

GLOSSARY

Absorbed dose	<i>Fundamental dosimetric quantity defined as the energy imparted by ionizing radiation in unit mass of matter; measured in grays (Gy); 1 gray is equal to 1 joule per kilogram (J/kg).</i>
Activity	The rate at which spontaneous transformations occur in a given amount of radioactive material. (Strictly, the expectation value of the number of nuclear transformations occurring in a given quantity of material per unit time). It is measured in becquerels (Bq); 1 becquerel equals one transformation per second.
Acute exposure	Exposure received within a short time period (see also protracted exposure).
Becquerel (Bq)	The SI unit of activity, equal to one transformation per second. As the unit is so small, multiples are frequently used such as megabecquerels (MBq) which is 10^6 or a million becquerels. (1 GBq is 10^9 Bq; 1 TBq is 10^{12} Bq; and 1 PBq is 10^{15} Bq)
Biokinetic model	A mathematical model for the behaviour of radionuclides in the body which takes account of the movement, retention and excretion of a radionuclide as a function of time.
Cold shutdown	Defined in the context of this report by TEPCO and the Nuclear Emergency Response Headquarters as the state where the coolant water temperatures of Units 1–3 were less than 100°C, the pressure inside the reactor vessels was the same as the outside air pressure, and where any further releases would not result in dose rates greater than 1 mSv per year at the site boundary.
Collective dose	The total radiation dose incurred by a population (that is the sum of all the individual doses); measured in man-sievert (man Sv) or man-gray (man Gy)
Committed dose	The integral, over a defined period of time, of the dose rate in a particular tissue or organ that will be received following the intake of radioactive material into the body.
Core cooling	The process by which heat is transferred from the reactor core (the central part of a nuclear reactor containing the fuel elements and any moderator) to the steam generators or directly to the turbines.
Decay heat	The heat generated by the transformation of radionuclides, particularly in the context of radionuclides in the core of a reactor.
Decontamination	The complete or partial removal of contamination by a deliberate physical, chemical or biological process.
Deterministic effect	A health effect of radiation exposure for which a threshold level of dose generally exists, above which the severity of the effect is greater for a higher dose.
Dose	A measure of the energy deposited by radiation in a target. Dose can be used as a shorthand for absorbed dose and effective dose when the context is clear.
Dose coefficient/dose per unit intake	The committed effective dose or committed absorbed or equivalent dose in a tissue or organ resulting from an intake, by a specified means (usually ingestion or inhalation), of unit activity of a specified radionuclide in a specified chemical form.
Dosimeter	A device for measuring an individual's exposure to ionizing radiation.

Dose rate	Dose delivered or received per unit time. Measurements are usually made in terms of the dosimetric quantity, ambient dose equivalent rate, $H^*(10)$, in units of $\mu\text{Sv/h}$.
Dose and dose rate effectiveness factor	The factor by which the risk of occurrence of a health effect in a specified time period (usually over a lifetime) per unit dose for exposures at high doses and high dose rates exceeds that for exposures at low doses and low dose rates.
Effective dose	Fundamental dosimetric quantity for the purposes of radiological protection defined as the tissue-weighted sum of the equivalent doses in all specified tissues and organs of the body; measured in sieverts (Sv).
Equivalent dose	Fundamental dosimetric quantity for the purposes of radiological protection defined as the product of the absorbed dose in the tissue or organ and the appropriate radiation weighting factor for the type of radiation giving rise to the dose; measured in sieverts (Sv).
Evacuation	The rapid, temporary removal of people from an area to avoid or reduce short-term radiation exposure in an emergency.
Exposure	The act or condition of being subject to irradiation. External exposure is exposure to radiation from a source outside of the body. Internal exposure is exposure to radiation from a source within the body.
Geiger counter	A Geiger counter (or Geiger-Müller counter) detects ionizing radiation by the ionization produced in a low-pressure gas in a Geiger-Müller tube.
Gray (Gy)	Unit of absorbed dose, equal to 1 joule per kilogram (J/kg).
In vitro measurement	A procedure used to determine the nature, activity, location or retention of radionuclides in the body by analysis of material excreted or otherwise removed from the body.
In vivo measurement	A procedure used to determine the nature, activity, location or retention of radionuclides in the body by direct measurement.
Lifetime risk	Probability that a disease occurs from a given point of time (e.g. at exposure) until the end of life. The lifetime baseline risk refers to the probably of a disease occurring over a lifetime without exposure additional to the background from natural and other sources of radiation. Lifetime risk due to exposure is the additional probability of a disease occurring over a lifetime due to additional radiation exposure.
Linear Energy Transfer (LET)	As radiation interacts with matter, it loses its energy through interactions with atoms. LET measures the average amount of energy lost over a defined distance. The same absorbed dose of low-LET radiation (such as beta particles and gamma rays) creates less biological damage than of high-LET radiation (such as alpha particles).
Protracted exposure	Exposure persisting in time (see also acute exposure).
Occupationally exposed worker	Any person who is employed, whether full time, part time or temporarily, by an employer, and who has recognized rights and duties in relation to occupational radiological protection. The Japanese regulations use another similar term, radiation worker.
Radionuclide	A radioactive isotope of an element. Different isotopes of an element have the same number of protons but different numbers of neutrons and hence different atomic masses. If there are too many or too few neutrons, the nuclei of the isotope tend to be unstable and transform into the nuclei of another element and in the process emit radiation.
Relative risk	Ratio of the risk for two groups, estimated from the relative rates of disease between, for example, an exposed group and an unexposed group.
Relocation	The non-urgent removal or extended exclusion of people from a contaminated area to avoid protracted exposure. This corresponds to the Deliberate Evacuation Area policy enacted in Japan.

Remediation	Any measures that may be carried out to reduce the radiation exposure from existing contamination of land areas through actions applied to the contamination itself (the source) or to the exposure pathways to humans.
Scram	A safety feature that triggers immediate shutting down of a nuclear reactor, usually by rapid insertion of control rods, either automatically or manually by the reactor operator. Also known as a "reactor trip".
Shielding	The absorbing property of material between a radiation source and a receptor which results in reduced exposure.
Sievert (Sv)	Unit of equivalent dose and of effective dose, equal to 1 joule per kilogram (J/kg).
Source term	Mathematical expression used to denote information about the actual or potential release of radiation or radioactive material from a given source. Here this term includes the release rate, radionuclide composition, physico-chemical form and their changes over time of the radionuclides released.
Stochastic effect	A radiation-related health effect, the probability of occurrence of which is greater for a higher radiation dose and the severity of which (if it occurs) is independent of dose.
Thyroid blocking	The administration of a compound of stable iodine (usually potassium iodide) to prevent or reduce the uptake of radioactive isotopes of iodine by the thyroid in the event of an accident in which these isotopes are released.
Whole body monitoring	The measurement from outside the human body (generally extending at least from the neck below the chin to the mid to upper parts of the thigh) of the quantity of specific radionuclides within the body by measuring radiation emitted by such radionuclides.

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This publication contains:

VOLUME I

Report of the United Nations Scientific Committee on the Effects of Atomic Radiation to the General Assembly

Scientific Annex with appendices

Annex A: Levels and effects of radiation exposure due to the nuclear accident after the 2011 great east-Japan earthquake and tsunami

- Appendix A. Data compilation
- Appendix B. Radionuclide releases, dispersion and deposition
- Appendix C. Assessment of doses to the public
- Appendix D. Assessment of doses to workers
- Appendix E. Health implications for the public and workers
- Appendix F. Assessment of doses and effects for non-human biota

Supplementary materials (available on CD-ROM and from www.unscear.org)



EVALUATING RADIATION SCIENCE FOR INFORMED DECISION-MAKING

In 1955 the United Nations General Assembly established the Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) in response to concerns about the effects of ionizing radiation on human health and the environment. At that time fallout from atmospheric nuclear weapons tests was reaching people through air, water and food. UNSCEAR was to collect and evaluate information on the levels and effects of ionizing radiation. Its first reports laid the scientific grounds on which the Partial Test Ban Treaty prohibiting atmospheric nuclear weapons testing was negotiated in 1963.

Over the decades, UNSCEAR has evolved to become the world authority on the global levels and effects of exposure to ionizing radiation. UNSCEAR's independent and objective evaluation of the science are to provide for—but not address—informed policymaking and decision-making related to radiation risks and protection.

