



IAEA

International Atomic Energy Agency
Atoms for Peace and Development

International RAMP Users' Group Meeting - Symposium on Emergency/Accident Assessment -

IAEA's assessment and prognosis tools

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Incident and Emergency Centre

Tools to support A&P activities



IAEA | IEC - Assessment Tools Incident and Emergency Centre
Assessment and Prognosis Tools



IAEA's IEC Assessment and Prognosis Tools

This website contains several tools that have been developed by the IAEA's Incident and Emergency Centre to be used by the IAEA to fulfil its role in assessment and prognosis during a nuclear and radiological emergency. These tools have been made available to IAEA Member States for awareness and to facilitate the IAEA assessment and prognosis process. Member States are encouraged to support implementation of the IAEA assessment and prognosis process by using these tools as applicable.

These tools are intended to be used by experts trained in their use and applicability.

Login to IEC Assessment >

Login to IEC Assessment Exercise >

Login to IEC Assessment Training >

- Link available in USIE
- Directly at: <https://iec.iaea.org/iecat>

USIE



The IAEA's Unified System for Information Exchange in Incidents and Emergencies (USIE)

- 20 years in operation
- Available and operational 24/7, restricted secure website
- 1500 users from > 300 Contact Points
- ~100 exercises conducted every year by Member States

A screenshot of the USIE website interface. The page has a blue header with the IAEA logo and the text "IAEA USIE Unified System for Information Exchange in Incidents and Emergencies". Below the header is a navigation menu with links for Home, Events, Address Book, RANET, Documents, and Links. The main content area features a "Welcome to USIE" section with a small image of a computer workstation and a text block explaining the system's purpose. To the right, there are three sidebar sections: "Announcements" with a notice about a technical meeting, "Calendar Events" stating no upcoming events, and "Related Links" listing various IAEA tools and services like NUCLEUS, EPRIMS, IRMIS, NEWS, and WebECURIE. A "Latest Events" section is also visible, showing recent news items with red headers.

IAEA's assessment tools



IAEA NUCLEUS IEC - Assessment and Prognosis Tools

STEPHANI, Frederic (IECAT Admin)

IAEA IEC - Assessment Tools Exercise Incident and Emergency Centre Assessment and Prognosis Tools

Tools Administration Documentation About

- Reactor Assessment
- Database of Source Terms
- Emergency Response Actions Assessment
- Nuclear Security Event Assessment
- Radiological Source Assessment
- Dose Assessment
- Monitoring Data Assessment
- Public Information Officer Assessment

IAEA's IEC Assessment and Prognosis Tools

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Home

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Tools made available to experts from Member States on request

A templated report can be generated using each of these tools

Reports generated by external users of the IAEA's A&P tools:

- Are not automatically shared with the IAEA
- Can be shared with the IAEA (and Member States) on USIE as an attachment to a USIE form

IAEA Reactor Assessment Tool (RAT)



- Supports the assessment of potential emergency consequences and prognosis of possible emergency progression during the response to a nuclear emergency at a Nuclear Power Plant (NPP) or Research Reactor (RR)

- 7 reactor modules (PWR, BWR, CANDU, VVER, AGR, Generic, RR)

- Each NPP module composed of two tabs (A&P) with technical workflows and dynamic color-coded pictures

- Embeds Reactor Technical Information from the IAEA Emergency Preparedness and Response Information Management System (EPRIMS)

- Functionality for quick templated report generation

Pressurized Water Reactor Assessment and Prognosis

To load data from the previous report select facility:

Assessment | Prognosis

This is the IAEA Reactor Assessment and Prognosis Tool. Follow the step by step process and answer the questions. Press the button at the bottom to capture your results in a report.

Show more

In this section you will enter basic information about the event details. This information will be automatically filled into the Reactor Assessment and Prognosis Report which is generated at the end of this process.

Country*

Name of facility*

Reactor unit being assessed*

EMERGENCY CLASSIFICATION ASSESSMENT	+
KEY BARRIERS AND CRITICAL SAFETY FUNCTIONS	+
RELEASE	+
ELECTRICITY AND WATER SUPPLY	+

Emergency Classification	IAEA Emergency Classification	
Status not confirmed, no data available	Rad radiological release monitoring	Past release
Barrier intact / Function satisfactory	Rad radiological release conditioning	Present release
Barrier degraded / Function degraded		Current release
Barrier failure / Function failure		Potential release

Water reserve for injection to

RCS and containment

Steam generators

Spent fuel

Electric Power (Offsite)

AC Power (EDG)

DC Power (Emergency)

RCS inventory control

Reactivity control

RCS heat removal

Fuel integrity

RCS integrity

Containment integrity

Containment isolation

Heat removal

Hydrogen control

Ultimate heat sink

This report was generated at (UTC)

*RCS: Reactor Coolant System

Emergency Classification Tool (in RAT)

[1/2]



Those 1+4 flowcharts have already been implemented in a new tool, available on the IAEA's Assessment and Prognosis Tools website (accessible to experts in Member States on request)

- As a tool to support each NPP module of the Reactor Assessment Tool

Assessment Prognosis

This is the IAEA Reactor Assessment and Prognosis Tool. Follow the step by step process and answer the questions. Press the button at the bottom to capture your results in a report.

Show more

In this section you will enter basic information about the event details. This information will be automatically filled into the Reactor Assessment and Prognosis Report which is generated at the end of this process.

Country* Select Country ⓘ

Name of facility* ⓘ

Reactor unit being assessed* ⓘ

EMERGENCY CLASSIFICATION ASSESSMENT

The purpose of this section is for the Technical Team to consider all of the information that has been provided and to identify any difference in the emergency classification declared by the 'Accident State' and the emergency classification assessed by the IAEA. The key point to consider is if the Technical Team believes the event is a General Emergency, IAEA guidance states that immediate actions should occur (such as automatic evacuation).

Follow the instructions for each step. Do not forget to include the declared emergency classification of the 'Accident State'. Keep in mind that their emergency classification system may have different terms than the IAEA system – you may need to translate their declared emergency classification into the IAEA naming convention.

Emergency Classification >>

Current declared emergency classification (in IAEA terminology)*

Justification (Optional) ⓘ

IAEA assessed emergency classification*

Emergency Classification	IAEA Emergency Classification
<input type="checkbox"/> Status not confirmed, no data available <input type="checkbox"/> Barrier intact / Function satisfactory <input type="checkbox"/> Barrier degraded / Function degraded <input type="checkbox"/> Barrier failure / Function failure	<input type="checkbox"/> Radiological release monitoring <input type="checkbox"/> Radiological release conditioning
	<input type="checkbox"/> Past release <input type="checkbox"/> Current release

Water reserve for injection to

RCS and containment

Steam generators

Spent fuel

Electric Power

AC Power (Offsite)

AC Power (EDG)

DC Power (Emergency)

RCS inventory control

Reactivity control

RCS heat removal

Fuel integrity

RCS integrity

Containment integrity

Heat removal

Hydrogen

Ultimate heat sink

Emergency Classification Tool (in RAT)

[2/2]



Emergency Classification Tool - example

Emergency Classification Assessment

- 1 Radiation and Dose Levels Facility Emergency
- 2 Fission Product Barriers Site Area Emergency
- 3 Conventional Emergencies, Natural Events, Security Events Below Alert
- 4 Safety Systems and Equipment Alert
- 5 Summary

Based on Flowchart **Radiation and Dose Levels**; **Fission Product Barriers**; **Conventional Emergencies, Natural Events, Security Events**; **Safety Systems and Equipment**

the most severe emergency class assessed is: Site Area Emergency

Guidance:

- On-site decision maker, declare Site area emergency and notify off-site notification point. Keep monitoring new information and updating the applicable emergency class as the situation develops.
- Protective actions and other response actions on-site and in the vicinity of the site are warranted.

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Database of source terms [1/3]



IAEA IEC - Assessment Tools Training Incident and Emergency Centre Assessment and Prognosis Tools

Tools - Documentation - About

Terms of Use

Content

The present database of source terms ("the Database") supports the response role of the International Atomic Energy Agency ("IAEA") for the assessment of potential emergency consequences and prognosis of possible emergency progression. It contains accident scenarios and source term files shared by IAEA Member States ("Member States") on a voluntary basis.

By clicking on "Acknowledge" below, the Database user confirms that he or she has read, and agreed to, the present terms of use as well as the Nucleus terms and conditions, which fully apply to the Database. The present terms of use and Nucleus terms and conditions shall be interpreted as complementary of one another. Should any ambiguities, inconsistencies, conflicts or discrepancies arise, the present terms of use shall take precedence.

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[Acknowledge](#)

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Tools - Administration - Documentation - About

Search Upload Manage

IAEA Database of Source Terms - Search

Use the filter menus below to help you identify source terms in the database for specific scenarios. Please note that there is no chronology consideration in this search function (e.g. if 'Loss of Coolant Accident' (LOCA) is selected as the type of accident, search results might include scenarios for which a LOCA is the triggering event and scenarios for which a LOCA occurs several minutes or hours after the triggering event). Only source terms that meet all inputs provided in these filter menus and that are shared with your country/international organization will appear in the search result table.

Search filters

Facility type *
Choose an item

Accident type *
Choose an item

Station blackout
Choose an item

Total loss of the Ultimate Heat Sink and/or related systems
Choose an item

Fuel degradation
Choose an item

Containment building
Choose an item

Filtered release
Choose an item

[Search](#)

Database of source terms [2/3]



Tools Administration Documentation About

IAEA Database of Source Terms - View

Country/Intl. Organization The Orangeland Republic
Facility Type Pressurised Water Reactor
Station Blackout No
Total loss of the Ultimate Heat Sink and/or related systems No
Containment building Release through containment

Contributing organization OJ Regulator
Accident Type Loss of Coolant Accident
Fuel degradation Core melt
Filtered release Yes

SCENARIO ASSUMPTIONS +

SCENARIO EVENTS +

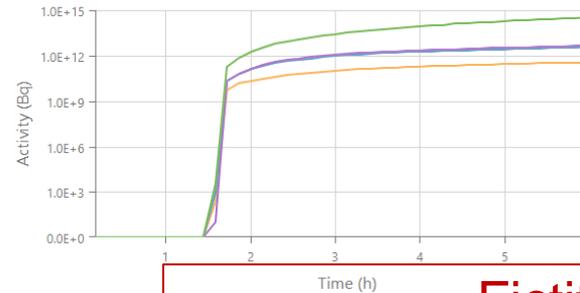
COMMENTS +

SUPPORTING DOCUMENTS +

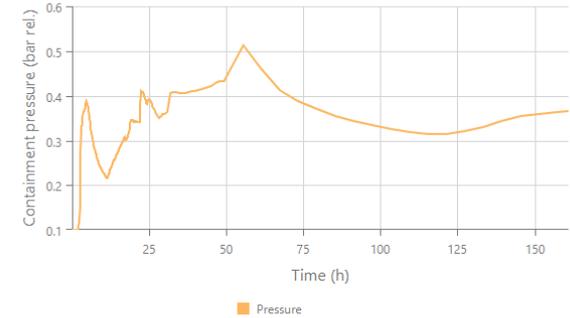
Total source term (Bq)

Xe-133 (noble gas)	I-131 (iodine)	Cs-137 (caesium)	Te-132 (tellurium)
3.69E+14	3.81E+12	3.84E+11	4.76E+12

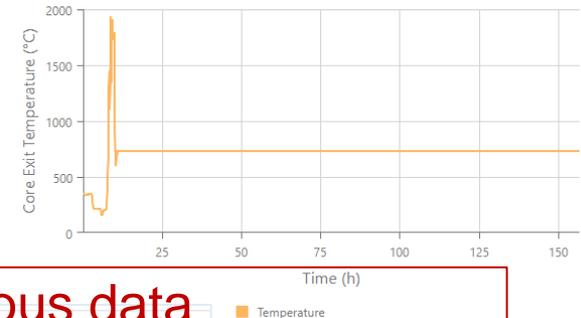
Source term activity vs Time



Containment pressure vs Time



Core Exit Temperature vs Time



Fictitious data

Latest upload

2021-12-21 08:38 UTC

Shared with

Users in the following countries and/or international organizations only:

- Austria
- Belgium
- European Commission (EC)
- International Atomic Energy Agency (IAEA)
- The Orangeland Republic

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Tools Database of Source Term

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IAEA Database of Source Terms [3/3]



Sharing scenarios and source terms

All Member States (MS) and International Organizations (IO) can share, on a voluntary basis

Using the 4 template files;
One set of 4 files per scenario

For each scenario and related source term, MS/IO will specify the sharing audience:

- IAEA only
- Specific list of MS/IO
- All MS/IO

Accessing the database

Member States and International Organizations will designate official users of the database

These designated users will need a Nucleus ID, which will be granted access to the database

Having access to the database will not guarantee seeing data in the database

Seeing scenarios and source terms in the database

A user of the database will not necessarily have access to all the content in the database

A user of the database will have access to scenarios and related source terms that have been shared with his/her country by another MS/IO

IAEA Emergency Response Actions Assessment Tool



Radiological Emergency Response Actions Assessment

This is the IAEA Emergency Response Actions Assessment Tool. Follow the step by step process and fill in the boxes as best you can. Press the button at the bottom to capture your results in a report that can be shared with the IAEA.

Show more

click [here](#) to load data from the last report you submitted on 2019-06-20 14:36:19 (UTC).

Event details

In this section you will enter basic information about the event details. This information will be automatically filled into the Emergency Response Actions Assessment Report which is generated at the end of this process.

Country* ⓘ

Name of location* ⓘ

Event type* ⓘ

PROTECTIVE ACTIONS +

OTHER RESPONSE ACTIONS +

ACTIONS SUPPORTING THE DECISION MAKING ON PROTECTIVE ACTIONS AND OTHER RESPONSE ACTIONS +

NON-RADIATION-RELATED HAZARDS +

Protective actions	Status	Implementation radius [km]	Maximum implementation distance [km]
Evacuation	Implemented	1	1
Sheltering	Not implemented		
Inner cordon	Implemented	1.5	1.7
Food/Milk/Water restrictions	Not needed		
Relocation	No information		
Other			

Other response actions

Actions supporting decision making

Hazards	Impact

- Assist in the process of capturing essential information during an incident or emergency involving a nuclear power reactor or radiological material

- Support the assessment of the situation regarding the nature and implementation of public protective actions
- Functionality for quick templated report generation

IAEA Nuclear Security Event Assessment Tool



- Information related to the security situation might be requested to the 'Accident State' by the IAEA during a nuclear or radiological emergency, so that other Member States can make informed decisions regarding any immediate changes needed for national arrangements (example: revised security posture at NPPs)
- The tool assists in the process of capturing such essential information
- Link to the IAEA Incident and Trafficking Database (ITDB)
- Functionality for quick templated report generation

Nuclear Security Event Assessment (Generic Emergency)

Due to the specific task of 'Active alerting of Member States in which response actions may need to be considered' [GOV/INF/2013/13], some information related to the security situation may be requested during an emergency by the IAEA. The information is to be of a sufficient level such that other Member States can make informed decisions regarding any immediate changes needed for any national arrangements (example: increasing police presence at all NPPs).

Show more

EVENT DETAILS



CURRENT NUCLEAR SECURITY SITUATION



STATUS OF KEY NUCLEAR SECURITY RESPONSE ACTIVITIES



ASSESSMENT OF NUCLEAR SECURITY RESPONSE ACTIVITIES AND OVERALL STATUS



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IAEA Radiological Source Assessment Tool



Radiological Source Assessment

Event Details

In this section you will enter basic information about the event details. This information will be automatically filled into the Radiological Source Assessment Report which is generated at the end of this process.

Country*

Location*

Give a short description of the event*

Source Description

Nuclide* <input type="text"/>	Activity* <input type="text"/>	Prefix <input type="text"/>	Unit* <input type="text"/>
Validity date (UTC)* <input type="text" value="2020-09-18 10:22"/>	Correction date (UTC)* <input type="text" value="2020-09-18 10:22"/>	Dispersed* <input type="text"/>	
Half-life (s) <input type="text" value="N/A"/>	Decay-corrected Activity (MBq) <input type="text" value="N/A"/>	A/D <input type="text" value="N/A"/>	Source category <input type="text" value="N/A"/>

Add Nuclide

Device Description

The purpose of this step is to report to the IAEA any additional information available on the device/source involved in the incident or emergency. Follow the instructions for each step and enter the requested device details in the associated fields. You can use the [International Catalogue of Sealed Sources and Devices](#) to obtain additional information on specific devices as well as pictures.

Number of devices and description*

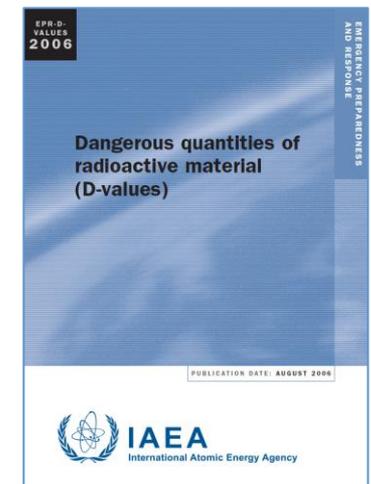
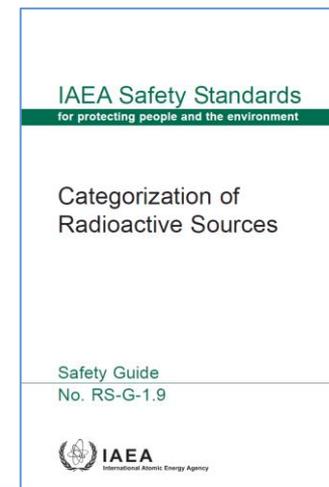
Images
Upload up to 5 image files (.jpg, .jpeg or .png), each up to 1 megabyte in size.

Is the shielding suspected/confirmed to be damaged or ruptured?*

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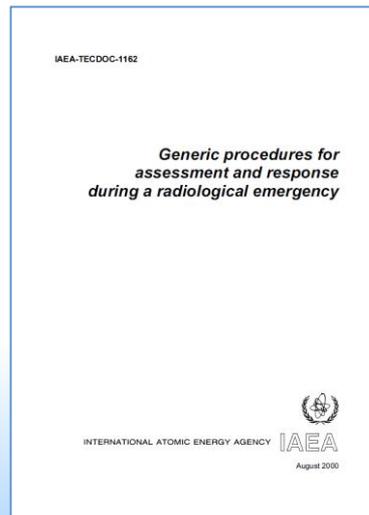
- To assist in the process of capturing essential information during an incident or emergency involving one or more radioactive sources
- To help an expert user categorize the sources involved, as well as assess the potential hazards associated with the category of the sources involved
- Functionality for quick templated report generation



IAEA Dose Assessment Tool



- To assist in the process of evaluating radiological consequences during an incident or emergency involving potential exposure to one or more radiological sources
- To help an expert user estimate the radiological dose to an individual in the case of external or internal exposure to radioactive material in prefabricated scenarios
- Functionality for quick templated report generation



External Dose Assessment

Follow the step-by-step process and fill in the fields as best you can. Press the button at the bottom to capture your results in a report that can be shared with the IAEA.

Show more

Event Details

In this section you can enter basic information about the event details. This information will be automatically filled into the External Dose Assessment Report which is generated at the end of this process.

Country*

Location*

Give a short description of the event*

Exposure Situation

The purpose of this step is to determine the type and length of the exposure situation. Follow the instructions for each step and enter the requested exposure details in the associated fields.

Exposure scenario*

Give a short description of the exposure scenario

Source distance (d)* m

Exposure duration

Shielding

Shielding material

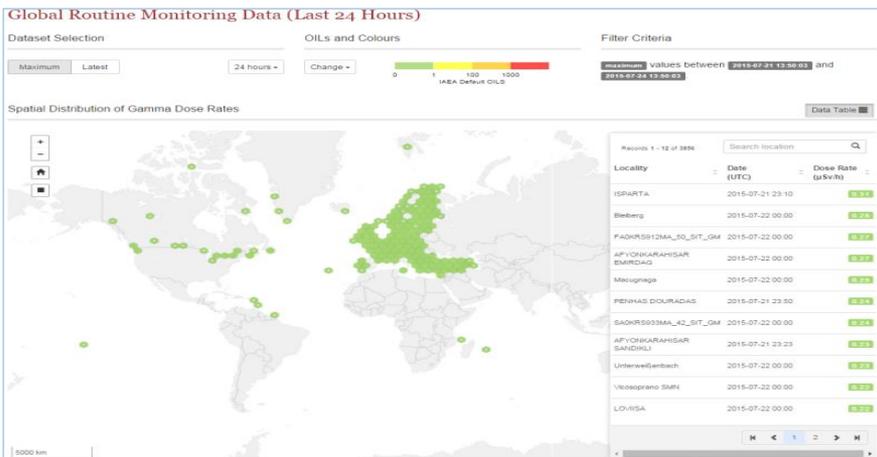
Thickness

Source Description

Nuclide *	Activity *	Prefix	Unit *
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Dose [Sv]	Dose rate [Sv/h]	Dose with shielding [Sv]	Dose rate with shielding [Sv/h]
N/A	N/A	N/A	N/A

IAEA International Radiation Monitoring System



- Supports implementation of the Early Notification Convention

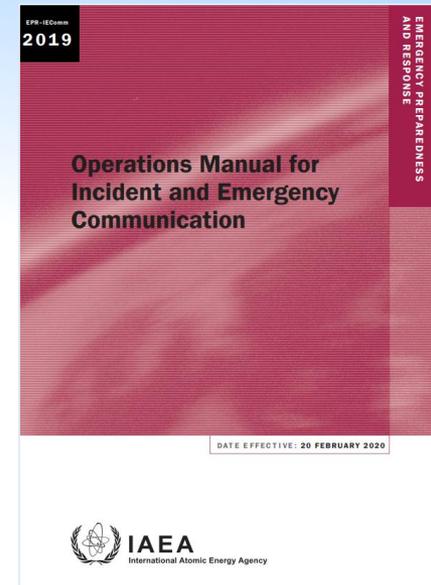
- Provides a mechanism for the global exchange of large quantities of radiation monitoring data

- Gamma dose rates, isotope specific ground deposition and air concentration from fixed monitoring stations



- Data in Visualization page are color coded in terms of user defined Operational Intervention Levels (OILs) to assist in the decision-making process to protect the public during an emergency

Exercising on the use of IAEA assessment tools



ConvEx-2 level: to test that CAs can appropriately complete various reporting forms and to test the procedures for information exchange, for provision of public information, for requesting and providing assistance and for assessment and prognosis

Type of exercise	Main objective
ConvEx-2a	test the abilities of CAs and INES National Officers to complete the appropriate reporting forms and the abilities of IRMIS Data Providers to upload monitoring data
ConvEx-2c	test the arrangements for responding to a transnational nuclear or radiological emergency
ConvEx-2e	test the IAEA's assessment and prognosis process
ConvEx-2g	test the arrangements for public communication



IAEA

International Atomic Energy Agency

Atoms for Peace and Development

Thank you!

