Office for Nuclear Regulation

ONR GUIDE			
LC 11– On-site Emergency Arrangements			
Document Type:	Nuclear Safety Technical Inspection Guide		
Unique Document ID and Revision No:	NS-INSP-GD-011 Issue 7.1		
Date Issued:	March 2021	**Review Date:**	August 2025
Approved by:	Kulvinder McDonald	Professional Lead - Operational Inspection	
Record Reference:	CM9 reference: [1.1.3.979.] 2021/13604		
Revision commentary:	Rev 5 implementation of the NSD 2014/87/EURATOM Rev 6 inclusion of REPPIR 2019, consolidation of annexes. Rev 7: Updated review period Issue 7.1 Minor update to body text from outcome of Review of ONR's Regulation of Nuclear Licensee's On-Site Emergency Preparedness and Response, further integration of relevant duties under IRR, COMAH, NISR and ADR and inclusion of capability map template.		

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Published /21

1. INTRODUCTION

1.1. ONR regulates a duty holder's compliance with a range of statutory provisions that set standards for emergency arrangements including: the Licence Condition 11 (LC 11) for Emergency Arrangements which is attached to the nuclear site licence which encompasses the entirety of the emergency arrangements, together with the Radiation (Emergency Preparedness and Public Information Regulations (REPPIR) 2019, which relates to radiation emergencies specifically. ONR also regulates the relevant sections of: the Ionising Radiation Regulations (IRR) 2017, The Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations (CDG) 2009, the Nuclear Industries Security Regulations (NISR) 2003 and the Control of Major Accident Hazards (COMAH) 2015 with respect to emergency arrangements on nuclear sites. This is achieved by processes of inspection and assessment of the arrangements a duty holder has made to demonstrate its compliance with the full range of statutory requirements.

1.2. LC 11 is, like most of the licence conditions, goal-setting in nature and non-prescriptive and so the adequacy of a licensee's arrangements for compliance is a matter for the licensee to decide and for ONR, as the enforcing authority, to adjudicate upon. REPPIR puts in place a framework for compliance comprising of regulations, an Approved Code of Practice and statutory guidance. It is considerably more detailed and in places more prescriptive than LC 11. Similarly, the other statutory provisions relating to emergency arrangements (IRR, NISR, COMAH, CDG) also specify many more duties and arrangements that licensees need to have in place. This guide is intended to help inspectors make consistent and proportionate decisions on the adequacy of the totality of licensee's emergency arrangements to demonstrate compliance with the relevant sections of *all* the relevant statutory provisions.

1.3. In addition, Licensees must comply with the Health and Safety at Work etc. Act 1974 (HSWA) and its relevant statutory provisions. The HSWA places a fundamental duty on employers to ensure, so far as is reasonably practicable, the health, safety and welfare at work of all their employees. It also imposes a duty on employers to ensure, so far as is reasonably practicable, that persons not in their employment are not exposed to risks to their health or safety as a result of the activities undertaken by the employer. This includes risks arising from an activity's nature, and the risks posed by plant and equipment associated with the activity.

1.4. Sections of the Nuclear Installations Act 1965 (NI Act) relating to the licensing and inspection of nuclear installations are relevant statutory provisions of the Energy Act 2013. These sections of the NI Act apply to all licensees. Section 4 of the NI Act requires ONR to attach conditions to a licence in the interests of safety, and ONR may also attach licence conditions with respect to the handling, treatment and disposal of nuclear matter. Failure to comply with licence conditions is an offence under section 4 of the NI Act. Furthermore, licence conditions are also applicable provisions of the Energy Act 2013, which provides for the serving of an improvement notice when arrangements by the licensee for compliance are concluded to be inadequate by ONR. LC 11 is of particular importance in relation to ensuring that adequate arrangements are made for responding to any accident or emergency arising on a licensee's site including conventional, nuclear safety and security related emergencies.

2. PURPOSE AND SCOPE

2.1. This document gives guidance on compliance of emergency arrangements by licensees in relation to LC 11 and refers to the relevant sections of other relevant statutory guidance for the corresponding duties on operators of nuclear sites. This document should be used in conjunction with the other relevant regulations, ACoP and statutory

guidance to provide a complete view of regulatory requirements. This technical inspection guide promotes a consistent approach to the inspection and assessment of emergency arrangements. In doing so, it provides guidance on the evaluation of emergency exercises, on the planning for and undertaking inspections of the licensee's on-site emergency plans and on the arrangements made to produce and maintain such plans. This document is not mandatory, but rather provides a framework for inspectors, to inform decision-making and allowing inspectors to exercise their discretion, where appropriate and necessary, during interventions.

2.2. This guide considers the sub-conditions of LC 11 and links with REPPIR (section 3), identifies their purpose (section 4), and provides guidance on the inspection of emergency arrangements (section 5). Guidance on the use of capability maps, a tool to use during inspections is provided in section 6. Annex 1 contains the capability maps template which includes a description of the key abilities a licensee needs to show (where relevant to the site) and refers to all the relevant statutory provisions. Annex 2 provides guidance on the evaluation of emergency exercises and Annex 3, an overview of emergency test arrangements. The guidance has been written in a way that describes the duties under LC 11 and REPPIR side-by-side to assist inspectors to understand all the requirements more easily for each particular duty holder activity.

2.3. Much of the scope of this guidance with regard to REPPIR is linked to Regulations 10 (the operator's plan) and 12 (reviewing and testing of emergency plans) and the associated Approved Code of Practice and statutory guidance, although other sections throughout REPPIR are also relevant to operators. Also of note: Regulations 4 to 7 are concerned with the production of Hazard Evaluations and Consequence Assessments; Regulations 13 and 15 concern consultation and cooperation; Regulation 16 relates to charging arrangements; regulation 17 relates to the implementation of emergency plans; regulations 18 and 19 relate to emergency exposures and the disapplication of dose limits; regulation 20 concerns reference levels; regulation 23 relates to the retention of information; regulation 24 instructs employers to seek advice from a Radiation Protection Advisor on their emergency arrangements and Schedules 6 and 7 refer to the emergency plan contents.

2.4. The duty on the licensee to restrict so far as is reasonably practicable the extent to which their employees and other persons are exposed to ionising radiation is imposed by regulation 9 of the Ionising Radiations Regulations 2017 (IRR17), which applies to emergency exposure situations as well as to normal operations. Similarly, licensees also have a duty to carry out radiation risk assessments (regulation 8) and prepare contingency plans (regulation 13). Licensees' arrangements should encompass these aspects as part of their suite of emergency arrangements. Therefore, inspectors should review these arrangements as part of the programme of interventions relating to emergency arrangements. Guidance for inspectors regarding compliance with IRR 2017 is described in NS-INSP-GD-054.

2.5. Separate guidance exists for security aspects under Security Assessment Principals (SyAps); Fundamental Security Principal (FSyP) 10 (Emergency Preparedness and Response)[1] for the inspection and assessment of security-related emergency planning and response arrangements as follows: CNS-INSP-GD-10.0 (Emergency Preparedness and Response), CNS-TAST-GD-10.1 (CT measures, emergency preparedness and response planning) CNS-TAST-GD-10.2 Testing and exercising the security response) and CNS-TAST-GD-10.3 (Clarity of command, control and communications arrangements during and post a nuclear security event). The capability map template

[1] FSyP 10 states: Dutyholders must implement and maintain effective security emergency preparedness and response arrangements which are integrated with the wider safety arrangements

makes reference to NISR and this guidance and draws out some of the relevant requirements relating to security in emergencies. As with the other relevant statutory provisions, it is good practice to undertake joint interventions with security inspectors as the licensee's emergency arrangements will apply both to safety and security.

2.6. NS-INSP-GD-051 describes arrangements for the delivery of ONR's responsibilities as the Competent Authority for COMAH 2015. As per the other statutory provisions, the licensee's emergency arrangements under COMAH should also be inspected as part of the suite of emergency arrangements. these are referred to with the capability map template (annex 1).

2.7. Lastly, a nuclear site's emergency arrangements under CDG 2017 should made as part of the wider suite of emergency arrangements. Therefore, the programme of interventions on emergency arrangements should seek to include the transport-related emergency arrangements. NS-INSP-GD-066 provides more detail on the emergency 'plan in writing' that is required in order to comply with CDG 2017 for transporting radioactive material.

2.8. Separate guidance exists for the inspection of off-site emergency preparedness and response arrangements in NS-INSP-GD-067 (Off-site emergency arrangements) where the requirements fall to local authorities Therefore these would normally be inspected separately to the on-site arrangements, however, both the on and off-site arrangements will need to work in conjunction with each other (REPPIR regulation 13).

2.9. Separate guidance also exists for Severe Accident Analysis (NS-TAST-GD-007), Radiological analysis (of) fault conditions (NS-TAST-GD-045) which explains what is required of operators to produce the information that will underpin their emergency plans.

2.10. Although the type, frequency and depth of intervention activity will vary according to the type of site, hazard posed and experience of previous regulatory compliance, (matters deferred to the integrated intervention strategy (IIS) and specific ONR divisions), indicative periods are suggested in this guidance for undertaking LC11 interventions overall and for each condition (see Table 1).

2.11. Some requirements under LC 11 and REPPIR implement certain Directive Articles from Council Directive 2014/87/Euratom of 8 July 2014.[2]

2.12. This guidance is aligned with the relevant sections of the IAEA Safety Standard Preparedness and Response for a Nuclear or Radiological Emergency GSR Part 7 and the Arrangements for Preparedness for a Nuclear or Radiological Emergency, Safety Guide GS-G-2.1.

Terminology

2.13. This guidance refers to ***tests*** and ***exercises*** of the operator's emergency plans, which can be considered to be interchangeable with the term ***rehearsals***, which is the term used within the site licence conditions. From this point onward, the TIG will refer to ***tests***

[2] "6(e) licence holders provide for appropriate on-site emergency procedures and arrangements, including severe accident management guidelines or equivalent arrangements, for responding effectively to accidents in order to prevent or mitigate their consequences. Those shall in particular: 6e(i) be consistent with other operational procedures [See paragraph 5.5] and periodically exercised to verify their practicability; [See paragraphs 4.21 and 4.22]. 6e(iii) provide arrangements to receive external assistance; [See paragraphs 4.8]. 6e(iv) be periodically reviewed and regularly updated, taking account of experience from exercises and lessons learned from accidents; [see paragraph 4.23]."

where it means rehearsals or tests, unless the text is quoting the relevant licence condition. Tests of on-site emergency plans are often referred to as level 1 exercises, which distinguishes them from level 2 exercises, which are tests of off-site emergency plans. Level 2 exercises look at the joint local emergency organisations' response, (for which guidance is provided in NS-INSP-GD-067). Level 3 exercises encompass both local and national organisation's response to a nuclear emergency and are also outside the scope of this guidance.

2.14. The licence conditions refer to licensees as the main duty holder, whereas REPPIR refers to the operator. For the purposes of this guide, the two terms are interchangeable although each is used within the text according to the most relevant statutory instrument.

3. LICENCE CONDITION 11 (EMERGENCY ARRANGEMENTS) AND REPPIR REGULATIONS 10 AND 12 (OPERATOR'S EMERGENCY PLAN AND REVIEW AND TESTING OF EMERGENCY PLANS)

LC 11(1): Without prejudice to any other requirements of the conditions attached to this licence the licensee shall make and implement adequate arrangements for dealing with any accident or emergency arising on the site and their effects.

LC 11(2): The licensee shall submit to ONR for approval such part or parts of the aforesaid arrangements as ONR may specify.

LC 11(3): The licensee shall ensure that once approved no alteration or amendment is made to the approved arrangements unless ONR has approved such alteration or amendment.

LC 11(4): Where any such arrangements require the assistance or co-operation of, or render it necessary or expedient to make use of the services of any person, local authority or other body the licensee shall ensure that each person, local authority or other body is consulted in the making of such arrangements.

LC 11(5): The licensee shall ensure that such arrangements are rehearsed at such intervals and at such times and to such extent as ONR may specify or, where ONR has not so specified, as the licensee considers necessary.

LC 11(6): The licensee shall ensure that such arrangements include procedures to ensure that all persons in his employ who have duties in connection with such arrangements are properly instructed in the performance of the same, in the use of the equipment required and the precautions to be observed in connection therewith.

3.1. This guidance refers to (but does not replicate) the relevant sections of REPPIR Regulations, ACOP and statutory guidance which contains significant detail. Inspectors should make themselves familiar with the relevant sections (see paragraph 2.4). Section 5 of this technical inspection guide describes some of the REPPIR requirements that put duties on licensees alongside ONR's expectations for compliance with LC 11. The other sections that relate to emergency arrangements within the relevant statutory provisions mentioned in sections 1 and 2 above (NISR, CDG, COMAH, IRR) are reflected in the capability map template (Annex 1).

3.2. Table 1 shows the various elements to be considered within each sub-clause and should be used when planning an LC11 inspection. A periodicity of inspection is suggested for each sub-clause.

3.3. In planning and undertaking LC11 interventions the inspector should consider linkages to related LCs, in particular: LC 8 - Warning Notices (NS-INSP-GD-008), LC 9 - Instructions to Persons on Site (NS-INSP-GD-009) , LC 10 – Training (NS-INSP-GD-010), LC 12 - Duly authorised and other suitably qualified and experienced persons (NS-INSP-GD-012) and LC 28 - Examination, Inspection Maintenance and Testing (EIMT) (NS-INSP-GD-028).

4. PURPOSE OF LICENCE CONDITION 11 AND REPPIR REGULATIONS AND ASSOCIATED ACOP

Making Adequate Arrangements

4.1. A key requirement from both LC 11 and REPPIR is that licensees make and implement ***adequate arrangements*** (in REPPIR this is referred to as ***an adequate emergency plan***[3]). Inspectors should ensure that the arrangements made by licensees address ***all events that might lead to a radiation emergency*** (REPPIR regulation 4(2)) including those that are ***beyond design basis***[4].

4.2. REPPIR regulation 10(2) and associated ACOP requires the operator to consider within the licensee's arrangements any ***variable factors*** that might affect the severity of the emergency, including conditions in the facility or facilities, condition of infrastructure, the availability of personnel with an emergency response role, or multiple factors in parallel.

4.3. The degree of planning should be ***proportionate*** to the consequences and likelihood of an event occurring. For severe but very low likelihood events (beyond design basis), the operator's emergency arrangements should ensure that these existing plans are scalable for these events and that any capabilities that are required in addition to, or instead of, can be adequately resourced and implemented in the event of such an emergency.

4.4. Inspectors should ensure that arrangements can be ***put into effect without delay*** (REPPIR ACOP para 248). This requires the underpinning capabilities to implement the plan to be in place and readily available. This may require seeking confirmation that those persons assigned duties in the emergency arrangements can fulfil those duties, for example, a tenant on site or neighbouring sites understands the arrangements and what is required of them in an emergency.

4.5. REPPIR defines all events to include ***perceived risks*** and these must be considered; this may simply require the licensee to put in place communication arrangements to mitigate the concern.

4.6. Emergency arrangements should be informed with a cause agnostic approach that focuses on the consequences. ***Security*** plans and protocols may be integrated with general emergency arrangements but the totality of arrangements should be suitable to inform the response to emergencies caused by any initiating event.

4.7. On sites where the Control of Major Accident Hazards (COMAH) Regulations apply, there may be co-joint or separate integrated internal emergency arrangements. COMAH

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[3] REPPIR refers to the totality of the operator's emergency arrangements as the *on-site emergency plan* however it is common for licensee's to refer to a high-level document such as the "Emergency Plan" which is accompanied by a suite of low-level documents detailing how it should be implemented which may be known as the "Emergency Handbook".

[4] In REPPIR, events equivalent to those 'beyond-design' are referred to as 'very severe radiation emergencies'.

regulations and emergency plans are regulated by the COMAH Competent Authority (ONR and EA/SEPA) who should be informed if plans are integrated.

Emergency Plan Content

4.8. REPPIR Schedule 6 Part 1 prescribes the information that must be included in the operator's emergency plan and REPPIR Schedule 7 parts 1 and 2 contain the principles and purposes to which emergency plans must have regard. The information must detail, for example: the activation process (on and off-site), the command structure, declaration states and definitions, mitigation and response instructions, roles and responsibilities, the use and availability of safety equipment and resources, the arrangements for transition to the recovery phase, the arrangements for gaining assistance from off-site emergency services and those for dealing with emergency exposures (see also REPPIR regulations 18 & 19) and reference levels (REPPIR regulation 20) amongst other information.

4.9. Arrangements should account for the need to respond outside normal working hours and consider what might be required by tenants, contractors and near neighbours of the site. Full details are described in REPPIR Schedules 6 and 7.

4.10. Arrangements should detail how the licensee will provide assistance to the off-site emergency response, for example, in initiating the notification process, the initial information and advice that will be provided to protect responders and the public, representation at the Strategic Coordination Centre and what and how off-site monitoring data will be relayed. The operator should work closely with the local authority to make sure that the on and off-site emergency plans are consistent with one another. Details are described in REPPIR regulations 10, 13 and Schedule 6, Part 1.

Approving the Plan

4.11. Under LC 11(2), *if* specified by ONR under primary or derived powers, the licensee must submit their arrangements (or parts thereof and as specified by ONR) to ONR for approval. An approval is normally issued once a document has undergone technical assessment and ONR is satisfied with its contents. Once a document is approved the licensee can no longer alter or amend it without the permission of ONR.

4.12. It is usually only the licensee's high-level Emergency Plan that is approved by ONR. This minimises the administrative burden on the licensee and the ONR. There should be written arrangements specifying which document or documents must be approved between the licensee and ONR. However, it may be that for some lower hazard sites, it is appropriate that no arrangements are specified by ONR, and therefore no approval is required under primary powers or acknowledgement or agreement under derived powers and that regulatory compliance is sought by other means (e.g. inspections and assessments).

4.13. Licensees should have in place procedures for identifying when a change to the approved plan is required, and for seeking approval of any proposed amendments from ONR prior to the implementation of change. Lower-level documentation, such as emergency contact address books containing the phone numbers and role-specific instructions that support the implementation of the Emergency Plan may be amended without ONR permission, but the licensee should ensure that changes to supporting documentation do not affect the validity of the approved plan. Modifications to emergency arrangements documentation should follow appropriate validation and sign-off processes appropriate to the type and degree of change.

Review and Revision

4.14. Under REPPIR regulation 12(1), the operator must review and where necessary revise their emergency plan at least every 3 years. REPPIR regulation 12(4) lists the factors to be taken into account at each review including; any material change to the hazard assessment or to the work being undertaken, new knowledge or guidance and any learning from an incident or exercise. In practice, identified improvements either from tests or real events should be implemented as soon as reasonably practicable and should also inform the future test programme.

4.15. Under LC 11(3), ONR approves the licensee's proposed changes (if ONR agrees the changes are warranted) to all specified documentation. (No such equivalent approval is required under REPPIR).

Consultation

4.16. Both LC 11(4) and REPPIR require the licensee/operator to consult with all agencies that may be required to provide support to the licensee in the event of an emergency response by the licensee. REPPIR regulation 10(5) specifies a list of agencies that must be consulted. Regulation 13 of REPPIR also requires co-operation between the operator and the local authority with respect to preparing emergency plans. If the emergency services would be expected to attend the site, their role should be agreed between both parties. It is usual to make use of Local Liaison Committees (LLC) and Emergency Planning Consultative Committees (EPCC) to inform consultees and key stakeholders.

4.17. REPPIR regulation 24 requires operators to consult a Radiation Protection Advisor (RPA) on their emergency arrangements; in particular on contingency planning, emergency procedures and remedial actions.

4.18. Where emergency arrangements require participation of contractors or on-site tenants, these organisations must also be consulted on the arrangements. REPPIR regulation 15(3) puts duties on all those with a role in the emergency plan (from *any* organisation) to co-operate with the operator and provide assurance that they can carry out their role(s).

4.19. Similarly, where there are industrial sites nearby that are subject to COMAH or could otherwise represent an external hazard to the nuclear site, the arrangements should include provision for the (periodic) exchange of information between the sites, so that external hazards presented by those industrial sites can be assessed and any necessary amendments to the safety case can be made.

Testing

4.20. LC 11(5) and REPPIR Regulation 12 both require licensees to test their emergency arrangements on a regular basis. LC 11(5) requires rehearsal (which is equivalent to a REPPIR test) at intervals as specified by ONR (or if not as the licensee considers necessary), and REPPIR requires testing at least every three years (unless otherwise agreed by the regulator).

4.21. Fundamental to a test of arrangements, is the level of challenge posed, as well as the opportunities for learning and improvement, rather than a simple pass/fail focus.

4.22. ONR would normally expect one *end-to-end* test (sometimes referred to as a level 1 exercise) of the site's emergency arrangements. This end-to-end test should consist of, so far as reasonably practicable, activating the *full* suite of arrangements that would be put in place for a realistic scenario. This is seen as the best way to demonstrate

compliance with both LC11(5) and the testing requirements of REPPIR regulation 12 (see Annex 2 for consideration of scenarios). A multi-year programme of end-to-end tests should be developed so that each scenario, and each corresponding element of the arrangements are tested over a reasonable time period. Inspectors should ensure that the time period is commensurate with the hazard on the site. It is usual for end-to-end tests to be evaluated by a team of ONR inspectors at least annually at operational sites, although evaluated tests may be less frequent at lower hazard sites with agreement with the nominated site inspector.

4.23. Multi-plant sites should similarly develop a testing programme that considers both all plants *and* all scenarios over a periodicity that ONR inspectors consider to be commensurate with the hazards posed on the site. To demonstrate the efficacy of the sites overall emergency arrangements, ONR would expect that one facility is chosen to participate in the (usually) annual *end-to-end* test that ONR normally chooses to observe. Multi-plant tests should be considered where there might be knock-on effects from plant to plant.

4.24. Arrangements should be made at both single and multi-plant sites for all shifts, and/or staff with a response role to participate recurrently in tests (or shift exercises) with a periodicity that ONR inspectors consider to be commensurate with the hazards posed on the site.

4.25. ONR inspectors would normally choose to attend the end-to-end test (level 1 exercise) but may also sample a number of the other tests or shift exercises. Shift exercises may be assessed as part of the training requirements under LC11(6) and REPPIR reg 10(6).

4.26. It may also be appropriate for any site to carry out a test of a single component of a site's or facilities' arrangements under particular circumstances, for example to test new equipment or arrangements, or if concerns have been raised.

4.27. Detailed guidance on the evaluation of tests is in annex 2 and an overview of emergency test arrangements in annex 3.

Report of the Test

4.28. REPPIR (reg 12(8)) requires the operator to prepare a report on the outcome of the test which must be sent to ONR. The associated ACOP describes what the report should contain including lessons identified and recommendations for improvements. The operator should track the implementation of the recommendations with the overall objective of continuous improvement.

Instruction, Training, Equipment and Dosimetry

4.29. Both LC 11(6) and REPPIR (Regulation 10(6)) require licensees to provide instruction and training to employees that might be involved or affected by arrangements in the operator's emergency plan. This may be the licensee's employees or any other employees of contractors, tenants or the emergency services if they have a role in the emergency arrangements. The overall objective is to ensure that persons who respond to an emergency on the site are suitably qualified and experienced (SQEP) to perform those roles and able to competently use the equipment provided to protect them and help them to undertake their tasks in an emergency. Licence Condition 10 puts duties on licensees to provide adequate training for all emergency response roles (see TIG NS-INSP-GD-010 and ACOP & guidance under REPPIR regulation 10 for more information).

4.30. REPPIR ACOP specifies that the operator should ensure that any other underpinning capabilities required to implement the plan are in place and readily available (para 248). Underpinning arrangements should include: the provision and training of the use in personal protective equipment (PPE) and other equipment, issue and training in the use of suitable dosimetry (or other suitable devices), general and specific training relevant to the hazards and the defined emergency roles, in addition to various other requirements. The readiness and proficiency of use of necessary equipment should be tested and witnessed by ONR inspectors in a test of arrangements. Arrangements must also include those specified in REPPIR regulation 18 regarding emergency exposures such as arrangements for medical surveillance.

5. INSPECTION OF EMERGENCY ARRANGEMENTS

5.1. *All* the key requirements of LC(11) and other relevant statutory provisions to emergency arrangements should be focused on over a series of inspections. The totality of licensee's emergency arrangements should be reviewed over an appropriate timescale determined by the nominated site and or corporate inspector and based on licensee past performance during demonstration tests and the results of previous inspections. The licensees corporate emergency arrangements should be reviewed at least every 5 years, or more frequently in response to significant change in the arrangements. The review of the overall arrangements should be assigned a RAG rating in accordance with ONR inspection guidance and the outcome recorded. Similarly, each sub-condition should be assigned a RAG. See Table 1 which provided guidance on the considerations for an inspection of each sub-condition. A completed capability map collates and provides claims toward each sub-condition.

5.2. Under LC 11(4), interventions should be undertaken to confirm the adequacy of the licensees' arrangements for interactions and collaboration with others, including: tenants, contractors, suppliers of emergency-related services and equipment, neighbouring sites, the local authority, the emergency services and local liaison committees. The frequency of such interventions being determined by the nominated site and or corporate inspector and be captured on the IIS and the outcome recorded. REPPIR also has several requirements for co-operation with third parties (regulation 13, with the local authority and regulation 15, with employers e.g. contractors and tenants working on the site). The outcome of witnessing of rehearsals including Level 1 exercises should be assigned a RAG rating and recorded under LC11 (5). The frequency of such interventions should be determined by the nominated site and /or corporate inspector and be recorded within the IIS.

5.3. Under LC 11(6), ONR should undertake interventions to confirm the adequacy of arrangements with respect to procedures to ensure all employees with duties under the arrangements have instructions, training on these including use of required equipment. The outcome of these interventions should be assigned RAG rating. The frequency of such interventions should be determined by the nominated site and /or corporate inspector and be recorded within the IIS.

5.4. Advice or assistance from radiation protection (RP), Civil Nuclear Security & Safeguards (CNSS), transport and Conventional health & safety specialist inspectors assigned to the Division/ sub-Division should normally be sought where this is relevant to focus of the inspection. Dependent upon the nature of the site and content of the emergency plan, it may also be appropriate to seek advice from additional specialisms, (for example, from ONR Emergency Preparedness and Response (EP&R)). Consideration of joint inspections, such as those with transport inspectors will avoid unnecessary burden on licensees who usually have one set of arrangements to respond to any emergency.

5.5. During each inspection it is usual to undertake a broad overview (“broad shallow”) and then sample in more detail selected areas (“deep slice”). Capability maps (section 6) should be used to inform which elements of the emergency arrangements should be inspected.

5.6. Examination of previous intervention records will identify what aspects of the arrangements have been examined recently and what corrective actions were required. The inspection should establish whether previous corrective actions have been and continue to be effectively implemented.

5.7. Emergency arrangements should be consistent with the licensee’s other operational procedures and plans; emergency plans and procedures should be managed within the site’s management systems to ensure that interdependencies are identified and relevant and related documents are updated as and when required.

LC 11 Sub-condition	Scope of Intervention	Frequency
LC 11(1): Without prejudice to any other requirements of the conditions attached to this licence the licensee shall make and implement adequate arrangements for dealing with any accident or emergency arising on the site and their effects.	• Periodic inspection undertaken by corporate and or nominated inspector to confirm LC 11(1) requirements are included in overall LC 11 arrangements. • Could be completed on corporate arrangements for fleet and multi plant sites for LC 11 (1) – (6). • Completed capability maps will provide detail on claims and also for other relevant statutory requirements requiring compliance (e.g. IRR 17, CDG 2009, REPPIR 2019, NISR 2003, COMAH 2015) and related LCs 7, 8, 9, 10, 12 and 28 arrangements. • Could be completed on corporate arrangements for fleet and multi plant sites by nominated site and or corporate inspector. • Assign and record RAG in IIS under LC 11(1).	• At least every 5 years for corporate LC arrangements, or following a significant change.
LC 11(2): The licensee shall submit to ONR for approval such part or parts of the aforesaid arrangements as ONR may specify.	• Periodic inspection undertaken by corporate and or nominated inspector to confirm LC 11(2) requirements are included in overall LC 11 arrangements • Could be completed on corporate arrangements for fleet and multi plant sites for LC 11 (1) – (6). • Include check if specification issued, fit-for-purpose, and if so, does Licensee has record of it and (if required) submitted changes for approval, • Include RAG outcome in IIS under LC11(2)	• Every 3 years or more frequently prior to implementation of significant change or issue of a Specification
LC 11(3): The licensee shall ensure that once approved no alteration or amendment is made to the approved arrangements unless ONR has approved such alteration or amendment.	• Periodic inspection undertaken by corporate and or nominated inspector to confirm LC 11(3) requirements are included in overall LC 11 arrangements. • Could be completed on corporate arrangements for fleet and multi plant sites for LC 11 (1) – (6). • Expect to use primary powers under LC 11 (3) for Approvals. However, derived powers may be used if	• Every 3 years for corporate arrangements and as required in response to implementation of significant change or request by licensee for Approval

	included within the arrangements and use of these is considered appropriate by ONR. • May consult RP specialist for REPPIR requirements. • Assign and record RAG in IIS under LC11(3) and REPPIR on arrangements and evidence of application.	
LC 11(4): Where any such arrangements require the assistance or co-operation of, or render it necessary or expedient to make use of the services of any person, local authority or other body the licensee shall ensure that each person, local authority or other body is consulted in the making of such arrangements.	• Periodic inspection undertaken by corporate and or nominated inspector to confirm LC 11(4) requirements are included in overall LC 11 arrangements. • Could be completed on corporate arrangements for fleet and multi plant sites for LC 11 (1) – (6). • Include as part of structured site LC11 intervention approach. Credit participation in local and national fora. • Check REPPIR reg 13 &15 elements, consult EP&R (local authority/emergency services interactions) and CNSS. • Assign and record RAG in IIS under LC11(4) & REPPIR.	• Every 3 years for corporate arrangements or more frequent prior to implementation of significant change.
LC 11(5): The licensee shall ensure that such arrangements are rehearsed at such intervals and at such times and to such extent as ONR may specify or, where ONR has not so specified, as the licensee considers necessary.	• Periodic inspection undertaken by corporate and or nominated inspector to confirm LC 11(5) requirements are included in overall LC 11 arrangements. • Could be completed on corporate arrangements for fleet and for multi plant sites for LC 11 (1) – (6). • Consider use of licensee's REPPIR capability maps (they cover LC11, REPPIR, CDG, COMAH, NISR, IRR) but for intervention and input from CNSS and EP & R functions to address wider elements. • Witnessing L1 and or other demonstration exercises – periodicity as required. • Check satisfies REPPIR reg 12 testing requirements. • Assign and record RAG in IIS under LC11(5) & REPPIR.	• Every 3 years for corporate arrangements. • Witnessing L1 and or other demonstration exercises – periodicity as determined by nominated inspector.

LC 11(6): The licensee shall ensure that such arrangements include procedures to ensure that all persons in his employ who have duties in connection with such arrangements are properly instructed in the performance of the same, in the use of the equipment required and the precautions to be observed in connection therewith.	• Periodic inspection undertaken by corporate and or nominated inspector to confirm LC 11(6) requirements are included in overall LC 11 arrangements. • Could be completed on corporate arrangements for fleet and for multi plant sites for LC 11 (1) – (6). • Consider integration of wider scope with LCs 10, 12 and/or 28. • Ensure similar REPPIR requirements are met (regulation 10). • Assign and record RAG in IIS under LC11(6) and REPPIR.	• Every year or periodicity as determined by nominated inspector • Every 3 years for corporate arrangements

TABLE 1. ELEMENTS TO BE CONSIDERED UNDER EACH LC(11) SUB-CONDITION & FREQUENCY OF INTERVENTION.

6. CAPABILITY MAPS

6.1. Capability maps are tools that inspectors and operators can use to record evidence of preparedness and capability when judging an operator's emergency response arrangements.

6.2. The descriptors in the capability map template provide examples of the criteria that Relevant Good Practice (RGP) for the on-site emergency arrangements should deliver. Completion and on-going revision of the maps provides a record of compliance with LC 11 and relevant sections of REPPIR 2019, CDG 2009, COMAH 2015, IRR 2017, NISR 2003 and other relevant licence conditions. Although the maps do not include every possible regulatory requirement relating to emergency arrangements they can provide a reasonable indicator and record of compliance at any particular time.

6.3. The maps can also be used by inspectors and Operators to identify good practice in addition to any gaps or shortfalls in their arrangements for closer examination and rectification.

6.4. The structure of the capability maps is aligned with that of the Integrated Emergency Management (IEM) model[5] and allows capability to be compared across operators, for example, across a fleet, to identify trends and gaps. It would also provide a useful source of information in an emergency, should information be needed at short notice about provisions on a range of sites.

6.5. Capability maps were cited as an area of good practice during the 2019 IAEA Integrated Regulatory Review Service (IRRS) mission to the UK and ONR is committed to encouraging their use on nuclear sites[6].

6.6. The template (Annex 1) refers to relevant sections of each relevant statutory provision (REPPIR, CDG, IRRs etc.) and any associated ACoP or Statutory guidance. For example, SyAPs and Sy Delivery Principles (SyDP) are referenced so that the source text can be found should clarification be needed. Descriptors that have no cited source referenced are likely to be Relevant Good Practice (RGP) recognised under LC 11, which is goal-setting and not prescriptive in nature.

6.7. This Technical Inspection Guide, together with the descriptors in the capability map template aim to consolidate Relevant Good Practice (RGP) for the majority of sites. Whilst following RGP is not strictly a legal requirement, it is one way of demonstrating that the regulation (or aspect thereof) has been complied with although there may be other ways to do this. Where descriptors are not relevant to an operator or site, this should be agreed between ONR and the operator and can be marked as not applicable or a more suitable alternative approach agreed.

6.8. It is the nominated site or corporate inspector that is the custodian of the completed maps within ONR.

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[5] Integrated Emergency Management (IEM) is the concept on which civil protection in the UK is based. IEM is a holistic approach to preventing and managing emergencies that entails six key steps: anticipation; assessment; prevention; preparation; response; and recovery.

[6] REPPIR 2019 is applicable to authorised defence sites and operational berths in addition to nuclear licensed sites whereas LC11 is only applicably to nuclear licensed sites but applies to all types of emergency not just radiological. Relevancy of sections of the capability map should be agreed between the ONR and the site in question on a case-by-case basis.

6.9. It is usual for inspectors to request that operators update the maps or sections of the maps, and return the completed or updated maps to ONR at agreed intervals. It is not intended that routine compliance inspections of *all* capability map questions are undertaken at any one time, rather that inspections target a subset of capability map indicators. Operators may also wish to send relevant supporting information as evidence to support the claims made in their return.

6.10. Following receipt of the information from operators, the relevant inspector within each division /programme should confirm the operator's claims and evidence to targeted questions prior to or during routine compliance inspections. Inspectors may wish to take a sampling approach targeting the areas where, for example, more evidence is needed to support claims. Nominated Site/corporate inspectors should refer to specialist inspectors within Civil Nuclear Security and Safeguards (CNSS), conventional Health & Safety and Transport to assess relevant requirements. Following any intervention (by inspection, assessment, correspondence) inspectors together with licensees can then review, and where necessary, revise the capability maps.

6.11. Following each intervention, a new revision of the capability map should be made to identify the key changes in emergency arrangements including: relevant conclusions of targeted interventions, progress that addresses previous areas for improvements identified by ONR inspectors, and the implementation of continuous improvements as a consequence of reviews of its arrangements and tests. The ONR inspector(s) will then determine a RAG rating for each section of the map which will assist in highlighting the areas that might need further attention. RAG ratings will be assigned according to ONR's Inspection Rating Guide. A diagram of the process is shown in Figure 1 below.

6.12. The frequency of revision of each section of the capability map should be determined according to the site risk profile, history of compliance and any other relevant factors, as determined by the nominated site/corporate and/or project inspector. Similarly, not all sections of the maps will be relevant to all sites.

6.13. The capability map template can be used as an aide-memoire for inspections of emergency arrangements, or to assist inspectors as part of assessing demonstration tests (outcome 6).

6.14. Any significant shortfalls identified should be raised and logged in the ONR issues database in addition to being recorded on the capability map.

6.15. ONR's Emergency Preparedness & Response function will analyse the information across all sites on a periodic basis to identify any GB-wide trends and provide feedback identifying areas of good practice and those that require improvement.

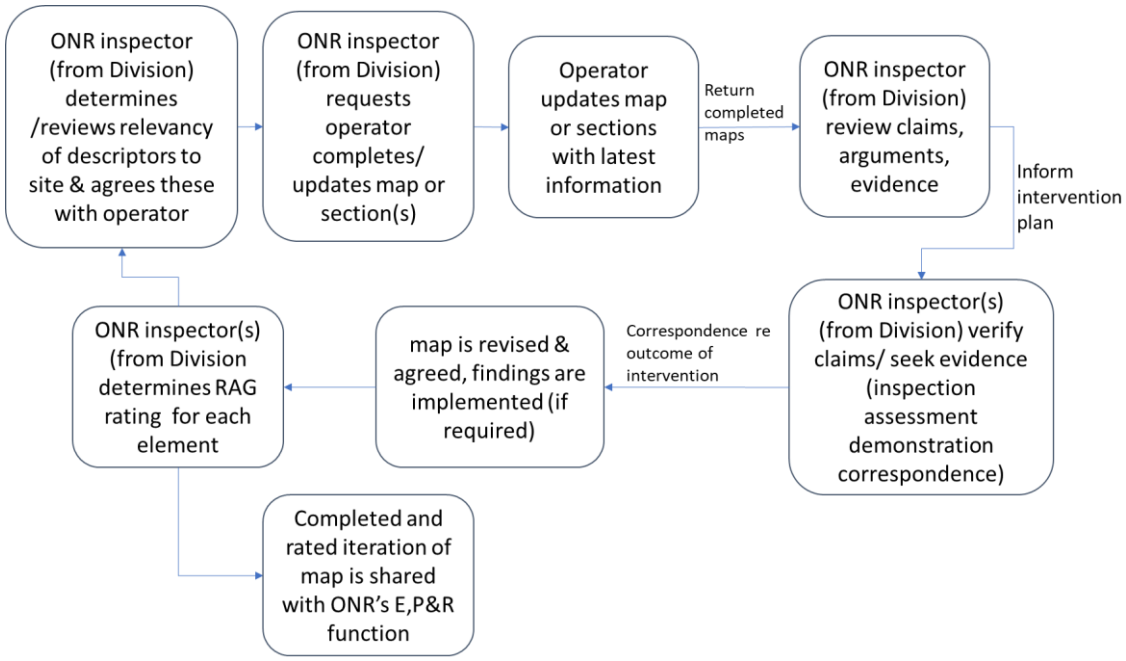

FIGURE 1. PROCESS FOR COMPLETING AND UPDATING CAPABILITY MAP

ANNEX 1: CAPABILITY MAP BLANK TEMPLATE [7]

Site/Operator	
Assessment Date	
Assessment Reference	
Outcome 1: Foundations	***The duty holder has the underlying abilities necessary to deliver adequate emergency planning & response. The duty holder can:***

Ref.	Ability	Supporting Guidance
1.1	**SHOW** that the organisation can provide the resources and commitment necessary to develop, maintain and implement adequate emergency arrangements [LC 11(1), LC11 (6), LC 8, 9 & 36, REPPIR regulation 10(1), ACOP 248, NISR Regulation 4-FSyP 10 & COMAH regulation 7, guidance L111]	There should be a justified baseline covering both the emergency preparedness function and emergency response activities. The baseline should show that sufficient resources are available to respond to a prolonged event, and/or one with very severe consequences caused by a beyond design basis event[8], or by multiple factors that materialise in parallel. [REPPIR ACOP paragraph 261] There should be succession planning for key roles to ensure continuity of capability and capacity of the emergency response. There should be a role with a clear and unambiguous mandate to integrate the various aspects of the EP&R organisation and arrangements (the 'controlling mind'). This role should be at an appropriate level within the organisation. The duty holder should be able to explain and justify the bounding assumptions that have been used to develop the EP&R arrangements (for example, number of buildings affected, duration of the emergency, number of casualties, size and nature of release and so on). There should be evidence of commitment at the senior management to the emergency organisation and sufficient financial provision (for examples see NS-TAST-GD-048 Organisational Change which includes LC 36 (organisational capability)).

[7] This word version of the template has been published with the TIG to control the content of the descriptors (the ability and the supporting guidance). Inspectors and operators should complete the corresponding excel spreadsheet template with the supporting claims and evidence.
[8] REPPIR refers to a beyond-design basis event as a very severe radiation emergency.

		The duty holder should be able to show how issues such as competence of contractors and other supply chain issues relevant to the EP&R arrangements are considered.
1.2	**PREPARE** and maintain adequate written emergency preparedness and emergency response arrangements [LC 11(1), LC11 (6) + LC 8 & 9, REPPIR regulation 10(1), ACOP 248, IRR reg 13(1), NISR Regulation 4, FSyP 10, COMAH regulation 7, guidance L111]	The duty holder should be able to confirm all documentation describing the EP&R arrangements is complete, up to date, consistent with other site arrangements and is readily available to all who have need to access it. Emergency arrangements describe the differences in the response arrangements that might be required for beyond design basis events in a proportionate manner, for example how capabilities will be scaled up if the response organisation becomes overwhelmed. Includes procedures and instructions for those with duties as LC11 (6), include emergency warning notices (LC 8) and LC9 site instructions action to be taken in the event of an accident or emergency.
1.3	**SHOW** configuration control of all resources, facilities and equipment used in support of the emergency arrangements [LC 11(6), LC 28, REPPIR ACOP 248(a)]	Describe (or refer to a description of) the configuration control for all resources (personnel, facilities and equipment) identified as being necessary to support the emergency arrangements. Includes equipment for those with duties as LC11 (6) and maintenance of these under LC28 or equivalent. Has the possible impact of a beyond design event been considered (for example, in the provision and siting of emergency facilities and proximity to potentially hazardous facilities and locations).
1.4	**SHOW** effective audit and assurance arrangements for the emergency management programme [REPPIR 12(1), NISR Regulation 4, FSyP 10, COMAH regulation 12 sections 6 & 8, guidance L111]	There should be formal review and approval process to ensure that the EP&R arrangements are and remain sound and practicable. There should be a programme of internal (and external) audits. Evidence of acting on the findings of such audits should be provided in response to Q1.5.
1.5	**SHOW** how key issues and learning are identified and used to help ensure emergency arrangements remain fit-for-purpose. [REPPIR regulations 12(6) & 12(8), IRR reg 13(2), NISR Regulation 4,FSyP 10 COMAH regulation 12 sections 6 & 8, guidance L111]	The duty holder should be able to show how information from relevant events both internal and external to the organisation are and have been considered and used to ensure EP&R arrangements continue to be robust. This includes how information and learning from previous tests (both training and demonstration), Learning From Experience (LFE)/OpEx, assessment, inspection or audit activities have been used. Issues identified should be tracked to timely completion, and improvement programmes should be appropriately funded.

1.6	**SHOW** that the Emergency Management Programme is underpinned by a structured training and assessment programme. [LC 11(5) & (6), REPPIR regulations 10(6) 10(7) & 10(8), IRR reg 13(2), CDG Sch 2., NISR regulation 4, FSyP 10]	There should be a structured approach to assessing training needs for defined roles in the Preparedness and Response organisations. An integrated initial & continued training design process and delivery programme utilising competent trainers should be in place. Personnel should be appropriately trained and assessed as competent before taking up active roles. Changes in emergency management arrangements should be captured by additions to, or new training. There should be sufficient opportunity for training, maintenance of competence and demonstration where many employees are available to undertake individual roles. Key capabilities of individuals (for each of their assigned emergency roles) should be tested at an appropriate frequency, and poor performance of emergency response personnel should be identified and managed. Training and testing should be appropriate for the full range of possible events including beyond design events, for example; how a beyond design basis event would be recognised and what extra or different actions may be necessary, as well as multiple or unconnected events occurring simultaneously and conditions which affect which affect infrastructure or several facilities at once. Transport plans are tested at least every 3 years. Joint, interactive training is carried out with the off-site emergency services at suitable intervals.
1.7	**SHOW** how material changes that may affect the EP&R arrangements are identified, understood and responded to. [REPPIR regulations 10(5) & 12(4), CDG Sch 2, NISR Regulation 4, FSyP 10]	There should be a process for managing change to the EP&R arrangements that identifies and involves all key stakeholders. Plans to implement changes should clearly articulate the equipment, processes, documentation and training requiring update.

Outcome 2: Anticipation	***The emergency situations that the duty holder needs to be prepared for have been identified in advance. The duty holder can:***

2.1	**IDENTIFY** all activities and process(s) that could, if compromised in some way, have an unwanted consequence [REPPIR regulation 4(2), IRR reg 8, NISR Regulation 4, FSyP 10, COMAH regulations 7 and 8(b), guidance L111]	Duty holder should be able to identify all activities and processes which have the potential for an accident or emergency including beyond design basis events.
2.2	**IDENTIFY** the threats and hazards that might, if realised, result in an adverse effect. [LC 11(4), REPPIR regulations 4(2) & 15(1), IRR reg 8, NISR Regulation 4, FSyP 10, COMAH regulations 7 and 8(b), guidance L111]	There should be an adequate understanding of *all* initiators that could lead to an accident or emergency involving the activities identified in 2.1. Emergency arrangements should cover all potential emergencies regardless of initiators (noting that in a real event the initiator may not be known), i.e. the emergency arrangements should be 'cause agnostic'. Tenants and contractors on the site should be consulted to inform the assessment of hazards and risks [REPPIR 15(1)].
2.3	**RESPOND** to new threats and hazards and changes to existing threats and hazards. [REPPIR regulation 12(4), IRR reg 8, NISR Regulation 4, FSyP 10]	Duty holders should be able to show how new initiators, threats and hazards are anticipated, the impact on the emergency arrangements considered and the arrangements amended where appropriate.
2.4	**IDENTIFY** transient issues and situations that could or will challenge the effective operation of the emergency arrangements and take action to mitigate as necessary [REPPIR regulation 10(2), ACOP 261, NISR Regulation 4, FSyP 10]	Duty holder should be able to show how transient threats and challenges (such as, for example, pandemics, severe weather, floods or strikes by external services that may be required to help the emergency response) are identified and managed. This also includes temporary changes to facilities that may impact emergency arrangements (e.g. restricted or no access).
Outcome 3: Assessment	***The ways in which the identified threats and hazards may initiate and develop has been assessed, and potential consequences and mitigations have been identified. The duty holder can:***	

3.1	**SHOW** that the full range of consequences both on- and off-site have been identified and the impact quantified [LC11(1), REPPIR regulations 4 & 5 and 10(2), ACOP paragraph 143 and associated guidance, IRR reg 8, CDG Part 5, Regulation 24 & Sch.2, NISR regulation 4, FSyP 10, COMAH regulations 7 & 11, guidance L111]	Duty holder should be able to show that the consequences of all accidents and emergencies are understood (including security initiators). Consequences for events of very low probability that may or may not have been considered within the design of the installation should be included. Both on- and off-site consequences should be considered, including impacts on adjacent sites, tenants, contractors and members of the public. Variable factors or a combination of variable factors that might affect the consequences of a radiation emergency, the supporting infrastructure or the ability to respond to the emergency should be considered. Variable factors should include the source term, chemical/physical form and nature of release, the weather conditions, conditions in the affected facility, conditions affecting infrastructure or conditions affecting several facilities at once and the availability of employees with a role in the operator's emergency plan. Specific to transport radiation emergencies, variable factors should include: the activity of class 7 goods, the number and distribution of packages and prevailing conditions (weather, traffic, location.)
3.2	**SHOW** how the identified threats, hazards and consequences have been used as an input to development of the emergency arrangements. [LC11 (1) REPPIR regulation 8(1), IRR reg 13, NISR Regulation 4, FSyP 10]	The duty holder should be able to explain how the potential initiators, hazards and consequences and safety cases have been used to design the emergency arrangements. The emergency arrangements should be able to respond appropriately to the full range and types of emergencies that could occur on-site. Arrangements to respond to nuclear, security, transport, conventional and environmental emergencies are integrated. Arrangements are flexible and could extend to respond to events of very low probability that may not have been considered within the design of the installation.
3.3	**SHOW** how the facilities and equipment necessary to respond to an emergency have been identified and provided [LC11 (1) LC11 (6), REPPIR Schedule 6, Part 1, Para 1 (d), IRR reg 13, NISR, Regulation 4, FSyP 10, COMAH regulations 7 & 11, guidance L111]	The duty holder should be able to show how the range of initiators, hazards and consequences have been used to determine what facilities and equipment are necessary to support the site/facility emergency plans. Suitable primary and back-up facilities should be designated, equipped and available for emergency use. - Locations should be credible for all scenarios - The number & size should be adequate. - Sufficient facilities and equipment should be maintained and available at all times within an acceptable time period. - The level of protection/ resilience should be appropriate. Beyond design scenarios have been considered in a proportionate manner.

3.4	**SHOW** how the impact of changes to the threat and hazard profile on emergency plans is assessed and any necessary changes to the arrangements made as necessary. [REPPIR regulations 4, 5 & 12(4), CDG Sch.2, NISR Regulation 4, FSyP10]	The duty holder should be able to show how changes to the initiator, hazard or consequence profile on EP&R arrangements are identified, considered and changes made, where appropriate. A review of arrangements should be carried out at regular intervals (at least three yearly) and should take into account changes to: - work being carried out on site, - the hazard evaluation or the consequences assessment, - the provision of emergency services, - new (external) knowledge or guidance, or - learning from incidents and tests. Transport plans are reviewed and where necessary revised within a 3 year period.
Outcome 4: Prevention	***All reasonable arrangements to respond to and prevent further development of adverse consequences are in place. The duty holder can:***	
4.1	**SHOW** that fault sequences have been understood and that managements strategies have been put in place to respond to them [REPPIR 10(1) & Schedule 6, Part 1, Para 1(d), COMAH regulations 7 & 11, guidance L111]	The duty holder should be able to show that at least broad strategies exist to manage and mitigate the complete range of accidents and emergencies that can occur, ranging from events that are restricted to one facility, to those that are beyond the basis of the original design.
4.2	**SHOW** how adverse events are monitored and action to mitigate the effects taken. [NISR Regulation 4, FSyP10]	Arrangements/processes should be in place to monitor and consider changes that could cause the accident/emergency situation to deteriorate further, and take action as appropriate. Considerations should also have been given to how further harm to responders will be prevented, and how adverse effects from the response activities themselves will be reduced or prevented, for example in the preparation of specific plans, training and equipment for these eventualities.
Outcome 5: Preparation	***Graded and proportional preparations are in place to respond to any emergency. The duty holder can:***	

5.1	**PROVIDE** suitable and sufficient, diverse and reliable communication channels available to support effective, resilient operation of the emergency arrangements. [REPPIR ACOP paragraph 248 b(ii) and 392, Guidance paragraphs 255, 356, 394 & 690, NISR Regulation 4, FSyP 10]	The duty holder should have considered: - primary & backup communication channels, - diversity of communications channels with consideration to resilience challenges, - availability for use and routine testing, - training of personnel, and - interoperability with other responders. Contingency plans for equipment failure should be available.
5.2	**SHOW** an integrated response to any emergency with all responding groups/agencies (internal & external) [LC11(4), LC 11(5), REPPIR regulations 10(5), 13(1) & Schedule 6, Part 1, Paragraphs 1(f)&(g), CDG 2009, Part 5 Radiological Emergencies, Regulation 24 and requirements set out in Schedule 2, NISR Regulation 4, FSyP 10, COMAH regulations 7 & 11, guidance L111]	Duty holders should be able to show how the on-site plans have been integrated with any relevant off-site plans and arrangements. Transport emergency response arrangements comply with requirements of The Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations [detailed in CDG Sch. 2]. Memoranda of Understanding (MoU) or equivalent written arrangements should be in place with those external organisations that the duty holder depends on for an effective response. External responders should have been appropriately consulted about the plans. [LC11(4), REPPIR regulations 10(5) & 13(1)] Arrangements are in place to provide and support a unified and coordinated command structure. Internal responders are trained and tested alongside external responders to provide an integrated emergency response capability. [REPPIR guidance paragraph 416] Equipment, IT, emergency response capabilities or procedures are where appropriate, interoperable between internal and external responders. Arrangements for the provision of information to external partners under the Joint Agency Modelling (JAM)[9] are in place (for applicable sites). Arrangements for the provision of information to external partners under the Joint Emergency Services Interoperability Programme (JESIP)[10]

[9] Guidance can be found within Resilience Direct > Planning > Working Groups > Nuclear Preparedness > Joint Agency Modelling

[10] JESIP is an interoperability framework sets out a standard approach to multi-agency working, along with training and awareness products for responding agencies to train their staff. www.jesip.org.uk .

5.3	**IDENTIFY** and plan for all likely external dependencies. [LC 11(4), REPPIR regulation 15, NISR Regulation 4, FSyP 10]	Duty holders should be able to identify all those on whom an effective response is dependent. Arrangements should be put in place so that, so far as reasonably practicable, the dependencies do not limit or constrain the Emergency Response. Dependencies can include (but are not limited to): - the emergency services, - transport providers, - neighbouring sites (and emergencies on them), - contractors or tenants (for example, the need to use shared mustering locations or evacuation routes), and/or - suppliers of other services (for example, monitoring resource). Any employers that have a role in the on-site emergency arrangements should be consulted on those arrangements and must put into place any reasonable measures that enable them to carry out their role. Those employers should also participate in demonstrations [LC 11(4), REPPIR ACOP paragraphs 407 & 408]. The impact of beyond design basis events on the provision of internal and external services should have been considered.
5.4	**SHOW** how emergency exposures have been planned for [LC11 in part but covered by REPPIR and for radiation accidents, IRR reg 9.]	Arrangements are in place for emergency exposures: persons are identified, trained and equipment made available, medical surveillance arrangements and emergency dosimetry are in place, and permitted dose levels identified and ONR notified. [REPPIR 18 & 19, Schedule 6 Part 1]. Reference levels are determined for all persons or groups of people involved in the response as well as all persons or groups on-site and that will be affected by the emergency and emergency arrangements reflect these reference levels. [REPPIR 20, Schedule 6 Part 1]
5.5	**SHOW** effective procedures for response organisation handover [LC 11(1), NISR Regulation 4, FSyP10]	Duty holders should have appropriate protocols in place covering whenever a handover of responsibility takes place during an emergency situation, for example for shift changes for all response roles. These should be reviewed and kept up to date as necessary.
5.6	**DEFINE** how unified command and control arrangements are in place to enable an effective integrated response	Command and control structures, and all roles within those structures should be defined. Protocols should be in place and understood by all those involved in the response. There should be unified command and control structures for safety and security emergencies.

	[LC 11 (1), REPPIR Schedule 6, Part 1, Para 1 (b), NISR Regulation 4, FSyP10]	JESIP (Joint Emergency Services Interoperability Principles) should have be adopted for effective working with the emergency services, where this may be required.
5.7	**SHOW** that access control protocols including flexibility [LC11 (4), NISR Regulation 4, SyDPs 10.1]	Arrangements to allow timely access of responders to affected areas should be in place (including understanding by responders of how and where to go), eg security at the gate to allow on site emergency services, use of guides for the emergency service personnel, checks on personnel and their PPE before entering the incident location.
5.8	**SHOW** that information requirements have been identified for each location and role and personnel are able to find/receive/process/use/ transfer in a timely manner [LC11 (1), (4) & (6), NISR Regulation 4, FSyP 10]	The information needed at each location to enable an effective response should have been considered, and the means of providing it put into place. The format of information should be designed to be effective for the user.
5.9	**ESTABLISH AND MAINTAIN** situational awareness of the emergency event(s) [NISR Regulation 4, FSyP 10]	Arrangements by which all involved gain and update situational awareness as appropriate and in a timely manner should be in place. The format of this should be readily accessible and understood.
5.10	**PROVIDE** confidence in the flexibility and adequacy of emergency response through demonstrations across the full range of event scenarios, timing and durations [LC 11(5), REPPIR regulation 12, IRR 13(2), NISR regulation 4, FSyP 10]	A forward programme of tests covering all relevant aspects of the arrangements should be available, although not all aspects need to be demonstrated at every test. A matrix can be useful to help show all aspects are appropriately tested at appropriate intervals. [REPPIR guidance paragraph 400] Test planning should rotate all personnel with EP&R responsibilities appropriately. The test programme should cover all aspects of the emergency arrangements, not just the immediate response phase. Tests should use different scenarios each time (and not repeat similar scenarios with similar consequences) [REPPIR guidance paragraph 405], and should cover extended durations, shift handovers, and out of hours response appropriately.
5.11	**CONFIRM** that drills and test are planned, conducted and evaluated by competent staff [LC 10, LC 12, LC 11 (5), REPPIR 12, IRR 13(2), NISR Regulation 4, SyDP 10.2, COMAH Regulations 12 section 6(b) and 14]	Consideration should be given, but not limited to: - evaluation of whether pre-agreed objectives and success criteria are met, - whether the scenario is sufficiently challenging yet realistic, - participants and umpire/evaluators are pre-briefed appropriately, - players attend test as scheduled, - post test de-briefs include players, umpires, evaluators and managers; and should be managed in way that is ‘blame free’ so that feedback is honest and robust.

Outcome 6: Response	***The response to an unexpected event will be effective. The duty holder can:*** (Note: the abilities in this section may be demonstrated and assessed during tests)	
6.1	**DEMONSTRATE** effective detection of the emergency and initiation of Emergency Response Arrangements. [LC 11(1), REPPIR Schedule 6, Part 1, Para 1) ACOP paragraph 289(b), NISR Regulation 4, FSyP 10]	Duty holders should show that arrangements exist for the timely detection of accident or emergency situations. The duty holder should be able to put the emergency arrangements into effect without delay, responding flexibly and dynamically to any emergency (including emerging issues).
6.2	**SHOW** timely assessment of the nature of the situation and **INITIATION** of a suitable and appropriate response	The response will be determined by the nature of the event and will be very different depending on whether the event is considered to be the result of a security or safety initiator. The suitable response may be to muster, shelter, evacuation or lockdown and the competence of those in command and control roles is crucial to the determination of what the most appropriate course of action is. Any protective actions should be appropriate to the specific situation. The decision as to whether to call an on-site and/or off-site incident should be made within 15 minutes of symptoms being detected and assessed [REPPIR guidance, para 491]. Beyond design /catastrophic events are identified early in the response to ensure safety of the public SFAIRP.
6.3	**DEMONSTRATE** effective on and off-site notification, integration and coordination of response with all internal and external responding agencies/ organisations [LC7 & LC11 (1), REPPIR regulations 13(1), 13(2) and Schedule 6 Part 1, Para 1(a), (b), (c), (f) and (g) & associated ACOP & guidance, NISR Regulation 4, FSyP 10]	Duty holders should demonstrate timely declaration and notification of an emergency using pre-agreed mechanisms and types of information. [REPPIR ACOP paragraph 433 & guidance paragraph 738]. The operator should aim for initial notification to take place within 15 minutes of the declaration of the radiation emergency but in any case as soon as possible. [REPPIR guidance paragraph 738].

6.4	**DELIVER** relevant and timely information/ instruction to those affected by/ responding to any emergency. [LC 7, LC 11(4), REPPIR Schedule 6 Part 1, Para 1(f), IRR 13, NISR Regulation 4, FSyP 10]	Duty holders should be able to demonstrate effective and timely communication with all stakeholders on and off-site. Pre-agreed communications protocols should be followed, and effective and regular briefings/ situation reports should be produced and provided to all organisations involved in the response following JESIP principles [REPPIR guidance paragraph 437]. All public/media communications messaging should be consistent with that from off-site responding organisations. If appropriate to the site and event, Joint Agency Modelling (JAM) information is provided according to JAM guidance[11] and within 2 to 4 hours of declaring an off-site nuclear emergency.
6.5	**ACCOUNT** for the whereabouts of all people on site who are affected by the emergency within an appropriate time. [LC11 (1)]	Duty Holders must be able to show, SFAIRP, that no-one has been or can be adversely affected by the incident or the response to it without the knowledge of response personnel. [Note: This is not necessarily limited to those in the immediate environs of any accident or emergency. It also includes those on the site who may be based elsewhere but could be in the area and those who may be affected by the consequences (such as a need to evacuate or shelter)]. This is for a range of reasons including, in particular, the need to positively confirm to emergency services that no-one is injured and needs rescue. The information will also be needed should, for example, the emergency services need to undertake a controlled explosion of a suspected IED or take other action to control the emergency.] Inspectors must agree what is an appropriate time to account for all affected personnel taking into account the nature of the site and facilities. An appropriate time will not normally be longer than 60 - 90 minutes. [Note: mustering is not always the most appropriate method of accounting for personnel, if, for example immediate sheltering or lockdown is required if the routes to muster points are not safe.]
6.6	**DEMONSTRATE** rescue/assistance of casualties and other emergency actions within high dose rate /hazardous areas. [LC 11 (6), REPPIR regulations 18(1) & 19, IRR 13, NISR Regulation 4, FSyP 10]	Rescue teams are briefed to understand their role, the nature/location of hazards and are appropriately equipped (PPE, dosimetry, monitoring, search and rescue equipment etc.) and can demonstrate timely recovery of casualties. This may require disapplication of dose limits . Those permitted to receive emergency exposures should have been pre-designated as ‘emergency workers’ and have had the correct training and been provided with, and trained to use any necessary PPE or equipment.

[11] Guidance can be found within Resilience Direct > Planning > Working Groups > Nuclear Preparedness > Joint Agency Modelling

6.7	**DEMONSTRATE** an understanding of the need to preserve evidence and take actions accordingly. [LC11 (1), NISR Regulation 4, SyDP 10.1]	All responders should have an appropriate awareness of the need to preserve evidence SFAIRP and there should be consideration of how this will be done. In particular to a security event, this should include, where necessary, crime scene management to be put in place as part of consequence management procedures.
6.8	**DEMONSTRATE** effective management and control of the emergency in environments hostile to personnel and equipment. [LC 11(5), NISR Regulation 4, FSyP 10]	All those involved in the emergency should be aware of the extra hazards and risk introduced by the emergency situation and act accordingly. Those in command and control positions should actively consider the extra hazards and risk during their consideration and direction of response actions.
6.9	**DEMONSTRATE** co-ordination, availability and deployment of suitable and sufficient resources. [LC 11(5), REPPIR 10, NISR Regulation 4, FSyP 10]	Adequate resources including people, facilities and equipment should be co-ordinated effectively during the emergency phase to enable the response.
6.10	**DEMONSTRATE** a well-managed transition to recovery. [LC11 (5), REPPIR Schedule 6, Part 1, Para 1(n), guidance paragraphs 748 to 751, NISR Regulation 4, SyDP 10]	Declaration of the termination of the emergency phase should take place under pre-defined circumstances, for example, when the incident is under control and the release has been terminated and characterised. Declaration that an emergency phase is over should not, for example, be as a result of undue commercial pressure. The considerations for the recovery phase should be carried out in tandem with the response phase noting that decision made in the response phase may impact the ability to deliver recovery successfully. There should be a communication to all relevant parties of the transition to recovery. Staff should understand what is required in terms of handover information and who is involved. There should be sufficient and timely communication with the off-site response to ensure alignment with the phases of the response.
6.11	**CONDUCT** effective and critical internal assessment of the emergency demonstration. [LC 11(1) and LC11 (5), REPPIR 12(8) and ACOP paragraph 419, IRR 13(2), NISR Regulation 4, FSyP 10]	Test reports are prepared within 3 months and sent to ONR and local authority (within 3 months + 28 days) and consider the feedback received during the debriefs (see 5.11). An action plan is produced and actively managed to implement the findings of the test. Duty holders should show that they have identified and fully understand the root causes of any areas for improvement identified as a result of demonstrating their response to accidents and emergencies.

Outcome 7: Recovery	***Arrangements are in place to manage and minimise the on-site longer term effects of any unexpected event. The duty holder can:***	
7.1	**SHOW** that arrangements are in place to manage a return to normality and minimise the long term effects of any unexpected event [LC 11(1)]	Arrangements are in place to deploy personnel and equipment, and the process for authorising activities. Strategies are in place for: - external support (e.g. from contractors) to carry out monitoring, remediation and other activities, - safe handling, storage, transport and disposal of radioactive waste, - on-going medical supervision and support (both physical and psychological), and - justification /implications for continued operations whilst remediation activity is carried out. Recovery plans are informed by hazard evaluations and consequence assessments, are scaleable and adaptable to take account of the full range of consequences. There is consideration of Safe Systems of Work.
7.2	**SUMMARISE** the process to develop standards for the on-site clean-up operation	The duty holder should have considered to what extent clean-up is required on the site (for example, to understand potential volumes and types of waste and the tolerable level of residual contamination).
7.3	**PROVIDE** advice on the safe transport to disposal or storage of radioactive wastes at its sites	Should cover co-ordination of both on-and off-site aspects.
7.4	**PROVIDE** evidence that recovery from significant plant failures (non-emergency) have been effective	Where it exists, the duty holder should be able to show that recovery from previous events has been effective.
7.5	**DESCRIBE** the arrangements for the transition from response to recovery. [REPPIR guidance paragraphs 749 and 750]	Arrangements should specify: - the criteria that should have been met to transition to the recovery phase, - the information needed to assist the transition, and - the identification of who will receive this information. Arrangements should consider how the on-site transition aligns with off-site transition to recovery.

		Resources [e.g. specialists, administration, long term location] to support the transition of the on-site response organisation set up in the early phases of the event to a recovery organisation should be identified.
7.6	**IDENTIFY AND DEMONSTRATE** a recovery organisation that is scalable to the size of the event. [LC 11(5)]	Arrangements for the recovery organisation should be scaleable and able to support a return to pre-event operational conditions, maintain a safe shutdown state with new site operational controls; manage the termination of the operation of site and provide a permanent containment of hazardous materials.
7.7	**SHOW** all aspects of Site Security will be considered (physical, passive) in post emergency planning [NISR Regulation 4 & 16]	Access arrangements should meet security requirements to protect nuclear and other radioactive material.
7.8	**SHOW** understanding of scene of crime management, investigations & inquires [LC 11(1), NISR Regulation 4, FSyP 10]	Delivery of crime scene management as part of the consequence management phase response to a malicious event.
7.10	**SHOW** that a process is in place to consider post emergency scenarios]	This should be initiated at the earliest possible opportunity to support consideration of (but is separate to) the emergency response. Both site and 'business' end point realistic scenarios should be considered (i.e. both the physical buildings and assets as well as monetary and related aspects). Financial provisions and company business objectives support recovery.
7.11	**SHOW** that arrangements exist for the provision of information to stakeholders [REPPIR Schedule 6, Part 1, Para 1(f)]	For an off-site incident, the operator should have arrangements in place to promptly provide detailed information to the off-site Strategic Coordinating Group, regarding the termination of the emergency phase and the site conditions which prompted the transition to the recovery phase. Information for the media/public should be provided at regular intervals and messages co-ordinated with all responding organisations.
7.12	**CONFIRM** the recovery plan is tested on a regular basis	Recovery plans are tested at intervals agreed between ONR and the operator.

ANNEX 2: EVALUATION OF EMERGENCY TESTS

A2.1 Why evaluate a demonstration test?

A2.1.1 A test of an operator's emergency plan provides a 'snapshot' of the ability of the licensee to implement its emergency arrangements at any one point in time. The test deals with a single scenario, possibly in only one of several facilities, on one particular day. It is important for the inspector to form a view in the context of continued readiness and the ability of the licensee to respond to a real event at any time. Performance at the test is dependent on one (of usually several) emergency response team(s) that a licensee has on its site. An intense training period prior to a test is therefore not the preferred approach, the test should demonstrate a licensee's ability to put its emergency response arrangements into effect at any time.

A2.1.2 Site inspectors should, as a matter of routine, keep a watching brief on the licensee's annual emergency preparedness training programme. This will generate a programme of internal exercises/ rehearsals/ demonstrations that the licensee undertakes in order to assess its own competence and capability. Site inspectors should bear in mind the complete programme of activity in evaluating the test as this will set the context for the test.

A2.2 Who should form the ONR inspection team?

A2.2.1 Evaluation of the test of the on-site emergency arrangements is normally undertaken by a team of ONR inspectors with complimentary expertise, experience and knowledge. The team may include inspectors with: expertise in radiation protection, experience in the inspection of similar facilities, knowledge of relevant safety cases and the actions that licensees should take to intervene in emerging events, including inspectors who are experienced in the assessment of tests performance at other licenced sites. The size of the inspection team should be proportionate to the priority attached to the intervention within ONR's overall intervention programme and to allow key aspects of the response to be observed simultaneously.

A2.2.2 Members of the ONR inspection team should be suitably qualified and experienced. Team members should usually have completed the Crisis Management (N2) and ONR Emergency Evaluation (N3) training courses.

A2.3 What should I consider before agreeing the scenario?

A2.3.1 The test scenario should be agreed between ONR and the licensee well in advance of the test. In agreeing the scenario, the inspector should consider: scenarios used in previous tests, areas for improvement that were identified in previous tests, any recent changes to the plant, personnel or operations that might benefit from being tested.

A2.3.2 Technical scenarios should challenge the demonstration team and therefore should be initiated by lower probability, higher hazard fault sequences that could occur on site. The scenario should normally be unexpected and require the demonstration team to think and assess circumstances and events rather than run through a routine set of actions.

A2.3.3 Over time, all aspects of emergency response need to be demonstrated satisfactorily and so, licensee's arrangements should include a means of tracking the technical aspects demonstrated in each test. The licensee test schedule should ensure that a range of scenarios are tested over time.

A2.3.4 The key requirement is that the scenario should ensure that sufficient elements of the emergency response plan are tested together, so that the ability to demonstrate integrated control and management of multiple, multi-element tasks is tested.

A2.3.5 The scenario should be rooted in the current safety case for the site/ facility and should involve an element of loss of radiological control or nuclear safety. Some of the consequences should require casualty recovery and contamination and radiation dose control appropriate to the site in question. Levels of radiation and contamination should be such that active control is necessary in order to effectively manage radiation safety and should be backed up by sufficient operational information on where, when and to what degree they arise.

A2.3.6 In the event that there is a coincidental level 1 (on-site) and level 2 or 3 (off-site) test, it may be beneficial to have an on-site incident that is coupled to a wider off-site release that will sufficiently test the off-site response capability.

A2.3.7 When off-site emergency services are involved, the scenario should provide a sufficient challenge (e.g. casualties for recovery/ a large fire in a controlled area/ an on-site road traffic accident [with trapped personnel] in the plume, contaminated casualties to be taken to hospital, etc.) for these services so that they have meaningful work to do during a test. This outcome requires co-operation during the planning stages between licensees and the emergency services.

A2.3.8 It will add to the realism if simulated repairs can actually be carried out by the damage repair team (DRT). Likewise, the use of actors to simulate casualties adds an element of realism. Note that casualties should have 'real' names, not something that is obviously made up (e.g. Andrew N. Other) and the same names should not be used year after year.

A2.3.9 The scenario should allow the response to be completed in about 3 hours with the licensee making provision for domestic arrangements as appropriate. There should be a clear expected decision sequence which can be used to judge a licensee's decisions and their timeliness.

A2.3.11 The ONR inspection team should usually be made aware of the test scenario at least four weeks in advance of the test so that it may be studied and there is sufficient time for any questions the inspection team may have to be answered by the licensee. However, if the site inspector is to play their expected role in the test, another inspector (perhaps from a twin site) should agree the scenario with the licensee.

A2.3.12 It is good practice to define the test objectives and then agree the scenario. Inspectors may wish to use the bullet point headings from the annex 3 aide-mémoire to agree detailed assessment criteria.

A2.4 How should the Inspection Team prepare for the test?

A2.4.1 Before going to site, the inspection team should be familiar with the scenario. They should know what is expected to happen, when it is expected to happen, who the casualties will be and where they will be, who is expected to take which decisions, and what the licensee success criteria are. Quite often it is only possible to hear one side of communications such as during phone calls and so it is necessary to deduce what is happening from the actions that result from the call. In such circumstances, prior knowledge of scenario detail helps inspectors make the right judgements about a licensee's performance.

A2.4.2 Before any test, it is usual to have a pre-meeting on-site to: handle the admin for the day; clarify any last minute issues; sort out access to active areas; distribute identifying tabards, and to identify escorts to inspectors who are unfamiliar with the site, etc. This meeting is a good opportunity for any remaining issues regarding the test scenario to be raised by inspection team members and to confirm that all inspectors have the necessary local training and pass access to secure areas in advance of the exercise. As part of maintaining personal safety, the ONR team may also be shown the areas that will be involved in the test so that the inspection team

can familiarise themselves with the layout of the facilities (noting that there is a risk of alerting site staff as to which areas will be involved in the test). Local on/off-site access arrangements will also be required if inspectors are to assess the operator's off-site response (e.g. radiation monitoring teams) during the test.

A2.4.3 Inspectors within the inspection team should know before they go to site what parts of the test they are expected to cover including if this involves entry to radiation controlled areas so that appropriate risk assessments can be put in place (if appropriate).

A2.4.4 At the pre-meeting, inspectors should establish if, when, and where they are required to muster, and pick up an observer tabard. If the inspector is unfamiliar with the site and the licensee offers an escort it is recommended that the offer be accepted. These individuals look after the details of routine protection, getting inspectors around the site and into areas that they want to visit, etc. Escorts are usually familiar with site emergency procedures and so enable inspectors to check whether what is being observed is a valid part of the site's arrangements or a 'construct' of the particular test.

A2.5 Observing a Test – on the day

A2.5.1 All inspectors evaluating the test should keep a timed log of the key events and decisions at their location(s). It is usually best to note the time that the site alarm sounds at the start of the test and time everything relative to this. Putting individual information together enables an overall record of what the various licensee teams knew (when), what decisions they took (when), what they did (when) and what information they exchanged (when).

A2.5.2 If inspectors identify play that might significantly challenge the progress of the test, intervention should be through the umpires/ exercise controllers via the ONR team leader. Inspectors should only intervene directly if they see something that is unsafe and therefore in need of immediate intervention by them. In general, non-urgent issues identified on site are usually fed back to the site inspector to carry forward into future intervention work.

A2.6 Operator Umpires

A2.6.1 Umpires should wear tabards that identify them clearly. They should be competent to provide the information they have to transfer so that they can improvise realistically if questions are raised that the scenario has not considered in detail.

A.2.6.2 Umpires should not normally volunteer information e.g. radiation/ contamination readings unless asked for them. NB licensee measurement instruments should be switched on when asking the umpire for radiation/ contamination readings.

A2.6.3 Umpires can point out things that would be obvious in real life but which might not be so in the simulation conditions of a test, for example, seeing a large pool of water, the sound of escaping gas/ high pressure steam, the sound and sight of a large fire, or audible loud noises, etc.

A2.6.4 Umpires should only intervene to maintain safety of the participants. Ideally umpires should not coach, comment on, or prompt teams undertaking test tasks unless this is required to maintain the scenario. The intervention should be noted and reviewed in the debrief as necessary.

A2.7 Safety

A2.7.1 On the familiarisation visit to the site before the test, inspectors should look at what is proposed for the test and ensure that nothing is introduced that could undermine usual site safety practice.

A2.7.2 Safety should always supersede any form of exercise play. Tests should be stopped if unsafe acts happen (or are about to happen) or if a real incident/ injury occurs. The participant's brief should describe the protocol by which it can be made clear when a real event has occurred.

A2.7.3 Inspectors should be able to identify signs of fatigue and heat exhaustion within teams deployed by a licensee during a test; they should continually review the performance of team members so that those affected can be identified and removed from the test before a safety incident occurs.

A2.8 Test Termination

A2.8.1 Tests should normally be run until the licensee's test objectives (usually stated in the scenario) have been met, and the ONR team is satisfied they have seen enough. Tests should normally be allowed to run until the release has been terminated and Damage Repair Teams (DRTs) have demonstrated their capability and completed any exit/decontamination procedures.

A2.8.2 If a test has gone awry, e.g. the casualties have not been rescued after several hours, the test should be terminated after a given period of time. Bearing in mind the fatigue load on those taking part (and the fact that if a real event occurs as the exercise is finishing and they will have to respond), 4 hours is about the maximum that they should be asked to perform their roles.

A2.8.3 The ONR team should agree beforehand who will agree with the licensee that the exercise is considered finished; this is usually the ONR Team Leader. If a consensus is required, inspectors who are deployed around the site should pick up an ECC phone number and phone the ECC observer to give their view on whether the exercise should finish. Alternatively, the exercise control team will have radios that can be borrowed to make such notification.

A2.9 Making the Judgement

A2.9.1 When observing test play it should be borne in mind that at the end of the test, inspectors will be asked to provide their judgement on the standard of those sections that have been observed. Comparison of the detailed assessment criteria with what was actually done should, in part, inform the judgment on the success of the demonstration. The focus should take into consideration the level of challenge posed by the test and the opportunities for learning and improvement. The 'hot' debrief held immediately after a test is a good opportunity to form an overall opinion of how a test went and an opportunity for all involved to discuss what was observed and also, most importantly, when the different centres became aware of various issues.

A2.9.2 Event time-line comparison with that of other inspectors is a good way of deriving a picture of what actually happened overall. Once this picture is clear, inspectors need to make their individual judgements on what they have seen so that an overall team judgment of the whole test can be made. The consensus view within the inspection team is best made by asking each member to rank the licensee's performance on a scale from 1 to 10 with 1 to 4 indicating a degree of unacceptability and 6 to 10 indicating an increasing degree of acceptability.

A2.9.3 To make such a judgement it is necessary to allow for the unreality of the scenario and the level of role-playing that is necessary to get any scenario to work. A licensee team may have to be told things like the temperature is increasing, or that they can see a fire or flood when in reality their senses would not tell them that. It should be remembered that the key consideration is whether an inspector thinks that the licensee's team would cope in a real emergency.

A2.9.4 Once an overall team view is established it is then usual to generate a list of good observations and areas for improvement. As with all identified shortfalls in compliance performance, inspectors should be able to explain to the licensee what good performance, on matters where it has fallen short of what is required, looks like, and evidence to support any criticism.

A2.9.5 Following the ONR hot debrief, a joint ONR/ licensee meeting takes place and other participating stakeholder organisations also attend. The debrief follows a structured protocol with a single spokesperson delivering the feedback. The licensee first reports back from its own hot debrief. This is usually followed by the internal regulator, which provides an opportunity to understand the internal regulator's ability to judge the adequacy of exercises. Lastly, the ONR's feedback is provided, including the team's judgement on the adequacy of the demonstration. The internal regulators may also provide an independent debrief.

A2.9.6 Most licensees are self-critical. They will also have a more complete picture of what occurred since they know what they were thinking (and why) at particular times and will have established this during their own team debrief and so, it is no disgrace in the joint debrief if, when having listened to the licensee's explanation of a problem which the ONR inspection team identified, any particular criticism is withdrawn. This approach engenders objectivity and trust amongst all involved and greatly improves regulatory outcome.

A2.9.7 When making a judgement on a licensee's overall performance, *how* outcomes during a test were achieved are as important as *what* has been achieved. However, if a good overall performance has been achieved by methods which do not correspond to the generality of good performance, for example, by means of a very personal and effective command and control style, this should not be a reason for ONR to require an aspect of a test to be re-demonstrated for it is the ability to cope, (safely in a well-controlled managed way), that in reality matters and not the method by which individuals choose to cope.

A2.10 Adverse Judgements

A2.10.1 In making the judgement on specific tests the key question is whether the regulatory team considers that the licensee team would cope with a real emergency. The result of the test will be either a satisfactory demonstration of the arrangements or that a further test is required. If the demonstration is unsatisfactory, a decision is required on whether the extent of shortfall necessitates a partial or a full repeat test (after the problems have been addressed by the licensee).

A2.10.2 This decision should be based on the performance as demonstrated on the day. For example, if the problem is assessed as being associated with general communication on site, improved communication is only likely to be demonstrated by running all the on-site facilities again in another test of the full suite of emergency arrangements. On the other hand, if the problem is communication between the off-site survey vehicles and the site, then this could be demonstrated by a repeat of just that part of the test.

A2.10.3 If a repeat is judged necessary, the question of continued operation of the site arises while the shortfalls are addressed. The decision will be dependent on the number and significance of the shortfalls on the day, and a judgement on whether they represent fundamental weaknesses in the licensee's arrangements, or are associated with the licensee's team getting it wrong on the day. This judgement will draw on the work that the site inspector has undertaken as part of their routine inspection of emergency arrangements and their implementation on the site prior to the test in question.

A2.10.4 It should be borne in mind that if the licensee does not provide a satisfactory demonstration of the arrangements this does not usually require a site or facility to be shut down (or be brought to a safe state) while the emergency response capability is improved.

ANNEX 3: OVERVIEW OF EMERGENCY TEST ARRANGEMENTS

A3.1 Command Structure and Control Centres

The following section describes the typical command structure and control centre arrangements. The exact arrangements including the names and locations of the various centres may vary between licensees.

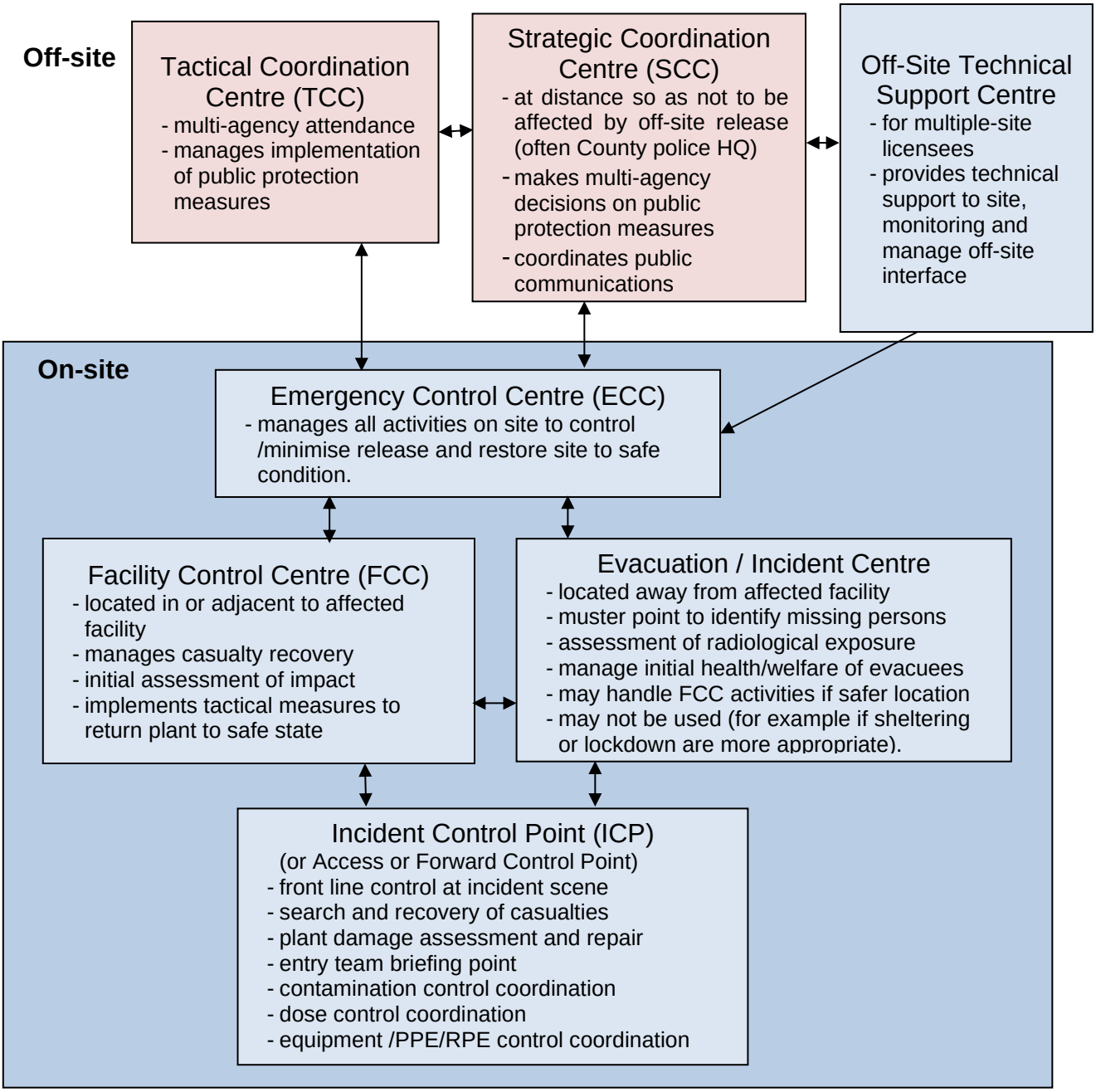

Figure 1: Typical arrangement for control centres and command structure. Blue boxes are licensee operated locations, red boxes are off-site multi-agency centres.

A3.2 Emergency Control Centre

Attributes	Indicators
Command, Control and Communication	• There should be clear direction (both short and long term) with a strategy for managing the incident. • All involved understand the command and control structure and team roles are defined. • The ECC deals with all strategic issues; tactical issues may be delegated elsewhere. • For reactor sites, the ECC has routine communications with the FCC, ICP, the on-site and off-site survey vehicles, the SCC, and the off-site technical support centre. (Arrangements may differ for non-reactor sites). • Requests for resources/ information/ technical questions beyond the capability of those on-site should be passed to the licensee senior management (technical centre where available) through the ECC. • The ECC Controller is kept informed of emergency services resource position and factors it into his/ her forward thinking. • Strategic focus points (and even copies of status boards) should be shared with the FCC & ICP and tactical focus points/ status boards should be received in return. • There is a calm operating environment.
Leadership	• The controller determines the response strategy as soon as reasonably practicable (people, plant, environment, security) and it is updated as necessary. • The controller considers the most likely and worst case outcomes, thinking ahead and basing actions on most likely outcome but putting resources in place for the worst case. • The controller briefs the team regularly, summarising the position and priorities for the next phase. Everything should stop for the 90 secs (or so) that the briefing should take. • Decision making is clear, timely, and based on best information. Decisions and associated actions are clearly communicated. • The controller makes use of their team for problem solving and to find optimum solutions. • The Controller monitors progress of the strategy for handling the incident and monitors the completion of actions placed both within the ECC and other control centres, intervening when necessary.
Public and personnel protection	• An incident (off-site or on-site) is declared quickly, notifications are carried out without delay and coordination centres are set up as soon as reasonably practicable.* • A summary of what is known about the incident and off-site protective action advice is provided to the police (quickly and initially) and then the SCC and is updated regularly.* • The site is closed down (entry /egress controlled).* • Control centre locations and muster points are confirmed as tenable or alternatives identified (this must consider the worst case incident with respect to radiation dose, air quality *etc*).* • Staff are informed of what protective actions to take as soon as practicable; non-essential staff are moved out of danger. • Decisions are based on individual dose commitment and are informed.*

	* These actions may be performed in the early stages at the FCC before the ECC is running.
Muster co-ordination	• Muster point locations are identified considering plume direction. (Mustering should not be automatic, timely evacuation for some non-essential staff may be more appropriate) • Mustering is carried out quickly and effectively. • Casualties and missing persons who might be in the area of the hazard are identified within an hour from incident declaration. • Individuals required to support emergency response are not delayed due to mustering.
Situational Awareness / information management	• Information is shared immediately, usually through the use of boards which are continually updated. • Events recorded should be timed so that it is possible to follow the incident from the board information alone. • A separate board should track actions, their owners and initiation and completion times. • A record should be kept of the boards as the event progresses (before they are overwritten) to assist with any later inquiry. • Records should be kept of key communications to and from the SCC/ECC/ICP to allow for later analysis. • Key decisions (for example about public/personnel protection measures, and reasons for those decisions, should be logged.
Emergency Services Liaison	• Representatives from fire service/ ambulance/ police who attend the ECC are provided with routine briefs on the current position, likely hazards and safe routes for what they are being asked to do, etc. • Emergency services should input information that comes directly to them through their radio links with their teams and the off-site centre. • The emergency services activity and resource availability should be clear and updated as necessary.

A3.3 Facility Control Centre (FCC) [Some sites might expect some or all of the following to be carried out at the ECC].

Attributes	Indicators
Strategic/ tactical thinking and problem solving	• In the early stages (until the ECC is operational for reactor sites) determines strategy and key priorities. • Once the ECC has taken over (for reactor sites), determines and implements the tactical arrangements for incident assessment, casualty recovery, incident control and termination. • Where there is a handover to another facility such as the ECC, this is communicated across the site. • Generates and evaluates the practical aspects of repair proposals.
Declaration and initial advice	• Collates and evaluates available information, e.g. plant status/ symptoms, CCTV, maintenance jobs, fence post monitors etc. • Assesses the severity, both realistic and possible worst cases, and potential for an off-site release based on best available information, without delay. • Declares emergency [and category i.e. on or off-site] **without delay** not waiting for further information, according to site's emergency arrangements.

	• Initiates off-site notification e.g. automated notification of police /general public (as specified in arrangements). • If appropriate to the site and event, Joint Agency Modelling (JAM) information is provided according to JAM guidance[12] and within 2 to 4 hours of declaring an off-site nuclear emergency [this may be done alternatively by the site team attending the SCC]. • Gives command to sound site alarms/ communicate instructions to site, e.g. tannoy announcements [what is thought to have happened, affected area, required actions (e.g. muster/evacuate, close doors and windows/ ventilation systems, take KIO_3 tablets, etc.)] and safe routes to reach mustering stations. • Mobilises response teams and other control centres.
Public/ Personnel Protection	• Oversees closure of site controlling access and egress (according to site's arrangements). • Reconciles roll calls and identify missing personnel in time to allow search and rescue teams to retrieve injured parties within the first hour (from declaration). • Establishes and communicates safe routes for essential personnel movement (staff and emergency services). • Regularly informs staff across site (or potentially sub-set for very large sites) of situation and actions required, e.g. tannoy announcements, remind to keep doors and windows shut, ventilation systems turned off, etc. • Confirms that control centre locations and muster points are tenable (safe with respect to radiation dose, air quality etc.) or alternatives identified.
Plant Control	• Evaluates incident/ prognosis based on realistic/ worst case assumptions. • Determines steps to alleviate incident impact/ terminate incident e.g. for a gas reactor blowing down through an iodine bed to reduce the pressure as quickly as possible and thus limit the release. • Identifies short and long term stable end point position. • Implement or consider need for implementing arrangements to deal with beyond design basis events, e.g. situation based emergency response guidelines (SBERGs) on reactor sites. • Manual operation of plant could be required – the relevant instructions/ operator familiarity should be apparent. • Seek to secure the plant in a safe, stable state. This can be an intermediate state e.g. making use of the Xe peak in reactors or provision of containment in process plants, but a longer term plan of action should be evident that ensures that the plant enters a permanent safe state.
Interfaces/ communications	• The point of handover to the ECC (if this is part of the site's arrangements) should be clearly defined and communicated. • Brief the ECC Controller before they take over on the incident with all available information actions taken. • Communications with front line teams is considered e.g. damage repair team

[12] Joint Agency Modelling guidance can be found within Resilience Direct > Planning > Working Groups > Nuclear Preparedness > Joint Agency Modelling

	• Brief the ICP on the event diagnosis and objectives of the initial entry team(s). • Regularly exchange status and focus point information with the FCC, ICP and the ECC to ensure alignment with the strategy set by the ECC.

A3.4 Evacuation Centre / Muster Point (may not be used if sheltering or lock down required)

Attributes	Indicators
Management	• Managed using Command and Control principles • Co-ordinated central system identifying those to be accounted for • On-going, effective communication of information to all present
Roll Call	• Seriously injured personnel are identified and recovered as soon as reasonably practicable, usually within 60 to 90 minutes (may be longer for very large sites). • Any system (paper or electronic) is acceptable if it can deliver in the timescale • Seriously injured casualties only accounted for when they receive medical treatment • Individuals are released as required to support the emergency response

Activities	• Venue large enough to handle numbers
	• Audible tannoy
	• Automatic protective actions are implemented immediately:
	  ○ KIO_3 simulated realistically and water available
	  ○ Doors/ windows shut; ventilation off unless air appropriately filtered.
	• Contamination control is in place including monitoring, decontamination facilities /segregation for contaminated individuals.
	• Doses assessed (eg using EPDs)
	• There is routine monitoring/ air sampling for contamination

Criticality	• Immediate dose assessment and checks in place for symptoms of high radiation doses. • Those suspected of having a high dose should be sent for urgent medical care.

A3.5 Incident Control Point (also termed Access or Forward Control Point)

Attributes	Indicators
Management	• Managed using Command and Control principles
Tactical thinking	• Focused on incident assessment, casualty recovery, incident mitigation and response & termination. • Continual assessment: what has to be done, in what order, how, resources/ equipment/ material and risks • Contamination control implementation

	• Changes of direction based on what has been achieved, what needs to be achieved, and what can be achieved • Tenability of the location is monitored initially and periodically to check it is safe.
Team Control	• Clear objectives set for re-entry and all teams deployed • Series/ parallel working as situation allows • Coordination/ co-operation with emergency services • Plans/ objectives changed/ updated as teams gather information/ achieve objectives
Emergency services liaison/ co-operation/ coordination	• Information is shared frequently • Agreed command structure in ICP and for individual teams • Effective use of specialist skilled resources
Information Handling	• Single radio contact point in quiet area • Effective and continuous flow of information from deployed/ debriefing teams to boards and controller • Use of all information sources, e.g. fixed cameras, installed monitoring equipment, etc. • Interaction with other centres, e.g. sharing of focus points/ action outcomes • Records kept of all key decisions, findings, actions etc.

A3.6 Emergency Services Liaison (see also Emergency Services liaison actions within the ECC (A3.2)

Attributes	Indicators
Reception	• The emergency services are met by a member of the licensee's staff whose specific role is facilitating their entry to site. Similarly, they should be escorted to the required places on site by a designated liaison. • Emergency vehicles are routed to a holding area to ensure the gate remains clear; this may be in an intermediate position (out of the plume) or close to the ICP. Congestion should be avoided inside and outside the gate. • The senior team leader is routed to the FCC or ECC (depending how quickly they arrive) for briefing; the operating leaders will go with their teams to the holding area and then the ICP.
Safe Routes	• Emergency Services should not be allowed to enter site until they have a safe route outside of the plume to their on-site destinations (holding area/FCC/ECC/ICP). • If the emergency services are unfamiliar with the site (NB some teams may contain site staff as retained firemen) vehicles and team leaders should be escorted by site staff to ensure they follow the route provided/arrive at the correct location.
PPE	• Emergency services team members are usually issued with: dosemeter, KIO_3 tablets (operating reactor sites), and (for the Fire Brigade at least) Electronic Personal Dosemeters (EPDs) to be used during entries.

Communications	• Operability should be considered between site and emergency services communication equipment to allow all responders to communicate with one another. Back up methods of communication should also be identified.

A3.7 Teams (Entry, Repair, Rescue etc).

Attributes	Indicators
Composition	• Initial team should include: facility personnel familiar with the layout /hazards, health physicist with radiation/ contamination/ gas monitoring equipment and first aider(s) for casualty handling (minimum of three). • Initial teams' site personnel switching to mixed/ emergency services when position on access and egress known. • Once conditions have stabilised and are known, teams can be led by experienced facility personnel or well briefed fire personnel. However, if there is a fire to be fought, some Fire Brigades will not accept the inclusion of facility personnel (but can accept site fire team members). • Staff should be trained and competent (e.g. in first aid, in use of stretchers etc.) and given consent to being part of the teams.
Task	• Tasks thought through to minimise team dose, • Complex tasks rehearsed before entry, • Equipment (communication, radiation monitoring, cameras, repair tools) tested before entry to check they work and can be used in PPE. • Once over the barrier initial entry teams should be led by the health physicist who is using the radiation and contamination instrumentation and (for reactors) hot gas checking instrumentation. They should move forward cautiously checking before they go round blind corners or enter corridors/ closed areas to establish what the hazard is before committing to go in. [During a test team members should show respect to hazards, e.g. not walking into hot gas clouds, very high radiation areas, contamination areas, etc. – information should be requested from umpires and not just fed to the team. They may be told they can hear escaping gas/ steam, or feel increasing heat, see a large fire, have just heard a loud noise, have seen an extensive pool of water, etc., because these cannot always be simulated in a realistic way]. • Team members should check each other for symptoms of heat exhaustion, remaining BA bottle pressure, protective clothing still in position, etc. • Later entries where safe routes/ areas have been established should recognise that the situation can have changed - requiring care at all times. Once the safe area limits are reached e.g. a new area is to be searched, the same level of caution and checking is required as was required during the initial team entry. • If the team is required to split up (e.g. to handle multiple casualties) the team members should always be in pairs so that they can check each other.

Briefing (before entry)	• Briefing to include:
	  ○ The purpose of entry (and how they will know when they have completed their tasks),
	  ○ known and potential hazards,
	  ○ safe routes/ fall back areas,
	  ○ communications: frequency and information required,
	  ○ dose constraints (rate and accumulated)
	  ○ expected actions if casualties encountered/ team has problems/ unexpected conditions encountered.
	• For search and rescue they will also need to know:
	  ○ which areas have already been searched,
	  ○ how many are still missing,
	  ○ what they had gone in to do,
	  ○ most recent known location,
	  ○ what to do if multiple casualties are encountered,
	  ○ positions of stretchers, and any other relevant information.
	• For Damage Repair Teams (DRTs) information required includes:
	  ○ routes in and out,
	  ○ known conditions in the area they have to work in,
	  ○ time in repair area (if working in a high radiation environment),
	  ○ dose control limitations (which could vary for each team member).

Communication	• Communication to teams should be handled by a single individual preferably in a quiet area. Key information being fed back should be fed into the rest of the ICP team via the boards. • If the teams hit any radio dead spot(s) this should be noted and fed back at the debrief. • Any difficulties with using radios in BA gear should be addressed, e.g. using throat mikes.
Personal Protective Equipment (PPE)/ Respiratory Protective Equipment (RPE)/ Dosimetry	• PPE and RPE is suitable for knowledge of hazard. If level of release/contamination unknown, expect use of impervious suit with gloves/ boots/ suit hoods taped, and breathing apparatus. • Electronic Personal Dosemeters (EPDs) carried with rate and accumulated dose. • EPDs set for both dose rate and accumulated dose alarms. • Before entry team members should check each other's PPE e.g. hoods attached properly over BA face masks, etc. and that they have adequate air pressure in the bottles.
Breathing Apparatus Control	• A log should be kept up to date that records who is in the controlled area, times of entry and exit, and breathing apparatus tag/tallies (air supply). • The controller should know who is in/ out at all times. • In general, all team members wearing BA should be under one BA control system. However, sometimes Fire Brigades (FB) insist on using their own system and two boards are run in parallel. • Before entry the dressing of TMs should be checked, usually by other TMs. BA set pressures should also be checked to establish bottles are full.
Back up Rescue Team	• Should be available for instant deployment, e.g. fully dressed wearing their BA sets (except for the face masks and hoods). • Requires briefing, equipment, etc. similar to initial entry team. If initial team is missing, will obviously require more cautious approach. • Members of the back-up team should be rotated regularly because even sitting around in full gear is tiring and will affect performance.

A3.9 Dose Control

Attributes	Indicators
ALARP	• Although IRR17 dose limits may be disapplied in a radiation emergency and for emergency workers* only, ALARP still applies. [* emergency workers are defined in REPPIR as: *having a role in an emergency plan …and might be exposed to radiation as a result of a potential or actual radiation emergency.*] • Tasks involving dose commitment should have been planned to minimise dose in the emergency arrangements. Reference levels** should have been determined for persons or groups of persons with specific roles in responding to the emergency. [**REPPIR Regulation 20] • Continuous risk assessment is also required. Examples of minimising dose include setting up the approach to firefighting to minimise fire team dose or moving deployed teams to low dose areas while decisions are made on task variations.
Systems	• There must be a system for recording the dose that each TM receives during an entry. • The entry dose and the dose rate must not exceed a predetermined limit, and the accumulated dose should be kept within the limit specified in the emergency arrangements. • All team members should be equipped with EPDs with the alarms set to appropriate levels. They should not be set on 'standard' limits e.g. 20 mSv if teams are going into low dose rate areas. • Decisions to authorise doses in excess of delegated limits should be escalated; the ICP controller will usually have discretion to allow doses up to a pre-agreed limit, with the ECC Controller approving doses up to the life-saving limit. • Checking of the prior dose commitment must be done before team members are allowed to go on a second or subsequent entry. • Dose control for Fire Team members must be integrated into the facility system for recording doses.

A3.10 Contamination Control

Attributes	**Indicators**
Facilities	• Facilities may be fixed or mobile • Access and egress routes should be separate • Air flow should be from clean to dirty • There should be double barriers on exit with decontaminable surfaces • Routine area monitoring & decontamination/ air samplers with alarms should be running and periodically checked
Dressing (see Teams 3.7)	• Team members self-checking/ checking each other for PPE seal/ BA pressure
Undressing	• Top down undressing by de-robers wearing full PPE. • Prioritisation should be based on remaining air • Before monitoring/undressing, contamination should be fixed, removed or damped down

	• De-robers should change gloves between team members and before fitting clean respirators. • Probes should not touch clothing/ become contaminated (N/A for alpha). • Contaminated clothing should be bagged • Over first barrier in full change/ respirator/ overshoes for full monitor • Respiratory protection maintained until monitored clear.
Housekeeping	• Bags containing contaminated clothing are routinely monitored and removed from operating area. • Floors and barriers are routinely monitored and any contamination is fixed or removed.
Casualty Handling	• Seriously injured casualties are fast tracked by wrapping in clean plastic before passing over barrier without further decontamination to be taken directly for medical attention (the clean plastic should not be contaminated, i.e. clean gloves should be worn by those handing the casualty). • Walking wounded should be decontaminated before receiving medical attention.
Vehicles	• Any vehicle leaving the site should be monitored – although ambulances leaving with severely injured casualties are likely to be waved through.

A3.11 On- & Off-site Surveys

[**Note:** For assessing on and off-site surveys during tests, there are three ways to observe: 1) travel with one of the vehicles, 2) go with a licensee observer or 3) follow the teams in your own car. Staying with a single vehicle limits what an inspector can see and makes it difficult to get back on to site to see other aspects. Joining a licensee observer provides more mobility, providing both agree to see the same aspects. In addition, the licensee observer is likely to have a radio so the traffic between survey teams and the centre can be monitored. If inspectors use own transport, obtaining a radio allows monitoring the survey team/ centre communication and destinations of monitoring teams].

Attributes	Indicators
Strategy/ Control	• Strategy prioritises positions and samples to gain the most information promptly initially to determine whether on- and/or off-site release, then plume extent (survey points are usually pre-determined). • Prioritises sampling methods (i.e. activity in air, radiation levels, ground contamination, soil and grass samples, water samples, CO_2 concentrations (gas reactor) etc. • Location of vehicles is known at all times. Off-site vehicles may be sent to 'centres' of population (to inform protective action decisions). On-site vehicle teams should define plume boundaries and then monitor impact of wind direction changes etc. • Communication protocols are clear (who, when, what). Who to communicate to may change during the response and the point of handover should be clear for sites where this is part of the arrangements (e.g. FCC to ECC or SCC) • Vehicles should not wait in the plume unnecessarily e.g. whilst awaiting instructions.

Deployment	• Prompt assembly of HP team as soon as the site alarm is sounded.
	• PPE inventory check
	• Instrument calibration dates and functionality checked.
	• Communications checks (radios, phones etc.)
	• Initial briefing:
	  ○ what is believed to have happened,
	  ○ wind direction/ strength,
	  ○ where and what to sample (priority order)
	  ○ who, when, what to communicate
	• Prompt departure to primary sample points on and off site.
	• Once results are obtained they should be communicated without delay with the time of sample and the location.

Instrumentation / Sampling	• Vehicles are usually sealed else RPE and PPE are required • Where possible, air samples should be obtained without leaving the vehicle • Care should be taken when fitting/ removing the air sampler to ensure cross contamination from one sample to the next does not occur. This is also true of the measuring instrumentation. • If samples taken outside the vehicle e.g. ground contamination (which usually gives a quicker indication of abnormal levels than air samples) before the air sample result is known, PPE and RPE should be worn. • Precautions should be taken to ensure interior of vehicles is not contaminated when leaving /re-entering. The interior should be monitored and contamination cleaned up. The interior should be checked routinely in any case to ensure contamination is not escaping from the samples/ sampling systems.
Communication	• There should be specific radio networks to handle the survey team/ centre exchanges. [Some scenarios should require back-up systems to be tested].
Information	• A live record /plume plot should be kept updated (usually colour coded points on a map of the site and surrounding area). • The HP team should use a plume model to confirm their understanding of the developing situation, provide interpolation where there is no immediate data and decide where the data is most needed next. • Measured results and model predictions should be combined to provide advice on radiological consequences both on- and off-site and provided without delay to the person(s) responsible for the provision of the public protection advice (FCC early stages, then EEC or SCC). • Records should be kept of all measurement data, interpretation/analysis and radiological advice.

A3.12 Medical Centre /Casualty Handling

Attributes	Indicators
Medical Centre	• Capable of providing triage for contaminated casualties. • May have an exit leading off-site so that, once treated, patients can be transferred to an ambulance.

	• Staffed by sufficient nurses/ first aiders, doctor(s) and HP monitor(s).
PPE	• Staff wear over suits, (multiple pairs of) gloves, overshoes and respirators. • Gloves are changed regularly to avoid cross contamination / wound uptakes (alpha nuclides).
Contamination control	• Requirements as for decontamination facilities (3.9) • Ideally the exit to the waiting ambulance should be through an air lock to limit the spread of contamination. • A supply of clean blankets, plastic sheets, etc. should be available to wrap patients who are still contaminated after treatment and require transfer to hospital in the ambulance. • The centre should have available a supply of body bags to handle contaminated dead bodies.
Communication	• Medical centre staff should be briefed by the ICP before contaminated casualties are sent to the centre. • The medical centre should keep the ECC informed on the status of the casualties. • The ECC should be informed when a casualty is sent to hospital to provide permissions for the ambulance to leave off-site.
Liaison with Ambulance Service	• Ambulance staff are not usually dressed to be in contaminated areas so should keep on the 'clean' side. • Medical staff should brief the ambulance team on the extent of remaining contamination. In addition, the casualty may be accompanied by a licensee health physicist to provide advice on contaminated casualty handling within the ambulance and at the hospital. • When the ambulance returns from delivering a contaminated casualty, the ambulance and team should be monitored.

A3.13 Plant with Chemical / Dispersible Radioactive Source Terms

Attributes	Indicators
Explosive/fire hazards	• Chemical/fire/explosive hazards may dictate the response in chemical plants, e.g. C_2H_2 (acetylene) cylinders, sensitised explosive material or releases of NOx, N_2H_4, H_2, tritium may all cause an energetic reaction.
Spills/ release of material	• Solid or liquid spills need an assessment of the amount spilled to provide a source term. There should be records of the inventory of the original containers available in the originating plant. • If external to buildings, a knowledge of wind direction and the likely wind pattern around groups of buildings should be considered. Inside buildings, the building air flow pattern/ ventilation system impact should be considered in the assessment/monitoring plans. • The approach to the spill requires care and the appropriate PPE/ RPE worn. • The affected area should be isolated and steps taken to limit the spread of activity to areas not designed to handle it e.g. storm drains, sumps, etc.

	• Barriers should be set up to control access and contamination spread. For an external incident, a mobile ICP may be set up if within the licensee's arrangements. • Appropriate containers should be used to store material (type, activity) as it is recovered. • Where required, back-up alpha monitoring equipment should be readily available to replace contaminated probes. [Detection of Pu can be difficult, especially if the levels of Pu 241/ Am 241 are low. Where reliance is placed on alpha detection, probes must be in close proximity to detect contamination risking contamination of the probe itself rendering it useless]. • Collection of activity on unshielded ventilation filters can provide an unexpected source of radiation. In addition, loaded ventilation filters may pass activity so these should be checked by instruments monitoring discharges. • If the spill is the result of a road traffic accident which also involves injured/ trapped personnel, protection for the rescue services, prioritisation of casualty recovery, potential to make the incident worse, possible delay in the assessment of incident impact, etc. should be considered.
Criticality	• When dealing with fissile material, the inventory of material in the immediate vicinity of the event and within the building/ environment as a whole should be known to enable realistic and worst case source terms to be estimated. • When dealing with liquids or dispersed solid fissile material, the potential for recovery operations to precipitate an initial or a further criticality must be considered. • The possibility of continuing pulse criticalities (e.g. Tokaimura criticality accident, 1999) should be considered when dealing with fissile material in solution. • When firefighting is required, areas of the plant where it is inappropriate to use water should be identified and communicated clearly to the firefighting teams. • Moderation caused by water in team member's bodies should be considered before teams are allowed to enter the affected facility.
Access	• Status of air sampling alarms should be monitored as the plant is inspected to help understand contamination spread. • Some areas may be out of bounds regardless of incident damage e.g. interiors of cells/ caves containing high levels of radiation fissile stores, etc. • Care should be taken near cave windows to check for high radiation levels. For caves with ZnBr windows, loss of liquid = loss of shielding, even if the alpha glass remains in place preventing contamination release. Damage to a lead glass window can allow neutrons to stream up the sides. • Ingress /egress routes to/ from the contaminated area should be monitored routinely to control contamination. Some plants may use trolley mounted floor monitors to check large areas quickly.

A3.14 Multi Plant Sites

Attributes	Indicators
Multi plant sites	• Licensees of multi plant /very large sites should either have a mobile ICP (or ICPs) that can be deployed close to the incident or a sufficient number of fixed-location ICPs at appropriate locations spread across the site in order to provide control and management of the incident. • Consideration should be given to potential for contamination of interlinked ventilation systems where several facilities use the same discharge routes. • Tenants and contractors should take part in tests in line with their emergency arrangements to support the licensee. [NB REPPIR 15(4) places a duty on tenants and contractors to participate in tests]. • On complex sites with multiple licensees/ non-licensee companies it is worth considering how long it is necessary to keep the site closed up during the test. Care is required in releasing such individuals to ensure they do not access the test area.

A3.15 Security

Attributes	Indicators
Security	• At the start of the incident, the initiator is often not known; security initiators should be considered and factored into the response until they are ruled out. • If the emergency is initiated by a security incident (Nuclear security event), the emergency response will need to deliver the immediate security response, e.g. armed police searching for armed intruders, search for improvised explosive devices (IEDs), evacuation from the threat etc. and those individuals will require protection from radiological risks • Security and safety emergency arrangements require careful integration to ensure that all constraints are addressed e.g. safe shelter locations away from the security threat and other hazards. • Nuclear security event considerations require different training and skills to nuclear safety events; commanders and response teams must be suitably SQEP to deliver the required effects.