

Radiological monitoring quick guide

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Environmental radiological monitoring

1. Scope

This quick guide provides an introduction to the good practice guidance on how to design environmental radiological monitoring programmes. It presents the environmental monitoring objectives and principles underpinning monitoring programmes, summarises the process for defining these programmes and sign posts the detailed technical information contained in the full document which is required for undertaking the task.

The guidance is aimed primarily at designing new or reviewing existing environmental radiological monitoring programmes around nuclear licensed sites for the purpose of monitoring the environmental effects of authorised discharges, by both operators and regulators.

2. Practical guidance

2.1 Environmental monitoring objectives

For any monitoring programme it is important that there are clear objectives to be achieved. Generic objectives for environmental radiological monitoring programmes are:

- Assess total representative person dose.
- Assess dose as an operator's performance measure.
- Assess total impact on wildlife (e.g. dose).
- Assess impact on wildlife as an operator's performance measure (e.g. dose).
- Provide public and stakeholder reassurance.
- Check / complementary monitoring.
- Assess background (very far field).
- Assess long term trends (Indicator).
- Comply with international obligations.
- Detect abnormal, fugitive and unauthorised releases (Indicator).
- Understand / monitor behaviour of radio-nuclides in the environment.

2.2 Environmental monitoring principles

Radiological monitoring programmes should be designed to meet the following generic principles:

- **Health and Safety** – The benefits of the programme should be balanced against health and safety requirements.
- **Benefits exceed impacts** – The benefits of the programme should exceed any significant environmental detriment (i.e. be environmentally sustainable).

- **Satisfy international requirements** – Programmes should satisfy or be compatible with international requirements or guidance where available.
- **Objective based** – Programmes should be based on defined objectives and monitoring of different exposure pathways clearly linked to at least one objective.
- **Proportionate** – The design and management of programmes should be proportionate to past, current and future potential impact of discharges on humans and wildlife. Other considerations in determining the proportionality of the programme will be the cost, the environmental impact of undertaking the programme, the type of environment (including how dynamic it is), the likely behaviour of radionuclides in that environment (including half-life) and current state of knowledge.
- **Complementary** – The regulators should ensure that their programmes and those of the operator address all the appropriate monitoring objectives whilst avoiding unnecessary duplication.
- **Satisfy stakeholder concerns** – Programmes should consider legitimate stakeholder concerns and expectations, as far as reasonably practicable.
- **Based on authorisations** – Specific radionuclides should be selected for the monitoring programme, based on the source term (taking into account the magnitude of release and environmental impact) and radionuclides limited by EPR 2010 / RSA 93 permits/authorisations, including those that could be released as fugitive emissions.
- **Optimised** – Programmes should be optimised to achieve the maximum number of objectives from a minimum number of samples, ensuring that sufficient monitoring data of an acceptable quality are collected for all the objectives to be achieved.
- **Meet quality standards** – Programmes should be undertaken to defined quality standards equivalent to ISO9001, ISO 14001 and ISO17025.
- **Appropriate performance criteria** – Performance criteria for the monitoring programme (in particular uncertainty criteria, limit of detection, analysis turnaround) should be designed to allow the objectives to be met, whilst ensuring proportionality (see Principle 5). Different objectives will have different performance criteria (e.g. for detecting abnormal releases a relatively quick analytical turnaround will be important, but a higher detection limit may be acceptable).

2.3 Design of environmental monitoring programmes

The guidance takes you through the design process which can be summarised as follows:

- **Collate Information** – When designing a new monitoring programme it will be necessary to develop a conceptual model of the source, pathway and receptors, the guidance includes information sources and aspects to be considered. Some further considerations are presented for reviewing an existing programme.
- **Assess site impact** – A useful first step in designing a monitoring programme is to establish the level of impact associated with the site and the presence of sensitive receptors. Levels of impact are defined along with the expectations for an appropriate monitoring programme.
- **Establish monitoring objectives** – The relevant monitoring objectives should be established, reflecting who is undertaking the programme, its scope and the site impact. Tables 1 and 2 are provided in the guidance note to aid with this.
- **Establish what to monitor, where and how often** – The monitoring and sample types need to be selected to meet the programme objectives. This is the detailed component of the guidance note and Table 3 is provided to show what monitoring and sampling is appropriate for the different objectives. Ranges of expected sample numbers are provided and account given to the fact that some sampling or monitoring activities will address more than one objective and thus how a whole programme would be built up.

- **Determine how to monitor and sample** - Correct sampling and monitoring procedures need to be applied to achieve particular objectives. Guidance is given on this in Table 4 of the guidance note which has been updated from the Environment Agency's best practice techniques for environmental radiological monitoring.
- **Determine analysis requirements** – For current discharges, analysis should take place for those radionuclides which are limited in discharge authorisations or are a significant component of a group limit, other radionuclides may be required as a result of international obligations or backgrounds. For historical discharges, unauthorised discharges and accidental releases, radionuclides to be analysed should be based on past routine monitoring and investigations.
- **Review monitoring programme** – Both operator and regulator programmes should be subject to review on a periodic basis, this would typically be an annual high level review, with a more thorough review within a 3-5 year timeframe. The guidance includes considerations for the review.

2.4 Other considerations

To complete the information required for undertaking a safe, quality assured radiological monitoring programme the guidance includes sections on Quality Assurance, Health Safety and Environment, Reporting, Records, Assessment and Interpretation.

3. Further Information

Radiological Monitoring Technical Guidance Note 2 – Environmental Radiological Monitoring