Regulation and Risk of Radiation Exposure from Discharges

The National Dose Assessments Working Group (www.ndawg.org) is an independent national committee whose members are drawn from regulators and government agencies, industry, local authorities, non-governmental organisations and specialists. Its views are those of the expert members rather than those associated with the discharge of radioactive materials to the environment. Its reports of best practice in the assessment of the radiation doses associated with the discharge of radioactive materials to the environment are drawn from independent national committees whose members are drawn from government agencies, industry, local authorities, regulators and government agencies, industry, local authorities, and government agencies. Its views are those of the expert members rather than those associated with the discharge of radioactive materials to the environment.
The Department of Health has reported on a number of epidemiological studies near nuclear facilities. These reports are a useful source of information and, in general, indicate that nuclear facilities and their discharges are not likely to be responsible for any detectable increased risk.

The only expected effect of low level radiation exposure is an increased risk of cancer. There are problems in assessing this risk, however, because there is a latent or lag period after exposure to any factor (or pollutant) before a cancer appears (this may be 5—50+ years).

Nevertheless, the risk at the doses received from radioactive material discharges in the UK is so low that it is unlikely for the size of the population exposed to the risk of cancer.

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Q1 What is the role of the site owner/operator?

The prime responsibility for the management of radioactive waste and discharges is the owner or operator of the facility. To reduce these risks to as low as reasonably achievable, the site operators must use best practicable means (BPM) to comply with the requirements of the regulators. BPM requires operators to take all reasonably practicable measures in design and operational management of their facilities to minimise discharges and disposals of radioactive material.
The EA and SEPA fulfill this responsibility by issuing authorisations which set limits on the amounts of radioactive materials that may be discharged by specified routes. They consult the Food Standards Agency (FSA) and the Health Protection Agency (www.hpa.org.uk) on food and health matters, respectively. The FSA has a statutory responsibility for the protection of public health at a national level; the Health Protection Agency (HSE) has a statutory responsibility for the protection of public health at a local level. The EA and SEPA consult these agencies over radioactive discharges from their sites.

Q1 How do I find out about health statistics in my area?

In addition to the official reporting of health statistics by national and local authorities, there are numerous independent organisations that provide information on health, including the Office for National Statistics (www.statistics.gov.uk), the Office of Population and Census Surveys (OPCS), and the Small Area Health Statistics Unit (www.sahsu.org). These organisations collect and analyse data on a wide range of health-related topics, including cancer incidence, mortality, and other health indicators. The data is made available to the public through reports and online databases, allowing individuals to access information about health trends and patterns in their area.

Q2 Who does the monitoring?

Monitoring or regulation is carried out by various bodies, namely:

- Agency Monitoring responsibility
  - EA and SEPA
  - HSE
  - FSA
  - Environment agencies
  - Site operators

In Scotland, SEPA incorporates the monitoring requirements of the FSA within its own programme.

Q3 How is compliance with the authorisation demonstrated?

Compliance is demonstrated by measurement of the actual discharges and comparing this against the authorisation. Although the monitoring and regulation are carried out by various agencies, the EA and SEPA ensure that the environmental and public health impacts of radioactive discharges are managed and controlled.

Q4 Who does the monitoring?

Monitoring or regulation is carried out by various agencies, including the EA and SEPA, the Health Protection Agency (HSE), and the Food Standards Agency (FSA). These agencies work closely together to ensure that the public health and environmental impacts of radioactive discharges are managed and controlled.

Q10 How do the risks compare — are they acceptable?

The risk of a health effect from environmental pollutants such as radiation can be put into some sort of perspective by comparing it to other risks. For instance, the one in four normal risk of dying of cancer can be expressed as a 25% chance. A radiation dose of, say, 50 μSv (i.e., 50 millionths of a Sv) gives an added risk (using the factor described under Q8) of about 0.00028% — the difference between 25% and 25.00028% would be impossible to detect amongst the normal variations in cancer incidence.

The radiation levels reported in the RIFE (Radioactivity in Food and Environment) 2007 report are generally below the public dose limit (see Q8). Materials discharged in previous years, however, may still pose a risk.

Q11 How do I find out about health statistics in my area?

Health statistics are available from the Office of Population and Census Surveys (OPCS), which is part of the Office for National Statistics, and from the Small Area Health Statistics Unit (at Imperial College, www.sahsu.org). These organisations provide data on a wide range of health-related topics, including cancer incidence, mortality, and other health indicators. The data is made available to the public through reports and online databases, allowing individuals to access information about health trends and patterns in their area.

The Committee on Medical Aspects of Radiation in the Environment (COMARE, www.comare.org.uk), which is sponsored by the Department of Health, provides advice on radiation-related issues and publishes reports on the latest research and developments in the field.

The EA and SEPA fulfil this responsibility by issuing authorisations that set limits on the amounts of radioactive materials that may be discharged by specified routes. They consult the FSA and HSE on food and health matters, respectively, and ensure that the public health and environmental impacts of radioactive discharges are managed and controlled.

Monitoring or regulation is carried out by various bodies, including the EA and SEPA, the HSE, and the FSA. These agencies work closely together to ensure that the public health and environmental impacts of radioactive discharges are managed and controlled.

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Q9 Are the risks detectable?

In a modern, industrialised society there are many pollutants in the environment. Most of these present some risks which people accept because they are small and assumed to be controlled. People are exposed to hazards from pollutants in food and the environment are known to be involved in the causation of cancer, e.g., benzene, nitrosamines, arsenic, paraffin oil, coal tar, tobacco smoke, asbestos, some chemical dyes, fungal toxins and viruses, and radiation. Thus radiation is just another pollutant but for low level exposure to radiation this is an increased risk of cancer (see Q9).

The radiation doses from current discharge of radioactive materials are very small compared even to natural background doses. The radiation dose limit for members of the public is the annual dose that will present a risk which is considered acceptable. The current advice is that if the annual dose limit is not exceeded the dose is not expected to exceed the dose average annual dose to the UK population — 2.7 mSv overall.

Q5 What is the public dose limit?

The radiation dose limit for members of the public is the annual dose that will present a risk which is considered acceptable. The maximum permitted, results in estimates which are generally higher than the radiation doses from current discharges of radioactive materials are very small compared even to natural background doses. The radiation dose limit for members of the public is the annual dose that will present a risk which is considered acceptable. The current advice is that if the annual dose limit is not exceeded the dose is not expected to exceed the dose average annual dose to the UK population — 2.7 mSv overall.

Q6 How are authorization limits set?

Authorisations are set so that discharges of radioactive materials are very small compared even to natural background doses. The radiation dose limit for members of the public is the annual dose that will present a risk which is considered acceptable. The current advice is that if the annual dose limit is not exceeded the dose is not expected to exceed the dose average annual dose to the UK population — 2.7 mSv overall.
Q8 How are radiation doses converted into risks?

The doses from the intake of radioactive materials in food are not so easily assessed. However, if we know the activity of a radionuclide in a foodstuff and the consumption rates of food, the amount of radioactive material ingested by a person can be calculated. This calculation is carried out for a representative member of the public (who may not exist) but represents the collective data from a large number of people. The principle is that if such a person is protected, the rest of the population will also be protected. The collective dose is calculated as the product of the concentration of the radionuclide in the food, the amount consumed, and a dose conversion factor. This factor is determined by research and is used to convert the amount of radioactivity taken in to the radiation dose to body tissues.

The doses from external radiation are more difficult to assess. However, if we know the activity of a radionuclide in an area, the amount of radiation received by a person can be calculated. This calculation is carried out for a representative member of the public (who may not exist) but represents the collective data from a large number of people. The principle is that if such a person is protected, the rest of the population will also be protected. The collective dose is calculated as the product of the concentration of the radionuclide in the area, the amount of time spent in the area, and an dose conversion factor. This factor is determined by research and is used to convert the amount of radioactivity in the area to the radiation dose to body tissues.

Q7 How are radiation doses to members of the public assessed?

Doses to the public arise from:

- doses from radioactive materials taken into the body from food and water
- doses from radioactive materials present in the environment
- doses from radioactive materials present in the body
- doses from radioactive materials present in the environment
- doses from radioactive materials present in the body

External doses (if detectable) are easily monitored by radiation detectors placed around the site or by surveys using handheld monitors. However, the doses from radioactive materials present in the environment or the body are more difficult to assess. The principle is that if such a person is protected, the rest of the population will also be protected. The collective dose is calculated as the product of the concentration of the radionuclide in the area, the amount of time spent in the area, and an dose conversion factor. This factor is determined by research and is used to convert the amount of radioactivity in the area to the radiation dose to body tissues.