key safety issues for all personnel at the scene, scene safety goals and the safety command structure;
- The geographical limits to the hazard control area;
- Assessment of the types of PPE, including personal respiratory equipment, to be worn during subsequent entries;
- Assessment of the permitted stay times and action levels for personnel entering the hazard control area;
- Evaluation of the presence of common hazards and mitigation techniques appropriate for these hazards.

In the case of (an) actual or suspected malicious act(s), key products also include:

- Evaluation of the threat at the scene in an unfolding event;
- Hazard evaluation of the risks posed to ancillary equipment used to support operations at a scene;
- The need for specialized equipment to assist in evidence collection (e.g. to remove debris to enable access to evidence).

## 6.6. Functional Area: Decontamination

*Advice on decontamination of areas, land (urban and rural), buildings, equipment, objects, persons and animals; advice on decontamination techniques and/or operational support; operational support in decontamination.*

<b>FAT</b>	primary or supporting function
<b>EBS</b>	primary or supporting function

	<b>Capability DE-1:</b>	<b>Expertise in Decontamination</b>
<b>Functions</b>	To advise on decontamination of areas, land (urban and rural), buildings, equipment, objects, persons or animals.	
<b>Expertise</b>	The EBS and/or FAT has/have sufficient competence and experience in techniques for decontamination of areas, land (urban and rural), buildings, equipment, objects, persons and animals, on decontamination equipment and reagents and on management of radioactive waste.	
<b>Resources</b>	<p>The actual equipment and staffing of the FAT will depend on the assistance requested. The following is an indicative list of resources and means:</p> <ul style="list-style-type: none"> <li>– Information directly from the event site and/or from various sources, which might include the products of other functional areas, such as radiation survey, environmental sampling and analysis, etc.</li> </ul>	
<b>Products</b>	<p>A list of key products includes:</p> <ul style="list-style-type: none"> <li>– Advice on decontamination;</li> <li>– Decontamination plans, including techniques, equipment, substances, reagents, and procedures.</li> </ul>	

	<b>Capability DE-2:</b>	<b>Support in Decontamination</b>
<b>Functions</b>	To provide operational support on decontamination of areas, land (urban and rural), buildings, equipment, objects, persons or animals.	
<b>Expertise</b>	The FAT has sufficient competence and experience in techniques for decontamination of areas, land (urban and rural), buildings, equipment, objects, persons and animals, on decontamination equipment and reagents and on management of radioactive waste.	
<b>Resources</b>	<p>The actual equipment and staffing of the FAT will depend on the assistance requested. The following is an indicative list of resources and means:</p> <ul style="list-style-type: none"> <li>– Information directly from the event site and/or from various sources, which might include the products of other functional areas, such as radiation survey, environmental sampling and analysis, etc.;</li> <li>– Decontamination equipment and reagents.</li> </ul>	
<b>Products</b>	<p>A list of key products includes:</p> <ul style="list-style-type: none"> <li>– Decontamination plans, including techniques, equipment, substances, reagents and procedures;</li> <li>– Operational support in decontamination;</li> <li>– Provision of decontamination equipment and agents.</li> </ul>	

## 6.7. Functional Area: Medical Support

*Advice on the optimum medical management of casualties, recommendations on their necessary treatment, treatment in specialized centres and advice on and/or psychological support to casualties, their families, first responders, care providers and the general public.*

<b>FAT</b>	primary or supporting function
<b>EBS</b>	primary or supporting function

	<b>Capability MS-1:</b>	<b>Medical Triage<sup>15</sup></b>
<b>Functions</b>	To collect and interpret all information needed for triage (including assessment of local resources) in order to evaluate the medical consequences; coordinate and organize the specialist multidisciplinary medical team; provide advice and consultation on the management of overexposed and/or contaminated/potentially contaminated patients and of bioassay procedures/collection of appropriate samples; provide feedback information to the media spokesperson.	
<b>Expertise</b>	<p>The FAT has sufficient competence and experience in radiation medicine, emergency medicine, disaster medicine (e.g. mass casualties) and in other related areas, e.g. haematology, burn treatment, physical and biological dosimetry and bioassay.</p> <p>The EBS has sufficient competence and experience for providing: advice on monitoring and recording of prodromal signs and symptoms; consultation in relevant medical specialties, such as haematology, burn treatment, surgery, nuclear medicine, radiotherapy and psychology; and advice on sampling procedures (e.g. repeated blood cell counts, biodosimetry, bioassay).</p>	
<b>Resources</b>	<p>The FAT<sup>16</sup> consists of medical doctors, paramedical support staff, health physicists and/or dosimetrists. It is expected that basic material and facilities for physical examination and sampling will be available locally. The following additional resources might be useful:</p> <ul style="list-style-type: none"> <li>– Mobile decontamination facilities;</li> <li>– Portable lung, thyroid, wound and whole body monitors;</li> <li>– Thermography equipment;</li> <li>– Ultrasound equipment.</li> </ul>	
<b>Products</b>	<p>A list of key products includes:</p> <ul style="list-style-type: none"> <li>– Patients grouped in medical triage categories;</li> <li>– The anticipation of likely requirements for managing patients;</li> <li>– Advice on collection and management of appropriate samples.</li> </ul>	

<sup>15</sup> Rapid method utilizing simple procedures to sort persons into groups based on their injury and/or disease for the purpose of expediting clinical care and maximizing the use of the available clinical services and facilities.

<sup>16</sup> The FAT composition will depend on the scenario; no precise figures can be specified here. Members of the FAT and EBS are encouraged to use the IAEA patient reporting forms (EPR-Medical 2005 [15]).

	<b>Capability MS-2:</b>	<b>Support in Treatment</b>
<b>Functions</b>	To advise on the necessary treatment, in support of the local health services and/or recommend treatment of patient(s) in specialized institutions; provide access to specific drugs (e.g. cytokines, decorporation and blocking agents, solution for broncho-pulmonary lavage, etc.)	
<b>Expertise</b>	<p>The EBS and FAT have sufficient competence and experience in radiation medicine, emergency medicine and other related areas, e.g. haematology, burn treatment, physical and biological dosimetry and bioassay, use of decorporation agents, thermography and ultrasound.</p> <p>The EBS has sufficient competence and experience for providing: advice on the acquisition of the most appropriate data for diagnosis and treatment; consultation in relevant medical specialties, e.g. haematology, burn treatment, surgery, radiation medicine; advice on optimum treatment and access to specific drug stockpiles.</p>	
<b>Resources</b>	A multidisciplinary, well-experienced team of experts, e.g. haematologists, burn treatment specialists, radiation medicine experts, plastic and other surgeons and gastroenterologists.	
<b>Products</b>	<p>A list of key products includes:</p> <ul style="list-style-type: none"> <li>– Advice on the acquisition of the most appropriate data for diagnosis and treatment;</li> <li>– Advice on optimum treatment strategies;</li> <li>– Provision of specific drugs not locally available.</li> </ul>	
	<b>Capability MS-3:</b>	<b>Emergency Treatment</b>
<b>Functions</b>	To treat selected patient(s) in a specialized centre.	
<b>Expertise</b>	The EBS has sufficient competence and experience in radiation medicine, emergency medicine, disaster medicine (e.g. mass casualties) and in other related areas, such as haematology, burn treatment, physical and biological dosimetry and bioassay, use of decorporation/blocking agents, thermography and ultrasound.	
<b>Resources</b>	A specialized hospital treatment centre; a multidisciplinary team of experts, e.g. haematologists, burn treatment specialists, radiation medicine specialists, plastic and other surgeons and gastroenterologists.	
<b>Products</b>	<p>A key product is:</p> <ul style="list-style-type: none"> <li>– Optimally managed patient(s).</li> </ul>	

	<b>Capability MS-4:</b>	<b>Psychological Support</b>
<b>Functions</b>	To provide psychological support to the patients, their families, first responders, care providers and medical professionals; provide guidance to government authorities on support for the public in order to minimize psychosocial effects arising from anxiety and uncertainties associated with the emergency.	
<b>Expertise</b>	The EBS and FAT have sufficient competence and experience in psychosocial support following mass casualty events and individual traumas.	
<b>Resources</b>	Experts knowledgeable in psychosocial support; ideally, experts need to be familiar with the local language and culture and be able to provide guidance to local risk communicators.	
<b>Products</b>	<p>A list of key products includes:</p> <ul style="list-style-type: none"> <li>– Consultations with patients, patients’ families, and their physicians to ensure the acceptance of optimal treatment and to minimize the psychosocial stress associated with such events;</li> <li>– Guidance to local medical professionals and government authorities;</li> <li>– Minimized stress level within the affected population.</li> </ul>	

## 6.8. Functional Area: Dose Assessment

*The assessment of doses following an external and/or internal exposure to ionizing radiation using in vivo and/or in vitro bioassay and tools (e.g. dose assessment tables and software): cytogenetics-based biodosimetry, electron paramagnetic resonance (EPR, also known as electron spin resonance), optically stimulated luminescence (OSL) and/or activation analysis; assessing the level and location of internal contamination and amount of intake; assessing the committed dose due to internal exposure.*

<b>FAT</b>	primary or supporting function
<b>EBS</b>	primary or supporting function

	<b>Capability DA-1:</b>	<b>Cytogenetics-Based Biodosimetry</b>
<b>Functions</b>	To determine whole/partial body dose using the dicentric and/or micronucleus assays on peripheral blood lymphocytes <sup>17</sup> and other cytogenetic techniques (e.g. premature chromosome condensation, FISH translocation).	
<b>Expertise</b>	The EBS has sufficient competence and experience in human radiation cytogenetics, basic radiation protection, sampling techniques and sample management for blood, fixed cells and slides.  The FAT may be deployed to participate in sample collection, initial processing and dispatch to the EBS laboratories.	
<b>Resources</b>	An established biodosimetry laboratory <sup>18</sup> .	
<b>Products</b>	A key product is: <ul style="list-style-type: none"> <li>– Dose estimates for external exposure (whole/partial body dose) and, in some circumstances, for internal exposure to radionuclides (e.g. for <sup>3</sup>H, <sup>137</sup>Cs), specified as absorbed dose and/or RBE weighted absorbed dose.</li> </ul>	

<sup>17</sup> The dicentric assay also can be used in triage mode.

<sup>18</sup> The laboratory needs to have a quality control programme in place.

<b>Capability DA-2: Electron Paramagnetic Resonance</b>	
<b>Functions</b>	To determine partial body dose (local dose) using electron paramagnetic resonance (EPR) in tooth, bone and/or nail samples; in vivo assays may be used for triage applications if available.
<b>Expertise</b>	<p>The EBS has sufficient competence and experience in sampling techniques and sample management, EPR counting instrumentation, measurement and evaluation of spectra.</p> <p>The FAT may be deployed to participate in sample collection and dispatch to the EBS laboratories.</p>
<b>Resources</b>	An established laboratory. <sup>18</sup>
<b>Products</b>	<p>A key product is:</p> <ul style="list-style-type: none"> <li>– Dose estimates for exposure to head (teeth), extremities (nail) or other localized sites (bone) in terms of absorbed dose/RBE weighted absorbed dose.</li> </ul>
<b>Capability DA-3: Optically Stimulated Luminescence/EPR</b>	
<b>Functions</b>	To determine partial body dose (local dose) using optically stimulated luminescence (OSL) or EPR using samples of personal items (electronic chips, buttons, jewellery, pharmaceuticals, etc.).
<b>Expertise</b>	<p>The EBS has sufficient competence and experience in sampling techniques and sample management, OSL/EPR counting instrumentation and measurement techniques and the interpretation and evaluation of measurements.</p> <p>The FAT may be deployed to participate in sample collection and dispatch to the EBS laboratories. Some other capabilities may be field deployable.</p>
<b>Resources</b>	An established laboratory. <sup>18</sup>
<b>Products</b>	<p>A key product is:</p> <ul style="list-style-type: none"> <li>– Dose estimates for external exposure (partial body dose) in terms of absorbed dose/RBE weighted absorbed dose.</li> </ul>

	<b>Capability DA-4:</b>	<b>Activation Analysis</b>
<b>Functions</b>	To determine either whole body or local neutron dose using gamma spectrum analysis of activated elements, e.g. sodium in blood or gold (for example in jewellery and teeth).	
<b>Expertise</b>	The EBS has sufficient competence and experience in sampling techniques and sample management, neutron activation analysis and interpretation and evaluation of measurements.  The FAT may be deployed to participate in sample collection and dispatch to the EBS laboratories.	
<b>Resources</b>	An established laboratory for neutron activation analysis <sup>18</sup> .	
<b>Products</b>	A key product is: – Neutron dose in terms of absorbed dose/RBE weighted absorbed dose.	

	<b>Capability DA-5:</b>	<b>In Vivo/Direct Bioassay</b>
<b>Functions</b>	To determine the nature, activity, location or retention of radionuclides in the body using fixed and/or mobile body/organ monitoring; to determine external and/or wound contamination by alpha, beta and gamma counting techniques.	
<b>Expertise</b>	The EBS and/or FAT has/have sufficient competence and experience in using whole body counter(s), organ counter(s), wound counter(s), analysis of spectra and intake assessment, including the quantification of intake amount.  The EBS may provide whole body counting capabilities and interpretation of measured spectra.	
<b>Resources</b>	The following is an indicative list of equipment for in vivo bioassay:	
<i>Gamma emitters</i>	Whole body counters, mobile NaI, CsI or HPGe detector systems, thyroid counters;	
<i>Beta emitters</i>	Phoswich and/or broad-energy spectral detector systems (Bremsstrahlung);	
<i>Wound monitoring</i>	Wound monitoring equipment for the detection of alpha, beta and gamma emitters.	
<b>Products</b>	A list of key products includes: – Confirmation of radionuclide(s) intake; – Amount of radionuclide intake(s) (whole body, specific organs, wounds).	

	<b>Capability DA-6:</b>	<b>In Vitro/Indirect Bioassay</b>
<b>Functions</b>	To identify and determine concentrations of specific radionuclides in excreta and in other biological samples such as blood, nasal mucus, saliva, exhaled breath or post-mortem tissue samples.	
<b>Expertise</b>	The EBS and/or FAT has/have sufficient competence and experience in bioassay sampling and sample management, in alpha, beta and/or gamma spectrometry and other counting techniques. The EBS may provide laboratory measurements, analysis and intake assessment.	
<b>Resources</b>	The following is an indicative list of equipment for in vitro bioassay:	
<i>Mobile</i>	Liquid scintillation counters for measurement of radionuclide activity in urine samples and swabs; XRF to determine low specific activity radionuclides; gamma spectrometers (e.g. NaI, CsI, HPGe detector systems);	
<i>Laboratory</i>	Chemical treatment capabilities to determine radionuclides in biological samples; gross-alpha, gross-beta/gamma counting equipment; alpha, beta and gamma spectrometers; capabilities to determine radionuclides in samples using mass spectrometry (i.e. ICP-MS, TIMS, AMS); high resolution XRF; tissue oxidizers and freeze drying equipment for tritium determination.	
<b>Products</b>	A list of key products includes: <ul style="list-style-type: none"> <li>– Confirmation of radionuclide(s) intake;</li> <li>– Concentrations of radionuclide(s) in biological samples.</li> </ul>	

	<b>Capability DA-7:</b>	<b>Internal Dose Calculation</b>
<b>Functions</b>	To estimate (calculate) the dose from internal exposure based on radionuclide intake data.	
<b>Expertise</b>	The EBS and/or FAT has/have sufficient competence and experience in the following areas: interpretation of bioassay data, biokinetic modelling, dose assessment methods, and determination of organ and committed dose.  The EBS may provide analyses of data, dose calculations and interpretation.	
<b>Resources</b>	Capabilities for dose calculations using validated biokinetic and dosimetric models.	
<b>Products</b>	A list of key products includes: <ul style="list-style-type: none"> <li>– Estimates of committed dose from internal exposure;</li> <li>– Dose distribution within the body.</li> </ul>	

	<b>Capability DA-8:</b>	<b>Dose Reconstruction</b>
<b>Functions</b>	To collect information (monitoring, bioassay, modelling) needed for dose reconstruction; assess dose based on available information, data and models.	
<b>Expertise</b>	The FAT has sufficient competence and experience in assessing doses, taking into account all available information, data and realistic models. Dose reconstruction may be provided by EBS.	
<b>Resources</b>	Given that all information for dose reconstruction needs to be available, no specific resources other than appropriate computer codes and tables are needed, except in cases where simulation of an event is envisaged (event specific resources may be needed).	
<b>Products</b>	A list of key products includes: <ul style="list-style-type: none"><li>– Identification of potentially exposed individuals;</li><li>– Estimates of radionuclide(s) intake;</li><li>– Dose estimates, reported as committed effective dose.</li></ul>	





# APPENDIX A: REGISTRATION FORM

## How to register

States wishing to register their National Assistance Capabilities (NACs) in the Response and Assistance Network (RANET) need to identify the capabilities, including the expertise and resources that they possess, and include this information in the registration form.

The registration form is available for download on the protected emergency web site of the IAEA's Incident and Emergency Centre – USIE at: [iec.iaea.org/usie](http://iec.iaea.org/usie).

## Completing the Registration Form

The form consists of three parts:

Part A: General Information. Enter the information regarding the State or international organization which is registering, the responsible Competent Authority and the nominated NAC coordinator.

Part B: National Assistance Capabilities. Enter the relevant information regarding the NACs that are being registered as a Field Assistance Team (FAT) and/or as External Based Support (EBS).

FAT expertise applicable in the case of (an) actual or suspected malicious act(s) may be registered as 'FAT-B' under some NACs (RS-1, RS-2, RS-3, RS-5 and RAA-8).

Information needs to be included about the available expertise and resources related to the registered NACs.

Part C: Signatures. By signing the final section and agreeing to the statements provided, the registering State/international organization agrees to register the identified NACs and its associated expertise and resources in RANET.

**Submitting RANET Registration Forms**

The application for registration must be sent through official channels: the ministry of foreign affairs (or equivalent) of the registering State or its permanent mission to the IAEA. However, the Competent Authorities are encouraged to send an advance copy of the registration directly to the IAEA's Incident and Emergency Centre.

The formal application for registration of NAC resources in RANET must be sent to the following address:

**Incident and Emergency Centre (IEC)**

**International Atomic Energy Agency  
Vienna International Centre  
PO Box 100  
1400 Vienna, Austria**

**For further details regarding registration in RANET, contact the IEC:**

Tel: +43 1 2600 21418

Fax: +43 1 2600 7 29309

Email: [iec-routine@iaea.org](mailto:iec-routine@iaea.org)

# REGISTRATION OF NAC RESOURCES

IN THE RESPONSE AND ASSISTANCE NETWORK – RANET

## PART A: GENERAL INFORMATION

### 1. Applying State/International Organization

Name: \_\_\_\_\_

### 2. Competent Authority

Name: \_\_\_\_\_

Address: \_\_\_\_\_

Telephone: \_\_\_\_\_

Email: \_\_\_\_\_

Fax: \_\_\_\_\_

Web site: \_\_\_\_\_

*(optional)*

### 3. NAC coordinator

Name: \_\_\_\_\_

Org: \_\_\_\_\_

Address: \_\_\_\_\_

Telephone: \_\_\_\_\_

Email: \_\_\_\_\_

Fax: \_\_\_\_\_

## PART B: NATIONAL ASSISTANCE CAPABILITIES

### 4. NAC to be registered

For each NAC being registered please check the function and include a description of the expertise and resources. The attached checklists should be completed to provide additional information about available expertise and resources. Text descriptions of the specific capabilities should be attached.

		<b>RS Radiation Survey</b>	
	FAT A	RS-1	Foot/manual/ground based survey
	FAT B		
	EBS		
	FAT A	RS-2	In situ gamma spectrometry
	FAT B		
	EBS		
	FAT A	RS-3	Vehicle based survey
	FAT B		
	EBS		
	FAT	RS-4	Aerial based survey
	EBS		
	FAT A	RS-5	Scene control
	FAT B		
	EBS		

		<b>SSR Source Search and Recovery</b>	
	FAT	SSR-1	Foot/manual/ground based search
	EBS		
	FAT	SSR-2	Vehicle based search
	EBS		
	FAT	SSR-3	Aerial search
	EBS		
	FAT	SSR-4	Maritime search
	EBS		
	FAT	SSR-5	Source recovery
	EBS		

		<b>RAA Radiological Assessment and Advice</b>	
	FAT	RAA-1	Atmospheric dispersion
	EBS		
	FAT	RAA-2	Hydrospheric dispersion
	EBS		
	FAT	RAA-3	Radioecological models
	EBS		
	FAT	RAA-4	Dose predictions
	EBS		
	FAT	RAA-5	Public health protection
	EBS		
	FAT	RAA-6	Remediation and recovery
	EBS		
	FAT	RAA-7	Geographic data mapping
	EBS		
	FAT A	RAA-8	Hazard and threat assessment
	FAT B		
	EBS		

		<b>DE Decontamination</b>	
	FAT	DE-1	Expertise in decontamination
	EBS		
	FAT	DE-2	Support in decontamination
	EBS		

		<b>SA Sampling and Analysis</b>	
	FAT	SA-1	Environmental sampling
	EBS		

	FAT	SA-2	Gamma spectrometry
	EBS		

	FAT	SA-3	Alpha spectrometry
	EBS		

	FAT	SA-4	Beta counting
	EBS		

	FAT	SA-5	Evidence management
	EBS		

	FAT	SA-6	Advanced Nuclear Analysis
	EBS		

		<b>MS Medical Support</b>	
	FAT	MS-1	Medical triage
	EBS		

	FAT	MS-2	Support in treatment
	EBS		

	FAT	MS-3	Emergency treatment
	EBS		

	FAT	MS-4	Psychological support
	EBS		

		<b>DA Dose Assessment</b>	
	FAT	DA-1	Cytogenetics-based biodosimetry
	EBS		

	FAT	DA-2	Electron paramagnetic resonance
	EBS		

	FAT	DA-3	Optical stimulated luminescence/EPR
	EBS		

	FAT	DA-4	Activation analysis
	EBS		

	FAT	DA-5	In vivo/direct bioassay
	EBS		

	FAT	DA-6	In vitro/indirect bioassay
	EBS		

	FAT	DA-7	Internal dose calculation
	EBS		

	FAT	(	Dose reconstruction
	EBS		

FAT – Field Assistance Team; EBS – External Based Support

**PART B: NATIONAL ASSISTANCE CAPABILITIES (cont.)**

		NAA	NI Assessment and Advice	Please indicate the nuclear installations and/or fuel types							
				PWR	BWR	GCR	PHWR	LWGR	FBR	RBMK	WWER
<input type="checkbox"/>	FAT	NAA-1	Nuclear Power Reactor Design Advice	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	EBS										
<input type="checkbox"/>	FAT	NAA-2	Nuclear Power Reactor Operations Advice	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	EBS										
<input type="checkbox"/>	FAT	NAA-3	Nuclear Power Reactor Accident Analysis	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	EBS										
<input type="checkbox"/>	FAT	NAA-4	Research Reactor Assessment and Advice	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	EBS										
<input type="checkbox"/>	FAT	NAA-5	Fuel Fabrication Facility Assessment and Advice	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	EBS										
<input type="checkbox"/>	FAT	NAA-6	Spent Fuel Storage Assessment and Advice	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	EBS										
<input type="checkbox"/>	FAT	NAA-7	Spent Fuel Reprocessing Assessment and Advice	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	EBS										
<input type="checkbox"/>	FAT	NAA-8	Operation of specialized technology	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	EBS										

FAT – Field Assistance Team; EBS – External Based Support

**5. Expertise**

Nuclear installation safety	Please specify type(s) of Nuclear Installations or fuel type as appropriate									
	PWR	BWR	GCR	PHWR	LWGR	FBR	RBMK	WWER	RR	
Accident analysis										
Chemistry/chemical engineering										
Cooling systems										
Design										
Fuel design and behaviour										
Fuel management										
Instrumentation and control										
Operation										
Plant and equipment maintenance										
Power and electrical systems										
Radiation protection expertise										
Reactor physics										
Severe accident management										
Source term calculation										
Thermohydraulics										
Thermodynamics										
Criticality analysis										
Fuel enrichment and fabrication										
Materials behaviour										
Spent fuel reprocessing										

Measurement techniques
Airborne dose rate monitoring
Airborne gamma spectrometry
Alpha spectrometry
Contamination monitoring (ground, surface, personal)
Environmental monitoring
Gamma dose rate monitoring
Gamma spectrometry
Gross alpha/beta measurements
In situ gamma spectrometry
Plutonium analysis
Sample preparation techniques
Sampling techniques (environ., biological samples)
Tritium analysis
Source monitoring
Strontium analysis
Evaluation and assessment
Atmospheric dispersion modelling
Biokinetic modelling
Dose assessment predictions
Dose reconstruction techniques
External dose assessment
Gamma mapping
Ground contamination assessment
Health impact assessment
Internal dose assessment
Geographic data analysis
Geographic data mapping
Hazardous material specialist
Hazard and threat analysis
Operation of specialized technology
Operation of robots
Operation of remotely controlled equipment
Operation of unmanned aerial vehicles

Radiation safety
Decontamination techniques
Design and operation of radiation devices
Design and use of sources (industrial, medical)
Emergency management
Intervention in high dose rate area
Radiation protection
Radioecology
Sampling strategies
Shielding
Source recovery techniques
Waste management

Radiation medicine
Collection and dispatch of biological samples
Decorporation therapy
Haematology
Management of acute radiation syndrome
Management of local radiation injury
Prevention of long term radiation effects
Public health issues

Dosimetry
Biological dosimetry
In vitro bioassay
In vivo bioassay
Organ monitoring (thyroid)
Personal dosimetry - external
Whole body monitoring

Other
Communication technology
Crime scene (evidence) recorder
Crime scene (evidence) custodian

**Remark:** If the expertise to be registered is not in the list, please add under 'Other'.

**6. Resources**

Identify the resources that are available to the NAC by marking **X** in column **A** next to the resource description.

Where other resources may be made available to a requesting State (e.g. through donation, loan or procurement) mark **X** in column **D** next to the resource description.

Registering States are encouraged to provide the necessary details, specifications and method of transportation and estimated quantities of these resources as attachments to the registration form.

A	D	Measuring systems
		Airborne gamma dose/count rate monitoring system
		Airborne gamma ray spectrometry system
		Alpha spectrometry system
		Car-borne gamma dose/count rate monitoring system
		Gamma spectrometry system (HPGe)
		Gamma spectrometry system (NaI)
		In situ gamma spectrometry system (HPGe)
		In situ gamma spectrometry system (NaI)
		Liquid scintillation counter system
		Mobile radiation laboratory
		Navigation system
		Whole body counter
		Ultrasonic level sensors
		Post accident monitoring systems

A	D	Medical equipment
		Basic medical examination equipment
		Biopsy instruments
		Blood cell counter
		Blood collection kit
		Blood transfusion and IV equipment
		Decontamination kit
		Defibrillator
		Diagnostic medical test kits (urine glucose, etc.)
		First aid kit
		Microscope
		PO2 monitor
		Surgical instruments

A	D	Radiation survey instruments
		Alpha/beta contamination monitor
		Gamma emitting radionuclide identifier
		Gamma/beta survey monitor
		Gross alpha/beta proportional counter
		Neutron dose rate meter
		Organ counter (thyroid)
		Personal contamination monitor
		Telescopic gamma probe
		Wound counter

A	D	Specialized resources
		Fixed wing aircraft
		Helicopter
		Mobile laboratory
		Robots (surveillance, source recovery, etc.)
		Source containers
		Specialized hospital treatment centre
		Telescopic manipulators
		Unmanned aerial survey systems
		Remote cameras for high radiation fields
		Remotely Operated Vehicles (ROVs)

A	D	Personal protection equipment
		Electronic personal dosimeter (EPD)
		Full face-piece self-contained breathing apparatus
		Passive Personal dosimeter
		Personal protection supplies
		Self-reading (electronic) dosimeter
		Totally-encapsulating chemical-protective suit
		Personal air samplers
		Personal air filters
		Disposable suits
		Disposable gloves
		Overshoes

A	D	Software
		3D modelling software and models of installations
		Computer aided design (CAD)
		Criticality analysis
		Data presentation system
		Dose assessment software
		Environmental dose assessment models
		Geographic Information System
		Plume dispersion modelling
		Reactor physics modelling (e.g. MCNP, Origen)
		Source term modelling software
		Thermal load calculation software
		Thermodynamic modelling software
		Remote sensing software

**6. Resources (cont.)**

Identify the resources that are available to the NAC by marking **X** in column **A** next to the resource description.

Where other resources may be made available to a requesting State (e.g. through donation, loan or procurement) mark **X** in column **D** next to the resource description.

*States are encouraged to provide the necessary details, specifications and method of transportation and estimated quantities of these resources as attachments to the registration form.*

A	D	Electrical Supply
		Diesel pumps
		AC power sources
		DC power sources
		Chargers/batteries
		Filtration for equipment inlets
		Misc. equipment (cables, connectors, spare parts)

A	D	Shielding and encapsulation
		Steel plates
		Lead shielding
		Concrete
		Shielded transport containers
		Spent fuel casks
		Liquid glass
		Fixing/coating agents

A	D	Sampling and sample preparation
		Cool pack
		Portable air sampler
		Sample container – biological samples
		Sample preparation equipment – high activity
		Sample preparation equipment – low activity
		Sampling equipment (soil, water, sediment, etc.)
		Remote sampling equipment for high radiation fields

A	D	Ventilation
		Air compressors
		Air compressors with oil filtration for breathing air
		Charcoal filtration system
		Portable HEPA filtration systems
		Portable hydrogen recombiner

A	D	Communication equipment
		Cellular phone
		Fixed video conference capabilities (for EBS)
		Mobile Internet modem/hotspots
		Portable video conference capabilities (for FAT)
		Radio phone
		Satellite phone

A	D	Water cooling and purification
		Emergency core cooling sized pumps
		High power fire pumps
		Water tanks/reservoirs
		Light water
		Portable heat exchangers
		Piping (flexible, metal, PVC)
		Giraffe system for delivering water from heights
		Ion exchangers
		Ion exchange resin
		Zeolite
		Hydrozine

A	D	Criticality control
		Boric acid
		Control Rods
		Safety Rods

A	D	General supplies
		Personal computer (PC)
		Power supply
		Tent (different sizes)

A	D	Other

**Remark:** If the resources to be registered are not in the list, please add under 'Other'.

**7. Comments (if any)**

**PART C: SIGNATURES**

**8. Compliance with the requirements/conditions**

- a) By submitting this application for registration, the State agrees to comply with the RANET requirements as stated in the EPR-RANET publication.
- b) These requirements will not supersede any national requirements/regulations of the State providing assistance.
- c) Financing NAC maintenance and preparedness is the responsibility of the State.
- d) Financial assistance to a response will be specified in the AAP.

Place: \_\_\_\_\_

Date: \_\_\_\_\_

Name: \_\_\_\_\_

(Responsible person)

Signature: \_\_\_\_\_



## **APPENDIX B: RANET ASSISTANCE ACTION PLAN**

An Assistance Action Plan (AAP) for the requested assistance will be developed by the IEC in coordination with the requesting State, State(s) providing assistance and relevant international organization(s), as appropriate.

An AAP is required for all Assistance Missions, regardless of whether they are in the form of:

- Assistance Missions;
- Joint Assistance Teams (JAT);
- External Based Support (EBS).

An AAP is not required for the provision of information or advice, except in the case of detailed assessment and advice.

A sample plan is provided below. The sample plan is an example of a case where assistance is provided under the Assistance Convention. However, in some instances, whether under the Assistance Convention or not, some parts may not be applicable. All names used in this example are fictitious and do not denote actual States, places or persons.

**International Assistance to State E**



**IAEA**

International Atomic Energy Agency

**IAEA Assistance to State E**

**ASSISTANCE ACTION PLAN**

**Radioactive Contamination and Public Exposure  
in Township**

**Date effective: 31 March 2017**

Version No.: Final

Date prepared: 30 March 2017

INTERNATIONAL ATOMIC ENERGY AGENCY

---

Incident and Emergency Centre

State E hereby agrees to receive the international assistance as detailed in this Assistance Action Plan. Members of the Assistance Mission hereby agree to provide assistance to State E as detailed in this Assistance Action Plan, including the special conditions specified in Annex I. The agreement to the terms contained herein is without prejudice to the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency to which State E, State A, State B, State C and State D are Parties.

Agreed by:		
Head-IEC	Name: F. Weston Signature:	Date: 29-03-2017
Assisting State officials	Name: H. Smith Organization: National Regulatory Authority State: State A Signature:	Date: 29-03-2017
	Name: J. Elton Organization: Atomic Energy Commission State: State B Signature:	Date: 29-03-2017
	Name: C. Woodhouse Organization: Nuclear Safety Administration State: State C Signature:	Date: 29-03-2017
	Name: P. Okafor Organization: Ministry of Foreign Affairs State: State D Signature:	Date: 29-03-2017
Requesting State (State E) official	Name: G. Knightley Organization: Atomic Authority of State E (AAE) Signature:	Date: 30-03-2017

## **Background**

On 29 March 2017, the IAEA's Incident and Emergency Centre (IEC) received a request for assistance from the Atomic Authority of State E in regard to radioactive contamination and public overexposure in Township, State E.

State E (Requesting State) is a State Party to the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency (Assistance Convention), and it made the request for assistance to the IAEA pursuant to the Assistance Convention.

## **Objective and Scope**

The overall objective of the Assistance Mission is to assist the Government of State E in response to its request for assistance in relation to a radiological emergency in State E.

Taking into account the information on the event available at present and the type of assistance requested from the Government of State E, an IAEA Assistance Mission (Assistance Mission) will be conducted in the form of a Joint Assessment Team (JAT). ANNEX I of this Assistance Action Plan (AAP) includes details of the Assisting State Team(s) and the capabilities being utilized during the Assistance Mission.

The following activities to be performed have been identified:

1. Assess the current situation;
2. Assess the radiological impact in terms of doses and levels of contamination;
3. Assess the threat to public health and safety;
4. Predict the possible evolution of the radiological conditions;
5. Advise the Government of State E on immediate steps to be taken in responding to the event and provide technical advice on countermeasures and source recovery;
6. Provide medical advice, undertake a medical evaluation of overexposed persons and collect blood samples;
7. Provide laboratory analysis of samples;
8. Perform biodosimetry on blood samples;
9. Recommend additional actions to be taken by the IAEA in assisting State E in responding to the event; and
10. Review the accident history to identify lessons to be learned; gather, record and evaluate information on the event and compile appropriate records for a formal accident report.

## **Responsibilities**

### Requesting State

State E will maintain overall direction, control, coordination and supervision of any assistance within its territory.

The Government of State E will observe the terms of the Assistance Convention and in particular will:

- Provide, to the extent of its capabilities, local facilities and services for the proper and effective administration of the assistance;
- Ensure the protection and security of personnel, equipment and materials brought into its territory by or on behalf of the assistance teams;
- Facilitate the entry into, stay in and departure from its national territory of personnel, equipment and property involved in the assistance; and
- Facilitate the transit through its territory of duly notified personnel, equipment and property involved in the assistance.

During the Assistance Mission, the National Competent Authority of State E will, where applicable, provide or arrange (free of charge) for:

- Hotel arrangements;
- Transportation within the country;
- English speaking counterpart or translator;
- Access to required facilities/premises;
- External power supplies/generators;
- Interviews with workers, first responders and patients;
- Workroom for Assistance Mission team members; and
- Access to international telephone lines, internet and e-mail, PC projector, printer and copier.

### Assistance Mission Team

The Assistance Mission team, as described in Annex I, should accomplish the objectives and activities set by this Assistance Action Plan; and

The Assistance Mission team will provide the IAEA Secretariat with an authoritative and factual overview of the radiological emergency and make recommendations for any further action(s) to be taken by the State E authorities and the IAEA.

### Assistance Mission Leader

The Assistance Mission Leader:

- Is in charge of and retains operational supervision over the Assistance Mission team and the equipment provided by or on behalf of the Assistance Mission team.
- Is responsible to ensure that all activities are performed in a safe manner by following procedures, which at a minimum shall meet applicable IAEA safety standards.
- Will prepare an After Action Assistance Report (in English) for submission to the IAEA's IEC for distribution to the requesting State and its Permanent Mission to the IAEA and to assisting parties within one week after completion of assistance. The After Action Assistance Report will contain background information, actions taken, actions recommended and conclusions.

### Assisting State(s)

State A, State B, State C and State D (Assisting States) will provide assistance through the IAEA to State E in response to the radioactive contamination and public overexposure in Township. The specific details and conditions of the assistance to be provided by the Assisting State(s) are detailed in Annex I.

### IAEA's Incident and Emergency Centre

The IAEA's IEC will be the focal point for the provision of this international assistance, providing necessary coordination and/or administration and support to all parties.

The IAEA's IEC will produce a final Assistance Report (in English) in coordination with all involved parties to fully describe the event history, response actions taken, collected data, measurement results, resolution of the situation, recommendations for future actions (if any) and lessons identified.

The IAEA's IEC will provide:

- An After Action Assistance Report (in English) to the Government of State E and its Permanent Mission to the IAEA within one week after completion of the mission; and
- A Final Assistance Report (in English) to the Government of State E, its Permanent Mission to the IAEA, all assisting parties and all members of the Assistance Mission within 60 days after completion of the mission.

## **Confidentiality**

All involved parties will treat all acquired information and assistance reports as classified and keep them for their respective internal use only until such time as deemed appropriate by all parties to release them. Confidential information provided under the terms of the Assistance Convention will not be made available to any party other than the Government of State E and will not be included in the assistance reports.

Notwithstanding the above, the involved parties avail themselves of the right to use elements from the assistance reports as deemed relevant for the sole purpose of describing their respective roles in the respective assistance mission and for sharing experiences and lessons identified. This excludes any

sensitive medical data, personnel information and/or any information from classified annexes of the assistance reports, which will be treated as confidential until such time as deemed appropriate by all parties. The involved parties will make every effort to coordinate the release of such information.

### **Public Information**

Members of the Assistance Mission team will not give any public interviews or information to the media before, during or after the mission without prior agreement of the State E authorities and without prior consultation with the IAEA's Office of Public Information and Communication (through the IEC).

### **Field Operational Safety and Security**

The activities defined in this AAP will not be conducted in conditions that are unsafe/not secure or possibly unsafe/not secure.

Where any such situations are identified, the Assistance Mission Leader shall coordinate with the appropriate authorities and entities to identify an acceptable, safe/secure solution for the conduct of the identified activities.

### **Financial Arrangements**

The IAEA will cover the expenses for the mobilization and deployment of the Assistance Mission.

All other financial arrangements relating to the assistance shall be in accordance with Article 7 of the Assistance Convention.

- In accordance with the Assistance Convention, State A, State B and State C will offer the assistance as detailed in Annex I without cost.
- In accordance with the Assistance Convention, State D will require to be wholly or partly reimbursed for any specialized hospital treatment to be provided.

### **Privileges and Immunities**

The Government of State E will afford the necessary privileges, immunities and facilities to the IAEA, its officials and experts, as well as the property, funds and assets of the IAEA, for the performance of the assistance functions in accordance with the Agreement on the Privileges and Immunities of the International Atomic Energy Agency, which was approved by the Board of Governors on 1 July 1959 (see INFCIRC/9/Rev.2).

### **Claims and Compensation**

All claims and compensation relating to the assistance provided under this Assistance Action plan shall be governed by Article 10 of the Assistance Convention.

## Assistance Termination

The IAEA will declare the official termination of assistance when all AAP objectives and activities are declared completed by the Assistance Mission Leader.

State E or any of the assisting parties may at any time, after appropriate consultations and by notification in writing, request termination of assistance received or provided (including partial withdrawal of assistance capabilities). Once such a request has been made, the involved parties consult to make arrangements for the proper conclusion of the assistance.

The IAEA may declare at any time, after appropriate consultations and by notification in writing, the end of the Assistance Mission due to failure to resolve conditions or practices that are unsafe or not secure, or the failure of the requesting State to comply with the AAP.

Upon termination of the assistance, the resources of the assisting States will be demobilized. Partial demobilization of resources may occur as the individual AAP tasks are completed.

## Overall Work Plan

The following is a provisional overall Assistance Mission Work Plan:

#	Activity	Date
1.	Arrival at Township	03 April
2.	Assistance Mission team meeting	04 April
3.	Introductory meeting with the AAE	04 April
4.	Start of mission activities	04 April
5.	Detect, locate and demarcate contaminated area(s)	04 - 05 April
6.	Measure ground contamination	05 April
7.	Measure dose rates	05 April
8.	Monitor personnel, equipment and other objects for external contamination	08 April
9.	Obtain blood samples for biodosimetry	06 April
10.	Obtain environmental samples	07 April
11.	Manage the collection of samples	07 April
12.	Measure concentration of radionuclide in samples	12 April
13.	Conduct cytogenetic-based biodosimetry	12 April
14.	Collect all information needed for analysis of consequences	08 April
15.	Collect information needed for dose reconstruction	08 April
16.	Assess the threat to the public	05 April
17.	Assess possible evolution of an emergency/situation	04 April
18.	Assess and evaluate radiological consequences of an emergency/situation	06 April
19.	Assess the doses to victims/emergency workers/public	06 April
20.	Undertake medical evaluation of patient(s)	08 April
21.	Assess the level of internal contamination	07 April

#	Activity	Date
22.	Plan source recovery operations	08 April
23.	Plan the transfer of the patient(s) to a specialized centre(s) (if required)	08 April
24.	Provide medical treatment (if required)	04 April
25.	Deal with public concerns and media attention	08 April
26.	Provide advice on collection of adequate samples	04 April
27.	Provide advice on source transportation and secure/safe storage	06 April
28.	Provide medical advice/consultation	08 April
29.	Provide advice on public health	08 April
30.	Provide advice on protective actions	05 April
31.	End of mission's activities	08 April
32.	Drafting Assistance Mission's conclusions and recommendations	09 April
33.	Exit meeting with the AAE	10 April
34.	Departure from Township	11 April

The Assistance Mission Leader, JAT Command and/or individual FAT Leaders shall develop more detailed work plans, as appropriate, for tasks to be performed to meet the mission objectives.

## ANNEX I - Assistance Mission Team Composition

The Assistance Mission will be performed by a Joint Assistance Team (JAT) comprised of Field Assistance Teams (FATs) and External Based Support (EBS):

#	Team	Assisting State	Area(s) of Assistance	Period of Assistance
1.	SA-FAT-1	State A (SA), National Regulatory Authority	<ul style="list-style-type: none"> <li>• Source Search and Recovery (SSR);</li> <li>• Radiation Survey (RS);</li> <li>• Sampling and Analysis (SA);</li> <li>• Radiological Assessment and Advice (RAA); and</li> <li>• Dose Assessment (DA).</li> </ul>	3 to 11 April
2.	SB-FAT-1	State B (SB), Institute for Safety and Security	<ul style="list-style-type: none"> <li>• Source Search and Recovery (SSR);</li> <li>• Sampling and Analysis (SA);</li> <li>• Medical Support (MS);</li> </ul>	3 to 11 April
3.	SC-FAT-1	State C (SC), Radiation Protection and Nuclear Safety Authority	<ul style="list-style-type: none"> <li>• Radiation Survey (RS);</li> <li>• Sampling and Analysis (SA);</li> <li>• Radiological Assessment and Advice (RAA);</li> <li>• Medical Support (MS);and</li> <li>• Dose Assessment (DA).</li> </ul>	3 to 11 April
4.	SD-EBS-1	State D (SD), National Laboratory	<ul style="list-style-type: none"> <li>• Radiological Assessment and Advice (RAA);</li> <li>• Dose Assessment (DA).</li> </ul>	4 to 9 April
5.	SD-EBS-2	State D (SD), Biodosimetry Institute	<ul style="list-style-type: none"> <li>• Radiological Assessment and Advice (RAA);</li> <li>• Medical Support (MS);and</li> <li>• Dose Assessment (DA).</li> </ul>	4 to 9 April

The specific details of each team are attached.

The JAT Command composed of all Field Assistance Team leaders will manage all on-scene JAT assistance and will ensure coordination with State E, the IEC and External Based Support.

Mr. J. Doe from National Regulatory Authority, State A as the Assistance Mission Leader will head the JAT Command (Chairperson). Mr. J. Doe was nominated by the IAEA's IEC and agreed to by all parties.

## State A assistance to State E

State A will provide assistance through the IAEA to State E in response the radioactive contamination and public overexposure in Township. The specific details of the assistance to be provided by are detailed below, including any special conditions related to the provision of assistance.

### Field Assistance Team Composition

#	Name	Team Function	Organisation	Contact Information
1	L. Garba	FAT Leader	National Regulatory Authority (NRA)	Telephone: + 123 456 11 Mobile phone: + 321 456 11 Email:L.Garba@NRASA.com
2	E. Nair	Radiological Assessor	National Regulatory Authority (NRA)	
3	G. Alfred	Radiological Assessor	National Regulatory Authority (NRA)	
4	T. Waits	Expert in evaluation of radiation injuries	National Clinical Centre (NCC)	
5	T. Carlos	Support Officer	National Regulatory Authority (NRA)	

### Field Assistance Team Capabilities and Resources

- *Source Search and Recovery*: Foot, manual, ground based search; and source recovery;
- *Medical Support*: Medical triage; and support in treatment;
- *Radiation Survey*: Foot, manual, ground based survey; in situ gamma spectrometry;
- *Sampling and Analysis*: Environmental sampling; gamma spectrometry; alpha spectrometry; beta counting;
- *Dose Assessment*: Cytogenetics-based biodosimetry; in vivo/direct bioassay; internal dose calculation; dose reconstruction;
- *Radiological Assessment and Advice*: Radioecological models; dose predictions; public health protection;
- Expertise in food countermeasures.

#### Assistance Team Equipment:

- In situ gamma spectrometry system (HPGe);
- Mobile radiation laboratory;
- Alpha/beta contamination monitor;
- Gamma/beta survey monitor;

- Telescopic gamma probe;
- Wound counter;
- Electronic personal dosimeters (EPD);
- Passive personal dosimeters and self-reading (electronic) dosimeters;
- Personal protection supplies, disposable suits, disposable gloves, overshoes;
- AC power sources; chargers/batteries;
- Sample container – biological samples;
- Sampling equipment (soil, water, sediment, etc.)
- Portable video conference capabilities;
- Medical equipment (blood cell counter, blood collection kit, etc.).

**Specific Conditions of Assistance (if any)**

None

SAMPLE

## State B assistance to State E

State B will provide assistance through the IAEA to State E in response the radioactive contamination and public overexposure in Township. The specific details of the assistance to be provided are detailed below, including any special conditions related to the provision of assistance.

### Field Assistance Team Composition

#	Name	Team Function	Organisation	Contact Information
1	C. Harrison	FAT Leader	Institute for Safety and Security (ISS)	Telephone: + 1113 456 11 Mobile phone: + 111 456 11 Email:C.Harrison@ISS.com
2	F. Rodolfo	Radiological Assessor	Institute for Safety and Security (ISS)	
3	R. Wang	Source recovery/transportation	Institute for Safety and Security (ISS)	
4	H. Bruno	Support Officer	Institute for Safety and Security (ISS)	

### Field Assistance Team Capabilities and Resources

- *Source Search and Recovery*: Foot, manual, ground based search; and source recovery;
- *Medical Support*: Medical triage;
- *Sampling and Analysis*: Environmental sampling; gamma spectrometry;

#### Assistance Team Equipment:

- In situ gamma spectrometry system (NaI);
- Alpha/beta contamination monitor;
- Gamma/beta survey monitor;
- Telescopic gamma probe;
- Electronic personal dosimeters (EPD);
- Passive personal dosimeters and self-reading (electronic) dosimeters;
- Personal protection supplies, disposable suits, disposable gloves, overshoes;
- AC power sources; chargers/batteries;
- Sampling equipment (soil, water, sediment, etc.).

### Specific Conditions of Assistance (if any)

- None

## State C assistance to State E

State C will provide assistance through the IAEA to State E in response the radioactive contamination and public overexposure in Township. The specific details of the assistance to be provided are detailed below, including any special conditions related to the provision of assistance.

### Field Assistance Team Composition

#	Name	Team Function	Organisation	Contact Information
1	P. Harte	FAT Leader	Radiation Protection and Nuclear Safety Authority (NPNA)	Telephone: + 333 456 11 Mobile phone:+ 331 456 11 Email:P.Harte@NPNA.com
2	A. Paul	Radiological Assessor	Radiation Protection and Nuclear Safety Authority (NPNA)	
3	S. Ultan	Public Health Expert	Radiation Protection and Nuclear Safety Authority (NPNA)	
4	D. Aderiye	Food Countermeasure Expert	Radiation Protection and Nuclear Safety Authority (NPNA)	
5	S. Neo	Support Officer	Radiation Protection and Nuclear Safety Authority (NPNA)	
6	J. Sambo	Public Information Officer	Radiation Protection and Nuclear Safety Authority (NPNA)	

### Field Assistance Team Capabilities and Resources

- *Medical Support:* Medical triage;
- *Radiation Survey:* Foot, manual, ground based survey;
- *Sampling and Analysis:* Environmental sampling; alpha spectrometry; beta counting;
- *Dose Assessment:* In vivo/direct bioassay;
- *Radiological Assessment and Advice:* Radioecological models; public health protection;
- Expertise in preparation of public and media information.

#### Assistance Team Equipment:

- Mobile radiation laboratory;
- Alpha/beta contamination monitor;
- Gamma/beta survey monitor;
- Wound counter;

- Passive personal dosimeters and self-reading (electronic) dosimeters;
- Personal protection supplies, disposable suits, disposable gloves, overshoes;
- Sample container – biological samples;
- Sampling equipment (soil, water, sediment, etc.);
- Portable video conference capabilities;
- Medical equipment (blood cell counter, blood collection kit, etc.).

**Specific Conditions of Assistance (if any)**

None

**SAMPLE**

## State D assistance to State E

State D will provide assistance through the IAEA to State E in response the radioactive contamination and public overexposure in Township. The specific details of the assistance to be provided are detailed below, including any special conditions related to the provision of assistance.

### External Based Support Capabilities and resources

- *Medical Support:* Support in treatment and emergency treatment;
- *Dose Assessment:* Cytogenetics-based biodosimetry; in vivo/direct bioassay; in vivo/indirect bioassay; internal dose calculation; dose reconstruction;
- *Radiological Assessment and Advice:* Radioecological models; dose predictions; public health protection; remediation and recovery.

### Assistance Team Equipment:

- Alpha/beta contamination monitor;
- Dose assessment software;
- Environmental dose assessment models;
- Medical equipment (blood cell counter, biopsy instruments, blood collection kit, etc.).

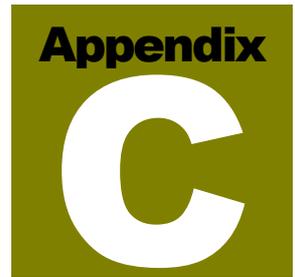
### Specific Conditions of Assistance (if any)

None

**ANNEX II – Relevant Contact Details**

Function	Name	Details
Assistance Mission Leader	J. Doe	Telephone: + 123 456 123 Mobile phone: + 123 456 321 Email: J.Doe@NRA.com
Counterpart (in the field) (requesting State: State E)	A. Mahla	Telephone: + 111 9 321 45676 Mobile phone: + 111 9 321 45677 Email: A.Mahla@AAE.com
Counterpart (headquarters) (requesting State: State E)	G. Knightley	Telephone: + 111 1 234 45678 Mobile phone: + 111 9 321 45678 Email: G. Knightley@AEE.com
IAEA counterpart (in the field)	N. Cave	Telephone: +43 1 321 45678 Mobile phone: +43 699 123 45678 Email: N.Cave@iaea.org
IAEA counterpart (Vienna)	P. Jones	Telephone: +43 1 321 45687 Mobile phone: +43 699 123 45687 Email: P.Jones@iaea.org





# APPENDIX C: EXAMPLE LIST OF RANET DOCUMENTATION

When developing the response/assistance capabilities, consider the importance of:

- Having quality plans;
- Having controls, processes and skills for achieving the right quality;
- Ensuring that all elements of the work process are compatible;
- Updating quality control and testing techniques;
- Developing capability in taking measurements;
- Identifying what checks need to be made;
- Identifying acceptable work standards;
- Keeping quality records.

The following is an indicative list of examples of types of documentation that may be helpful when establishing response/assistance capabilities.

Code	Document or procedure title
<i>Organizational procedures</i>	
RANET-01	Response Plan (NAC Emergency Operation Document)
RANET-02	Annual Programme of Drills and Exercises
RANET-03	Team Communicating Instructions – Communication Protocol
RANET-04	Notifying and Alerting RANET Field Assistance Teams
RANET-05	Activation and Deployment of RANET NACs and Equipment
RANET-06	FAT Leader Procedure
RANET-07	FAT Equipment and Vehicle Arrangements for Intervention
<i>QA procedures</i>	
QA-01	Procedure Development and Procedure Management
QA-02	Internal Audits and Management Review
QA-03	NAC Staff Qualification and Training Requirements
QA-04	Management of Complaints and Nonconformity
<i>QC procedures</i>	
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

Code	Document or procedure title
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-13	Equipment Control and Maintenance
QC-14	Data Recording System
QC-15	Intercomparison Measurements
<i>Sampling procedures</i>	
SA-01	Emergency Sampling of Air, Soil, Milk, Food, Pasture and Water
SA-02	In-vitro Bioassay Sampling
SA-03	Sampling for Cytogenetic Dosimetry
SA-04	Preparation for In-vivo Bioassay
<i>Sample preparation procedures</i>	
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 Alpha Spectrometry
PR-06	Sample Preparation for Beta Spectrometry
<i>Survey and measuring procedures</i>	
ME-01	Emergency Worker Personal Protection Guide
ME-02	Personal Dosimetry
ME-03	Radiological Survey of Victim(s) on the 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	Alpha Spectrometry
ME-17	Beta Spectrometry
ME-18	Source Recovery/Removal of Radioactive Material
ME-19	Personal Contamination Monitoring
ME-20	Basic Instructions for Personal, Equipment and Vehicle Decontamination
<i>Assessment procedures</i>	
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
<i>Equipment checklists</i>	
EQ-01	Common FAT Equipment
EQ-02	Arial Survey/Search
EQ-03	Vehicle Based Survey/Search
EQ-04	Radiation Monitoring
EQ-05	Environmental Measurements
EQ-06	Source Search/Recovery

# APPENDIX D: INDICATIVE LIST OF MEDICAL RESOURCES

This appendix presents an indicative list of medical equipment and other general supplies suggested for immediate medical response to nuclear or radiological emergencies and a list of possible drugs for the treatment of internal contamination (radionuclide intakes).

## Medical tools

### Instrumentation

- Set of standard surgical instruments
- Equipment for blood transfusion
- Disposable syringes
- Catheters
- Blood cell counter
- Microscope
- Equipment for preparing blood smears
- Containers for collecting biological samples
- Phlebotomy kits
- Ventilation bag and mask
- Defibrillator, batteries and charger
- Portable surface contamination monitors
- Computers with validated dosimetry software

### Personal protection kit

- Self-reading dosimeter
- Permanent dosimeter
- Disposable protective overalls and caps
- Overshoes
- Cotton gloves, vinyl gloves, rubber gloves
- Masks
- Eye protection equipment
- Stable iodine for thyroid blocking
- Vinyl apron

### Medical first aid kit

- Analgesics, including eye drops
- Local anaesthetics
- Sedative drugs
- Acute cardiac care drugs
- Antihypotensive and antihypertensive drugs
- Antiemetics
- Antibiotic, antiviral and antifungal drugs
- Diuretics

- Topical antibiotic cream
- Rehydration salts
- Corticosteroids
- Cytokines (probably would need to be supplied by EBS)

#### **Decontamination kit**

- Soap and soft brush, detergents, shampoo
- 5% sodium hypochlorite solution NaHClO<sub>3</sub>
- Hydrogen peroxide solution H<sub>2</sub>O<sub>2</sub> for oral cavity care
- Saturated solution of potassium permanganate KMnO<sub>4</sub>
- Physiological saline solution
- Sterile water or solution for wound irrigation
- Sterile eyewash solution, surgical cotton rolls
- Cotton nasal swabs
- Masking tape
- Indelible felt pens for marking contaminated spots
- Nail brushes
- Sterile wound dressings
- Swabs
- Nasal catheters
- Hair clippers

#### **Biological sampling\***

- 24-hour urine containers
- Faecal collection pots
- Lithium heparin blood tubes (for cytogenetics)
- EDTA blood tubes (for differential cell counts)
- 25-ml plastic scintillation vials (for swabs)

#### **General supplies**

- Communication equipment (e.g. cellular phone, satellite phone, portable radio with adjustable frequencies, etc.)
- Computer
- Spare batteries
- Critical spare parts
- Plastic sheets, tapes, bags (different size)
- Surgical clothing
- Sheets and blankets
- Portable stretchers
- Tags and adhesive labels
- Medical information forms
- Radiation emergency patient form
- Scissors
- Drapes (waterproof material recommended)
- Waste bags
- Administrative supplies
- Cases for shipment
- Torch

\*Samples sent for analysis in an EBS laboratory should be transported according to the United Nations packaging and labelling requirements for diagnostic specimens; they may also be required to conform to regulations for the transport of radioactive material.

## **Drugs for treatment of internal contamination**

The following is a complete list of all decorporation/blocking agents that might be required. However, this list includes some agents for which clinical experience is still limited. The preferred treatment is indicated in the third column. The status of approval of these drugs differs among countries; some of them have been approved by the U.S. Food and Drug Administration (FDA) for other purposes or just for adults, while others have not been approved by FDA but are commercially available in other countries. Most of these drugs are in off-label use even if they have been approved.

Major references for this table include [21–29] and clinical experience at REAC/TS. There is limited clinical experience with many of these recommendations. See individual drug labels for detailed guidance on these drugs.

Radionuclide	Possible therapeutic agents	Preferred treatment
Americium	DTPA <sup>(a)</sup>	DTPA
Arsenic	BAL, penicillamine, DMPS, DMSA	BAL
Barium	barium, calcium therapy (see strontium)	See strontium
Bismuth	DMPS, DMSA, BAL, penicillamine	DMPS
Californium	DTPA	DTPA
Calcium	Calcium therapy (see strontium), barium	See strontium
Carbon	Consider hydration and stable carbon	Hydration and stable carbon
Cerium	DTPA	DTPA
Caesium	Prussian blue	Prussian blue
Chromium	DTPA, EDTA, penicillamine, NAC	DTPA
Cobalt	DTPA, penicillamine, DMSA, EDTA, NAC	DTPA, Penicillamine
Copper	Penicillamine, DMSA, DMPS, trientine	Penicillamine
Fission products (mixed)	Management depends on predominant radionuclides present at the time (e.g. early: iodine; late: strontium, caesium and others)	
Fluorine	Aluminium hydroxide	Aluminium hydroxide
Gallium	Consider penicillamine, DFOA	Penicillamine
Gold	BAL, penicillamine, DMPS	Penicillamine, BAL
Iodine	KI, Propylthiouracil, Methimazole or potassium iodate	KI
Iridium	Consider DTPA, EDTA	Consider DTPA
Iron	DFOA, Deferasirox, DFOA and DTPA together	DFOA
Lead	DMSA, EDTA, EDTA with BAL	DMSA
Manganese	Ca-DTPA, EDTA	Ca-DTPA
Magnesium	Consider strontium therapy (see strontium)	Consider strontium therapy
Mercury	BAL, DMPS, DMSA, EDTA, penicillamine	BAL, DMPS, DMSA
Molybdenum	Limited clinical experience	
Neptunium	Consider DFOA and/or DTPA, DMPS	Consider DFOA and/or DTPA
Nickel	DDTC, BAL, DTPA, EDTA	DDTC, BAL, DTPA
Phosphorus	Hydration, oral sodium or potassium phosphate, aluminium hydroxide/aluminium phosphate, calcium	Hydration, oral sodium or potassium phosphate
Plutonium	DTPA, DFOA, EDTA, DTPA and DFOA together	DTPA
Polonium	DMPS, BAL, DMSA, penicillamine	DMPS, BAL
Potassium	Diuretics	Diuretics
Promethium	DTPA	DTPA
Radium	Radium, strontium therapy	Strontium therapy
Rubidium	Prussian blue	Prussian blue
Ruthenium	DTPA, EDTA	DTPA
Silver	No specific therapy	
Sodium	Diuretic and isotopic dilution with 0.9 % NaCl	Diuretic and isotopic dilution with 0.9 % NaCl
Strontium	Aluminium hydroxide, barium sulphate, sodium alginate, calcium phosphate, stable strontium (as a diluting agent)	Aluminium hydroxide, barium sulphate
Sulphur	Consider sodium thiosulfate	Consider thiosulfate
Technetium	Potassium perchlorate	Potassium perchlorate
Thallium	Prussian blue	Prussian blue
Thorium	Consider DTPA	Consider DTPA
Tritium	Force fluids	Water diuresis
Uranium	Bicarbonate to alkalize the urine; consider dialysis	Bicarbonate
Yttrium	DTPA, EDTA	DTPA
Zinc	DTPA, EDTA, zinc sulphate as a diluting agent	DTPA
Zirconium	DTPA, EDTA	DTPA

<sup>(a)</sup> DTPA comes in two forms: calcium (Ca-DTPA) and zinc (Zn-DTPA). Both forms work by tightly chelating plutonium, americium, and curium. When given within the first day after internal contamination has occurred, Ca-DTPA is about 10 times more effective than Zn-DTPA at chelating plutonium, americium, and curium. After 24 hours have passed, Ca-DTPA and Zn-DTPA are equally effective in chelating these radioactive materials<sup>19</sup>. However, Ca-DTPA is more effective than Zn-DTPA at chelating manganese, and Zn-DTPA is not used for chelating zinc. When specified, Ca-DTPA should be used.

DDTC	Sodium diethylcarbodithioate
DFOA	Deferoxamine
BAL (Dimercaprol)	British anti-Lewisite
DMPS	2,3-dimercaptopropane-1-sulfonate
DMSA	Meso-2,3-dimercaptosuccinic acid
DTPA	Diethylenetriaminepentaacidic acid
EDTA	Ethylenediaminetetraacetic acid
KI	Potassium iodide
Prussian blue	Insoluble ferric hexacyanoferrate (II)

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<sup>19</sup> Centers for Disease Control and Prevention: Emergency Preparedness and Response; see <https://emergency.cdc.gov/radiation/dtpa.asp>.



# **APPENDIX E: MINIMUM EQUIPMENT SPECIFICATIONS**

Some measurements will be performed in the field, while others may be performed in the laboratories on samples collected in the field. In either situation the procedures used in the fieldwork must be performed correctly if the measurements are to produce valid results.

Radiation measurement instruments can be characterized as installed, portable, personal and laboratory equipment. The equipment specifications and characteristics that are needed to perform certain assistance tasks will vary according to the circumstances under which they may be used (field, area, laboratory conditions) and according to their purpose (radiation survey, contamination monitoring, or personal monitoring). In any case the products of the measurements need to be in a form and a format allowing those being assisted to easily make use of them. This implies the need to establish guidelines for the minimum compatibility of assistance products.

This appendix provides guidance for the minimum specifications for measuring instrumentation, software and other equipment. Additional guidance is included in the EPR-Harmonized Assistance Capabilities 2017 [20].

## Measuring instrumentation

Type of instrument	Physical quantity measured	Unit <sup>a</sup>	MDA <sup>b</sup> or range	Remarks
Airborne gamma spectrometric survey system	Surface activity concentration	Bq/m <sup>2</sup>	1 to 5 kBq/m <sup>2</sup> , Cs-137 <sup>c</sup>	Radionuclide-specific; linked to navigation system
Airborne dose rate survey system	Dose rate	Sv/h	0.1 µSv/h	Linked to navigation system
Vehicle-borne gamma spec. survey system	Surface activity concentration	Bq/m <sup>2</sup>	0.1 to 0.5 kBq/m <sup>2</sup> , Cs-137 <sup>d</sup>	Radionuclide-specific; linked to navigation system
Vehicle-borne gamma dose rate survey system	Dose rate	Sv/h or cps	0.05 µSv/h–1 Sv/h <sup>e</sup>	Linked to navigation system
Alpha/beta contamination monitor	Surface activity concentration	Bq/m <sup>2</sup> , cps	Beta: 1, alpha: 0.1 Bq/cm <sup>2</sup>	Sensitive area: ≥100 cm <sup>2</sup>
Personal contamination monitor	Surface activity concentration	Bq/m <sup>2</sup> , cps	Beta/gamma: 1 Bq/cm <sup>2</sup>	Earphones option
Multipurpose gamma/beta survey monitor	Dose rate	Sv/h	0.1 µSv/h–1 Sv/h	Window option
Multipurpose gamma/beta survey monitor	Dose rate	Sv/h	0.05 µSv/h–100 mSv/h	Window option
Telescopic gamma probe	Dose rate	Sv/h	0.1 µSv/h–10 Sv/h	
Neutron dose rate meter	Neutron dose rate	Sv/h, cps	1 µSv/h	Energy: thermal to 14 MeV
Neutron fission meter	Neutron multiplicity	cps, Feynman variance (Y2F)	Radionuclide specific	Deviation from normal distribution of multiplicity
Hand-held radionuclide identifier	Radionuclide	n.a. <sup>f</sup>	Radionuclide specific	Identify radioisotopes
Self-reading dosimeter	External gamma dose	Sv or Gy	1 µSv–10 Sv	Alarm function available
	Gamma dose rate	Sv/h	5 µSv/h–1 Sv/h	
Personal dosimeter	External gamma dose	Sv or Gy	10 µSv–10 Sv	TLD, film badge, glass dosimeter, optically stimulated luminescence (OSL) dosimeter
HPGe in situ gamma ray spectrometry system	Surface activity concentration	Bq/m <sup>2</sup>	1 kBq/m <sup>2</sup> of Cs-137	Calibrated also for samples
Mobile laboratory gamma spectrometry system	Activity concentration	Bq/L, Bq/kg	Radionuclide specific	Portable; with shielding
Gross alpha/beta proportional counter	Activity concentration	Bq/m <sup>3</sup> , Bq/kg	1 Bq alpha, 2 Bq beta	Portable; with shielding
Liquid scintillation counter	Activity concentration	Bq/L, Bq/kg	Radionuclide specific	Portable
Area monitor	Gamma dose rate	Sv/h	0.1 µSv/h–100 mSv/h	Portable
In vivo counting equipment (portable)	Activity (in the body)	Bq	Cs-137: 0.4 kBq	Calibrated: for the age of 1 year old to adult
NaI(Tl) spectrometer (portable)	Activity concentration	Bq/L, Bq/kg	Cs-137: 4 Bq/L	In vitro laboratory; energy range 100–3000 keV
Gamma/beta surface contamination monitor	Surface activity concentration	Bq/m <sup>2</sup> , cps	Beta/gamma: 1 Bq/cm <sup>2</sup>	

<sup>a</sup> Or equivalent; units to be reported.

<sup>b</sup> Minimum detectable activity.

<sup>c</sup> With NaI detector (16 L), altitude 40 m, speed 70 km/h, acquisition time 2 seconds, uniform surface contamination.

<sup>d</sup> With Ge detector (20%), at 40 to 50 km/h, acquisition time 5 to 10 seconds, uniform surface contamination.

<sup>e</sup> At 40 to 50 km/h.

<sup>f</sup> Not applicable.

Calibration period:

annual

Quality control checks:

prior and following the use

Maintenance period:

biannual

**Software**

All software used is recommended to be either commercially available (with validation declared by the provider/producer) or validated.

**Other equipment**

Item	Criteria
Personal protection supplies	Need to be standard field protective clothing and respiratory protective devices suitable for the hazard level presented. All supplies must be within manufacturer's expiry date in a quantity suitable for the limits of the mission as indicated by the IAEA, but not less than for three days.
Sampling and sample preparation equipment	Need to be suitable for emergency sampling and sample preparation.
Medicaments and substances	Need to be within manufacturer's expiry date for the whole expected duration of the usage.
Specialized equipment	No specific criteria.
General supplies	Need to be within manufacturer's expiry date and in a quantity suitable for the limits of the mission as indicated by the IAEA, but not less than for three days.



# APPENDIX F: ASSISTANCE PRODUCTS SPECIFICATION

Nuclear or radiological emergencies can have serious consequences over wide geographical areas. Authorities in States have the responsibility to decide upon and to take appropriate response actions and to ensure that resources are available for mitigating the consequences. However, an effective response to a nuclear or radiological emergency, including a situation in which a prompt response is warranted to mitigate the effects of a hazard, can easily require resources that exceed the capabilities of individual States. It is therefore important for States to cooperate in response to such emergencies. This can be effectively achieved only if emergency preparedness arrangements are in place to ensure a timely, managed, coordinated and effective response at the scene and at the local, regional, national and international levels.

States have developed national arrangements to respond to a nuclear or radiological emergency within their own borders, but these may vary from State to State. The IAEA safety standards provide the framework for a harmonized approach to nuclear or radiological emergency preparedness and response. However, the types of response teams, technical products, equipment, training and methods of operation may differ from State to State, resulting in significant challenges in providing effective assistance to one another. Confidence in the accuracy and appropriateness of field monitoring and of laboratory measurements is seen as vital.

There is a need for compatibility of assistance capabilities and for harmonization of the outputs, or products, of the international assistance. These products need to be in a form and a format that allow those being assisted to easily make use of them. This implies that, for each functional area, guidelines for minimum compatibility need to be established. If complied with by the provider and receiver of the assistance, a sound basis for efficient international assistance will be achieved.

RANET products may be the results of measurements, modelling or other information gathering (radiation monitoring products, material products, dispersion products, dose prediction and dose assessment products).

RANET products may also be in the form of expert advice, recommendations, suggestions or guides based on the evaluation of existing detailed information (e.g. NPP and other facility designs).

This appendix contains example guidelines for the minimum compatibility of some RANET assistance products. Additional guidance is included in the EPR-Harmonized Assistance Capabilities 2017 [20].

## RANET products

### General products

<b>Location</b>	The location expressed by the latitude and longitude.
	<b>Location:</b> a point on the Earth's surface expressed by a recognized coordinate system.
	<b>Latitude:</b> the angular distance, in degrees, minutes and seconds, of a point north or south of the Equator. Lines of latitude are often referred to as parallels.
	<b>Longitude:</b> the angular distance, in degrees, minutes and seconds, of a point east or west of the Prime (Greenwich) Meridian. Lines of longitude are often referred to as meridians.
	<b>GPS</b> (Global Positioning System): a global satellite-based system for determining precise locations on Earth.
	<b>Datum:</b> A math model which depicts a part of the surface of the Earth. Latitude and longitude lines on a paper map are referenced to a specific map datum. The map datum selected on a GPS receiver needs to match the datum listed on the corresponding paper map in order for position readings to match.

### Radiation monitoring products

<b>Source activity</b>	The activity of a radioactive source or radionuclide; the unit is Bq.
<b>Radionuclide concentration</b>	The activity of a radionuclide per unit mass or per unit volume of a material (solid or liquid); the unit is Bq/kg or Bq/m <sup>3</sup> or Bq/L.
<b>Ground deposition</b>	Radioactive material deposited on the ground (or within few cm of the surface of the ground); the activity of a radionuclide per unit ground (surface) area; the unit is Bq/m <sup>2</sup> .
<b>Surface contamination</b>	The activity of a radionuclide per unit surface area of an object or person; the unit is Bq/cm <sup>2</sup> .
<b>Reports or plans</b>	A document containing the outlines of a mission, results of measurements, recommendations or advice – for example, the decontamination plans, operational plans, recovery plan, etc.
<b>Radionuclide identification</b>	The identification of individual radionuclides by using spectrometric data and/or software.

<b>Data maps</b>	Graphical representation of measurement data on a map – for example, ground deposition, dose rate, etc.
<b>Environmental sampling</b>	The process of collecting samples from environmental media (air, soil, water, sediments, dietary products and other human food, pasture, biota).

## Material products

<b>Decontamination equipment and reagents</b>	Equipment and chemical substances used in the processes of decontamination of areas, land (urban and rural) buildings, equipment, objects and persons.
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## Dispersion products

Despite the considerable progress made in the field of atmospheric transport, dispersion and deposition modelling, different numerical models used in different operational centres will not lead to identical predictions. Variance in the transport, dispersion and deposition predictions may arise from differences in the driving numerical weather analysis and forecast systems, different approaches to modelling physical processes, and differences in numerical algorithms, as well as from differences in the use of the model. It is also recognized that several States have invested considerable resources in the development of atmospheric transport, dispersion and deposition prediction capabilities. Most of these capabilities are limited to regional coverage, but several have global coverage.

<b>Trajectories</b>	In the event of a release of radioactive material to the atmosphere from a nuclear installation or other facility, the IAEA has arrangements with the World Meteorological Organization (WMO) for the production of a standard set of meteorological products for initial response. These are developed on the basis of the time of release, event site coordinates and, if available, information on the source term and the duration of release. These products include:
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- Three-dimensional trajectories of hypothetical packets of material, plotted separately for packets released at 500, 1500 and 3000 metres above the ground. Also marked are the locations of each packet at 6-hour intervals at the main synoptic hours (6h, 12h, 18h, 24h UTC) up to the end of the dispersion model forecast;
- Time integrated airborne concentrations, in Bq.h/m<sup>3</sup>, within the layer 0 to 500 metres, for the forecast period(s)<sup>20</sup>;
- Total deposition (wet and dry) in Bq/m<sup>2</sup> for the forecast period(s).

Competent Authorities are encouraged to establish links with their national meteorological service. The national meteorological service can provide interpretation of the WMO meteorological products and help with the development of national arrangements for atmospheric dispersion calculations. A list of national

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<sup>20</sup> For the arrangements with the IAEA, the WMO use the following forecast periods: 24 hours, 48 hours and 72 hours.

meteorological services can be found on the WMO<sup>21</sup> web site: [www.wmo.int/pages/prog/www/DPFSERA/delegated\\_authorities.htm](http://www.wmo.int/pages/prog/www/DPFSERA/delegated_authorities.htm).

## Dose prediction products

Early dose predictions are necessary to evaluate the potential health consequences and other impacts of an airborne radioactive release. Despite the considerable progress made in the field of atmospheric dispersion modelling, different numerical models used in different operational centres may not lead to the same predictions.

<b>External dose</b>	Dose resulting from external exposure to gamma radiation from radioactive material deposited on the ground (ground shine) and from radioactive materials in an airborne plume (cloud shine); the unit is Sv.
<b>Inhalation dose</b>	Committed effective dose resulting from inhalation of radioactive materials and subsequent deposition of radionuclides in body tissues; the unit is Sv.
<b>Ingestion dose</b>	Committed effective dose resulting from ingestion of radioactive materials and subsequent deposition of radionuclides in body tissues; the unit is Sv.
<b>Thyroid dose</b>	Committed dose resulting from inhalation or ingestion of radioactive iodine and subsequent deposition of iodine in the thyroid, the unit is Sv.
<b>Total dose</b>	Sum of the external, inhalation and ingestion doses; the unit is Sv.

## Dose assessment products

In a nuclear or radiological emergency, exposure of an individual may be external and/or internal and may be incurred by various pathways. External exposure may be due to direct irradiation from the source, airborne radionuclides (immersion or exposure to an overhead plume), or radionuclides deposited onto the ground and onto person's clothing and skin. Internal exposure follows from the inhalation of radioactive material either directly from a plume or re-suspended from contaminated surfaces, from the ingestion of contaminated food and water or through contaminated wounds or absorption through intact skin.

Dose assessment products will use the dosimetry system specified in [30–31], Doses calculated will be expressed as absorbed dose (Gy), equivalent dose (Sv), committed effective dose (Sv) or as RBE-weighted absorbed dose (Gy).

## General assessment and advice products

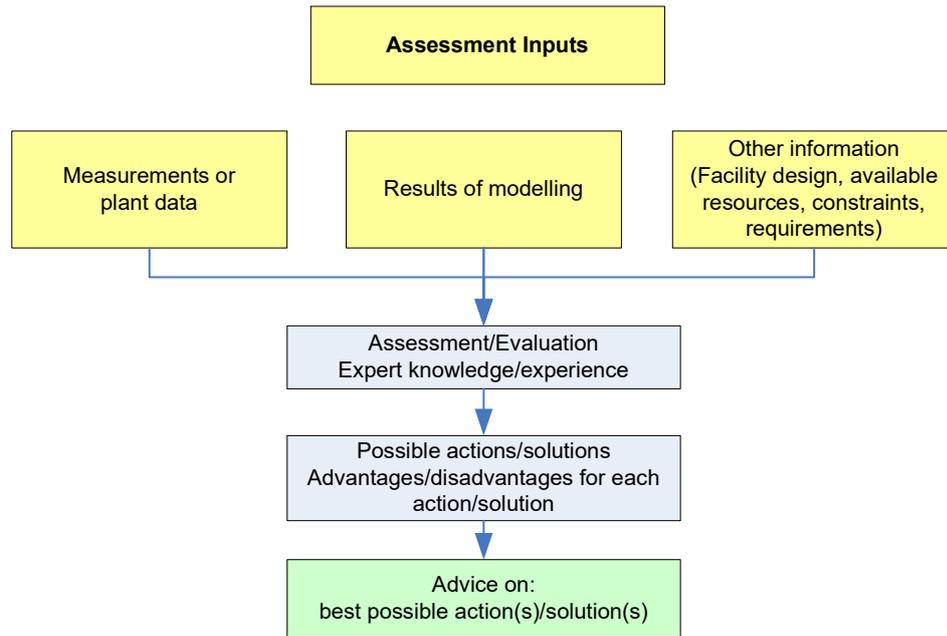
<b>Advice</b>	Advice/recommendation/suggestion is a proposal for an appropriate course of action.
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<sup>21</sup> If requested by the IAEA, the WMO can prepare specialized meteorological products showing 'plume' arrival times. These include contour lines of airborne concentrations for a single radioactive element, indicating the time, at 3-hour intervals after the start of the release, when such a projected airborne concentration will be present at a geographical location.

Before giving advice:

- Thoroughly assess the situation based on available information (e.g. facility design, plant status, measurement data, modelling results), and any relevant constraints and considerations;
- List relevant options for possible actions/solutions;
- List advantages/disadvantages for each action/solution;
- Suggest specific action(s) or solution(s) and give an explanation for why this is recommended.



**Medical consultation**

Two or more health professionals discuss the diagnosis, prognosis and treatment of a particular case.





# **APPENDIX G: RESPONSIBILITIES AND DUTIES OF TEAM LEADERS**

Team Leader(s), e.g. Assistance Mission Leader and FAT Team Leader(s) are identified and agreed upon before deployment by all parties. Where an Assistance Mission involves the utilization of External Based Support(s) (EBS), the EBS Leader(s) are also identified and agreed upon by all parties.

The following are expected responsibilities and duties of a Team Leader.

## **Responsibilities**

A Team Leader leads and manages the mission and ensures coordination with the requesting State, assisting State(s), the IAEA Secretariat and other Team Leaders as appropriate. He/she:

- Ensures that the mission tasks are performed according to the AAP;
- Coordinates the mission tasks with the requesting State/Competent Authority;
- Ensures the radiological safety and security of the team members;
- Ensures liaison with the responsible person identified by the requesting State/Competent Authority, local United Nations representative (if appropriate) and other relevant authorities;
- Ensures that sufficient support is provided to achieve the mission objectives;
- Liaises with the media (if required), in consultation with the IAEA Secretariat and jointly with the requesting and assisting State/Competent Authority; provides clear explanation of the situation and risks;
- Ensures regular contact with the IAEA Secretariat and provides briefings on the progress of the mission, including the results achieved and issues identified;
- Ensures that the respective FAT Team Leaders, or Assistance Mission members regularly contact their Competent Authority (of assisting States) to brief them on the progress of the mission.

## Task lists

Tasks lists are provided below to assist the Assistance Mission Leader in ensuring the fulfilment of the Assistance Mission team's responsibilities. The tasks listed are generic and need to be reviewed and, if needed, amended as required depending on the scope of the Assistance Mission and its role as defined in the AAP.

## TASK LIST

### ASSISTANCE MISSION LEADER

**Objective:** To provide a list of the basic tasks to be performed by an Assistance Mission team.

Note: This guide is supported by additional guides that provide more detail for some specific actions listed within this guide.

#### Pre-deployment tasks

- Obtain a briefing from the IAEA Secretariat on the situation and review/clear AAP.
- Ensure that all members of an Assistance Mission or FAT Team Leaders (if appropriate) clearly understand the situation, mission objectives, responsibilities and tasks.
- Identify, in consultation with the IAEA Secretariat and all team members or FAT Team Leaders, the resources that are required to perform the assistance tasks described in the AAP and specify who will be providing the resources.
- Obtain a security briefing.
- Ensure that all team members or FAT Team Leaders receive security briefings and relevant information prior to departure.
- Ensure that all team members or FAT Team Leaders receive from the local counterpart and/or the IAEA Secretariat any information that may be relevant to the conduct of the mission, for example:
  - AC power supply for the country (voltage, frequency and plug type);
  - Local communication protocols (e.g. mobile phone bands/frequency, shortwave radio regulations);
  - Expected climate;
  - Local currency;
  - Religious protocols, local customs, public holidays/traditions.
- Confirm that all logistical arrangements for the deployment of team members and/or FAT have been addressed. This needs to include:
  - Travel to the requesting State;
  - Visas for entry into the requesting State, and any transit States (if applicable);
  - Local ground transport within the requesting State;
  - Accommodation within the requesting State.
- Obtain from the IAEA Secretariat the contact details for:
  - Local counterpart (s) within the requesting State;
  - IAEA IEC;
  - Assistance Mission team members or FAT Team Leaders;
  - Local United Nations representative;
  - Any other relevant authorities.
- Make arrangements for introductory briefing at the mission destination location.

### Initial tasks on arrival in requesting State

- Conduct meeting/briefing with the requesting State/Competent Authority or concerned organization to obtain current status on the situation.
- Conduct meeting/briefing with the responsible Incident Commanders of the requesting State upon arrival at the site to obtain current status of the situation.
- Conduct situation briefing with all team members, FAT or EBS Team Leaders and IAEA Secretariat.
- Ensure that all resources have arrived in the requesting State and that the deployed equipment is operational.
- Establish contact with the assisting State authorities.
- Establish contact with the local United Nations representative (if appropriate).

### Recurring tasks throughout deployment

- Manage and coordinate implementation of the AAP in close coordination with:
  - The requesting State/Competent Authority or concerned organization;
  - The IAEA Secretariat;
  - External Based Support (if applicable).

#### **CAUTION**

**Do not** make any assessment or recommendations concerning areas that are not within the scope of the AAP.

**Do not** give any media interview without approval of the requesting State, assisting State or NAC coordinator and consultation with the IAEA Secretariat.

- Ensure that all response work is performed according to the IAEA safety standards and safety requirements or the State's requirements, whichever are more restrictive.
- Ensure that the tasks assigned to the team members/FATs are implemented.
- Identify to the IAEA Secretariat the need for any additional experts, FAT or EBS.
- Ensure continuous interaction with:
  - Team members;
  - FAT and/or EBS Team Leaders;
  - Requesting State/Competent Authority;
  - IAEA Secretariat (at a minimum once per day);
  - Responsible Competent Authority and other relevant authorities of assisting State(s);
  - Any other relevant authorities.
- Identify any issues, in consultation with team members/FAT Team Leaders on which the IAEA could provide and/or coordinate additional assistance.
- Approve all reports prior to their submission to the requesting State and/or the IAEA Secretariat.

- Ensure the coordination of any media issues in the field with the IAEA Secretariat and the requesting State/Competent Authority and assisting State(s).
- Ensure that the mission is properly documented through:
  - Mission logbook updates;
  - Maintaining copies of all final assistance products collected and reported throughout the mission (note: the retention of raw data is the responsibility of the team members, individual FAT Leaders or EBS);
  - Meetings minutes;
  - Obtaining photographic or video records (if appropriate).

### Actions prior to departure from the requesting State

- Ensure that all results, reports, findings, logbooks, maps, minutes and completed forms are collected and maintained.
- Confirm the conclusion of the mission and preparation for departure as well as any relevant mission information with the IAEA Secretariat.
- Conduct an exit meeting with requesting Competent Authority or concerned organization. The meeting includes:
  - Briefing on findings/results of the mission/assistance;
  - Preliminary conclusions and recommendations.
- Ensure that logistical arrangements are in place for departure from the requesting State:
  - Return travel of team members (ground, air and visas);
  - Shipping of non-consumed resources back to original locations.
- Ensure that the IAEA Secretariat contacts the relevant Competent Authority(ies) of the assisting State(s) and confirms the conclusion of the mission and preparation for departure.
- Ensure that the IAEA Secretariat contacts and informs the local United Nations representative about the departure.

### Post-mission actions

- Discuss the mission's recommendations to the requesting Government/Competent Authority with the IAEA Secretariat.
- Prepare and conduct mission debrief in coordination with the IAEA Secretariat (if applicable).
- Ensure that all mission documents, results, photographic and video material, completed forms, logbooks, etc.,<sup>22</sup> are submitted to the IAEA Secretariat.
- Prepare the After Action Assistance Report to the requesting State within one week of the termination of the assistance and submit it to the IAEA Secretariat.<sup>23</sup>
- Assist the IAEA Secretariat in preparing a comprehensive Assistance Report including:

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<sup>22</sup> Based on lessons identified, the Assistance Team Leader also considers preparing recommendations for improvements of the assistance process.

<sup>23</sup> The IAEA Secretariat formalizes and distributes the report.

- Fully described event history;
- Response actions taken;
- Resolution of the situation;
- Results of the assistance;
- Conclusions and recommendations for future actions (if any).

## TASK LIST

### BRIEFINGS TO THE IAEA SECRETARIAT BY THE ASSISTANCE MISSION LEADER

**Objective:** To provide a generic list of items for the Assistance Mission Leader and the IAEA Secretariat to discuss during briefings to the IAEA Secretariat.

- Provide an event situation report (SITREP) based on the most recent information provided by the local counterpart, including any problems being encountered.
- Provide a report on the progression of the mission, including (as appropriate):
  - Progress and expected completion time of the task(s);
  - Summary of findings from conduct of task(s);
  - Potential deviations from the scope and tasks;
  - Safety and security issues;
  - Relevant reports of radiological exposures, contaminations or injuries;
  - Any media issues that may have occurred or may be anticipated;
  - Any political issues that may have occurred or that may be anticipated;
  - Any additional resources or support that may be required during the conduct of the mission.
- The IAEA Secretariat will provide information regarding the IAEA's actions related to the event:
  - Progress and results of tasks being performed by the IAEA Secretariat;
  - Information being provided that would be of benefit to the Assistance Mission, such as data being provided by neighbouring States;
  - Replacement or additional NAC resources to be deployed;
  - Other offers of assistance received by the IAEA Secretariat;
  - Media and political items that may impact on the conduct of the mission;
  - Other missions in which the IAEA may be participating.
- Agree on the time of the next briefing.

## TASK LIST

### JAT TEAM MEETINGS

**Objective:** To provide a generic list of items for the Assistance Mission Leader and the FAT Team Leaders to discuss during daily briefing sessions.

- Provide an event SITREP based on the most recent information provided by the local counterpart, including any problems being encountered.
- Each FAT Team Leader provides a (brief) update on the progression of the mission, including (as appropriate):
  - Progress and expected completion time of allocated task(s);
  - Summary of findings from conduct of task(s);
  - Potential deviations to the scope and task(s);
  - Safety and security issues;
  - Relevant reports of radiological exposures, contaminations or injuries;
  - Any media issues that may have occurred or may be anticipated;
  - EBS updates;
  - Any additional resources or support that may be required;
  - Information that would be of benefit to the Assistance Mission, such as data being provided by neighbouring States and/or EBS;
  - Replacement or additional NAC resources to be deployed.
- Identify mission outcomes/advice.
- Review, and if necessary update, the AAP work plan.
- Agree on the time of the next briefing.



## **APPENDIX H: INTERNATIONAL ATA CARNET DOCUMENT**

The ATA is a system allowing the free movement of goods across frontiers and their temporary admission into a customs territory with relief from duties and taxes. The goods are covered by a single document known as the ATA Carnet that is secured by an international guarantee system.

The ATA Carnet serves as a goods declaration at export, transit and import. In addition, no import duties or taxes are collected for the temporary importation of goods covered by the system, since internationally valid security has been established by the national associations issuing the ATA Carnets. These national associations are approved by customs and are affiliated to an international guaranteeing chain administered by the ICC World Chambers Federation (ICC/WCF).

An example ATA Carnet is included below. The ATA Carnet can be downloaded from the World Customs Organization's web site<sup>24</sup>.

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<sup>24</sup> [http://www.wcoomd.org/-/media/wco/public/global/pdf/topics/facilitation/instruments-and-tools/conventions/ata/pf\\_ata\\_carnet.pdf?la=en](http://www.wcoomd.org/-/media/wco/public/global/pdf/topics/facilitation/instruments-and-tools/conventions/ata/pf_ata_carnet.pdf?la=en).



A.T.A. CARNET

GENERAL LIST/LISTE GENERALE

CARNET A.T.A.

Item No./ N° d'ordre	Trade description of goods and marks and numbers, if any/ Désignation commerciale des marchandises et, le cas échéant, marques et numéros	Number of Pieces/ Nombre de Pièces	Weight or Volume/ Poids ou Volume	Value*/ Valeur*	**Country of origin/ **Pays d'origine	For Customs Use/ Réservé à la douane  Identification marks/ Marques d'identification
1	2	3	4	5	6	7
TOTAL or CARRIED OVER / TOTAL ou A REPORTER						



\*Commercial value in country/customs territory of issue and in its currency, unless stated differently./Valeur commerciale dans le pays/territoire douanier d'émission et dans sa monnaie, sauf indication contraire  
 \*\*Show country of origin if different from country/customs territory of issue of the Carnet, using ISO country codes./\*\*Indiquer le pays d'origine s'il est différent du pays/territoire douanier d'émission du carnet, en utilisant le code international des pays ISO



# APPENDIX I: EXAMPLE REQUEST FOR ASSISTANCE

If a State needs assistance in the event of a nuclear or radiological emergency, whether or not such an event originates on its territory or is under its jurisdiction or control, it may request assistance from or through the IAEA.

The State's permanent mission to the IAEA, or the Competent Authority, is the Government representative that is expected to request assistance. To facilitate the effective provision of assistance, it is expected that a State will request assistance through one of the following communication channels, listed by preference:

- (1) Submitting the Request for Assistance (RFA) form on the IAEA's Unified System for Information Exchange in Incidents and Emergencies (USIE);
- (2) Fax to the IEC through 24/7 communication channel;
- (3) Telephone to the IEC through 24/7 line.

The request for **assistance** needs to include the scope and type of assistance required as follows:

- Information about the nuclear or radiological emergency: location, time of its occurrence (UTC and local time), name and full address of organization in charge of response actions, and name and contact details of person assigned to liaise with the IAEA.
- Type(s) of assistance required: nuclear installation assessment and advice, source search and recovery, radiation survey, sampling and analysis, assessment and advice, decontamination, medical support, dose assessment.

A sample RFA is provided below. The sample RFA is an example of a case in which assistance is requested under the Assistance Convention. All names used in this example are fictitious and do not denote actual States, places or persons.

## EMERCON REQUEST FOR ASSISTANCE FORM (RFA)

To :  IAEA (IEC)  For IAEA Secretariat use only  
 For authority use only  
 Free for public use

EMERCON

EMERCON

EMERCON

EMERCON  
EMERCOM

1 Requesting STATE:	State E	Number of pages:	2
2 Subject of Request:	Medical Support, Dose Assessment and Radiation Survey		
3 Is this an official Request for Assistance made under the Assistance Convention?	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	
4 Competent Authority:	Atomic Authority of State E (AAE)		
Tel:	+123 456 789	E-mail:	AAE@AAE.com
Fax:	+123 654 987		
5 Assistance Coordinator:	A. Mahla		
Organization:	Atomic Authority of State E		
Tel:	+123 456 781	E-mail:	A.Mahla@AAE.com
Fax:	+123 654 981		

6 EVENT DESCRIPTION: Due to unknown circumstances, a 40 TBq Cs-137 sealed source was ruptured. This event resulted in radioactive contamination and public overexposure in Township, State E.

7 ACTIONS TAKEN / PLANNED: The AAE has identified 75 residents of Township that require immediate medical attention. The AAE has performed environmental monitoring and identified the extent of the contamination. The AAE has issued advice on protective measures to all Township residents potentially impacted by the event and has asked impacted residents to attend local hospital for screening.

8 TYPE OF ASSISTANCE REQUESTED:

		FAT	EBS			FAT	EBS
<b>Source Search and Recovery</b>				<b>Medical Support</b>			
SSR-1	Foot, manual, ground based search	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MS-1	Medical triage	<input checked="" type="checkbox"/>	<input type="checkbox"/>
SSR-2	Vehicle based search	<input type="checkbox"/>	<input type="checkbox"/>	MS-2	Support in treatment	<input checked="" type="checkbox"/>	<input type="checkbox"/>
SSR-3	Aerial search	<input type="checkbox"/>	<input type="checkbox"/>	MS-3	Emergency treatment	<input checked="" type="checkbox"/>	<input type="checkbox"/>
SSR-4	Maritime search	<input type="checkbox"/>	<input type="checkbox"/>	MS-4	Psychological support	<input type="checkbox"/>	<input type="checkbox"/>
SSR-5	Source recovery	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				
<b>Radiation Survey</b>				<b>Dose Assessment</b>			
RS-1	Foot, manual, ground based survey	A <input checked="" type="checkbox"/> B <input type="checkbox"/>	<input type="checkbox"/>	DA-1	Cytogenetics-based biodosimetry	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
RS-2	In situ gamma spectrometry	A <input checked="" type="checkbox"/> B <input type="checkbox"/>	<input type="checkbox"/>	DA-2	EPR/ESR	<input type="checkbox"/>	<input type="checkbox"/>
RS-3	Vehicle based survey	A <input type="checkbox"/> B <input type="checkbox"/>	<input type="checkbox"/>	DA-3	Optical stimulated luminescence	<input type="checkbox"/>	<input type="checkbox"/>
RS-4	Aerial survey	<input type="checkbox"/>	<input type="checkbox"/>	DA-4	Activation analysis	<input type="checkbox"/>	<input type="checkbox"/>
RS-5	Scene control	A <input type="checkbox"/> B <input type="checkbox"/>	<input type="checkbox"/>	DA-5	In vivo/direct bioassay	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<b>Sampling and Analysis</b>				DA-6	In vitro/indirect bioassay	<input checked="" type="checkbox"/>	<input type="checkbox"/>
SA-1	Environmental Sampling	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	DA-7	Internal dose calculation	<input checked="" type="checkbox"/>	<input type="checkbox"/>
SA-2	Gamma spectrometry	<input type="checkbox"/>	<input checked="" type="checkbox"/>	DA-8	Dose reconstruction	<input checked="" type="checkbox"/>	<input type="checkbox"/>
SA-3	Alpha spectrometry	<input type="checkbox"/>	<input checked="" type="checkbox"/>				
SA-4	Beta counting	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<b>Decontamination</b>			
SA-5	Evidence Management	<input type="checkbox"/>	<input type="checkbox"/>	DE-1	Expertise in decontamination	<input type="checkbox"/>	<input type="checkbox"/>
SA-6	Advanced Nuclear Analysis	<input type="checkbox"/>	<input type="checkbox"/>	DE-2	Support in decontamination	<input type="checkbox"/>	<input type="checkbox"/>
<b>Radiological Assessment and Advice</b>				<b>Nuclear Installation Assessment and Advice</b>			
RAA-1	Atmospheric dispersion	<input type="checkbox"/>	<input type="checkbox"/>	NAA-1	Nuclear Power Reactor Design Advice		
RAA-2	Hydrospheric dispersion	<input type="checkbox"/>	<input type="checkbox"/>	NAA-2	Nuclear Power Reactor Operations Advice		
RAA-3	Radioecological models	<input type="checkbox"/>	<input checked="" type="checkbox"/>	NAA-3	Nuclear Power Reactor Accident Analysis	<input type="checkbox"/>	<input type="checkbox"/>
RAA-4	Dose predictions	<input checked="" type="checkbox"/>	<input type="checkbox"/>	NAA-4	Research Reactor Assessment and Advice	<input type="checkbox"/>	<input type="checkbox"/>
RAA-5	Public health protection	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	NAA-5	Fuel Fabrication Facility Assessment and Advice	<input type="checkbox"/>	<input type="checkbox"/>
RAA-6	Remediation and recovery	<input type="checkbox"/>	<input type="checkbox"/>	NAA-6	Spent Fuel Storage Assessment and Advice	<input type="checkbox"/>	<input type="checkbox"/>
RAA-7	Geographic data mapping	<input type="checkbox"/>	<input type="checkbox"/>	NAA-7	Spent Fuel Reprocessing Assessment and Advice	<input type="checkbox"/>	<input type="checkbox"/>
RAA-8	Hazard and threat assessment	A <input type="checkbox"/> B <input type="checkbox"/>	<input type="checkbox"/>	NAA-8	Operation of specialized technology	<input type="checkbox"/>	<input type="checkbox"/>

Other Type of Assistance Requested: Assistance with public concerns and media attention

9 OTHER RELEVANT INFORMATION: n.a.

10  Further information in attachment

**INSTRUCTIONS FOR COMPLETING EMERCON FORM RFA**

## REQUEST FOR ASSISTANCE FORM

The authorized National Competent Authority completes this form to request emergency assistance from or through the IAEA.

**Type** all information. **Fields in blue should always be completed.**

Select one of 'for IAEA Secretariat use only', 'for authority use only' or 'free for public use'.

Ensure the word **EXERCISE** is not displayed if it is a real event.

Item 1: Type (in English) the State requesting assistance; and the number of pages, including any attachments.

Item 2: Type the subject of the request.

Item 3: Mark clearly if this is an official request for assistance made under Article 2 of the Assistance Convention.

Item 4: Type the name of the Competent Authority requesting assistance, the telephone, fax and e-mail details of the Competent Authority.

Item 5: Type the name and position, organizational affiliation and contact details of the individual who will coordinate arrangements regarding the provision of assistance. The person should be readily available for regular communication with the IAEA, and any other assisting parties.

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Item 6: **EVENT DESCRIPTION.** Provide key facts about the event, including nature of the event, date/time of occurrence (UTC and local time), location, current status of the situation, cause and foreseeable development.

Item 7: **ACTIONS TAKEN / PLANNED.** Describe any response actions and protective measures already taken or planned.

Item 8: **TYPE OF ASSISTANCE REQUESTED.** Specify the types of National Assistance Capabilities (NACs) requested as either deployable Field Assistance Teams (FAT) or home based External Based Support (EBS). See EPR-RANET 2018 for the technical guidelines for each NAC. Provide more detailed information about the type of assistance requested, and/or specify other types of assistance requested, under 'Other Type of Assistance Requested'.

Item 9: **OTHER RELEVANT INFORMATION.** Briefly summarize any other relevant information that may help the IAEA and/or other States carry out their response functions. Also indicate here any information regarding changes to contact numbers.

Item 10: Indicate whether more information is available in an attachment.

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**Send this FORM by fax to +43-1-2600 7 29000.  
Telephone the IAEA emergency number for confirmation of receipt.**



## **APPENDIX J: EXAMPLE OFFER OF ASSISTANCE**

As outlined in Section 3.1, if the activation of NAC resources is recommended, the Assistance Officer will alert the appropriate National Warning Point(s) and request coordination with relevant Competent Authorities/NAC coordinator(s). The Competent Authorities/NAC coordinator(s) will inform the Assistance Officer regarding the availability of their resources for assistance and, if available, an Offer of Assistance (OFA) will be submitted via USIE, email or fax.

A sample OFA is provided below. The sample OFA is an example of a case where assistance is offered under the Assistance Convention. All names used in this example are fictitious and do not denote actual States, places or persons.

## EMERCON OFFER OF ASSISTANCE FORM (OFA)

To:  IAEA (IEC) For IAEA Secretariat use only For authority use only Free for public use**EMERCON****EMERCON****EMERCON**

1	Offering STATE:	State C	Number of pages: 4
2	Competent Authority:	Radiation Protection and Nuclear Safety Authority (RPNA)	
	Tel:	+ 111 222 333	E-mail: <a href="mailto:RPNA@RPNAStateC.com">RPNA@RPNAStateC.com</a>
	Fax:	+ 111 333 222	
3	Assistance Coordinator:	P. Michael, Head of Radiation Protection and Nuclear Safety Authority	
	Organization:	Radiation Protection and Nuclear Safety Authority	
	Tel:	+111 222 333	E-mail: <a href="mailto:P.Michael@RPNAStateC.com">P.Michael@RPNAStateC.com</a>
	Fax:	+111 333 222	

SAMPLE

## 4 ASSISTANCE OFFERED:

Type of Assistance Offered:

		FAT	EBS			FAT	EBS
<b>Source Search and Recovery</b>				<b>Medical Support</b>			
SSR-1	Foot, manual, ground based search	<input checked="" type="checkbox"/>	<input type="checkbox"/>	MS-1	Medical triage	<input checked="" type="checkbox"/>	<input type="checkbox"/>
SSR-2	Vehicle based search	<input type="checkbox"/>	<input type="checkbox"/>	MS-2	Support in treatment	<input checked="" type="checkbox"/>	<input type="checkbox"/>
SSR-3	Aerial search	<input type="checkbox"/>	<input type="checkbox"/>	MS-3	Emergency treatment	<input checked="" type="checkbox"/>	<input type="checkbox"/>
SSR-4	Maritime search	<input type="checkbox"/>	<input type="checkbox"/>	MS-4	Psychological support	<input type="checkbox"/>	<input type="checkbox"/>
SSR-5	Source recovery	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>				
<b>Radiation Survey</b>				<b>Dose Assessment</b>			
RS-1	Foot, manual, ground based survey	A <input checked="" type="checkbox"/> B <input type="checkbox"/>	<input type="checkbox"/>	DA-1	Cytogenetics-based biodosimetry	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
RS-2	In situ gamma spectrometry	A <input checked="" type="checkbox"/> B <input type="checkbox"/>	<input type="checkbox"/>	DA-2	EPR/ESR	<input type="checkbox"/>	<input type="checkbox"/>
RS-3	Vehicle based survey	A <input type="checkbox"/> B <input type="checkbox"/>	<input type="checkbox"/>	DA-3	Optical stimulated luminescence	<input type="checkbox"/>	<input type="checkbox"/>
RS-4	Aerial survey	<input type="checkbox"/>	<input type="checkbox"/>	DA-4	Activation analysis	<input type="checkbox"/>	<input type="checkbox"/>
RS-5	Scene control	A <input type="checkbox"/> B <input type="checkbox"/>	<input type="checkbox"/>	DA-5	In vivo/direct bioassay	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<b>Sampling and Analysis</b>				DA-6	In vitro/indirect bioassay	<input checked="" type="checkbox"/>	<input type="checkbox"/>
SA-1	Environmental Sampling	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	DA-7	Internal dose calculation	<input checked="" type="checkbox"/>	<input type="checkbox"/>
SA-2	Gamma spectrometry	<input type="checkbox"/>	<input checked="" type="checkbox"/>	DA-8	Dose reconstruction	<input checked="" type="checkbox"/>	<input type="checkbox"/>
SA-3	Alpha spectrometry	<input type="checkbox"/>	<input checked="" type="checkbox"/>				
SA-4	Beta counting	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<b>Decontamination</b>			
SA-5	Evidence Management	<input type="checkbox"/>	<input type="checkbox"/>	DE-1	Expertise in decontamination	<input type="checkbox"/>	<input type="checkbox"/>
SA-6	Advanced Nuclear Analysis	<input type="checkbox"/>	<input type="checkbox"/>	DE-2	Support in decontamination	<input type="checkbox"/>	<input type="checkbox"/>
<b>Radiological Assessment and Advice</b>				<b>Nuclear Installation Assessment and Advice</b>			
RAA-1	Atmospheric dispersion	<input type="checkbox"/>	<input type="checkbox"/>	NAA-1	Nuclear Power Reactor Design Advice	<input type="checkbox"/>	<input type="checkbox"/>
RAA-2	Hydrospheric dispersion	<input type="checkbox"/>	<input type="checkbox"/>	NAA-2	Nuclear Power Reactor Operations Advice	<input type="checkbox"/>	<input type="checkbox"/>
RAA-3	Radioecological models	<input type="checkbox"/>	<input checked="" type="checkbox"/>	NAA-3	Nuclear Power Reactor Accident Analysis	<input type="checkbox"/>	<input type="checkbox"/>
RAA-4	Dose predictions	<input checked="" type="checkbox"/>	<input type="checkbox"/>	NAA-4	Research Reactor Assessment and Advice	<input type="checkbox"/>	<input type="checkbox"/>
RAA-5	Public health protection	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	NAA-5	Fuel Fabrication Facility Assessment and Advice	<input type="checkbox"/>	<input type="checkbox"/>
RAA-6	Remediation and recovery	<input type="checkbox"/>	<input type="checkbox"/>	NAA-6	Spent Fuel Storage Assessment and Advice	<input type="checkbox"/>	<input type="checkbox"/>
RAA-7	Geographic data mapping	<input type="checkbox"/>	<input type="checkbox"/>	NAA-7	Spent Fuel Reprocessing Assessment and Advice	<input type="checkbox"/>	<input type="checkbox"/>
RAA-8	Hazard and threat assessment	A <input type="checkbox"/> B <input type="checkbox"/>	<input type="checkbox"/>	NAA-8	Operation of specialized technology	<input type="checkbox"/>	<input type="checkbox"/>

Other Capabilities Offered: [Expertise in preparation of public and media information and expertise in food countermeasures](#)

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5 ASSISTANCE EXPERTISE AND RESOURCES:

Assistance Team Composition:

P. Harte, FAT Leader;  
A. Paul, Radiological Assessor;  
K. Ryan, Public Health Expert;  
D. Aderiye, Food Countermeasure Expert;  
S. Neo, Support Officer; and  
I. Sambo, Public Information Officer

Assistance Team Equipment:

In situ gamma spectrometry system (HPGe);  
Mobile radiation laboratory;  
Alpha/beta contamination monitor;  
Gamma/beta survey monitor;  
Telescopic gamma probe;  
Wound counter;  
Electronic personal dosimeter (EPD);  
Passive personal dosimeters and self-reading (electronic) dosimeters;  
Personal protection supplies, disposable suits, disposable gloves, overshoes;  
AC power sources; chargers/batteries;  
Sample container – biological samples;  
Sampling equipment (soil, water, sediment, etc.)  
Portable video conference capabilities;  
Medical equipment (blood cell counter, blood collection kit, etc.)

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6 AVAILABILITY OF ASSISTANCE:

Estimated Time Until Ready: 24 hours (to arrive in Township on 2017-04-02)

Duration of Assistance: Seven days

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7 RESOURCES OFFERED: Dose assessment software and tent (different sizes)

---

8 TERMS OF ASSISTANCE OFFERED:

Requirements: Transport team and equipment from airport to Township

Terms: [None](#)

---

9 OTHER RELEVANT INFORMATION: [None](#)

10  Further information in attachment

SAMPLE

**INSTRUCTIONS FOR COMPLETING EMERCON FORM OFA**  
OFFER OF ASSISTANCE FORM

The authorized National Competent Authority completes this form to offer emergency assistance under the Assistance Convention.

**Type** all information. **Fields in blue should always be completed.**

Select one of 'for IAEA Secretariat use only', 'for authority use only' or 'free for public use'.

Ensure the word **EXERCISE** does not display if this is a real event.

---

Item 1: Type (in English) the State offering assistance; and the number of pages, including any attachments.

Item 2: Type the name of the Competent Authority offering assistance, the telephone, fax and e-mail details of the Competent Authority.

Item 3: Type the name and position, organization affiliation and contact details of the individual who will coordinate arrangements regarding the provision of assistance. The person should be readily available for regular communication with the IAEA and the Requesting party.

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Item 4: ASSISTANCE OFFERED. Specify the types of National Assistance Capabilities (NACs) offered as either deployable Field Assistance Teams (FAT) or home based External Based Support (EBS). See EPR-RANET 2018 for the technical guidelines for each NAC. List other types of capabilities offered under 'Other Capabilities Offered'. In addition to specifying the NACs offered, also provide additional details so that the IEC and/or the Requesting State can determine the most suitable Offers to meet

Item 5: ASSISTANCE EXPERTISE AND RESOURCES: Provide the necessary details regarding the assistance team composition (e.g. numbers of people and their expertise) and the equipment and resources that will be used by the assistance team (e.g. types of detectors, devices, vehicles). This information is necessary so that the IAEA and the Requesting State can determine whether the offered assistance is of the specific type requested. Necessary information can also be added as an attachment.

Item 6: AVAILABILITY OF ASSISTANCE: Provide an indication of when the deployable resources may be ready to depart and/or external based support ready to assist. Also indicate the estimated duration of time which the assistance may be offered.

Item 7: RESOURCES OFFERED: If this offer of assistance includes resources that could be provided directly to the Requesting State, for its use, provide the necessary details regarding the composition of the expertise and resources that are being offered as part of the assistance. This information is necessary so that the IAEA and the Requesting State can determine if and how the resources offered can be best utilized. Necessary information can also be added as an attachment.

Item 8: TERMS OF ASSISTANCE OFFERED: List any requirements (e.g. logistical) or terms, including financial, under which the assistance is offered.

Item 9: OTHER RELEVANT INFORMATION. Briefly summarize any other relevant information that may help the IAEA and/or other States carry out their response functions. Also indicate here any information regarding changes to contact numbers.

Item 10: Indicate whether more information is available in an attachment.

---

**Send this FORM by fax to +43-1-2600 7 29000.**  
**Telephone the IAEA emergency number for confirmation of receipt.**

## 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, IAEA Nuclear Security Series No. 23-G, Security of Nuclear Information: Implementation Guide, IAEA, Vienna (2015).
- [3] FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS, INTERNATIONAL ATOMIC ENERGY AGENCY, INTERNATIONAL CIVIL AVIATION ORGANIZATION, INTERNATIONAL LABOUR ORGANIZATION, INTERNATIONAL MARITIME ORGANIZATION, INTERPOL, OECD NUCLEAR ENERGY AGENCY, PAN AMERICAN HEALTH ORGANIZATION, PREPARATORY COMMISSION FOR THE COMPREHENSIVE NUCLEAR-TEST-BAN TREATY ORGANIZATION, UNITED NATIONS ENVIRONMENT PROGRAMME, UNITED NATIONS OFFICE FOR THE COORDINATION OF HUMANITARIAN AFFAIRS, WORLD HEALTH ORGANIZATION, WORLD METEOROLOGICAL ORGANIZATION, Preparedness and Response for a Nuclear or Radiological Emergency, IAEA Safety Standards Series No. GSR Part 7, IAEA, Vienna (2015).
- [4] INTERNATIONAL ATOMIC ENERGY AGENCY, Statute, IAEA, Vienna (1989).
- [5] EUROPEAN ATOMIC ENERGY COMMUNITY, FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS, INTERNATIONAL ATOMIC ENERGY AGENCY, INTERNATIONAL LABOUR ORGANIZATION, INTERNATIONAL MARITIME ORGANIZATION, OECD NUCLEAR ENERGY AGENCY, PAN AMERICAN HEALTH ORGANIZATION, UNITED NATIONS ENVIRONMENT PROGRAMME, WORLD HEALTH ORGANIZATION, Fundamental Safety Principles, IAEA Safety Standards Series No. SF-1, IAEA, Vienna (2006).
- [6] INTERNATIONAL ATOMIC ENERGY AGENCY, Objective and Essential Elements of a State's Nuclear Security Regime, IAEA Nuclear Security Series No. 20, IAEA, Vienna (2013).
- [7] FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS, INTERNATIONAL ATOMIC ENERGY AGENCY, INTERNATIONAL LABOUR OFFICE, PAN AMERICAN HEALTH ORGANIZATION, WORLD HEALTH ORGANIZATION, Criteria for Use in Preparedness and Response for a Nuclear or Radiological Emergency, IAEA Safety Standards Series No. GSG-2, IAEA, Vienna (2011).

- [8] INTERNATIONAL ATOMIC ENERGY AGENCY, Method for Developing Arrangements for Response to a Nuclear or Radiological Emergency, EPR-METHOD 2003, IAEA, Vienna (2003).
- [9] FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS, INTERNATIONAL ATOMIC ENERGY AGENCY, INTERNATIONAL LABOUR OFFICE, PAN AMERICAN HEALTH ORGANIZATION, UNITED NATIONS OFFICE FOR THE COORDINATION OF HUMANITARIAN AFFAIRS, WORLD HEALTH ORGANIZATION, Arrangements for Preparedness for a Nuclear or Radiological Emergency, IAEA Safety Standards Series No. GS-G-2.1, IAEA, Vienna (2007).
- [10] INTERNATIONAL ATOMIC ENERGY AGENCY, Operations Manual for Incidents and Emergency Communication, EPR-IEComm 2018, IAEA, Vienna (in press).
- [11] EUROPEAN COMMISSION, FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS, INTERNATIONAL ATOMIC ENERGY AGENCY, INTERNATIONAL LABOUR ORGANIZATION, OECD NUCLEAR ENERGY AGENCY, PAN AMERICAN HEALTH ORGANIZATION, UNITED NATIONS ENVIRONMENT PROGRAMME, WORLD HEALTH ORGANIZATION, Radiation Protection and Safety of Radiation Sources: International Basic Safety Standards, IAEA Safety Standards Series No. GSR Part 3, IAEA, Vienna (2014).
- [12] INTERNATIONAL ATOMIC ENERGY AGENCY, Generic Assessment Procedures for Determining Protective Actions during a Reactor Accident, IAEA-TECDOC-955, IAEA, Vienna (1997).
- [13] INTERNATIONAL ATOMIC ENERGY AGENCY, Generic Procedures for Assessment and Response during a Radiological Emergency, IAEA-TECDOC-1162, IAEA, Vienna (2000).
- [14] INTERNATIONAL ATOMIC ENERGY AGENCY, Generic Procedures for Monitoring in a Nuclear or Radiological Emergency, IAEA-TECDOC-1092, IAEA, Vienna (1999).
- [15] INTERNATIONAL ATOMIC ENERGY AGENCY, Generic Procedures for Medical Response During a Nuclear or Radiological Emergency, EPR-Medical 2005, IAEA, Vienna (2005).
- [16] INTERNATIONAL ATOMIC ENERGY AGENCY, PAN AMERICAN HEALTH ORGANIZATION, WORLD HEALTH ORGANIZATION, Cytogenetic Dosimetry: Applications in Preparedness for and Response to Radiation Emergencies, EPR-BIODOSIMETRY 2011, IAEA, Vienna (2011).
- [18] INTERNATIONAL ATOMIC ENERGY AGENCY, Radiation Protection Programmes for the Transport of Radioactive Material, IAEA Safety Standards Series No. TS-G-1.3, IAEA, Vienna (2007).
- [19] INTERNATIONAL ORGANIZATION FOR STANDARDIZATION, Radiological Protection: Performance Criteria for Service Laboratories Performing Biological Dosimetry by Cytogenetics, ISO 19238, ISO, Geneva (2014).
- [20] INTERNATIONAL ATOMIC ENERGY AGENCY, Guidelines on the Harmonization of Response and Assistance Capabilities for a Nuclear or Radiological Emergency, EPR-Harmonized Assistance Capabilities 2017, IAEA, Vienna (2017).
- [21] INTERNATIONAL ATOMIC ENERGY AGENCY, Nuclear Forensics in Support of Investigations, IAEA Nuclear Security Series No. 2-G (Rev. 1), IAEA, Vienna (2015).

- [22] ROJAS-PALMA, C., et al. (Eds), TMT Handbook: Triage, Monitoring and Treatment of People Exposed to Ionising Radiation Following a Malevolent Act, Norwegian Radiation Protection Authority, Østerås (2009).
- [23] WORLD HEALTH ORGANIZATION, Guidance on Regulations for the Transport of Infectious Substances 2009–2010, WHO, Geneva (2008).
- [24] NATIONAL COUNCIL ON RADIATION PROTECTION AND MEASUREMENTS, Management of Persons Contaminated with Radionuclides, NCRP Rep. 161, NCRP, Bethesda, MD (2008).
- [25] HENGÉ-NAPOLI, M.H., STRADLING, G.N., TAYLOR, D.M. (Eds), Decorporation of Radionuclides from the Human Body, Nuclear Technology Publishing, Ashford (2000).
- [26] BENNETT, J.C., GOLDMAN, L. (Eds), Cecil Textbook of Medicine, 21st edn., Elsevier Health Sciences, Oxford (1999).
- [27] BHATTACHARYYA, M.H., et al., Guidebook for the Treatment of Accidental Internal Radionuclide Contamination of Workers, GERBER, G.B., THOMAS, R.G. (Eds), Radiat. Prot. Dosim. **41** 1 (1992) 1–49.
- [28] HENGÉ-NAPOLI, M.H., STRADLING, G.N., TAYLOR, D.M. (Eds), Decorporation of radionuclides from the human body: Decorporation of the actinides, caesium and cobalt and a general medical overview, Radiat. Prot. Dosim. **87** 1 (2000) 9–56.
- [29] BLANUSA, M., VARNAI, V.M., PIASEK, M., KOSTIAL, K., Chelators as antidotes of metal toxicity: Therapeutic and experimental aspects, Curr. Med. Chem. **12** (2005) 2771–94.
- [30] POISINDEX System, Thomson MICROMEDEX Health Care Series, Truven Health Analytics, Armonk, NY (2004) monograph on CD-ROM.
- [31] INTERNATIONAL COMMISSION ON RADIOLOGICAL PROTECTION, The 2007 Recommendations of the International Commission on Radiological Protection, ICRP Publication 103, Ann. ICRP **37** 2–4 (2007).
- [32] INTERNATIONAL COMMISSION ON RADIOLOGICAL PROTECTION, Relative Biological Effectiveness (RBE), Quality Factor ( $Q$ ), and Radiation Weighting Factor ( $w_R$ ), ICRP Publication 92, Ann. ICRP **33** 4 (2003).





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