

ISO 24434:2024-01 (E)

Radiological protection - Radiological monitoring for emergency workers and population following nuclear/radiological incidents - General principles

Contents

| | Page |
|---|-----------|
| Foreword..... | vi |
| Introduction..... | vii |
| 1 Scope..... | 1 |
| 2 Normative references..... | 2 |
| 3 Terms and definitions..... | 2 |
| 4 Symbols and abbreviated terms..... | 10 |
| 4.1 Symbols..... | 10 |
| 4.2 Abbreviated terms..... | 11 |
| 5 Collecting Information about the incident..... | 12 |
| 5.1 General..... | 12 |
| 5.2 Description of the incident..... | 12 |
| 5.3 Source term identification and magnitude..... | 13 |
| 5.4 Weather conditions and modelling results..... | 13 |
| 5.5 Potential exposure pathways..... | 14 |
| 5.6 Affected population and demographic information..... | 14 |
| 6 Organizing and managing a population screening centre..... | 14 |
| 6.1 Selecting the site..... | 14 |
| 6.1.1 General considerations..... | 14 |
| 6.2 Staffing and organization..... | 16 |
| 6.2.1 General..... | 16 |
| 6.2.2 Modules of a population screening centre..... | 17 |
| 6.3 Scalability and sustainability..... | 18 |
| 6.4 Practical considerations..... | 18 |
| 6.5 Population with special needs..... | 19 |
| 6.5.1 Main considerations..... | 19 |
| 6.5.2 Other considerations..... | 19 |
| 6.6 Services (medical and psychological, security and safety, communication, transportation)..... | 19 |
| 6.6.1 Medical..... | 19 |
| 6.6.2 Mental health (psychosocial)..... | 20 |
| 6.6.3 Security and safety..... | 20 |
| 7 Screening and monitoring for potential external contamination..... | 21 |
| 7.1 Purpose..... | 21 |
| 7.2 Radiation detection equipment..... | 21 |
| 7.3 Contamination screening during initial sorting..... | 22 |
| 7.4 Contamination screening station..... | 22 |
| 7.4.1 General..... | 22 |
| 7.4.2 Contamination screening station location..... | 22 |
| 7.4.3 Contamination screening station staffing..... | 22 |
| 7.4.4 Contamination screening station personal protective equipment (PPE)..... | 22 |
| 7.5 Decontamination station..... | 23 |
| 7.5.1 General..... | 23 |
| 7.5.2 Decontamination station location..... | 23 |
| 7.5.3 Decontamination station staffing ^[5] | 23 |
| 7.5.4 Decontamination station personal protective equipment..... | 23 |
| 7.5.5 Clothing and personal belongings..... | 23 |
| 7.5.6 Partial-body decontamination..... | 24 |

| | | |
|-----------|--|-----------|
| 7.6 | Post-decontamination screening | 24 |
| 7.6.1 | General | 24 |
| 7.6.2 | Factors affecting the criteria for determining if decontamination is warranted | 24 |
| 8 | Assessing and monitoring internal exposure | 25 |
| 8.1 | Overview | 25 |
| 8.2 | Sample collection | 25 |
| 8.3 | Monitoring for potential internal contamination | 25 |
| 8.3.1 | General | 25 |
| 8.3.2 | Monitoring for radionuclides emitting predominantly non-penetrating radiation | 26 |
| 8.3.3 | Penetrating radiation | 27 |
| 8.3.4 | Radionuclide mixture | 27 |
| 8.4 | Method for dose assessment | 28 |
| 8.4.1 | General | 28 |
| 8.4.2 | Initial dose assessment | 29 |
| 8.4.3 | Detailed internal dose assessment | 30 |
| 9 | Assessing and monitoring external exposure | 30 |
| 9.1 | General | 30 |
| 9.2 | Assessing external exposure | 31 |
| 9.2.1 | Subjects | 31 |
| 9.2.2 | Guidance | 31 |
| 9.2.3 | Measurement devices | 31 |
| 9.3 | Assessing external exposure for workers | 33 |
| 9.3.1 | Subjects | 33 |
| 9.3.2 | Procedure | 33 |
| 9.3.3 | Measurements | 33 |
| 9.3.4 | Calculations | 34 |
| 9.3.5 | Assessment | 35 |
| 9.4 | Assessing external exposure for emergency workers | 36 |
| 9.4.1 | Subjects | 36 |
| 9.4.2 | Guidance | 36 |
| 9.4.3 | Measurements | 37 |
| 9.4.4 | Calculations | 37 |
| 9.4.5 | Assessment | 37 |
| 9.5 | Assessing external exposure for the public | 37 |
| 9.5.1 | Subjects | 37 |
| 9.5.2 | Guidance | 38 |
| 9.5.3 | Measurements | 38 |
| 9.5.4 | Calculations | 39 |
| 9.5.5 | Assessment | 40 |
| 9.6 | Clinical and biological dose assessment | 40 |
| 9.6.1 | Overview | 40 |
| 9.6.2 | Clinical signs and symptoms | 41 |
| 9.6.3 | Haematology | 41 |
| 9.6.4 | Blood chemistry | 42 |
| 9.6.5 | Cytogenetics | 42 |
| 9.6.6 | EPR Dosimetry | 44 |
| 9.6.7 | Combination of dose assessment methods | 45 |
| 10 | Recording and reporting monitoring and dose assessment results | 46 |
| 10.1 | Purpose | 46 |
| 10.2 | Recording monitoring and dose assessment results | 47 |
| 10.2.1 | General | 47 |
| 10.2.2 | Recording screening and monitoring results | 47 |
| 10.2.3 | Recording dose assessment results | 48 |
| 10.3 | Reporting screening, monitoring and dose assessment results | 48 |
| 10.3.1 | General | 48 |
| 10.3.2 | Reporting results to the individuals being monitored and assessed | 48 |
| 10.3.3 | Reporting results to personnel performing more detailed dose assessment | 49 |
| 10.3.4 | Reporting results to professionals for medical or health follow up | 49 |
| 11 | Supporting processes and quality management | 49 |
| 11.1 | Purpose | 49 |
| 11.2 | Preparedness | 50 |
| 11.3 | Emergency plans and procedures (planning) | 50 |

| | | |
|---------------------|---|-----------|
| 11.4 | Training and exercises..... | 50 |
| 11.5 | Communication..... | 52 |
| 11.5.1 | General..... | 52 |
| 11.5.2 | Public communication..... | 52 |
| 11.5.3 | Emergency operations communication..... | 52 |
| 11.6 | Audits and evaluation..... | 53 |
| Annex A | (informative) Screening centre roles, equipment, and communication (see Clause 6)..... | 56 |
| Annex B | (informative) Screening external contamination..... | 62 |
| Annex C | (informative) Sample biodosimetry and clinical worksheet..... | 67 |
| Annex D | (informative) Grading system for response of neurovascular, gastrointestinal, Cutaneous, and hematopoietic systems..... | 74 |
| Annex E | (informative) Examples of resources to assist responders and emergency medical personnel in managing radiation injury and dose assessment..... | 76 |
| Bibliography | | 78 |