

**NUCLEAR REGULATORY AUTHORITY,
GHANA**



**DRAFT EMERGENCY PREPAREDNESS AND RESPONSE FOR AUTHORISED
PERSONS REGULATIONS**

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EMERGENCY PREPAREDNESS AND RESPONSE FOR AUTHORISED PERSONS REGULATIONS

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Emergency Preparedness and Response for Authorised Persons Regulations

In exercise of the power conferred on the Minister responsible for Nuclear Regulatory Authority, acting on the advice of the board, by Section 91 of the Nuclear Regulatory Authority Act, 2015 (Act 895), these regulations are made on this day of

Preliminary

Application

1. (1) These Regulations apply to
 - (a) facilities and activities that
 - (i) are regulated and that use nuclear fuel or radioactive sources or materials which are categorized as dangerous;
 - (ii) have the potential of causing radiation exposure, environmental contamination or public concern; and
 - (iii) by the nature of their operation require protective actions and other response actions in a nuclear or radiological emergency; and
 - (b) peace time emergencies.
- (2) These regulations do not apply to preparedness or response for emergencies that involve hazards associated with non-ionizing radiation including microwave, ultraviolet or infrared radiation.
- (3) These regulations provide for a coordinated and integrated approach with security plans, but do not cover preparedness for, or response measures that are specific to, nuclear security events.

Planning Basis

Roles and responsibilities in emergency preparedness and response

2. An authorised person shall
 - (a) have the necessary human, financial and material resources, required for the purposes of the expected roles and responsibilities and the assessed hazards associated with the operation of the facility or the conduct of the activity, to prepare for and to deal with both radiological and non-radiological consequences of a nuclear or radiological emergency, whether the emergency occurs within or beyond national borders;
 - (b) establish, maintain and demonstrate leadership in relation to the preparedness for and response to a nuclear or radiological emergency on the site;
 - (c) establish and maintain arrangements for on-site preparedness for and response to a nuclear or radiological emergency in respect of a facility or activity for which the authorised person is responsible; and
 - (d) demonstrate to and provide the Authority with an assurance that emergency arrangements are in place for effective response on-site to a nuclear or radiological emergency for which the authorised person is responsible.

Hazard Assessment

3. (1) For the purpose of these regulations, radiological hazards at a facility or connected to an activity are grouped into four emergency preparedness categories, as specified in the Schedule, to enable a graded approach to be adopted to plan the response to a nuclear or radiological emergency.

(2) An authorised person shall ensure that the preparedness and response procedures are applied by a facility or to an activity, according to the emergency preparedness category to which the radiological hazard belongs.

(3) For the purpose of this regulation, a radiological hazard relating to a facility or an activity in

- (a) emergency preparedness category III, is one in which the use of a dangerous radioactive source or material is at fixed locations; and
- (b) emergency preparedness category IV, is one in which the use of a dangerous radioactive source or material is at unknown location.

(4) An authorised person shall

- (a) identify the hazard and assess the potential consequences of an emergency in order to provide the basis for establishing a commensurate arrangement for preparedness and response for a nuclear or radiological emergency; and
- (b) periodically review the hazard assessment and revise the emergency arrangements to be consistent with existing hazards.

Protective Strategy

4. An authorised person shall,

- (a) on the basis of the hazards identified and the potential consequences of a nuclear or radiological emergency and for the purpose of achieving the goals of emergency response, develop, justify and optimise on-site protection strategies in accordance with the off-site protection strategy for taking effective protective actions and other response actions in a nuclear or radiological emergency;
- (b) justify each protective action, in the context of the protection strategy, and the protection strategy by ensuring that the protection strategy and the protective actions do more good than harm, with account taken of the detriments that are associated with
 - (i) radiation exposure; and
 - (ii) impacts of the actions taken on public health, the economy, society and the environment; and
- (c) establish procedures that provide an off-site response organisation with relevant information and actions, including procedures for off-site radiation monitoring, to enable the implementation and optimisation of the protection strategy during the response to a nuclear or radiological emergency.

Emergency Response

Managing operations in an emergency response

5. An authorised person shall

- (a) establish procedures for the appropriate management of operations in response to a nuclear or radiological emergency;
- (b) in the case of emergency for facilities in emergency protection categories I, II and III
 - (i) promptly execute and manage the on-site emergency response without impairing the performance of the continuing operational safety and security functions both at the facility and at any other facilities on the same site;
 - (ii) clearly specify and effectively make the transition from normal operations to operations under emergency conditions on the site area;
 - (iii) designate the responsibilities of each personnel who should be on the site in an emergency, as part of the arrangements for the transition; and
 - (iv) transit to the emergency response and perform initial response actions without impairing the ability of operating personnel, including operating personnel in the control room, to ensure safe and secure operation while taking mitigating actions;
- (c) establish a clearly specified command and control system for emergency response under every hazard approach as part of the emergency management system, which
 - (i) clearly assigns the authority and responsibility for directing the emergency response and for making decisions on on-site emergency response actions to be taken;
 - (ii) provides sufficient assurance for effective coordination of the on-site and off-site response actions; and
 - (iii) promptly discharges the responsibility for directing the emergency response and for decision making on emergency response actions to be taken following a notification of an emergency;
- (d) provide a means by which information necessary for making decisions on the allocation of resources for all response organisations throughout a nuclear or radiological emergency, to be obtained and assessed on-site;
- (e) establish a process that ensures that the on-site nuclear or radiological emergency response is effectively coordinated and integrated with the off-site response at local, regional and national level for response to a conventional emergency and to a nuclear security event;
- (f) for facilities of emergency preparedness categories I, II and III, establish a nuclear security system that is functional in a nuclear or radiological emergency;
- (g) for facilities in emergency preparedness categories I and II, where several facilities are co-located on the same site, institute measures that are adequate to manage the emergency response at each of the facilities where all of the facilities are under emergency conditions simultaneously; and
- (h) for each facility in emergency preparedness category I or II and each area in emergency preparedness category, institute measures for the coordination of emergency response between response organisations within the authorised emergency planning zones and emergency planning distances and for providing mutual support.

Identification and notification of nuclear or radiological emergency and emergency response activation

6. An authorised person shall

- (a) institute measures for the prompt identification and notification of a nuclear or radiological emergency and for the activation of an emergency response;
- (b) at each facility or location where there is a significant likelihood of the occurrence of a dangerous source that is not under control, ensure that
 - (i) the on-site managers of operations and other personnel; and
 - (ii) the local officials responsible for the response and first respondersare aware of the indicators of a potential nuclear or radiological emergency, the appropriate notification, and protective actions and other response actions that are warranted to be taken immediately in an emergency;
- (c) for each facility or activity of emergency preparedness categories I, II, III and IV, establish a procedure for prompt classification, on the basis of the hazard assessment, of a nuclear or radiological emergency that warrants protective action or other response action to protect workers, emergency workers and members of the public, in accordance with the protection strategy;
- (d) for each facility or activity in emergency preparedness categories I, II or III and IV, establish a procedure for the review the emergency class in the light of any new information and, as appropriate, for the revision of the class as necessary;
- (e) classify the emergency for each facility or activity in emergency preparedness categories I, II, III and IV, taking into account every postulated emergency, including an emergency arising from events of very low probability;
- (f) ensure that the process for rating an event on the International Nuclear and Radiological Event Scale does not delay the emergency classification or emergency response actions;
- (g) for each facility or activity in emergency preparedness categories I, II and III, and IV, institute measures for
 - (i) prompt recognition and classification of a nuclear or radiological emergency;
 - (ii) prompt declaration of the emergency class and for the initiation of a coordinated and pre-planned on-site response, upon classification;
 - (iii) the notification of the Authority and other appropriate bodies that require notification and for the provision of sufficient information for an effective off-site response;
 - (iv) the initiation of a coordinated and pre-planned off-site response, as appropriate, in accordance with the protection strategy, upon notification; and
 - (v) the inclusion of suitable, reliable and diverse means of warning persons on the site, for notification of the bodies that require notification and for communication between response organisations.

Taking mitigating actions

7. An authorised person shall

- (a) institute measures to take mitigating actions in a nuclear or radiological emergency;
- (b) promptly decide on, and take necessary actions on the site to mitigate the consequences of a nuclear or radiological emergency under its responsibility for a facility or activity in emergency preparedness category I, II, III or IV.

- (c) for each facility in emergency preparedness categories I, II and III, provide in the planning phase for mitigating actions to
 - (i) prevent an escalation of the emergency;
 - (ii) return the facility to a safe and stable state;
 - (iii) ensure the continued functionality of nuclear security systems;
 - (iv) reduce the potential for releases of radioactive material or exposures; and
 - (v) mitigate the consequences of any actual releases or exposures;
- (d) for each facility or activity in emergency preparedness categories I and II establish a severe accident management plan;
- (e) for each facility or activity emergency preparedness category I, II, III or IV assess and determine, at the preparedness stage, when and under what conditions assistance from off-site emergency services may have to be provided on the site, in conformity with the hazard assessment and the protection strategy;
- (f) for each facility in emergency preparedness category I, II or III,
 - (i) provide technical assistance to the operational staff;
 - (ii) form a team responsible for mitigating the consequence of an emergency and to perform actions on-site; and
 - (iii) provide response equipment at suitable accessible locations;
- (g) for an activity in emergency preparedness category IV, institute measures for a prompt response to an emergency that involves a source in order to mitigate any consequences in the preparedness phase;
- (h) for each activity in emergency preparedness category IV, institute measures for the prompt provision of expertise and services in radiation protection to local officials and specialised response services, including law enforcement agencies; and
- (i) assist off-site authorities to initiate a prompt search in the event that a dangerous source could possibly be in the public domain as a result of the loss or unauthorised removal of that source.

Taking urgent protective actions and other response actions

8. An authorised person shall

- (a) assess the magnitude of hazards and the possible development of hazardous conditions initially and throughout a nuclear or radiological emergency in order to promptly identify, characterize or anticipate, as appropriate, new hazards or the extent of hazards and to revise the protection strategy;
- (b) for each facility in emergency preparedness category I, II or III, institute measures for prompt assessment and anticipation of
 - (i) abnormal conditions at the facility;
 - (ii) exposures and releases of radioactive material;
 - (iii) radiological conditions on and off the site; and
 - (iv) any actual or potential exposures of the workers and emergency workers, the public and, as relevant, patients and helpers in an emergency;
- (c) for each activity in emergency preparedness category IV, institute measures for the prompt assessment of the extent or the significance of any abnormal conditions on the site, any exposures or any contamination;
- (d) establish procedures for prompt sharing of information on emergency conditions, assessments, data analysis and provision of relevant information including maps, protective actions and other response actions that have been recommended and have been taken with all relevant response organisations, for decision making;

- (e) provide for actions that have to be taken without any delay, to save human life or to prevent serious injury, on the grounds of the possible presence of radioactive material;
- (f) in the preparedness phase, for a facility in emergency preparedness categories I and II, provide for appropriate emergency planning zones and distances off the site, for which detailed planning shall be prepared for implementing urgent and early protective actions and other response actions on the basis of a graded approach and protection strategy;
- (g) establish criteria, based on the emergency classification, for initiating and for adjusting urgent protective actions and other response actions within the emergency planning zones and distances, in accordance with the protection strategy;
- (h) assign the authority and responsibility to provide sufficient and updated information to the bodies that require notification at any time to allow for an effective off-site emergency response;
- (i) institute measures for the effective coordination and prompt implementation of appropriate protective actions and other response actions that are necessary within emergency planning zones and planning distances, upon the notification of a nuclear or radiological emergency;
- (j) in the planning phase, be responsible for instituting measures for the prompt monitoring and assessment of contamination, releases of radioactive material and doses within emergency planning zones and planning distances, for the purpose of deciding on or adjusting the protective actions and other response actions that have been taken;
- (k) for a facility in emergency preparedness categories I, II and III, institute measures for the protection and safety of each person on the site;
- (l) for a facility in emergency preparedness category I, II or III, ensure that suitable, reliable and diverse means of communication are available at all times, under the full range of emergency conditions for
 - (i) use in taking protective actions and other response actions on the site; and
 - (ii) communication with off-site officials responsible for taking protective actions and other response actions off the site or within any emergency planning zones or emergency planning distances; and
- (m) for an activity in emergency preparedness category IV, provide operating personnel with guidance and training on taking urgent protective actions and other response actions.

Providing instructions, warnings and relevant information to the public for emergency preparedness and response

9. An authorised person shall,

- (a) through coordination with local authorities, provide the public who are affected or are likely to be affected by a nuclear or radiological emergency with information that is necessary for their protection, to warn them promptly and to instruct them on actions that need to be taken;
- (b) before the start of operations and throughout the lifetime of the facility, through coordination with local authorities, provide in respect of each facility in emergency preparedness category I or II and area in category V, information on the response to nuclear or radiological emergency to
 - (i) permanent population;

- (ii) transient population groups and special population groups or those responsible for them; and
- (iii) special facilities within the emergency planning zones and planning distances;
- (c) periodically assess the effectiveness of the public information arrangements;
- (d) for each facility in emergency preparedness category I or II and area in category V, coordinate with local authorities to
 - (i) register the members of the public in the special population groups and, as appropriate, those responsible for them; and
 - (ii) issue to the permanent population and transient population groups, as well as special facilities in the emergency planning zones and emergency planning distances, a warning and instructions in the languages mainly spoken by the population to be followed upon declaration of a general emergency;
- (e) for each facility or activity in emergency preparedness categories III and IV, through coordination with local authorities, provide information and instructions, commensurate with the radiological risk of the facility or activity, to the public in order to identify and locate people who may
 - (i) have been affected by a nuclear or radiological emergency; and
 - (ii) need response actions such as decontamination, medical examination or health screening.

Protecting emergency workers and helpers

10. An authorised person shall

- (a) designate in the preparedness phase, to the extent practicable, the employees who are responsible for emergency and provide for their health surveillance to assess their initial and continuing fitness for their intended duties in a nuclear or radiological emergency;
- (b) register and integrate into the operations of the on-site emergency, the emergency employees, helpers and response organisations that participate in the management of an emergency but who have not been designated in advance;
- (c) in the preparedness phase, provide for
 - (i) the hazardous conditions in which emergency workers may be required to perform response functions on and off the site in accordance with the hazard assessment and protection strategy;
 - (ii) protection of the employees and helpers who are engaged in the management in an emergency and for the range of anticipated hazardous conditions in which they might have to perform response functions;
- (d) ensure that practicable means are used to minimise exposures of employees and helpers engaged in the response to a nuclear or radiological emergency and to optimise their protection;
- (e) ensure that the system of radiological protection is consistent with that for planned exposure situations and is applied to the persons who are engaged in an emergency response except in the exceptional circumstances provided in paragraph (f);
- (f) ensure that personnel engaged in an emergency response are not, in the emergency, subject to an exposure that could give rise to an effective dose in excess of 50 mSv, except where the exposure is to
 - (i) save lives or to prevent serious injury;
 - (ii) avert a large collective dose; and

- (iii) prevent severe deterministic health effects or the development of catastrophic conditions;
- (g) for the exceptional circumstances of paragraph (f), restrict the exposure of the person engaged in the emergency response in accordance with the national guidance values;
- (h) ensure that emergency personnel who undertake emergency response actions in which doses received might exceed an effective dose of 50 mSv,
 - (i) do so voluntarily;
 - (ii) have been clearly and comprehensively informed in advance of associated health risks as well as of available protective measures; and
 - (iii) are, to the extent possible, trained in the actions that they might be required to take;
- (i) institute measures for the prompt assessment of the individual doses received by the employees and helpers engaged in emergency response to nuclear or radiological emergency to restrict further exposure;
- (j) provide, on its own initiative or upon request, the employees and the helpers engaged in an emergency response with medical attention appropriate for the doses they have received in response to a nuclear or radiological emergency;
- (k) ensure that personnel engaged in emergency response who receive effective doses in excess of 200 mSv as a result of a nuclear or radiological emergency are not, except with the advice of an appropriately qualified medical officer or the consent of that personnel, subject to any further exposure; and
- (l) communicate, as soon as practicable, to employees and helpers engaged in an emergency response, information on the doses received and consequent health risks in the response to the nuclear or radiological emergency.

Managing the medical response

11. An authorised person shall,

- (a) in coordination with related off-site authorities, provide appropriate medical screening and triage, medical treatment and longer-term medical actions for persons who could be affected in a nuclear or radiological emergency;
- (b) provide for individuals with possible contamination on-site to be given prompt and appropriate medical attention, transport services and give instructions to medical personnel on the precautions to take in a nuclear or radiological emergency;
- (c) in the preparedness phase for a facility in emergency protection category I, II or III, designate a local medical facility to be used
 - (i) to manage a limited number of contaminated or overexposed workers;
 - (ii) for the provision of first aid, the estimation of doses, medical transport and the initial medical treatment of contaminated or highly exposed individuals;
- (d) coordinate with local authorities to arrange for the performance of medical screening and triage, and the assignment to a predesignated local medical facility of any individual exposed to increased levels of radiation for areas within emergency planning zones; and
- (e) coordinate with local authorities to arrange for the identification of individuals who are in population groups that are at risk of sustaining increases in the incidence of cancers as a result of radiation exposure in a nuclear or radiological emergency.

Communicating with the public in a nuclear or radiological emergency

12. An authorised person shall

- (a) institute a process and provide facilities for communication with the public throughout a nuclear or radiological emergency;
- (b) provide useful, timely, true, clear and appropriate information to the public in a nuclear or radiological emergency, taking into account the possibility of the usual means of communication being
 - (i) damaged in the emergency or by the event, including earthquake or flooding that led to the emergency; or
 - (ii) overburdened by demand for its use;
- (c) modify the communication strategy in the emergency response to conform to the prevailing conditions;
- (d) ensure that the information provided to the public in a nuclear or radiological emergency is coordinated and consistent with that of response organisations, the Authority and others, taking due cognisance of the evolutionary nature of the emergency;
- (e) provide information to the public in plain and understandable language in a nuclear or radiological emergency.
- (f) promptly and publicly identify and address concerns, misconceptions, and rumours as well as the consequence and risk of action beyond those that are warranted and promptly respond to any rumours or enquiries from the public and from media during the period of the emergency.

Taking early protective actions and other response actions

13. An authorised person shall assist an off-site response organisation to take early protective actions and other response actions effectively in a nuclear or radiological emergency.

Managing radioactive waste in an emergency

14. An authorised person shall

- (a) apply the national policy and strategy for radioactive waste management for radioactive waste generated in a nuclear or radiological emergency;
- (b) in a manner that does not compromise the protection strategy and taking into account prevailing conditions as they evolve, identify, characterise and categorise and manage radioactive waste arising in a nuclear or radiological emergency, including radioactive waste arising from associated protective actions and other response actions taken;
- (c) safely and effectively manage radioactive waste;
- (d) manage human remains and animal remains which are contaminated as a result of a nuclear or radiological emergency, in a manner that takes account of the religious practices and cultural practices of the persons affected.

Mitigating the non-radiological consequences

15. An authorised person shall

- (a) in deciding on the protective actions and other response actions to be taken in the context of the protection strategy, consider non-radiological consequences of a nuclear or radiological emergency and of an emergency response;

- (b) take remedial action to mitigate the non-radiological consequences of an emergency and those of an emergency response and to respond to public concern in a nuclear or radiological emergency; and
- (c) to the extent practicable, promptly identify and appropriately address any actions taken, beyond the emergency response actions that are warranted, by members of the public and by commercial, industrial, infrastructural or other governmental or non-governmental bodies.

Requesting, providing and receiving international assistance

16. An authorised person shall,

- (a) in the response phase, request for international assistance, where necessary, from a state or an international organisation through the national competent authority under the Convention on Early Notification and Request for Assistance during Nuclear or Radiological Emergency; and
- (b) in the preparedness phase, request and obtain international assistance through the national competent authority under the Convention on Early Notification and Request for Assistance during Nuclear or Radiological Emergency.

Terminating a nuclear or radiological emergency

17. An authorised person

- (a) may formally alter or modify the protective actions and other response actions and the other instituted measures that are aimed at enabling the termination of an emergency but shall only do so after consultation with interested parties;
- (b) shall, in a nuclear or radiological emergency, communicate to the public,
 - (i) the reasons for any alteration or modification of the protective actions and other response actions and the other instituted measures aimed at enabling the termination of the emergency; and
 - (ii) the need for any continuing protective actions after the termination of the emergency and on any necessary modifications to personal behaviour required of the public;
- (c) shall institute measures, during the termination period, for close monitoring of public opinion and reaction in the news media in order to promptly address any concerns arising from the health hazards perspective;
- (d) shall only terminate a nuclear or radiological emergency, on the basis of a formal decision that is made public after consultation with interested parties;
- (e) shall consider both radiological consequences and non-radiological consequences in deciding on the termination of an emergency as well as in the justification and optimisation of further protection strategies;
- (f) shall transit to an existing exposure situation or to a planned exposure situation in a coordinated and orderly manner, by transferring responsibilities and ensure the involvement of relevant authorities and interested parties in the process;
- (g) shall in the preparedness phase, arrange for the termination of a nuclear or radiological emergency taking into account different termination times in different regions or localities; and
- (h) shall on the termination of an emergency,
 - (i) subject each employee who undertakes relevant work, to the requirements for occupational exposure in planned exposure situations; and

- (j) conduct individual monitoring, environmental monitoring and health surveillance, subject to the requirements for planned exposure situations or existing exposure situations, as appropriate.

Analysis of the nuclear or radiological emergency

18. (1) An authorised person shall

- (a) in the preparedness phase, with the involvement of interested parties, provide for the documentation, protection and preservation of data and information important for a timely and comprehensive analysis of the nuclear or radiological emergency and of the emergency response;
- (b) establish a process that enables comprehensive interviews on the causes of the nuclear or radiological emergency to be conducted with those involved;
- (c) acquire the expertise needed to perform the evaluation of the nuclear or radiological emergency; and
- (d) in the preparedness phase, for the purpose of avoiding other emergencies, promptly take actions on the basis of an analysis.
- (e) actions in paragraph (d), include provision of information to the Authority.

Emergency Preparedness

Authorities and Responsibilities

19. An authorised person shall

- (a) in the preparedness phase, assign and document emergency response roles, functions, authorities and responsibilities of the operating staff and assent to the authorities, roles and responsibilities of other response organisations and in the process ensure that there are no conflicting roles or responsibilities;
- (b) for each phase of the response, clearly assign the authority and responsibility for making decisions on response actions to be taken on the site and the authority and responsibility for communication with the public;
- (c) in each phase of the response, clearly assign responsibilities and authorities, and provide for coordination and for communication;
- (d) ensure that personnel with authority and responsibility to perform critical response functions in an emergency response are not assigned any other responsibilities in an emergency that would interfere with the prompt performance of the specified functions; and
- (e) specify in the emergency plan, the procedure for delegation and transfer of authority, together with procedure for notifying the appropriate parties of the transfer.

Organisation and Staffing

20. An authorised person shall

- (a) establish on-site organisational relationships for preparedness and response for a nuclear or radiological emergency and interfaces between the operating and response organisations;

- (b) assign in the on-site emergency plans and procedures, the positions, within the operating and response organisation, which are responsible for the performance of the response functions;
- (c) assign qualified personnel to positions in the relevant operating organisations to perform the functions necessary to comply with this regulation and assess their initial fitness and continuing fitness for their intended duties;
- (d) make available appropriate numbers of suitably qualified personnel at all times to ensure that appropriate positions can be promptly staffed as necessary following the declaration and notification of a nuclear or radiological emergency; and
- (e) for a facility in emergency preparedness category I or II with multiple units, make available sufficient number of qualified personnel to manage each of the units if all of the units are under emergency conditions simultaneously.

Coordination of emergency preparedness and response

21. An authorised person shall

- (a) establish a process for the coordination of emergency preparedness and response and for the development of protocols for operational interfaces between the authorised person and authorities at the local, regional and national levels, including the organisations and authorities responsible for the response to conventional emergencies and to nuclear security events;
- (b) document and make available to the relevant parties the coordination mechanism and the operational protocol interfaces; and
- (c) at the preparedness stage and in an emergency, ensure effective working relationships among organisations which have authority and are responsible for response to conventional emergency, nuclear and radiological emergency and nuclear security events.

Plans and Procedures

22. An authorised person shall

- (a) for a facility or an activity in emergency preparedness category I, II, III or IV, prepare an emergency plan;
- (b) for a facility or an activity which does not have a significant radiological risk and which uses non dangerous radioactive or radiation sources, only prepare emergency response instructions as part of the radiation protection programme;
- (c) coordinate the emergency plan with the plans of other bodies including public authorities that have responsibilities in a nuclear or radiological emergency;
- (d) submit the emergency plan to the Authority for approval;
- (e) develop the necessary procedures and analytical tools that enables the authorised person to perform the response functions necessary to achieve the goals of the emergency response and to make the emergency response effective;
- (f) test the procedures and analytical tools under simulated emergency conditions and validate them before they are initially used; and
- (g) make known to those responsible for decision making, the limitations of the analytical tools in a way that would not reduce the effectiveness of the response actions when the tools are used in an emergency response to support decision making on protective actions and other response actions.

Logistical Support and Facilities

23. An authorised person shall

- (a) provide adequate tools, instruments, supplies, equipment, communication systems, facilities and documentation, including procedures, checklists, telephone numbers, email addresses and manuals, for performing emergency response functions;
- (b) select items and facilities that will be operational under the postulated conditions, including the radiological, working and environmental conditions that may be encountered in the emergency response, and ensure that the items and facilities are compatible with other procedures and equipment for the response as appropriate;
- (c) locate or provide the support items in a manner that allows their effective use under postulated emergency conditions;
- (d) for facilities in emergency preparedness categories I and II, ensure that as contingency measures, alternative supplies for taking on-site mitigating actions, including an alternative supply of water and an alternative electrical power supply, and any other necessary equipment, are provided, maintained and easily accessible;
- (e) designate emergency response facilities or locations to support an emergency response under the full range of postulated hazardous conditions;
- (f) for facilities in emergency preparedness category I, establish emergency response facilities, separate from the control room and supplementary control, to
 - (i) provide technical support to the operating personnel in the control room in an emergency from a technical support centre;
 - (ii) maintain operational control of personnel performing tasks at or near the facility from an operational support centre; and
 - (iii) manage the on-site emergency response from an emergency centre;
- (g) collaborate with response organisations, including designated laboratories to perform appropriate and reliable analyses of samples and measurements of internal contamination for the purposes of emergency response and health screening, as appropriate; and
- (h) obtain appropriate support from organisations responsible for providing support in conventional emergencies for logistics and communication, social welfare and for other areas.

Training, Drills and Exercises

24. An authorised person shall

- (a) ensure that personnel possess the requisite education, training, qualification and competence to perform emergency response functions;
- (b) establish a procedure for the selection of personnel and for training to ensure that the personnel have the requisite knowledge, skills, abilities, equipment, and are well-informed of the rules and procedures required for the performance of their assigned response functions;
- (c) provide training, to include radiation safety, and continuous re-training in accordance with an appropriate schedule that ensures that personnel assigned to positions with responsibilities for emergency response possess the required skills;
- (d) ensure that emergency workers accept information, instruction and training in protection and safety to enable them to conduct their work in accordance with the provisions of this regulations.

- (e) for emergency preparedness category I, II or III, instruct the staff and other persons on the site, on the procedures for giving them notice of an emergency and the actions required of them after they have received notice of the emergency;
- (f) develop, implement and evaluate exercise programmes to ensure that the specified functions required to be performed for emergency response, the organisational interfaces for facilities in emergency preparedness category I, II or III, and the national level programmes for emergency preparedness category IV or V are tested at suitable intervals;
- (g) subject the exercise programme to review and revision in the light of experience gained;
- (h) ensure that personnel responsible for critical response functions participate in drills and exercises on a regular basis and thus provide an assurance of their ability to take their actions effectively; and
- (i) evaluate the conduct of exercises against pre-established objectives of emergency response to demonstrate that identification, notification, activation and response actions can be performed effectively to achieve the goals of the emergency response.

Quality Management Programme

25. An authorised person shall

- (a) establish a quality management programme as part of its integrated management system and emergency management system, to ensure a high degree of availability and reliability of all supplies, equipment, communication systems and facilities, plans, procedures and other arrangements necessary to perform functions in a nuclear or radiological emergency;
- (b) maintain, review and update emergency plans and procedures and incorporate lessons learned from research, operating experience and emergency exercises;
- (c) establish and maintain records in relation to both the emergency arrangements, to include workers training, and the response to a nuclear or radiological emergency, to include dose assessments, monitoring results and inventory of radioactive waste managed, in order to allow for their review and evaluation; and
- (d) review and evaluate responses in actual events and in drills and exercises, to record the areas in which improvements are necessary and to ensure that the necessary improvements are made.

Miscellaneous

Penalties

26. A person who contravenes any of the provisions of these Regulations commits an offence and is liable to penalty provision in Regulation 80 of the *Basic Ionising Radiation Control Regulations*.

Appeal

27. A person who is not satisfied with a decision taken by the Authority may appeal against the decision in accordance with the procedures provided in sections 81, 82, 83, 84 and 85 of the Nuclear Regulatory Authority Act, 2015 (Act 895).

Interpretation

28. In these Regulations unless the context otherwise requires

“Act” means the Nuclear Regulatory Authority Act, 2015;

“authorised person” means an organisation or person who has applied for authorisation or is authorised or responsible for nuclear radiation or radioactive waste or transport safety when undertaking an activity in relation to a nuclear facility or a source of ionising radiation;

“control” means the function or power or means of directing, regulating or restraining;

“dangerous source” means a source that if not kept under control, may give rise to exposure sufficient to cause severe deterministic effects;

“deterministic effect” means a health effect of radiation for which generally a threshold level of dose exists above which the severity of the effect is greater for a higher dose;

“early protective action” means a protective action in the event of a nuclear or radiological emergency that can be implemented within days to weeks and still be effective;

“emergency” means a non-routine situation or event that necessitates prompt action, primarily to mitigate a hazard or adverse consequences for human health and safety, quality of life, property or the environment;

“emergency action level” means a specific, predetermined, observable criterion used to detect, recognize and determine the emergency class;

“emergency class” means a set of conditions that warrant a similar immediate emergency response and the events that constitute the set of conditions are defined by criteria specific to the installation, source or practice, which, if exceeded, indicate classification at the prescribed level;

“emergency classification” means the process by which an authorised official classifies an emergency in order to declare the applicable emergency class;

“emergency exposure situation” means a situation of exposure that arises as a result of an accident, a malicious act, or any other unexpected event, and requires prompt action in order to avoid or reduce adverse consequences;

“emergency plan” means a description of the objectives, policy and concept of operations for the response to an emergency and of the structure, authorities and responsibilities for a systematic, coordinated and effective response;

“emergency planning distances” means the distances in respect of which protective actions are prepared for the purposes of managing emergency situations;

“emergency planning zone” means the precautionary action zone or the urgent protective action planning zone;

“emergency preparedness” means the capability to take actions that will effectively mitigate the consequences of an emergency for human life, health, property and the environment;

“emergency procedures” means a set of instructions describing in detail the actions to be taken by emergency workers in a situation of emergency;

“emergency response” means the performance of actions to mitigate the consequences of an emergency for the purposes of safeguarding human life, health, property and the environment;

“emergency response action” means an action to be taken in response to a nuclear or radiological emergency to mitigate the impact of an emergency on human health and safety, property or the environment;

“emergency response facility or location” means a facility or a location needed for supporting an emergency response, to which specific functions are assigned at the preparedness stage and which need to be usable under emergency conditions;

“emergency services” means the local off-site response organisation, including the police, fire fighters, rescue brigades, ambulance services and control teams for hazardous materials that is generally available and that performs emergency response function;

“existing exposure situation” means a situation of exposure, including exposure due to

- (a) natural background radiation that is amenable to control,
- (b) residual radioactive material that arose from past practices that were never subject to regulatory control, or
- (c) residual radioactive material arising from a nuclear or radiological emergency after an emergency exposure situation has been declared to have ended,

and that already exists when a decision on the need for control needs to be taken;

“extended planning distance” means a distance around a facility within which measures have been instituted, for the conduct of monitoring and identification of areas that warrant response actions that would allow for the effective reduction of the risk of stochastic effects

among members of the public to be taken within a period after the declaration of a general emergency, following the significant release;

“facilities and activities” means nuclear facilities, uses of sources of ionizing radiation, radioactive waste management activities, transport of radioactive material and any other practice or circumstances in which people may be subject to exposure to radiation from naturally occurring or artificial sources;

“first responders” means the first members of an emergency service to respond to the emergency at the scene of an emergency;

“graded approach” means in respect of a system of control encompassing a regulatory system or a safety system, a process or method in which the stringency of the control measures and conditions to be applied is commensurate, to the extent practicable, with the likelihood and possible consequences of, and the level of risk associated with, a loss of control and an application of safety requirements that is commensurate with the characteristics of the practice or source and with the magnitude and likelihood of the exposures;

“hazard assessment” means an analytical evaluation of the hazards associated with facility, activity or a source within or beyond the borders of a State in order to identify

- (a) the events and the associated areas for which protective actions and other response actions may be required within the State; and
- (b) the actions that would be effective in mitigating the consequences of such events.

“helpers in an emergency” means members of the public who willingly and voluntarily help to respond to a nuclear or radiological emergency in spite of being aware that they may be exposed to radiation in the course of offering the help;

“ingestion and commodities planning distance” means a distance around a facility within which arrangements are made to take effective response actions to reduce the risk for stochastic effects among members of the public and to mitigate the non-radiological consequences as a result of distribution, sale and consumption of food, milk and drinking water and of use of commodities other than food that may have contamination from the significant release, following the declaration of a general emergency;

“interested party” means a person, with a concern or interest in the activities and performance of an organisation, business, or a system among others;

“justification” means the process of determining, in respect of an emergency exposure situation or an existing exposure situation, whether a proposed protective action or remedial action is likely, to be beneficial over all;

“management system” means a set of interrelated or interacting elements and coordinated activities for establishing policies and objectives and enabling the objectives to be achieved in an efficient and effective manner;

“mitigating action” means immediate action by the operator or other party to offset otherwise deleterious consequences through

- (a) the reduction of the potential for the development of conditions that would result in exposure or a release of radioactive material requiring emergency response actions on or off the site; or
- (b) the mitigation of source conditions that may result in exposure or a release of radioactive material requiring emergency response actions on or off the site;

“non-radiological consequences” means adverse psychological, social or economic consequences of a nuclear or radiological emergency or of the response to an emergency that have effects on human life, health, property or the environment;

“notification” means a report which provides details of

- (a) an emergency or a possible emergency and which submitted to a national or international authority; or
- (b) the set of actions taken upon detection of emergency conditions with the purpose of alerting the organisations with responsibility for emergency response in the event of those conditions;

“notification point” means a designated organisation with which there is an understanding or agreement to receive notification and to promptly initiate predetermined actions to activate a part of the emergency response;

“nuclear or radiological emergency” means an emergency in which there is, or is perceived to be, a hazard due to

- (a) the energy resulting from a nuclear chain reaction or from the decay of the products of a chain reaction; or
- (b) ionising radiation exposure;

“nuclear security” means the prevention and detection of, and response to, criminal or intentional unauthorised acts involving nuclear material, other radioactive material, associated facility or associated activity;

“nuclear security event” means an event that has the potential or an actual implication for nuclear security and that must be addressed;

“other response action” means an action to be taken in response to a nuclear or radiological emergency that is not a protective action;

“operating personnel” means individual workers engaged in the operation of an authorised facility or conduct of an authorised activity;

“optimisation of protection and safety” means the process of determining what level of protection and safety would result in the magnitude of individual doses, the number of individuals, encompassing workers and members of the public that are subject to exposure and the likelihood of exposure being as low as reasonably achievable, taking into account economic and social factors;

“out of regulatory control” means the situation in which nuclear material or other radioactive material is present without an appropriate authorisation, either because controls have failed for some reason, or because they never existed;

“planned exposure situation” means a situation of exposure that arises from the planned operation of a source or from a planned activity that results in an exposure from a source;

“precautionary action zone” means an area around a facility for which there exists measure for taking urgent protective actions to avoid or minimise severe deterministic effects off the site, in the event of a nuclear or radiological emergency;

“preparedness phase” means the stage before the occurrence of a nuclear or radiological emergency for which measures for an effective emergency response are established;

“protective action” means an action for the purposes of avoiding or reducing doses that might otherwise be received in an emergency exposure situation or an existing exposure situation;

“protection strategy” means justified and optimized set of protective actions designed to achieve emergency response goals;

“radioactive source” means a source containing radioactive material that is used as a source of radiation.

“regulatory control” means any form of control or regulation applied to a facility and an activity by a regulatory body for reasons relating to nuclear safety and radiation protection or to nuclear security;

“response organisation” means an organisation designated or otherwise recognized by a State as being responsible for managing or implementing or supporting the management and implementation of any aspect of an emergency response;

“response phase” means the period of time from the detection of conditions that warrant an emergency response until the completion of all the actions taken in anticipation of or

in response to the radiological conditions expected in the first few months of the emergency;

“site” means a geographical area, determined in accordance with the emergency protection category, that contains an authorised facility or source or in which an authorised activity is undertaken and within which the management of the authorised facility or authorised activity or first responders may directly initiate emergency response actions;

“source” means

- (a) anything that may cause radiation exposure by emitting ionizing radiation or by releasing radioactive material and which can be treated as a single entity for protection and safety purposes; and
- (b) a radioactive material used as a source of radiation;

“special population group” means members of the public for whom special arrangements are necessary in order for effective protective actions to be taken in the event of a nuclear or radiological emergency;

“termination of an emergency” means ending the emergency response phase and transiting to recovery phase to return to existing exposure situation;

“transient population group” means members of the public who reside temporarily, for a short period of time, spanning a number of days or weeks in a location that can be identified in advance;

“transnational emergency” means a nuclear or radiological emergency of actual, potential or perceived radiological significance that may involve release or potential release of radioactive material for more than one State;

“urgent protective action” means a protective action in the event of an emergency which must be taken promptly, usually within hours to a day, in order to be effective, and the effectiveness of which will be markedly reduced if it is delayed;

“urgent protective action planning zone” means an area around a facility for which there are instituted measures for taking urgent protective actions to avert doses off the site in accordance with international safety standards, in the event of a nuclear or radiological emergency; and

“worker” means any person who works, whether full time, part time or temporarily, for an employer and who has recognized rights and duties in relation to occupational radiation protection.

FIRST SCHEDULE – Description and Criteria for Emergency Preparedness Categories

(regulation 3)

Table 1: Description and Criteria for Emergency Preparedness Categories

Category	Description
I	Facilities, including nuclear power plants, for which on-site events ^{a, b} (including those not considered in the design ^c) are postulated that could give rise to severe deterministic effects ^d off the site that warrant precautionary urgent protective actions, urgent or early protective actions and other response actions to achieve the goals of emergency response in accordance with international standards, or for which such events have occurred in similar facilities.
II	Facilities, including some types of research reactor and nuclear reactors used to power vessels, for which on-site events ^{a, b} are postulated that could give rise to doses to people off the site that warrant urgent or early protective actions and other response actions to achieve the goals of emergency response in accordance with international standards, or for which the events have occurred in similar facilities. Category II as opposed to category I does not include facilities for which on-site events, including those not considered in the design, are postulated that could give rise to severe deterministic effects off the site, or for which the events have occurred in similar facilities.
III	Facilities, including industrial irradiation facilities or some medical facilities, for which on-site events ^d are postulated that could warrant protective actions and other response actions to achieve the goals of emergency response in accordance with international standards on the site, or for which the events have occurred in similar facilities. Category III, as opposed to category II, does not include facilities for which events are postulated that could warrant urgent or early protective actions off the site, or for which the events have occurred in similar facilities.
IV	Activities and acts that could give rise to a nuclear or radiological emergency that could warrant protective actions and other response actions to achieve the goals of emergency response in accordance with international standards in an unforeseen location and comprises a level of hazard that applies to every State. The activities and acts include (a) transport of nuclear or radioactive material and other authorised activities involving mobile dangerous sources such as industrial radiography sources, nuclear powered satellites or radioisotope thermoelectric generators; an (b) theft of a dangerous source and use of a radiological dispersal device or radiological exposure device; (c) detection of elevated radiation levels of unknown origin or of commodities with contamination; (d) identification of clinical symptoms due to exposure to radiation; and (e) a transnational emergency that is not in category V arising from a nuclear or radiological emergency in a neighbouring country of Ghana.

V Areas within emergency planning zones and distances in Ghana for a facility in Category I or II located in a neighbouring country.

^aInvolving an atmospheric or aquatic release of radioactive material, or external exposure due among others, to a loss of shielding or a criticality event, that originates from a location on the site.

^b Events that include nuclear security events.

^cThis includes events that are beyond the design basis accidents and, as appropriate, events that are beyond design extension conditions.

^dSee ‘deterministic effect’ in regulation 28 on “Interpretation”.