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ANNEX Q TO
JSP 538

OUTLINE SAFETY CATEGORISATION SYSTEM

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OUTLINE SAFETY CATEGORISATION SYSTEM

1 Table Q-1 outlines a possible system for safety categorisation of hardware (facilities, plant, weapons, subsystems thereof, and safety related software). Five categories are suggested because of the very wide range of importance to nuclear safety of different physical items in the NWP. Certain parts of nuclear weapons are for example a number of orders of magnitude more important to nuclear safety than a container used for short term storage of low active waste. It will be seen that this is basically a 'four level' categorisation system as used within the Naval Nuclear Propulsion Programme, with the addition of an additional 'top' category for those parts of a nuclear weapon which prevent unintended yield.

2 The reasons why an additional category for 'safety critical' parts of nuclear weapons is recommended are:

- a. the consequences of unintended yield from a nuclear weapon are of a different order to most other potential nuclear accidents;
- b. unlike a reactor/facility accident it is infeasible to take steps to mitigate a developing accident sequence once yield has started;
- c. nuclear weapons are commonly positioned in the vicinity of other nuclear and explosive facilities/devices and so yield from an NW is likely to cause 'knock on' nuclear accidents;
- d. space and weight constraints prevent NW designers from adopting the degree of segregation of lines of protection which would otherwise be desirable.

3. Table Q-1 provides an outline from which an Authorisee or ADA can develop a categorisation system meeting both his own and JSP requirements, for example for nuclear weapons for which no categorisation system exists at the time of writing. However NWR does not require all Authorisees and ADA to adopt the same Safety Categorisation System or to abandon any existing and satisfactory safety categorisation system.

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SAFETY CATEGORISATION SCHEME FOR WEAPONS, FACILITIES, PLANT, AND OTHER EQUIPMENT			
Nuclear Safety Category	Typical Description	Typical Application [Approximate]	Precise Definition
0	'Safety Critical Item'	Parts of a nuclear weapon system which if badly specified, designed, manufactured, maintained or operated could cause or very substantially increase the probability of unintended nuclear yield larger than 2kg of TNT equivalent. Items which if they failed or were badly conceived, manufactured, or operated could cause or very substantially increase the probability of an accident comparable to an INES Level 6 or 7 accident.	[To be defined by Authorisee or ADA]
1	'Ky Safety Item'	Items which if they failed or were badly conceived, manufactured, or operated could cause or very substantially increase the probability of a substantial release of radioactive material to the environment, or to a person receiving a radiation dose causing a deterministic effect. Some items, failure of which would challenge the capability of a Category 0 item, or which reduce the frequency of demands on a Category 0 item.	"
2	'Secondary Safety Item'	Items failure of which would lead to: <ul style="list-style-type: none"> • a substantial challenge to the capability of a Cat 1 item, or • a minor challenge to a Cat 0 item, or • a person receiving a radiation dose in excess of a legal limit but not large enough to cause a deterministic effect. • A release resulting in a committed dose to a member of the public located off site greater than 0.05mSv. 	"
3	'Safety Significant Item'	Any item significant to nuclear safety not in categories 0, 1, or 2, for example items failure of which would lead to: <ul style="list-style-type: none"> • a challenge to the capability of a Cat 2 item, or • a minor challenge to a Cat 1 item, or • a person receiving a radiation dose in excess of a legal limit. • a release resulting in a committed dose greater than 0.05mSv to serviceman or worker on site, in an SSBN, or on duty on a Convoy. 	"
4	'Non Safety Related'	Items which if they failed or were badly conceived, manufactured, or operated would have essentially no effect on nuclear safety.	"
0-3	'Safety Related'	Collective term for items in categories 0, 1, 2, or 3	

See also the 'Notes on Safety Categorisation' below, in particular when categorising parts of systems incorporating more than one line of defence against a given hazard.

Table Q-1 - OUTLINE SAFETY CATEGORISATION SCHEME FOR PLANT, EQUIPMENT, LINES OF DEFENCE, INTERLOCKS, AND OTHER SAFETY RELATED HARDWARE

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NOTES ON SAFETY CATEGORISATION

MANAGEMENT OF CATEGORISATION

4. The Authorisee or ADA should determine the appropriate area of his management structure competent to assign the appropriate category to any proposals. Arrangements should be in place to ensure that this initial categorisation is independently reviewed within the organisation, and, for the higher categories, the Authorisee or ADA should elicit the views of the organisation's Nuclear Safety Committee (NSC).

5. Arrangements should also be in place to audit periodically areas and elements that are initially considered as non-safety related. Experience shows that such audits can reveal items that should have attracted a higher safety category.

APPLICATION OF CATEGORISATION

Scope of Categorisation

6. Categorisation should be applied to the following areas:

- when establishing a safety case for an existing plant, facility, or weapon;
- for the construction or manufacture of new plant, facility, or weapon (AC19);
- modification of design of plant or under construction (AC20);
- modification or experiment on existing weapons or plant (AC22);
- commissioning or decommissioning processes which could give rise to radiological consequences (AC35).

7. Categorisation may be applied to other areas including:

- operating instructions;
- Examination, Maintenance, Inspection, & Testing (EMIT);
- Complete facilities.

Categorisation of 'Utilities'

8. The categorisation of supporting systems such as power supplies and HVAC systems is not always straightforward. Categorisation of supporting systems should be carried out with particular care if failure of the supporting system:

- a. provides the initiating event to any sequence of multiple failures that result in radiological consequences;
- b. results in the loss of an engineered safeguard;
- c. results in the loss of a dose mitigation feature (note: the dose which is averted should be used as the basis for categorisation);
- d. impairs the performance of operators or cause multiple failures leading to operator overload and hence increased likelihood of operator error.

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MODIFICATIONS

9. Categorisation of modifications should be applied with care to ensure the modification is not considered in isolation. There can be a tendency to place modifications into lower categories, particularly where uncertainties exist. Safety management arrangements should contain sufficient checks or audits to ensure that this does not occur. A modification may be of little consequence in itself, but may have the potential to adversely affect an adjacent or connected component or system with significant resulting consequences. The risks of the modification process itself should be considered, in particular with respect to modifications to weapons or to 'active' or operational facilities. The effect of changing the potential consequences, and hence categorisation, during construction, manufacture, installation or transition to a different method of operation, should be considered. Such changes in consequences may be transient in nature, particularly during construction or manufacture. The safety categorisation process should address the possibility that the modification could be inadequately conceived or executed in its construction or manufacture.

REVIEWS OF CATEGORISATION

10. A review of the safety category to which items have been allocated should be carried during Periodic Reviews and whenever a safety case is substantially modified or developed.

POINTS OF DETAIL

11. It is strongly recommended that:

- a. where radioactive material is in the form of a gas, liquid, powder, (or any other form capable of dispersion if exposed to fire or the forces of nature) the principal containment system should be allocated to the safety category which would apply if there were no other line of defence against a release of the material;
- b. where there are multiple Lines of Defence (LOD) against a given fault sequence, at least one is allocated to the safety category which would apply if there was only one LOD;
- c. where both physical and procedural lines of protection against a given fault sequence are claimed, then at least one physical LOD is to be allocated to the safety category which would apply if it was the only LOD.

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ANNEX R TO
JSP 538

**MINISTERIAL NOTIFICATION AND REPORTING OF
DEFENCE NUCLEAR INCIDENTS: INSTRUCTIONS FROM
MOD CENTRE**

CONTENTS

Loose Minute D/D SEF POL/26/25 dated 18 October 04	R-3
'Ministerial Notification and Reporting of Defence Nuclear Incidents'	
Annex A to D/D SEFPOL/26/25 dated 18 October 04	R-5
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From: Assistant Director Nuclear Accident Response



Ministry of Defence



Level 6, Z
MOD Main Building
Whitehall
LONDON SW1A 2HB

Tel: 020 721
MOD (9621) MB
Fax: 020 721
MOD (9621) MB

DII:
Email: @mod.uk

Distribution: See overleaf

Your reference

Our reference
DSePol/26/25
Date
18 October 2004

MINISTERIAL NOTIFICATION AND REPORTING OF DEFENCE NUCLEAR INCIDENTS.

Reference:

A. D/D SEF Pol/26/25GH/43/04 dated 27 April 2004

1. Further to Reference A, and following consultation and review, arrangements have now been developed for the Ministerial Notification and Reporting of Defence Nuclear Incidents. These provide that with effect from 1 November 2004:
 - i. Defence nuclear operators should report all incidents covered by the criteria (Annex A) directly to DS&C-NAR and the relevant MOD nuclear regulator as soon as is practicable, and in any case, within 24 hours. The timing requirement may be extended for submarines on patrol with restricted communications, but should be achieved as soon as practicable. The information at Annex B should be included in any report.
 - ii. MoD nuclear regulators should report formally to DS&C-NAR as soon as possible following receipt of notification of an incident that falls under the criteria. When preparing notification of incidents on defence licensed sites the MoD nuclear regulators are expected to consult, so far as is practicable, with the NII. The relevant MoD regulator should submit a follow-up report in the form of the regulator's annual statement of nuclear incidents.
 - iii. DSC&-NAR will report all incidents in accordance with the DS&C Ministerial Notification and Reporting Desk Instructions (Enclosure).

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2. I would be grateful if you would ensure that these arrangements are implemented with effect from 1 November 2004.

[signed on original]

Assistant Director, Nuclear Accident Response
for DS&C.

Distribution

NBC Clyde	DNM&NARG	NWR	MD BAE SYSTEMS Marine Ltd, Barrow FLEET COS(SPT)
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DS&cC -D
DS&C -DD

Enc:

1. DS&C - Desk Instructions - Ministerial Notification and Reporting of Defence Nuclear Incidents, Version 2.
2. DS&C-NAR - contact and reporting point details.

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ANNEX A

DEFENCE MINISTERIAL REPORTING CRITERIA AND HIGH LEVEL GUIDANCE

Criteria are in bold text

Guidance is in italics

a. Dangerous occurrences reportable under the Nuclear Installations (Dangerous Occurrences) Regulation 1965. (Note: It is most likely that such occurrences would fall within the REPPIR definition of a radiation emergency and require implementation of emergency plans.)

i) *Any event on a defence nuclear operators site¹ that involves the emission of ionising radiations or the release of radioactive or toxic substances that has caused or is likely to cause the death of, or serious injury to the health of, persons² outside the site or on the site at the time of occurrence.*

ii) *Any event in the course of carriage of defence nuclear material that:*

a) *has caused or is likely to cause the death of, or serious injury to the health of, any person by reason of the radioactive properties of such nuclear matter.*

b) *involves the breaking open of any outside container in which such nuclear material is being carried.*

iii) *Any explosion or outbreak of fire on a defence nuclear operators site or in the vicinity of a vehicle carrying defence nuclear material that is affecting, or is likely to affect, the safe working or safe condition of the nuclear plant/facility or of the nuclear material. It would be appropriate to report any explosion or major fire affecting sufficient safety related plant such that the affected system is unable to perform its safety function.*

iv) *Any uncontrolled criticality excursion.*

b. Confirmed exposures to radiation of individuals which exceed, or which are expected to exceed, the dose limits specified in Schedule 4 to the Ionising Radiations Regulations 1999.

i) *Dose limits specified in schedule 4 to IRR99 are clear and objective. No guidance required.*

c. Examination, maintenance, inspection, test or operation of any part of the plant revealing that safe operation or condition of the plant may be significantly affected.

¹ Site means: a licensed site; an authorised site; a site under the control of Secretary of State for Defence; a submarine which may, or may not, form part of an aforementioned site or any movement of defence nuclear materials.

² Medical confidentiality must be respected in all notifications.

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i) *Notification is required if discovery of a fault requires serious consideration of withdrawal or amendment of the Authority to Operate a naval reactor plant.*

ii) *Notification is required if discovery of a fault requires serious consideration of the need to make safe a nuclear device³ or component and review of conformance of the device or component with the safety case.*

iii) *Notification is required if discovery of a fault on a naval reactor plant or nuclear device or component that although in a safe condition at the time of discovery (eg shut down) nevertheless could have serious implications for the continued safety of other naval reactor plant or nuclear devices or components.*

d. A confirmed breach of, or discharge expected to breach, quantitative limits of a Certificate of Authorisation, or Letter of Agreement, for the disposal of radioactive waste issued under the Radioactive Substances Act 1993.

i) *Quantitative limits set under RSA93 are clear and objective. No further guidance required.*

e. Abnormal occurrences leading to a confirmed release to atmosphere or spillage of a radioactive substance which exceeds, or is expected to exceed, the limits set out in Column 4 of Schedule 8 of the Ionising Radiations Regulations 1999, except where the release is in a manner specified in an Authorisation/Agreement under the Radioactive Substances Act 1993.

i) *Quantities and concentrations specified in column 4 of schedule 8 to IRR99 are clear and objective.*

ii) *This criteria covers liquids, gases, aerosols and dusts. The term 'atmosphere' covers the internal environment of buildings/submarines/vehicles as well as the external atmosphere.*

iii) *Reporting is not required where the spillage is in an enclosure or other such localised facility, so designed, maintained and used as to effectively prevent the release going beyond that facility. This exception would apply, for instance to glove boxes and purpose designed enclosures and benches in laboratories, in circumstances where the spillage would not be considered an 'abnormal occurrence'. However, this exception would not cover releases affecting whole rooms or buildings where people work and could receive a significant exposure to radiation as a result of the spillage.*

f. Abnormal occurrences leading to a release or suspected release or spread of radioactivity, on or off site, which requires special action or special investigation by the Operator.

i) *Any unplanned event that significantly increases radiation dose rates or surface or airborne contamination, for which an investigation report will subsequently*

³ Nuclear device is taken to mean all those devices whose design intent is to be able to produce an uncontrolled nuclear reaction.

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be required. Any formal investigation into any such suspected occurrence outside the site boundary

g. Any 'nuclear or radiological safety event' which does not meet the criteria at (a)-(f), but which the operator believes might attract media or public attention and for which a press release or response statement is to be issued.

i) Any unplanned event involving the naval reactor plant, defence nuclear materials, nuclear weapons or radioactive wastes generated as a result the defence weapon or propulsion programmes.

If the incident is so serious that the relevant nuclear accident response plan has to be invoked, the notification and reporting procedures in those plans are to be followed.

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ANNEX B

MINISTERIAL NOTIFICATION AND REPORTING OF DEFENCE NUCLEAR INCIDENTS: REPORTING DETAILS

Operator's reports should include:

- Details of site/submarine/operation;
- Date and time of the incident;
- Location of submarine/convoy(if applicable);
- Part of plant/site involved;
- Whether personnel were affected (details of casualties);
- Source of information;
- Nature of incident including brief description;
- Under what criterion the incident is being reported;
- A provisional International Nuclear Event Scale (INES) rating;
- Whether radioactivity was released from its proper place of confinement;
- What action has been taken in response to the incident;
- Which emergency services have been informed/are on site;
- Initial estimate of safety implication, including;
- Likelihood of only affecting the reported site/submarine;
- Implications for other sites/submarines;
- An indication of whether the incident will have major significance in the short term or long term;
- Likelihood of Press interest and details of any Press enquiries;
- Whether the Authorisee/Duty Holder is issuing a press release and/or whether other parties (eg trade unions) are being informed;
- Full contact details for the Operator's lead press officer.

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ANNEX S TO
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INTERNATIONAL NUCLEAR EVENT SCALE

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INTERNATIONAL NUCLEAR EVENT SCALE

BACKGROUND

1. The International Nuclear Event Scale (INES) (Figure S-1) has been designed by the IAEA as a means for promptly communicating to the public in consistent terms the safety significance of events reported at nuclear power plants. By putting events into proper perspective, the scale can facilitate a common understanding between the nuclear community, the media and the public.
2. The scale has been designed for prompt assessment following an event. Internationally agreed guidance is available to assist those classifying events, but engineering judgement must play a role in fixing the appropriate level.
3. Although the Scale has been designed primarily for nuclear power plants, it can be applied to events within the nuclear weapons programme.

THE INTERNATIONAL NUCLEAR EVENT SCALE

For prompt communication of safety significance

7 Major Accident
6 Serious Accident
5 Accident with off-site risks
4 Accident mainly in installation
3 Serious Incident
2 Incident
1 Anomaly
0 Below scale No safety significance

Figure S-1 - THE INTERNATIONAL NUCLEAR EVENT SCALE

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4. The matrix in Figure S-2 explains the underlying logic of the scale, showing how the criteria of off-site impact, on-site impact and degradation of the plant's defence in depth capability are applied. An event which has characteristics represented by more than one criterion is always classified at the highest level according to any one criterion.

UNERLYING LOGIC OF THE SCALE
(Criteria given in matrix are broad indicators only)

Level	Descriptor	Criteria		
		Off-site impact	On-site impact	Defence in depth degradation
7	Major Accident	Major release. Widespread health and environmental effects.		
6	Serious Accident	Significant release. Full implementation of local emergency plans.		
5	Accident with off-site risks	Limited release. Partial implementation of local emergency plans.	Severe core damage.	
4	Accident mainly in installation	Minor release. Public exposure of the order of prescribed limits.	Partial core damage. Acute on-site health effects.	
3	Serious Incident	Very small release. Public exposure at a fraction of prescribed limits.	Major contamination. Over exposure of workers.	Near accident. Loss of defence-in-depth provision.
2	Incident			Incident with potential safety consequences.
1	Anomaly			Deviation from authorised functional domains
0	Below Scale			No safety significance.

Figure S-2 - UNDERLYING LOGIC OF THE SCALE

USING THE SCALE

5. Events classified on the Scale (Figure S-2) relate only to nuclear or radiation safety. They are classified at eight levels. The levels, their descriptors and more detailed criteria are shown in Figure S-3, together with examples of classified nuclear events which have occurred at nuclear power plants. The lower levels (1-3) are termed incidents and the upper levels (4-7) accidents. Events which have no safety significance are classified as Below Scale/Level zero. Industrial accidents or other events which are not related to nuclear plant operations are not classified on the Scale; these are termed out of Scale.

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Level	Criteria	Examples
7	External release of a large fraction of the reactor core activity, typically involving mixture of short and long-level fission products (FPs) (in quantities radiologically equivalent to more than $\approx 10^{16}$ Bq 1-131). Possible acute health effects. Delayed health effects over wide area, possibly involving more than one country. Long term environmental consequences.	Chernobyl, Ukraine 1986
6	External release of FPs (in quantities radiologically equivalent to $\approx 10^{15}$ Bq 1-131). Full implementation of local emergency plans probably needed to limit serious health effects.	
5	External release of FPs (in quantities radiologically equivalent to $\approx 10^{15}$ to 10^{14} Bq 1-131). Partial implementation of emergency plans (eg local sheltering and/or evacuation) required in some cases to lessen the likelihood of health effects. Severe damage to large fraction of the core due to mechanical effects and / or melting.	Windscale UK 1957 Three Mile Island USA 1979
4	External release of radioactivity resulting in a dose of the most exposed individual off-site of the order of a few mSv. Need for off-site protective actions generally unlikely except possibly for local food control. Severe damage to large fraction of the core due to mechanical effects and / or melting	St Laurent France 1980
3	External release of activity above the authorised limits, resulting in a dose to most exposed individual of ≈ 0.1 to 1 mSv. Off-site protection measures not needed. High radiation levels and / or contamination on the site due to equipment failures or operational incidents. Over exposure of workers (individual doses ≥ 50 mSv). Incidents in which a further failure of safety systems could lead to accident conditions or a situation in which safety systems would be unable to prevent an accident if certain initiators were to occur.	Vandallos, Spain 1989
2	Technical incident or anomaly which, although not directly or immediately affecting plant safety, are liable to lead to subsequent re-evaluation of safety provision.	Leningrad / St Petersburg Russia 1992 Tomsk-7 Russia 1993
1	Functional or operational anomaly which does not pose a risk but which indicates a lack of safety provisions. This may be due to equipment failure, human error or procedural inadequacies. (Such anomalies should be distinguished from situations where operational limits and conditions are not exceeded and which are properly managed in accordance with adequate procedures. These are typically 'below scale'.)	
0	No safety significance (See level 1 above).	

Figure S-3 - DETAILED CRITERIA

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6. In the event of an incident or accident within the NWP which might be at Level 1 or above on the INES scale the Authorisee will advise NWR of his view as to what INES level applies. NWR will make the final decision on what INES level applies, in consultation with the Authorisee, the MCA (if deployed), HQ NARO, and for AWE sites, the NII. No announcements concerning the INES level of an incident or accident are to be made without the agreement of NWR and MOD HQ NARO.

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ANNEX T TO
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NUCLEAR ACCIDENT RESPONSE ORGANISATION - NWR INSPECTOR CHECKLIST

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NUCLEAR ACCIDENT RESPONSE ORGANISATION - NWR INSPECTION CHECKLIST

INTRODUCTION

1. As the Regulator of the nuclear weapon programme, NWR is responsible for formally assessing the adequacy NWP related NAROs, (including those covering SNM). NAROs should be capable of achieving the outputs listed in the checklist below.
2. The NWR assessment of demonstration exercises will make use of this checklist will be carried out systematically, to a common standard, and on as objective a basis as possible. The key assessment criterion is the achievement of a satisfactory response, and full credit will be given for achieving this by means other than those identified.
3. The names given to Posts, Control Centres, etc varies considerably between Authorisees. This is acceptable. NWR looks for an efficient NARO, not for a NARO based on a specified model. The checklist tends to be based on the MOD model, AWE is not expected to have identical arrangements.

INSPECTION CHECKLIST

ALERTING

4. The alerting chain for a nuclear accident should be through continuously manned positions, and as a minimum should be capable of achieving all of the following outputs within 10 minutes of declaration of an accident:
 - a. action taken to implement any automatic countermeasures and to convene the NARO;
 - b. notification to the police, including any advice on public protection and, in the case of a transport accident, advice on the on-scene hazards and necessary protective actions. Notification to civil Fire and Ambulance services if required;
 - c. telephone notification to CDSDO.

MANAGEMENT OF THE ON-SITE RESPONSE (FIXED SITE)

5. Overall responsibility for the on-site response should be delegated to a pre-identified individual, hereafter referred to as the Incident Co-ordinator (IC) (Titles may vary). His responsibilities break down into three key areas:
 - a. the safety of personnel on-site;
 - b. accident assessment and mitigation, and accident recovery;
 - c. keeping the MCA informed.

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The Safety of Personnel On-Site

6. Within a pre-designated 'Countermeasure Zone', countermeasures should be implemented within 30 minutes of the declaration of an accident.
7. Any Shelter Stations which are used should be fit for purpose. A Shelter Station Manager should be nominated in each case. Numbers of personnel should be logged and forwarded to the appropriate authority. Regular contact should be maintained with Shelter Station Managers who should keep sheltering personnel informed. Monitoring equipment should be provided if necessary to enable the hazards to sheltering personnel to be assessed. Instrument readings should be forwarded to the appropriate authority.
8. Positive efforts should be made to identify and report any personnel who are unaccounted for.
9. Arrangements are required for the protection of any personnel on-site who do not take the generally recommended protective action but remain within the hazard area, minimising their numbers, assessing the hazards and any requirement for their withdrawal, providing any necessary protection, arranging reliefs, shift change procedures, access etc. Two-way communication should be maintained.
10. Arrangements are required for managing personnel on-site who are taking countermeasures or who are outside the area within which countermeasures have been advised, assessing the hazards to them, providing any necessary protection, keeping them updated, prioritising their evacuation, and managing that process. Any significant evacuation from the site should be notified in advance to the MCA for the attention of the civil authorities, and agreed by them.
11. In carrying out all of these assessments the available monitoring information and the current assessment of the likely development of the accident should be kept under review.
12. Separately, the monitoring required to support all aspects of the protection of personnel on-site should be assessed and communicated to Monitoring Control.
13. The IC should be provided with regular updates and in any case notified immediately of any key developments. The IC should be made fully aware of the significance of the risks on-site, the uncertainties involved etc. The effective presentation of information on hazards, hazard zones, necessary countermeasures etc will normally require their visual presentation on maps. Appropriately assimilated monitoring information will also need to be presented.

Management of Evacuees

14. Adequate arrangements are required for the reception, monitoring and decontamination of personnel on exit from the Countermeasure Zone.
15. The facility should be suitably located and should be immediately accessible to evacuees. Airborne contamination levels should be monitored and assessed, and appropriate

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action taken. Appropriate protective clothing, dosimetry etc should be worn by personnel manning the facility.

16. A documentation system is required to record all personnel arriving at the facility and their processing through it. Any identified missing persons should be reported immediately. Personal dosimeters should be collected from evacuees where applicable.

17. Triage should be provided within the facility (or alternative arrangements made). The facility should allow the processing of personnel with minor injuries.

18. All monitoring instrumentation should be fit for purpose. Detailed monitoring techniques, undressing and decontamination procedures, and contamination control generally should be to industry standards.

19. Contaminated waste should be adequately stored.

20. Regular progress reports should be provided and key findings notified immediately to the appropriate authority.

21. Operation of the facility should be subject to professional health physics oversight.

Management of Access to the Countermeasure Zone

22. Formal arrangements should be implemented for managing access to the Countermeasure Zone. These should include formalised assessment, approval and briefing procedures, the management of deployed teams and their after-care. The arrangements should ensure that all personnel accessing the Countermeasure Zone are adequately briefed on the hazards, and provided with appropriate protective clothing (including respiratory protection) together with both statutory and electronic alarm dosimeters.

23. Initial responders accessing the accident scene should be trained in advance on the potential hazards and personal protection requirements, and arrangements are required on the day to ensure that these personnel are provided with all available information.

24. For MOD response forces appropriate personal protective clothing should be provided and used effectively, together with personal dosimetry. All of this should be covered by documented arrangements for managing the initial response.

Accident Assessment and Mitigation, and Accident Recovery

25. An initial assessment of the status of the accident is required. All available information and resources should be utilised to mitigate the accident and its consequences (firefighting, cooling etc).

26. Once a stable state has been achieved, a plan should be drawn up for the render safe, recovery, packaging and shipment of weapons, associated hazardous or classified components, and other arisings. Once approved, this should be implemented in a timely manner, in consultation with health and safety specialists.

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27. The IC should be provided with regular updates and in any case notified immediately of any key developments. The IC should be made fully aware of the significance of the assessments and of the uncertainties involved.

Keeping the MCA Informed

28. The MCA should be notified immediately of any key developments, and provided with regular routine updates. In particular, any on-site activity with the potential to cause an off-site hazard should be notified to the MCA in advance to allow the necessary consultation with the civil authorities.

SUPPORT TO THE ON-SCENE RESPONSE (TRANSPORT)

29. Overall responsibility for managing MOD's support to the on-scene response should be delegated to a pre-identified individual, hereafter referred to as the Incident Co-ordinator (IC). His responsibilities break down into four key areas:

- a. provision of advice and support to the emergency services;
- b. accident assessment and mitigation, and accident recovery;
- c. security;
- d. keeping the MCA informed.

Provision of Advice and Support to the Emergency Services

30. Road convoys should be adequately manned and equipped to provide initial on-scene advice and support to the emergency services. The NARO should be capable of deploying the IC and a suitably equipped Advance Party to any credible UK crash site within 1 hour of the accident.

31. Pending the arrival of the emergency services (where applicable), the IC should establish initial management of the accident scene, including fire-fighting, casualty handling, and the evacuation of in-cordon personnel.

32. Advice and support should be provided to the emergency services in respect of their management of the accident scene, covering the on-scene hazards and protective actions. This initial advice should be provided as a priority; close liaison should then be maintained on an on-going basis.

33. The public protection advice already provided to the police during alerting/notification should be reiterated and explained as required.

34. An MOD spokesperson should be available to support the police at their first media briefing within one hour of the accident (or of the arrival of the IC Advance Party on the scene in the case of an air transport accident), in either case following prior liaison on the use of pre-scripted statements.

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35. The control of access for MOD personnel should be actively managed at all times.
36. The IC should be provided with regular updates and in any case notified immediately of any key developments. The IC should be made fully aware of the significance of the risks and the uncertainties involved etc. The effective presentation of information on hazards, hazard zones, necessary countermeasures etc will normally require their visual presentation on maps. Appropriately assimilated monitoring information will also need to be presented.

Monitoring of Personnel Exiting the Countermeasure Zone

37. Adequate arrangements are required for the reception, monitoring and decontamination of all response force personnel exiting the Countermeasure Zone. Advice and support should be provided in respect of the reception, monitoring and decontamination of the public.
38. The facility for the processing of response forces should be suitably located and should be immediately accessible. Airborne contamination levels should be monitored and assessed, and appropriate action taken. Appropriate protective clothing, dosimetry etc should be worn by personnel manning the facility.
39. A documentation system is required to record all personnel arriving at the facility and their processing through it. MOD personal dosimeters should be collected and recorded.
40. The facility should allow the processing of personnel with minor injuries.
41. All monitoring instrumentation should be fit for purpose. Detailed monitoring techniques, undressing and decontamination procedures, and contamination control generally should be to industry standards.
42. Contaminated waste should be adequately stored.
43. Regular progress reports should be provided and key findings notified immediately to the appropriate authority.
44. Operation of the facility should be subject to professional health physics oversight as soon as practical.

Management of Access to the Countermeasure Zone

45. In consultation with the police, formal arrangements should be implemented for managing access to the Countermeasure Zone. These should include formalised assessment, approval and briefing procedures, the management of deployed teams and their after-care. The arrangements should ensure that all personnel accessing the Countermeasure Zone are adequately briefed on the hazards, and provided with appropriate protective clothing (including respiratory protection) together with both statutory and electronic alarm dosimeters.

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46. Initial MOD responders accessing the accident scene should be trained in advance on the potential hazards and personal protection requirements, and arrangements are required on the day to ensure that these personnel are provided with all available information.

47. For MOD response forces appropriate personal protective clothing should be provided and used effectively, together with personal dosimetry. All of this should be covered by documented arrangements for managing the initial response.

48. The available monitoring information and the current assessment of the likely development of the accident should be kept under review.

49. Separately, the monitoring required to support all aspects of the protection of personnel on-site should be assessed and communicated to Monitoring Control.

Accident Assessment and Mitigation, and Accident Recovery

50. See paragraphs 24-26 above.

Security

51. The IC is responsible for the security of all nuclear and classified material.

Keeping the MCA Informed

52. See paragraph 27 above.

RADIATION MONITORING

53. The monitoring response should be capable of detecting a release of radioactive material by ground monitoring within 30 minutes of an accident.

54. Downwind monitoring at nominally 1, 2, 3, 4 and 5 km should be completed within 2 hours of an accident. Thereafter, this monitoring should be extended to greater distances.

(In the case of an air transport accident, the datum in respect of the above would be the time of arrival on site of the IC Advance Party rather than that of the accident.)

55. The initial monitoring response should be pre-planned and consistent with the above protocol; thereafter, monitoring should be carried out in accordance with the requirements of the appropriate authorities. Any conflict in requirements should be resolved.

56. Monitoring information should be subject to a process of quality assurance. Results should be forwarded systematically and in a timely manner to all locations where they are required.

57. All monitoring instrumentation is required to be fit for purpose. Detailed monitoring techniques and operations should be to industry standards.

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58. Monitoring personnel should be provided with appropriate protection and issued with both statutory and direct-reading electronic alarm dosimeters. All radiation exposures should be managed pro-actively and maintained as low as reasonably practicable. Personnel should be kept informed of significant events, in particular of any changes to the accident category.

59. Wherever a risk of cross-contamination arises, eg in handling contaminated samples or from the presence of personnel from a contaminated area, there should be robust arrangements for contamination control. Contamination of essential counting or analysis equipment should be avoided and this should be confirmed by monitoring.

60. A hazard prediction based on the initial monitoring results (to 5km downwind) should be provided within 2 hours of completion of that monitoring.

MOD SUPPORT TO THE CIVIL RESPONSE

61. The Military Co-ordinating Authority (MCA) is responsible for managing the overall MOD response in the local area. He has four key responsibilities:

- a. providing advice to the civil authorities on the hazards to the public and on public protection measures (until the arrival of the specialist civil agencies);
- b. providing the civil authorities with information on the technical status of the accident and its consequences, and subsequently on the render safe and recovery process;
- c. the local MOD PR response;
- d. keeping MOD HQ informed and consulting MOD HQ on policy issues.

Provision of Public Protection Advice

62. In the event of an accident at a fixed site the MCA should be available to provide a face-to-face briefing to the police at Strategic HQ or other agreed location within 1 hour of the declaration of an accident. In the case of a transport accident the MCA may be represented by a Liaison Officer, who is to be available to provide a face-to-face briefing within 2 hours of the accident.

63. Subsequent to the provision of the initial public protection advice and until the arrival of the specialist civil agencies any change to the advice should be notified to the police immediately; in any case MOD should establish and maintain close liaison with the police on this issue.

64. The hazards to any persons within the off-site countermeasures zones who are not taking the recommended countermeasure (eg emergency services) should be assessed and the necessary advice provided on their protection.

65. In carrying out these assessments, the available monitoring information and the current assessment of the likely development of the accident should be kept under review.

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66. Separately, the monitoring required to support all aspects of the protection of personnel off-site should be assessed and communicated to Monitoring Control.

67. Specialist civil agencies should be briefed on their arrival and provided with regular updates thereafter. Responsibility for providing public protection advice should be actively transferred to the specialist civil agencies, after which MOD should specifically avoid providing a source of alternative advice. MOD's role should then be to assist the specialist civil agencies by providing background information on the response plan, advising on the availability of MOD monitoring and mapping resources (and liaising as necessary on requirements), managing the assimilation and presentation of MOD monitoring information etc.

68. The effective co-ordination of the multi-agency response may be aided by the establishment of a Joint Health Advisory Cell (JHAC), preferably chaired by a Public Health executive or similar, but not by MOD. For similar reasons a Remediation Working Group may be set up, preferably under the chairmanship of a Local Authority executive or similar (but again not MOD), at an early stage of the response in order to begin consideration of the longer term issues.

69. The effective presentation of information on hazards, hazard zones, necessary countermeasures etc will normally require their visual presentation on maps. Appropriately assimilated monitoring information will also need to be presented.

Provision of Information on the Accident

70. The MCA should keep the civil authorities informed of the nature of the accident and of projected developments. ~~Key~~ developments should be reported immediately, with routine updates provided as necessary. Specialist technical advice should be available for this purpose, but the emphasis of the information provided should be on the accident's implications for the off-site response rather than technical detail.

The Local MOD PR Response

71. Although this is a key MCA responsibility, reputation management is not a direct nuclear safety issue and it is not therefore an aspect on which NWR is responsible for providing guidance. However, public compliance with essential countermeasures, and avoidance of over-reaction, will depend critically on maintaining public confidence in official bodies, including MOD. Public announcements by MOD should therefore be authoritative and consistent, both internally and with announcements by other authorities.

Keeping MOD HQ Informed

72. MOD HQ should be provided with regular updates and in any case notified of any key developments. MOD HQ should be consulted as appropriate on matters of policy.

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OTHER ASPECTS

Remediation

73. Consideration should be given to remediation issues on-site within an appropriate timescale. These considerations should be in accordance with pre-defined arrangements (fixed site only).

74. Appropriate support should be provided to consideration of the remediation aspects of the response off-site within a timescale established by the lead agency.

Command and Control, Communications and Information Management

75. Effective command and control should be demonstrated in all areas. Key attributes will include a clear understanding of the role and extent of responsibilities, appropriate identification of priorities, effective decision-making, a forward-looking approach, good leadership, effective integration with and support to the civil authorities as necessary, and effective communication.

76. Each area of the response should maintain a log of key events including decisions made, actions taken and information provided.

77. The timely and effective dissemination of information in an appropriate format should be demonstrated. NARIMS is the benchmark for the management and dissemination of information internally within the MOD NARO and it should be fully utilised for this purpose in accordance with pre-defined procedures. Arrangements are required to ensure the effective provision of information to the civil authorities.

78. The MOD facilities provided should be suitable for their purpose and thereby facilitate an effective response.