



**Ministry
of Defence**

**JSP 518
Regulation of the Naval Nuclear Propulsion
Programme**

Part 2: Guidance

Preface

How to use this JSP

1. JSP 518 is intended as the primary source documentation describing independent Defence safety regulation of the Naval Nuclear Propulsion Programme. It is designed to be used by staff responsible for both the regulation of activities delivered by Duty Holders and the staff of the Duty Holders within the Defence Nuclear Programme. This JSP contains the policy and direction on nuclear safety regulation and guidance on the processes involved and best practice to apply. This JSP will be reviewed at least annually.

2. The JSP is structured in two parts:

- a. Part 1 - Directive, which provides the direction that must be followed in accordance with Statute, or Policy mandated by Defence or on Defence by Central Government.
- b. Part 2 - Guidance, which provides the guidance and best practice that will assist the user to comply with the Directive(s) detailed in Part 1.

Related JSPs	Title
JSP 538	Regulation of the Nuclear Weapon Programme
JSP 471	Defence Nuclear Emergency Response
JSP 815	Defence Health, Safety and Environmental Protection

Coherence with other Defence Authority Policy and Guidance

3. Where applicable, this document contains links to other relevant JSPs, some of which may be published by different Defence Authorities. Where particular dependencies exist, these other Defence Authorities have been consulted in the formulation of the policy and guidance detailed in this publication.

Training

4. Details of relevant training applicable to the DNP including safety regulation are identified in individual post specifications and/or terms of reference and the associated training plans developed against the Nuclear Competence Framework, published by the Head of the nuclear profession.

Further Advice and Feedback- Contacts

5. The owner of this JSP is DSEA-DNSR. For further information on any aspect of this guide, or questions not answered within the subsequent sections, or to provide feedback on the content, contact:

Job Title/E-mail	Project focus	Phone
DNSR Nuclear Propulsion Regulator Dsea-dnsr-npr@mod.uk	Nuclear Propulsion Regulation	03067932389

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Chapter 1 Authorisee and Duty Holder Guidance

Introduction

1. This Chapter provides information and guidance on a selection of topics that are referred to in the JSP or are topics that have general applicability. The range of topics discussed and the information presented is not intended to be exhaustive and the reader should consult other authoritative advice and guidance, such as that issued by the Office for Nuclear Regulation (ONR) and the International Atomic Energy Agency (IAEA) on these and other topics as required.

2. The guidance to Authorisees and Duty Holders offered in the attached Annexes is based largely on that which was available in the preceding issues of JSP 518 and JSP 538 and is generally being retained with minimal change. However, the guidance has been amended where necessary, e.g. to reflect changes made to AC 17 and 36, and to reflect guidance that has been issued subsequently.

3. The Annexes to this Chapter provide guidance on the following topics:

Annex A – Guidance on Specific Topics, Provided by DNSR for Authorisees and Duty Holders

Annex B – Guidance on the Application of the Authorisation Conditions

Annex C – Guidance on the Application of Further Authorisation Conditions

Annex D – Guidance on the Application of the Authorisation Conditions for the Approving Authority

Annex E – Standard Statements (of the UK, USA and France in respect of information provided on the operation of nuclear powered warships in foreign countries)

Annex A to Chapter 1: Guidance on Specific Topics, Provided by DNSR, for Authorisees and Duty Holders

Below is a list of guidance on specific topics, provided by DNSR, for Authorisees and Duty Holders:

1. DNSR, Guide to an Application for UK Defence Nuclear Programme Competent Authority Approval of a Transport Package for Radioactive Material (IAEA 2009 & 2012 Regulations), Issue 19, dated April 2013.

Annex B to Chapter 1: Guidance on the Application of the Authorisation Conditions

AC1 Guidance Note	Interpretation
AC2 Guidance Note	Marking of the Site Boundary
AC3 Guidance Note	Restrictions on Dealing with the Site
AC4 Guidance Note	Restrictions on Nuclear Matter on the Site
AC5 Guidance Note	Consignment of Nuclear Matter
AC6 Guidance Note	Documents, Records, Authorities and Certificates
AC7 Guidance Note	Incidents on the Site
AC8 Guidance Note	Warning Notices
AC9 Guidance Note	Instructions to Persons on the Site
AC10 Guidance Note	Training
AC11 Guidance Note	Emergency Arrangements
AC12 Guidance Note	Duly Authorised and Other Suitably Qualified and Experienced Persons
AC13 Guidance Note	Nuclear Safety Committee
AC14 Guidance Note	Safety Documentation
AC15 Guidance Note	Periodic Review
AC16 Guidance Note	Site Plans, Designs and Specifications
AC17 Guidance Note	Management Systems
AC18 Guidance Note	Radiological Protection
AC19 Guidance Note	Construction or Installation of New Plant
AC20 Guidance Note	Modification to Design of Plant Under Construction
AC21 Guidance Note	Commissioning
AC22 Guidance Note	Modification or Experiment on Existing Plant
AC23 Guidance Note	Operating Rules
AC24 Guidance Note	Operating Instructions
AC25 Guidance Note	Operational Records
AC26 Guidance Note	Control and Supervision of Operations
AC27 Guidance Note	Safety Mechanisms, Devices and Circuits
AC28 Guidance Note	Examination, Inspection, Maintenance and Testing
AC29 Guidance Note	Duty to Carry Out Tests, Inspections and Examinations
AC30 Guidance Note	Periodic Shutdown
AC31 Guidance Note	Shutdown of Specified Operations
AC32 Guidance Note	Accumulation of Radioactive Waste
AC33 Guidance Note	Disposal of Radioactive Waste
AC34 Guidance Note	Leakage and Escape of Radioactive Material and Radioactive Waste
AC35 Guidance Note	Decommissioning
AC36 Guidance Note	Organisational Capability

AUTHORISATION CONDITION 1 - INTERPRETATION

GUIDANCE NOTE

Introduction

1. The purpose of this Condition is to ensure there is no ambiguity in the use of certain specified terms which are found in the text of the Conditions. It also contains important powers for Defence Nuclear Safety Regulator (DNSR) to modify, revise or withdraw approvals, etc. and to approve modifications to any matter currently approved. Where appropriate, reference is made back to the relevant statutory Acts of Parliament.

Guidance to Authorisees

2. The following regulatory controls are used throughout the Conditions and have the following definitions and meanings:

Consent

Explanation: A consent is required before an Authorisee can carry out any activity for which DNSR has so specified the need.

Reason for use: A consent is used to ensure an Authorisee does not carry out an activity before DNSR has been satisfied that the proposed course of action is safe and all necessary procedures and controls are in place.

Approval

Explanation: An Authorisee is required to submit its arrangements for approval if so specified by DNSR.

Reason for use: An approval is used to freeze an Authorisee's arrangements. Once approved no alteration or amendment can be carried out without further approval by DNSR.

Direction

Explanation: A direction requires an Authorisee to take a particular action.

Reason for use: A direction is used for matters of major or immediate importance.

Agreement

Explanation: An agreement allows an Authorisee to proceed in accordance with its own arrangements.

Reason for use: Where the need to obtain DNSR's agreement is written into the Authorisee's arrangements, it prevents an Authorisee from proceeding unless the course of action has been agreed.

Notification

Explanation: When so notified, an Authorisee is required to submit information to DNSR.

Reason for use: A notification to an Authorisee is used to request the submission of information to DNSR.

Specification

Explanation: A specification issued by DNSR requires an Authorisee to implement the specified arrangements.

Reason for use: A specification is the means by which DNSR can implement discretionary control over an Authorisee's arrangements.

3. To differentiate between the use of these terms by DNSR and other organisations, the terms may be prefixed by 'DNSR' or 'regulatory'.

AUTHORISATION CONDITION 2 - MARKING OF THE SITE BOUNDARY

GUIDANCE NOTE

Introduction

1. The purpose of this Condition is to ensure that the Authorisee takes the necessary steps to make Authorised sites, facilities, Nuclear Powered Warships (NPW) and transportation secure in order to prevent unauthorised persons injuring themselves or damaging safety related plant or equipment.

Scope

2. This guidance relates to the identification, marking, inspection and maintenance of security by fences or other appropriate means around the sites, facilities, NPW or transportation, which are subject to Authorisation.

Guidance to Authorisees

3. The Authorisation Condition Compliance Statement should be sufficiently comprehensive to provide the basis for evidence that the safety management organisation and arrangements, including interfaces are adequate. Consideration should be given to the following:

a. Clear identification, using maps and plans as necessary, of the coverage of Authorisation. For sites, this should include a definition of any sea areas and the seaward boundary. This includes an indication of access controls, including both within and around any NPW and transportation.

b. Identification of the lines of responsibility for the control of access between individuals within each Life Cycle Phase and between Authorisees.

c. Any special precautions taken to prevent unauthorised entry, including patrols, manning and controls during movements. Fences, boundary markings, signs etc. should be provided as appropriate, not only warning of the restricted nature of an area but also giving hazard and emergency action information. See also Authorisation Condition 8 (AC8).

d. The arrangements for the inspection and maintenance of boundary markings, fences, signs, etc. including identification of those persons with the responsibility for carrying out such inspection and maintenance.

4. It is DNSR policy that all Defence Nuclear Programme activities will, as far as is practicable, be subject to Authorisation. However, the Office for Nuclear Regulation (ONR) Nuclear Licensed Site boundaries are recognised by DNSR and are not required to be separately marked as Authorised site boundaries. As such, this Condition does not require those Authorisees who are also Licensed to apply measures in addition to those which satisfy Licence Condition 2 (LC2).

5. Where a Licensed Site has an attached area in which relevant support activities are undertaken by the same Licensee, but are not licensable activities under Nuclear Installations Act 65, AC2 will apply to that area. Hence the Authorisee's site will encompass all his relevant activities and compliance will be covered by compliance statements against LC2 for the licensed activities and AC2 for the remaining Authorised activities.

6. Suitable arrangements for security should be made by the sponsoring Authorisee or the Duty Holder at those sites that are not Authorised in their own right.
7. Whilst the assessment of the adequacy of security requirements implemented to prevent unauthorised access falls outside the scope of DNSR regulation, due credit will be given where such security arrangements effectively enhance the safety arrangements for restricted access. This Condition does not require the Authorisee to apply security measures in addition to those contained in JSP 440.

AUTHORISATION CONDITION 3 - RESTRICTIONS ON DEALING WITH THE SITE

GUIDANCE NOTE

Introduction

1. The purpose of this Condition is to ensure that the Authorisee does not let, convey, assign, feu or transfer any part of the Authorised site to a third party without seeking the permission of the Defence Nuclear Safety Regulator (DNSR). This is to ensure that the Authorisee does not change the character of the activities that are Authorised and to prevent activities being carried out on the site which could put nuclear operations at risk. Also it is essential that nothing confuses the absolute responsibility of the Authorisee in respect of safety on the whole Authorised site or activity. The Authorisee should be able to demonstrate that there are organisational procedures to prevent individuals from conveying, assigning, transferring, feuing or granting any Authorisations in relation to the site or parts of the site without first obtaining the consent of DNSR.

Scope

2. See Introduction.

Guidance to Authorisees

3. The Authorisee should include a simple but enforceable statement in his documented arrangements to the effect that he will not let, convey, assign, transfer, feu or grant any Authorisation in relation to the site, Nuclear Powered Warship or transportation under his control without first obtaining DNSR's consent.

AUTHORISATION CONDITION 4 - RESTRICTIONS ON NUCLEAR MATTER ON THE SITE

GUIDANCE NOTE

Introduction

1. The purpose of this Condition is to ensure that the Authorisee has adequate arrangements to control the introduction and storage of nuclear matter on the Authorised site or Nuclear Powered Warship (NPW) to ensure safety. It also provides Defence Nuclear Safety Regulator (DNSR) with powers to specify that certain types of nuclear matter cannot be brought onto the site or NPW without the consent of DNSR. This enables DNSR to intervene to ensure that, for specific activities, it can assess the adequacy of the Authorisee's arrangements before nuclear matter is brought onto the site. *(Nuclear matter being nuclear fuel, radioactive waste, etc. as defined by the NI Act).*

Scope

2. This guidance describes the arrangements for controlling nuclear matter being brought onto or stored on a site or NPW, or transported within a site and for the production and keeping of records pertaining to such matter.

Guidance to Authorisees

3. The Authorisation Condition Compliance Statement should be sufficiently comprehensive to provide the basis for evidence that the safety management organisation and arrangements, including interfaces are adequate. Consideration should be given to the following:

- a. The management responsibilities of all personnel who are responsible for the processing, recording and storing of radioactive matter.
- b. The arrangements for ensuring that no nuclear matter is brought onto or stored on site or NPW or transportation within a site, unless:
 - (1) a safety case for the handling, storage or transport of that matter is in place;
 - (2) the Conditions and Limits of Safe Operation have been defined;
 - (3) operating instructions have been issued to ensure that the conditions and limits of safe operation are observed.
- c. The safety case needs to indicate the type and form of nuclear matter, the method of storage and how traceability of the matter will be achieved. These arrangements should include how any radioactive matter brought onto the site or NPW is managed.
- d. The safety case should include a justification for the use of all transport, storage flasks, packages and containers. The safety case should indicate the type and form of nuclear matter, the method of storage and how traceability of the material is achieved.
- e. The arrangements for ensuring that no nuclear matter is brought onto a site or NPW for the first time without the consent of DNSR.

- f. The arrangements for the production and keeping of all records which pertain to the introduction, storage, processing and transfer of nuclear matter.
- 4. Where matter is to be transferred between Authorisees then the arrangements must reflect the duty of co-operation between the Authorisees.
- 5. DNSR will not normally wish to be involved in the movement or use of sealed sources used for radiography except where there is a potential hazard which needs to be taken into account by the safety management arrangements. Further guidance on High Activity Sealed Sources is given in Authorisation Condition 25 guidance notes.

AUTHORISATION CONDITION 5 - CONSIGNMENT OF NUCLEAR MATTER

GUIDANCE NOTE

Introduction

1. The purpose of this Condition is to ensure that the transfer of nuclear matter, other than excepted matter and radioactive waste, to sites in the UK other than relevant sites:
 - a. is carried out only with the consent of Defence Nuclear Safety Regulator (DNSR); and that
 - b. the Authorisee has adequate records of where such nuclear matter has been sent (Authorisation Condition 6). The Authorisee should also be able to demonstrate that there are organisational procedures to prevent individuals from consigning such matter to non-relevant sites without first obtaining a Consent from DNSR.
2. This Condition is aimed at ensuring not only that there is a record of where nuclear matter has been sent to, but also so that DNSR can be sure that there are adequate arrangements for safely handling such material at the destination.
3. For the Defence Nuclear Programmes, a relevant site (as defined in S26 of the Nuclear Installations Act 1965) is identified as:
 - a. Licensed site;
 - b. an Authorised site;
 - c. Nuclear Powered Warship.

Scope

4. This guidance relates to the consignment of nuclear matter to relevant sites and the requirement for making and preserving a record of all consignments of nuclear matter, including excepted matter and radioactive waste.

Guidance to Authorisees

5. The Authorisation Condition Compliance Statement should be sufficiently comprehensive to provide the basis for evidence that the safety management organisation and arrangements, including interfaces are adequate. Consideration should be given to the following:
 - a. The management responsibilities of all personnel responsible for the consignment of nuclear matter.
 - b. The arrangements for ensuring that nuclear matter, other than excepted matter and radioactive waste, is consigned only to a relevant site.
 - c. The arrangements for recording details of all consignments of nuclear matter, including excepted matter and radioactive waste.
 - d. The arrangements for ensuring the preservation of records for the specified period.

- e. The arrangements for ensuring that nuclear matter is not consigned to any place other than a relevant site without the consent of DNSR.
- 6. Any change in the Authorisee responsible for nuclear matter should be regarded as a consignment of nuclear matter from one Authorisee to another.
- 7. For consignments of nuclear matter (apart from excepted matter and waste) from a licensed Defence Nuclear Programme site to a non-Defence Nuclear Programme site, the Consent of ONR will be accepted by DNSR.

AUTHORISATION CONDITION 6 - DOCUMENTS, RECORDS, AUTHORITIES AND CERTIFICATES

GUIDANCE NOTE

Introduction

1. The purpose of this Condition is to ensure that adequate records are held by the Authorisee for a suitable period to ensure that the safety case for operation is available at all times, that design and construction information is available for decommissioning, that operational records are available to assist investigations in the event of an accident or incident and operational records are available for the statutory number of years after the cessation of operations for the purpose of assisting any claims of damage to health as a result of exposure to ionising radiation.

Scope

2. This guidance refers to the management of records associated with the Authorisation Conditions and statutory requirements.

Guidance to Authorisees

3. The Authorisation Condition Compliance Statement should be sufficiently comprehensive to provide the basis for evidence that the safety management organisation and arrangements, including interfaces are adequate. Consideration should be given to the following:

- a. The management responsibilities of all personnel responsible for the production of documents, records, authorities and certificates and for the preservation of all documentation.
- b. The arrangements and keeping of records of:
 - (1) the accumulated effective dose to all personnel who have been employed on Defence Nuclear Programme activities;
 - (2) personnel health records; and
 - (3) any reports investigating over-exposure;

for 50 years after completion of last entry. All other records relating to the control of exposure such as monitoring, dosimetry service, radioactive substance accounting etc should be kept for at least 2 years. Records are a means of demonstrating that statutory requirements have been met.

c. The management arrangements for controlling documentation and how its storage and preservation is carried out, including the generation of a record retention schedule, record schedules and the means of record retrieval. This should take account of the challenge of obsolescence of hardware and any associated software, and also loss of operator skills. Arrangements should demonstrate how the continued viability of the records is maintained and how often the recording method is subject to periodic review for its longevity.

- d. The arrangements for assessing the minimum time scale for the maintenance of records unless agreement to the contrary has been reached with Defence Nuclear Safety Regulator.
- e. The arrangement for safeguarding records against hazards which may render the records unusable. These hazards include such events as fire, flood and adverse environments. Safeguards may include duplication of records or high integrity storage.
- f. The maintenance of adequate records for design, safety justification, production, testing, operation, support, modification and decommissioning is essential to the long-term safety of the Defence Nuclear Programmes and to satisfy legislative requirements.

AUTHORISATION CONDITION 7 - INCIDENTS ON THE SITE

GUIDANCE NOTE

Introduction

1. The purpose of this Condition is to ensure that the Authorisee has adequate arrangements to deal with incidents that may occur within the scope of the Authorisation. It is essential that the Authorisee keeps a record of all such incidents, notifies Defence Nuclear Safety Regulator (DNSR) when appropriate, investigates the cause of each incident and produces a report of the investigation to ensure that lessons are learnt.

Scope

2. This guidance relates to incidents, as defined in the glossary.

Guidance to Authorisee

3. The Authorisation Condition Compliance Statement should be sufficiently comprehensive to provide evidence that the safety management organisation and arrangements, including interfaces are adequate. Consideration should be given to the following:

- a. The management responsibilities of all personnel responsible for reporting incidents.
- b. The arrangement for reporting, investigating, reviewing and assessing all incidents that directly or indirectly affect nuclear or radiological safety, including notifying and reporting incidents to DNSR.
- c. The arrangements for the categorisation of incidents against the International Nuclear Events Scale.
- d. The above should include arrangements for:
 - (1) appointing personnel to implement and supervise the arrangements;
 - (2) categorising incidents, occurrences and deviations;
 - (3) ensuring staff awareness of the need for reporting incidents and events;
 - (4) ensuring an open approach to the reporting and assessment of incidents;
 - (5) specifying the appropriate level of investigation;
 - (6) referring the reports to the Nuclear Safety Committee and to DNSR;
 - (7) implementing recommendations;
 - (8) ensuring staff awareness of the lessons learned from incidents;
 - (9) reviewing and analysing all incidents for trends in location, type, cause etc. and promulgating the lessons learned;
 - (10) analysing incidents occurring elsewhere and applying any applicable lessons learned;

- (11) auditing the incident reporting and assessment system;
 - (12) providing an annual report to the respective safety committee on the effect of incidents on the validity of the respective safety justification;
 - (13) the control and storage of documentation recording incidents.
- e. The arrangements for managing the interface with the Approving Authority (incorporating the Design Authority) for the provision of support where appropriate.

DNSR Expectation

4. All incidents with the potential to adversely affect safety are to be notified to DNSR and a verbal brief provided at the earliest practicable opportunity following the incident. This will enable DNSR to fulfil its duties under the defence ministerial reporting requirements. The timing of the notification will depend upon the safety significance or regulatory profile of the incident or event and will range between:

- (1) immediate notification by pager, telephone or fax;
- (2) notification on the next working day;
- (3) notification on the next Inspector's visit;
- (4) notification during the Inspector's review of the Authorisee's event reporting process.

5. The Authorisee is to provide routine reports covering all safety related incidents not falling into the more serious category above.

6. DNSR to be informed of the assessment of incidents.

7. DNSR to be informed of any other incident/event/occurrence that might attract public and/or media attention.

8. The Authorisee is to submit proposals covering the period for retention of records relating to incidents for agreement by DNSR.

AUTHORISATION CONDITION 8 - WARNING NOTICES

GUIDANCE NOTE

Introduction

1. The purpose of this Condition is to ensure the safety of all people on the site, Nuclear Powered Warship (NPW) or during transportation so that they can respond appropriately and without delay to an emergency situation. The Authorisee therefore needs to ensure that all warning notices are in appropriate places to advise people on what to do in that area in the event of a fire or any other emergency.

Scope

2. This guidance relates to the placing of notices on site, NPW or during transportation to ensure that personnel, visitors and contractors are made aware of:

- a. the meaning of any warning signal;
- b. the location of emergency exits or exit routes;
- c. the actions to be taken in the event of an emergency.

Guidance to Authorisees

3. The Authorisation Condition Compliance Statement should be sufficiently comprehensive to provide the basis for evidence that the safety management organisation and arrangements, including interfaces are adequate. Consideration should be given to the following:

- a. The management responsibilities of all personnel responsible for the arrangements that ensure that there are appropriate, sufficient, up-to-date and suitably positioned notices and signs that denote potential hazards, explaining the meaning of all warning signals and identifying the measures to be taken in the event of an emergency.
- b. The arrangements that ensure all escape routes, emergency exits and equipment, and assembly points are clearly marked and are not obstructed.
- c. The review arrangements that ensure all notices and signs remain valid and are maintained in a legible condition, including the recording of such reviews. It should be recognised that notices and signage may vary depending on the activity being undertaken and periods when normal operation may be disrupted.
- d. The arrangements for ensuring that the dependence upon notices and signs is consistent with the training and briefings which should be given to personnel, including visitors and contractors who may not be familiar with local arrangements
- e. Warning notices and signs should be sufficiently clear to avoid confusion between the response to nuclear and non-nuclear emergencies.
- f. A 'warning notice' is defined as a notice which states one or more of the following:
 - (1) the meaning of a warning signal;

- (2) the hazard associated with a warning signal;
- (3) the action to be taken by individuals in response to a warning signal in order to avoid or minimise exposure to the hazard associated with the signal.

4. Notices and safety signs associated with the required response, e.g. signs for emergency exits, evacuation routes and muster points, and the location of emergency equipment, should be classed as warning notices.

5. A warning signal is an acoustic signal and/or illuminated sign used to indicate an accident or emergency condition requiring the person(s) hearing/seeing it to take specific action to protect themselves from harm, e.g. a fire alarm. Alarms that require action solely to maintain a process or operation within defined safety limits do not fall within this definition.

AUTHORISATION CONDITION 9 - INSTRUCTIONS TO PERSONS ON THE SITE

GUIDANCE NOTE

Introduction

1. The purpose of this Condition is to ensure that the Authorisee provides adequate instructions to all persons allowed on the site, Nuclear Powered Warship (NPW) or involved in transportation so that they are aware of the risks and hazards associated with nuclear activities, the precautions that must be taken to minimise the risk to themselves and others and the actions to be taken in the event of an accident or emergency.

Scope

2. This guidance covers the provision of instruction to all persons who are authorised to enter a site, NPW or be involved in transportation for any purpose. The information provided to any person should be appropriate and adequate for the circumstances under which the person is authorised to be present.

Guidance to Authorisees

3. The Authorisation Condition Compliance Statement should be sufficiently comprehensive to provide the basis for evidence that the safety management organisation and arrangements, including interfaces are adequate. Consideration should be given to the following:

- a. The management responsibilities of all personnel responsible for the provision of instructions.
- b. The arrangements for authorising persons, including contractors and visitors, to be on site or NPW or involved in transportation, including the arrangements for instruction of personnel on such topics as ionising radiations, nuclear emergencies, fire and bomb/terrorist alerts and making them formally aware of the hazards and the emergency arrangements, and how such arrangements relate to non-nuclear emergency arrangements.
- c. The arrangements for determining the content of the instruction provided, including an audit trail back to the hazards and emergency arrangements.
- d. The arrangements for co-operation between Authorisees where their activities overlap, typically when a NPW or transportation is within the site boundary.
- e. The arrangements for assessing that the outcome of instructions is acceptable.
- f. The arrangements for ensuring that records of staff training are kept.
- g. The arrangements for managing the interface with the Approving Authority (incorporating the Design Authority) for the provision of information regarding the risks and hazards associated with a NRP, a nuclear weapon, component or relevant support equipment, the precautions to be observed in connection therewith and the action to be taken in the event of an accident or emergency.

AUTHORISATION CONDITION 10 - TRAINING

GUIDANCE NOTE

Introduction

1. The purpose of this Condition is to ensure that all people who carry out activities during design, construction, manufacture, commissioning, operation or decommissioning which may affect safety are adequately trained for that purpose. The Authorisee is expected to ensure that the necessary training requirements are identified for each activity, that individuals who carry out these activities can demonstrate that they have received such training and that records are kept to demonstrate that individuals have been trained. This Condition is in addition to the general duty under the Health and Safety at Work etc Act 1974 (HSWA) s.2(2) and the Ionising Radiation Regulations 1999, Reg. 14.

Scope

2. This guidance applies to the training requirements for all persons with specific safety responsibilities, including non-nuclear safety where this may have implications for nuclear or radiological safety. It is applicable to all organisations, whether they are regulated through the framework of Authorisation or not and includes, those with emergency response responsibilities.

Guidance to Authorisees

3. The Authorisation Condition Compliance Statement should be sufficiently comprehensive to provide the basis for evidence that the safety management organisation and arrangements, including interfaces are adequate. Consideration should be given to the following:

- a. The management responsibilities of all personnel responsible for ensuring the provision of safety training to personnel who have responsibility for any operations that may affect nuclear or radiological safety.
- b. The arrangements that ensure that a training plan is developed and maintained and equates to the training and qualifications required to undertake duties of safety specific posts.
- c. The arrangements that ensure that records are kept in a training register to show that safety post holders have the required qualifications. Where personnel have more than one role, for instance their main post and also a role in responding to emergencies, then the training needs of both roles should be considered jointly.
- d. The process of assessing posts' training requirements should consider the demands of any relevant safety case and the performance, skill, experience and knowledge of post holders which the safety case assumes.
- e. The arrangements for ensuring a continuing programme of formal and practical training, including any new training needs and periodic refresher training.
- f. The arrangements for gaining assurance that lodger units and contractors have adequate training arrangements. Where additional resources within an Authorisee's organisation are provided by contractors (for instance as secondees), then these staff should be treated as if they were employed by the Authorisee for the purposes of Authorisation Condition 10.

- g. The arrangements for:
- (1) establishing the training need;
 - (2) approving the training solution for each safety specific post;
 - (3) approving the training delivery;
 - (4) planning and providing the training;
 - (5) verifying that the training is meeting the identified need.
- h. The arrangements for managing the interface with the Approving Authority (incorporating the Design Authority) for the provision of information to support the structuring and content of training.

AUTHORISATION CONDITION 11 - EMERGENCY ARRANGEMENTS

GUIDANCE NOTE

Introduction

1. The purpose of this Condition is to ensure that the Authorisee has adequate arrangements in place to respond effectively to any emergency. The Authorisee is required to have arrangements in place to cover a wide range of events including those which can result in a significant release of radioactive material into the environment. The Condition gives Defence Nuclear Safety Regulator (DNSR) powers to ensure that the Authorisee's emergency arrangements are exercised. DNSR uses its powers to ensure the Authorisee's exercises demonstrate adequate performance to protect both workers and the public.

Scope

2. This guidance relates to the arrangements for dealing with any emergency which has nuclear safety implications. This includes situations where no actual hazard exists but where the potential for a hazard to arise is identified.

Guidance to Authorisees

3. The Authorisation Condition Compliance Statement should be sufficiently comprehensive to provide the basis for evidence that the safety management organisation and arrangements, including interfaces are adequate. Consideration should be given to the following:

- a. The management responsibilities for those personnel who are responsible for emergency response planning.
- b. The arrangements for defining and reviewing the risk and hazard assessments which derive from the emergency arrangements, and the key conclusions of the risk and hazard assessments.
- c. The arrangements for preparing the operating organisation's emergency plan on the basis of the risk and hazard assessment.
- d. The arrangements for ensuring that any person who has duties in relation to the emergency arrangements is a Suitably Qualified and Experienced Person, and is provided with training, instructions, equipment, etc.
- e. The arrangements for ensuring that all persons on site, Nuclear Powered Warship, or involved in transportation who may be affected by the emergency, are provided with the necessary instruction, training, equipment etc.
- f. The arrangements for ensuring that any external organisation with a role in the emergency arrangements (e.g. the emergency services) is appropriately consulted and provided with all necessary information.
- g. The arrangements for providing coherent information to the local authority to enable the preparation of an off-site plan, including identification of the key aspects of the information provided.
- h. The arrangements for providing advance information to the local community.

- i. The key aspects of the emergency arrangements, including the provision of support to the off-site plan and, in each case, the response capability or performance standard which the arrangements are intended to achieve.
- j. The arrangements for assessing the adequacy of the emergency arrangements and for ensuring that each aspect of the emergency arrangements, including the interfaces with external agencies, is exercised at appropriate intervals.
- k. How the emergency arrangements and any amendments thereto are approved.
- l. The arrangements for ensuring compliance with the provisions of the Radiation (Emergency Preparedness and Public Information) Regulations (REPPIR) (2001).
- m. The arrangements for managing the interface with the Approving Authority (incorporating the Design Authority) for the provision of information and support to Authorisees in the event of an emergency.

DNSR Expectation

- 4. In accordance with REPPIR regulation 13(1)(1)(b), site Authorisees and Duty Holders as appropriate are to notify DNSR in addition to the ONR without delay in the event of either a radiation emergency or an event which could reasonably be expected to lead to a radiation emergency.
- 5. DNSR will specifically approve arrangements for this Authorisation Condition (AC) and under sub clause (2) will expect to be provided with evidence, for DNSR agreement, that Authorisees have developed performance standards based on those detailed in JSP 471.
- 6. In accordance with AC11(2), site Authorisees and Duty Holders as appropriate are to submit to DNSR for approval such parts of their emergency arrangements as are sufficient to demonstrate compliance with the requirements of AC11.
- 7. In accordance with AC11(5), Authorisees and Duty Holders as appropriate are to rehearse their on-site emergency arrangements at intervals not exceeding 1 year, other than by agreement with DNSR, the scope of the rehearsal to be agreed with DNSR on a case-by-case basis.

DNSR Guidance to Authorisees Further to the Radiation (Emergency Preparedness and Public Information) Regulations (REPPIR) 2001

- 8. Further to REPPIR Regulation 7(6)(b), DNSR should in all cases be included in the consultations conducted by site Authorisees and Duty Holders as appropriate for the purpose of preparing an operator's plan, in accordance with Regulation 7(1), or of reviewing the plan (in accordance with Regulation 10(1)).

AUTHORISATION CONDITION 12 - DULY AUTHORISED AND OTHER SUITABLY QUALIFIED AND EXPERIENCED PERSONS

GUIDANCE NOTE

Introduction

1. The purpose of this Condition is to ensure that only Suitably Qualified and Experienced Persons (SQEP) perform duties which may affect safety. The Authorisee is required to ensure that all activities that can affect safety are identified and the experience and qualification requirements for people to carry out these activities are defined. The Authorisee must ensure that the qualifications and experience of people match those required for the job. The Condition gives Defence Nuclear Safety Regulator (DNSR) the power to remove a person from safety related work if he or she is not suitably qualified or experienced for the job.

Scope

2. This guidance relates to nuclear safety and non-nuclear safety where this may have nuclear or radiological safety implications.

Guidance to Authorisees

3. The Authorisation Condition Compliance Statement should be sufficiently comprehensive to provide the basis for evidence that the safety management organisation and arrangements, including interfaces are adequate. Consideration should be given to the following:

- a. The management responsibilities of all personnel responsible for post profiling and identification of required qualifications and experience of individuals who are to fill each nuclear safety related post.
- b. A description of the system for post profiling, the required qualifications and experience of the individuals who are to fill each nuclear safety related post.
- c. The methods of defining the categorisation of each post and the arrangements that apply for managing the categorisation.
- d. The arrangements that ensure that:
 - (1) only SQEP carry out the duties that may affect nuclear or radiological safety;
 - (2) only Duly Authorised Persons (DAP) are appointed to posts which provide specific control and supervision functions significantly affecting nuclear and radiation safety.
- e. A description of the arrangements for appointing DAP, including the circumstances under which they hold authority, what that authority is, how that authority is transferred/relinquished, and how the DAP's authority is made known to other Authorisees' personnel.
- f. The arrangements that ensure that contractors have an appropriate level of expertise, are qualified to perform the tasks required, or alternatively are supervised by SQEP throughout their work. Contractors who are Authorisees in their own right, are

subject to the requirements of this Authorisation Condition and other contractors should adhere to these arrangements under the scrutiny of their parent Authorisee or Duty Holder.

g. Design and procurement activities are often carried out by external contractors who are not subject to the controls on qualifications and experience specified here. Authorisees should be able to provide assurance to DNSR that acceptable controls for appointing persons with the appropriate competence, qualifications and experience are in place in such organisations.

h. The 'waiver' arrangements for appointments should ensure that:

(1) the lack of qualification or experience is formally recorded along with the considerations which, permit the appointment;

(2) all waivers are controlled, managed, approved and regularly reviewed;

(3) an appropriate timescale is set defining the period of validity of the waiver.

i. The arrangements for identifying projected SQEP requirements to undertake future work programmes and the process for ensuring that future SQEP requirements are met.

j. The arrangements for appointing and training personnel to ensure that waivers are only necessary in exceptional circumstances and that they are not used as a palliative measure to overcome foreseeable and avoidable shortages of SQEP.

k. The Authorisees' arrangements for managing the interface with the Approving Authority (incorporating the Design Authority) for the provision of information about the qualifications and experience of personnel conducting nuclear activities.

DNSR Expectation

4. The Authorisee to categorise posts in organisations according to their safety significance.

5. DNSR will expect to give agreement to those posts in the highest class, including the qualifications and experience relevant to those posts.

6. DNSR will expect to give agreement to a waiver if it is proposed to appoint someone in the highest class who does not meet the agreed qualifications and experience for the post.

AUTHORISATION CONDITION 13 - NUCLEAR SAFETY COMMITTEE

GUIDANCE NOTE

Introduction

1. The purpose of this Condition is to ensure that the Authorisee sets up a senior level committee to consider and advise the Authorisee on matters which affect the safe design, construction, commissioning, manufacturing, operation and decommissioning on its Authorised site and any other matter relevant to safety. The committee must have members who are adequately qualified to perform this task including members who are independent of the Authorisee. The Condition gives Defence Nuclear Safety Regulator (DNSR) the power to veto the appointment of or continued presence of any member. The committee is intended to act as a check on the Authorisee's decision making process to ensure that safety considerations are given due weight. However, the committee is intended to be purely advisory and must not be considered to have an executive function. Where the Authorisee rejects the advice of the committee the Condition requires the Authorisee to notify DNSR; in this way DNSR can investigate the justification of the Authorisee's safety related actions.

Scope

2. This guidance relates to the Authorisee's or Duty Holder's Nuclear Safety Committee (NSC). The NSC's responsibilities should also cover all those aspects that are required by other Conditions and any other topic requested by the Authorisee or Duty Holder.

Guidance to Authorisees

3. The Authorisation Condition Compliance Statement should be sufficiently comprehensive to provide the basis for evidence that the safety management organisation and arrangements, including interfaces are adequate. Consideration should be given to the following:

- a. The management responsibilities of all personnel involved with the NSC.
- b. The Terms of Reference (ToRs) for the NSC, including the arrangements for providing the ToRs to DNSR for approval.
- c. The constitution of the NSC, in particular the rules of attendance, what constitutes a quorum, the number of independent members, and members' experience and qualifications.
- d. The arrangements for managing the NSC.
- e. The arrangements for making appointments to the NSC, including informing DNSR of the name, experience, qualifications and details of current and past posts held by each member.
- f. The arrangements for emergency meetings or out of committee decisions of the NSC, when urgent advice is sought but a properly constituted meeting is not practicable.
- g. The arrangements that ensure a record of the committee's membership, the minutes of meetings, papers and reports considered are maintained.
- h. The status of the NSC advice and the action to be taken if the Authorisee or Duty Holder rejects such advice.

- i. The arrangements for notifying DNSR, as soon as practicable, if it is intended to reject, in whole or in part, any advice given by any such committee together with the reason for such rejection.

DNSR Expectation

4. DNSR will specifically approve the ToRs of the NSC.

AUTHORISATION CONDITION 14 - SAFETY DOCUMENTATION

GUIDANCE NOTE

Introduction

1. The purpose of this Condition is to ensure that the Authorisee sets up arrangements for the preparation and assessment of the safety related documentation used to justify safety during design, construction, manufacture, commissioning, operation and decommissioning. The arrangements for the assessment of safety related documentation are intended to ensure an independent review of the quality and accuracy of the Authorisee's safety related decisions and activities to ensure they have been adequately justified.

Scope

2. This guidance applies to the safety documentation produced to justify the safety during research, design, trials, development, construction, manufacture, commissioning, operation, modification and decommissioning.

Guidance to Authorisees

3. The Authorisation Condition Compliance Statement should be sufficiently comprehensive to provide the basis for evidence that the safety management organisation and arrangements, including interfaces are adequate. Consideration should be given to the following:

- a. The management responsibilities of all personnel responsible for the production and approval of the safety documentation.
- b. The arrangements to:
 - (1) prepare, peer review and assess safety documentation;
 - (2) ensure that safety documentation is categorised in accordance with its safety significance;
 - (3) ensure that safety documentation is produced by Suitably Qualified and Experienced Person(s) (SQEP);
 - (4) ensure that safety documentation is reviewed by independent SQEP;
 - (5) determine whether documentation which has higher categories of safety significance should be subjected to an Independent Nuclear Safety Assessment by SQEP, independent of the groups responsible for the production of the safety case or for activities;
 - (6) submit documents, where appropriate, after peer review to the Authorisee's own Nuclear Safety Committee;
 - (7) ensure that documentation is submitted to Defence Nuclear Safety Regulator (DNSR) in accordance with the categorisation scheme or as specified by DNSR. This includes the provision of the Nuclear Safety Committee's comments as appropriate;

(8) ensure that safety documentation is approved and reviewed at appropriate intervals. The level at which safety documentation is reviewed should be in accordance with the Authorisee's categorisation scheme.

c. The requirement for safety documentation to cover procurement, commissioning, operation, maintenance, modification, decommissioning of equipment or systems, supporting infrastructure if appropriate, and the management of radioactive waste products including their storage and disposal.

d. State the approval level of the safety documentation.

DNSR Expectation

4. With regard to Authorisation Condition 14(1) DNSR expects:

a. The Authorisee to categorise safety documentation according to safety significance.

b. To give agreement to activities described in safety documentation in the highest class.

c. To be able to 'Call in' any safety documentation.

AUTHORISATION CONDITION 15 - PERIODIC REVIEW

GUIDANCE NOTE

Introduction

1. The purpose of this Condition is to ensure that the Authorisee periodically stands back and reviews the safety case against current standards to see if there are reasonably practicable improvements that could be made, to demonstrate that it is safe to continue to conduct nuclear activities for the next defined period and to identify any life limiting factors.

Scope

2. All safety cases, Statements of Compliance and Safety Justifications.

Guidance to Authorisees

3. The Authorisation Condition Compliance Statement should be sufficiently comprehensive to provide the basis for evidence that the safety management organisation and arrangements, including interfaces are adequate. Consideration should be given to the following:

- a. The management responsibilities of all personnel responsible for the periodic review of safety cases.
- b. The form of the review being undertaken. There are two types of review: the rolling programme of reviewing and updating safety cases and Statements of Compliance, and the less frequent stand-alone periodic review of the Safety Justification.
- c. The arrangements for reviewing safety justifications when any change, significant external event or emergent information arises.
- d. The procedure for managing the unplanned situation, especially as to whether the operation may continue.
- e. The arrangements for reporting and ensuring that results of all reviews are subjected to scrutiny by a sufficiently independent and competent body before submission to the Nuclear Safety Committee.
- f. The arrangements for agreeing, prioritising, planning and implementing recommendations from the review and obtaining agreement from Defence Nuclear Safety Regulator (DNSR) when significant safety or programme implications are identified.
- g. The arrangement for reviewing the safety justification if operation beyond the original justified period or equipment/system design life is considered.
- h. The arrangement for determining the scope and review periodicity, linking this to its life cycle and ensuring that the safety justification remains valid and is reviewed at intervals agreed by DNSR, e.g. whilst a typical timescale for periodic review is 10 years, for the Naval Reactor Plant this may be linked to the Long Overhaul Period programme.
- i. The means by which the standards and processes for the review reflect current best practice, are systematic, address developments in technology and safety

management, consider operating experience and emergent problems, address ageing, incorporate lessons learned from other sites and industries and address the principle of continuous improvement.

j. The arrangements for ensuring that a holistic view is adopted during each review.

AUTHORISATION CONDITION 16 - SITE PLANS, DESIGNS AND SPECIFICATIONS

GUIDANCE NOTE

Introduction

1. The purpose of this Condition is to ensure that the Authorisee indicates, using plans and schedules, any site, facility, Nuclear Powered Warship (NPW), transport activity or Naval Reactor Plant (NRP) which might affect safety and provides a schedule updated as necessary giving details of each and its associated operations. This is to ensure that the Authorisee and Defence Nuclear Safety Regulator (DNSR) are able to understand the content and function of the site, facility, NPW, transport activities or NRP.

Scope

2. This guidance relates to all site plans, plans, schedules and specifications for the site, facility, NPW, transport activity, NRP or utilities sufficient to define the activities and boundaries.

Guidance to Authorisees

3. The Authorisation Condition Compliance Statement should be sufficiently comprehensive to provide the basis for evidence that the safety management organisation and arrangements, including interfaces are adequate. Consideration should be given to the following:

- a. The management responsibilities of all personnel responsible for ensuring that site plans, design specifications and schedules are maintained up to date and are forwarded to DNSR at appropriate intervals.
- b. The purpose of each facility, transport activity, service and utility. Their design life and the period of validity of the Safety Justification should be stated.
- c. The arrangements that verify, at suitable periodicity, that the plans and schedules reflect the actual state of the subject of the plan or schedule.
- d. The arrangement which ensures that independent surveys of facilities, transport activities, services and utilities are commissioned at appropriate intervals to show fitness for purpose.
- e. The arrangements for ensuring that the proximity of any building does not constitute an unacceptable hazard to nuclear services.
- f. The arrangements for locating facilities to ensure that hazards are minimised and separated by distance.
- g. The arrangements for maintaining detailed plans of approved berths, facilities and associated services including any nuclear or explosives limitations on occupancy required by the site safety case.
- h. The arrangements that state the period for which plans, designs and specifications will be retained.

AUTHORISATION CONDITION 17 – MANAGEMENT SYSTEMS

GUIDANCE NOTE

Introduction

1. The purpose of this Condition is to ensure that the Authorisee establishes and implements management systems which give due priority to safety. This is to include the making and implementation of adequate quality management arrangements for all activities associated with the design, construction, manufacture, commissioning, operation and decommissioning on the site including the preparation and review of safety documentation. The Authorisee's arrangements are expected to include the provision of a quality management capability to oversee the specification, audit and review of quality management arrangements.

Scope

2. This guidance relates to the management systems implemented by Authorisees, Duty Holders and contractors, involved in activities covered by Defence Nuclear Safety Regulator (DNSR) Authorisation that may affect nuclear or radiological safety.

3. Duty Holders with responsibility for safety should have management systems, including quality management arrangements, appropriate to the scope and extent of their activities.

Guidance to Authorisees

4. The Authorisation Condition Compliance Statement should be sufficiently comprehensive to provide the basis for evidence that the safety management organisation and arrangements, including interfaces are adequate. Consideration should be given to the following:

- a. The management responsibilities of all personnel responsible for establishing, co-ordinating and maintaining the management systems.
- b. The arrangements for ensuring that any of the management systems processes (e.g. financial, commercial, project, industrial safety or environmental) give due priority to safety.
- c. The arrangements for managing and supervising work with safety implications, demonstrating a clear split in responsibility for the prescription of nuclear and radiation safety and adherence to the rules.
- d. The quality management arrangements, making reference to any accredited system being operated.
- e. The arrangements for monitoring, reviewing and maintaining documents and procedures.
- f. The management arrangements for periodic internal and external audits, including audits by independent competent bodies.
- g. The arrangements for rectification of shortfalls and deficiencies identified during audits, including the use of Safety Justification Plans and other arrangements to ensure that issues are not overlooked and that lessons are learned and managed.

AUTHORISATION CONDITION 18 - RADIOLOGICAL PROTECTION

GUIDANCE NOTE

Introduction

1. The purpose of this Condition is to ensure that the Authorisee makes and implements adequate arrangements to assess the average effective dose for any class or classes of workers. It also requires the Authorisee to notify Defence Nuclear Safety Regulator (DNSR) if the dose exceeds a specified level. This is complementary to the Ionising Radiations Regulations 1999, Regulation 25 compliance of which fulfils this Authorisation Condition.

Scope

2. This guidance relates to the arrangements for assessing the average effective dose for classes of persons identified by the Authorisee.

Guidance to Authorisees

3. The Authorisation Condition Compliance Statement should be sufficiently comprehensive to provide the basis for evidence that the safety management organisation and arrangements, including interfaces are adequate. Consideration should be given to the following:

- a. The management responsibilities of all personnel responsible for radiological protection including personal dosimetry and for the assessment of dosimetry returns.
- b. The classes of persons for whom the average effective dose will be assessed.
- c. The arrangements for assessing, recording and retaining the average effective dose of classes of persons.
- d. The arrangements for identifying and notifying DNSR if the average effective dose exceeds levels specified by DNSR.

AUTHORISATION CONDITION 19 - CONSTRUCTION OR INSTALLATION OF NEW PLANT

GUIDANCE NOTE

Introduction

1. The purpose of this Condition is to ensure that the Authorisee provides and implements adequate control over the construction and installation of any new facility, transport activity or Naval Reactor Plant (NRP) or system which may affect nuclear safety. The objective is for the Authorisee to plan the design, manufacture, construction and installation. This is to ensure that before the construction takes place a pre-construction safety report is produced to demonstrate the safety of the installation. The Condition gives the power to Defence Nuclear Safety Regulator (DNSR) to prevent the commencement of construction until it is satisfied with the safety case and/or put hold points during the construction process to ensure the installation is being constructed in accordance with the stated intent. DNSR's control can be either through using the direct powers in the Condition or through secondary powers built into the Authorisee's arrangements.

Scope

2. This guidance relates to the control of design, manufacture, construction or installation of any new facility, transport activity or NRP.

Guidance to Authorisees

3. The Authorisation Condition Compliance Statement should be sufficiently comprehensive to provide the basis for evidence that the safety management organisation and arrangements, including interfaces are adequate. Consideration should be given to the following:

- a. The management responsibilities of all personnel who are responsible for ensuring correct manufacture/construction/assembly and installation activities.
- b. The personnel responsible for managing and supervising work and those responsible for categorising the proposed work.
- c. The arrangements for categorising all proposed work according to the hazard potential.
- d. The arrangements to:
 - (1) ensure that documentation is produced to justify the safety of the undertakings;
 - (2) ensure that such documentation is produced by Suitably Qualified and Experienced Persons (SQEP);
 - (3) ensure that the documents are reviewed by independent SQEP;
 - (4) ensure that the documents are approved through the appropriate due process;
 - (5) produce and keep records of the relevant safety documentation; and

(6) apply lessons learned from other similar projects.

e. The arrangements for managing the work during all phases of design, manufacture, construction or installation, including the assessment of hazards specific to the work and interactions between the broader site. This should demonstrate an integrated approach.

f. The arrangements for the production of a project programme and management plan that includes the arrangements for dividing the work into stages, where appropriate, each of which will have a safety justification and require approval before commencement. Approval hold points and the associated activities should be identified for internal approval activities (typically, internal audit, Independent Peer Review, Nuclear Safety Committee and the Design Authorities), as well as those associated with external approval activities undertaken by DNSR.

AUTHORISATION CONDITION 20 - MODIFICATION TO DESIGN OF PLANT UNDER CONSTRUCTION

GUIDANCE NOTE

Introduction

1. The purpose of this Condition is to ensure that the Authorisee cannot change the design of an installation once Defence Nuclear Safety Regulator (DNSR) has given its consent or agreement to design, manufacture or construction without going through a proper design change process which assesses the modification in relation to its safety significance and defines the degree of safety justification required. The Condition gives DNSR the power to intervene and stop a modification if it believes there is inadequate safety justification.

Scope

2. This guidance relates to all modifications during design, manufacture, construction and installation.

Guidance to Authorisees

3. The Authorisation Condition Compliance Statement should be sufficiently comprehensive to provide the basis for evidence that the safety management organisation and arrangements, including interfaces are adequate. Consideration should be given to the following:

- a. The management responsibilities of all personnel who are responsible for ensuring that modifications are managed, controlled and supervised.
- b. The personnel responsible for the managing and supervising of work and those responsible for categorising the proposed work.
- c. The arrangements for categorising or re-categorising modifications according to their safety significance; the management arrangements governing the processing and approval of modifications at each categorisation level; and the safety documentation required for each categorisation level.
- d. The arrangements for implementing the modification in stages, where appropriate, with each stage needing DNSR consent, if specified, before commencement of the next stage.
- e. The safety documentation justifying the safety of the modification describing the level of approval required.
- f. A 'hold point' strategy and the arrangements for defining the appropriate level of approval for each stage.
- g. The arrangements for appointing a committee, whose specific purpose is to approve safety related design changes.
- h. The role of relevant groups or review bodies, the Approving Authority (incorporating the Design Authority) and the involvement of the Nuclear Safety Committee.

- i. The arrangements for approval of modifications.
- j. The arrangements to ensure that where DNSR so specifies, the Authorisee is not to introduce a modification without the consent of DNSR.
- k. The arrangements, if so directed by DNSR, to halt a modification and not to recommence without DNSR consent.

AUTHORISATION CONDITION 21 - COMMISSIONING

GUIDANCE NOTE

Introduction

1. The purpose of this Condition is to ensure that the Authorisee has adequate arrangements for the commissioning of a new or modified facility, Nuclear Powered Warship (NPW) or transport activity or Naval Reactor Plant (NRP) or process which may affect safety.

2. The Condition gives the Defence Nuclear Safety Regulator (DNSR) powers to control various stages of commissioning. This is to ensure that the Authorisee demonstrates that the facility, NPW, transport activity, NRP or modification has been completed according to the design intent, and the necessary safety implications associated with commissioning have been considered, assessed and shown to be acceptable. Usually a hold point is put at the start of inactive commissioning, i.e. testing systems before the introduction of radioactive materials, and at the start of active commissioning. This latter hold point is to ensure that the Authorisee has demonstrated that the facility is functioning and is safe to allow the introduction of radioactive materials. Finally the Condition gives DNSR the power to control the commencement of routine operations by requiring the Authorisee to produce a pre-operational safety report and seek DNSR's consent to start operations.

Scope

3. This guidance relates to all commissioning of any facility, NPW, transport activity or NRP.

Guidance to Authorisees

4. The Authorisation Condition Compliance Statement should be sufficiently comprehensive to provide the basis for evidence that the safety management organisation and arrangements. Including interfaces are adequate. Consideration should be given to the following:

- a. The management responsibilities of all personnel who are responsible for ensuring that commissioning trials are carried out safely.
- b. The personnel responsible for managing and supervising the commissioning of new or modified items.
- c. The system to define the commissioning required for each new or modified item. This should clearly differentiate between the testing required to demonstrate the project's design intent and the overall commissioning required to demonstrate correct functioning and fitness for purpose.
- d. The arrangements for commissioning in stages, including inactive and active commissioning, where appropriate, recognising that each stage may require DNSR consent, before starting the next stage.
- e. The arrangements that ensure only Suitably Qualified Experienced Persons control the commissioning process and assess the results of any tests or trials.
- f. The safety documentation justifying the safety of the proposed commissioning and the description of the level of approval required, including the approval of concessions.

g. The arrangements that ensure there are comprehensive and accurate records of test and trial results and that assessment of the results are kept and form part of the commissioning report.

h. The arrangements that ensure that new or modified items which may affect safety are not operated until the appropriate stage of commissioning has been completed. A report of such commissioning has been produced and a safety case(s) has been developed and considered. DNSR will expect all pre-commissioning safety reports to be approved before any inactive and active commissioning takes place. These arrangements also apply after major work to restore the design intent including after such events as a fire when major repair work may be required.

i. The Authorisee should make provision for the Approving Authority (AA) (incorporating the Design Authority) to be integrated into the arrangements for commissioning. The AA is charged with understanding the design intent with respect to the nuclear safety case and representing this design intent at all stages of design, build and commissioning. DNSR will seek assurance that the integrity of the design intent and appropriate configuration control is being maintained. The management of these aspects is normally vested in a committee, which controls safety related design changes. Inactive and active commissioning should be planned and executed to show that the design assumptions have been met.

j. All work with nuclear safety significance should be carried out in accordance with an appropriate procedure. The procedure should undergo a process of review and approval commensurate with its significance to safety.

AUTHORISATION CONDITION 22 - MODIFICATION OR EXPERIMENT ON EXISTING PLANT

GUIDANCE NOTE

Introduction

1. The purpose of this Condition is to ensure that the Authorisee has adequate arrangements to control all modifications to any facility, Nuclear Powered Warship (NPW), transport activity or Naval Reactor Plant (NRP) on an Authorised site that may affect safety. The Condition also gives Defence Nuclear Safety Regulator (DNSR) the power to control such modifications to ensure that they cannot commence until the Authorisee has adequately demonstrated the safety of the proposal. These powers can be direct or indirect via the Authorisee's own voluntary hold points. The Condition also gives DNSR the power to halt a modification or intervene at any stage in the interest of safety.

Scope

2. This guidance relates to all modifications, trials or experiments carried out on any part of existing facilities, NPW, transport activities, NRP and equipment.

Guidance to Authorisees

3. The Authorisation Condition Compliance Statement should be sufficiently comprehensive to provide the basis for evidence that the safety management organisation and arrangements, including interfaces are adequate. Consideration should be given to the following:

- a. The management responsibilities of all personnel who are responsible for ensuring that modifications, trials or experiments are managed, controlled and supervised.
- b. The personnel responsible for managing and supervising work and those responsible for categorising the proposed work.
- c. The arrangements for categorising modifications, trials and experiments according to their safety significance; the management arrangements governing the processing and approval of modifications, trials and experiments at each categorisation level; and the safety documentation required for each categorisation level.
- d. The arrangements for considering the affect of modifications on the category of the facility.
- e. The arrangements for ensuring that the procedures for modifications, trials or experiments are implemented, properly controlled, authorised and conducted.
- f. The arrangements for implementing the modification, trial or experiment in stages, where appropriate, with each stage requiring DNSR consent, if specified, before commencement of the next stage.
- g. Producing a 'hold point' strategy and the arrangements for defining the appropriate level of approval for each stage.
- h. The safety documentation justifying the safety of the modification, trial or experiment and the level of approval required.

- i. The role of relevant groups or review bodies, including the involvement of the Nuclear Safety Committee and the Approving Authority (AA) (incorporating the Design Authority).
- j. The arrangements for approval of modifications, trials or experiments.
- k. The Authorisees' arrangements should make provision for the AA to be integrated into the control of modifications and alterations ensuring that operating instructions and procedures are consistent with the Safety Justification and the design intent.
- l. The arrangements to ensure that where DNSR so specifies, the Authorisee is not to introduce a modification without the consent of DNSR.
- m. The arrangements, if so directed by DNSR, to halt a modification and not to recommence without the consent of DNSR.

AUTHORISATION CONDITION 23 - OPERATING RULES

GUIDANCE NOTE

Introduction

1. The safe operation of a nuclear installation results from many factors including the design of the facility, Nuclear Powered Warship (NPW), transport activity or Naval Reactor Plant (NRP), its behaviour under fault or accident conditions and the actions of the operators. It is therefore essential that the totality of these often complex interactions are fully understood. The method of doing this is to require the operator to produce a safety case to justify the operation of the installation.

2. The purpose of this Condition is to ensure that the operational safety case identifies all the necessary conditions and limits of safe operation (CLOSO). Operating rules must then be set to ensure that the safety related facility, NPW, transport activity, NRP, or system is kept within parameters which ensure the safety during normal operation and fault and accident conditions, and allowing an appropriate margin for error where operator action is invoked.

Scope

3. This guidance relates to the operating conditions and limits necessary in the interest of safety, which may also be referred to as operating rules which are generated to prevent a breach of the safe operating envelope.

Guidance to Authorisees

4. The Authorisation Condition Compliance Statement should be sufficiently comprehensive to provide the basis for evidence that the safety management organisation and arrangements, including interfaces are adequate. Consideration should be given to the following:

- a. The identification of the safe operating envelope of the facility, NPW, transport activity or NRP from the design limits of individual safety critical components thereof.
- b. The identification in the safety case of appropriate CLOSO, hereafter referred to as operating rules, to be applied by the operator which will keep within its safe design limits allowing a margin for error or oversight.
- c. The arrangements that ensure that any operating rules identified in safety cases have been effectively translated into operational documentation
- d. The management responsibilities of all personnel who are responsible for defining, approving, producing, reviewing and maintaining the operating rules, ensuring a consistent and rigorous link to the design substantiation and design safety case.
- e. The arrangements for dealing with breaches of operating rules including their recording and monitoring to feed into a review process by competent persons with a knowledge of the design limits.
- f. The links with related Authorisation Conditions (AC), e.g. see AC24, along with any other links necessary to ensure that the Authorisee's safety management arrangements are effective and consistently implemented.

- g. The arrangements for ensuring that the appropriate operating rules are derived, reviewed, maintained and approved, including the Defence Nuclear Safety Regulator approval, if specified, via the appropriate clearance route.
- h. The arrangements for ensuring that amendments to operating rules are approved before implementation.
- i. The arrangements for dealing with a breach of an operating rule.
- j. The arrangements for the production and keeping of relevant operational records.
- k. The arrangements for managing the interface with the Approving Authority (incorporating the Design Authority) supporting the Authorisees in the identification of the operating rules.

AUTHORISATION CONDITION 24 - OPERATING INSTRUCTIONS

GUIDANCE NOTE

Introduction

1. Safety is influenced by the actions of people who control, maintain or service the facility, Nuclear Powered Warship, transport activity or Naval Reactor Plant. It is important given the often complex nature of the safety case for all actions carried out by people to be done in accordance with procedures derived from the design intent and the safety case. It is also important that actions are not carried out on an ad hoc basis without evidence. Therefore the purpose of this Condition is to ensure that all operations which may affect safety, including any instructions to implement conditions and limits of safe operation (CLOSO), are undertaken in accordance with written operating instructions.

Scope

2. This guidance relates to operations that may affect nuclear or radiological safety. However, these can often not be separated in operating instructions from other operations which ensure the satisfactory output from the facility; such operations include the routine day-to-day operations and related activities such as research, trials, maintenance, commissioning and decommissioning.

Guidance to Authorisees

3. The Authorisation Condition Compliance Statement should be sufficiently comprehensive to provide the basis for evidence that the safety management organisation and arrangements, including interfaces are adequate. Consideration should be given to the following:

- a. The management responsibilities of all personnel responsible for implementing (writing and acting upon) written operating instructions.
- b. The arrangements for translating the CLOSO (operating rules) into operating instructions. Such operating instructions should include:
 - (1) step-by-step instructions on how to carry out an operation to ensure that it is undertaken in the way identified in a manner consistent with the design intent and the safety case;
 - (2) instructions to ensure that the CLOSO are complied with (operating rules may be cited explicitly);
 - (3) other instructions necessary in the interests of safety.
- c. The arrangements for ensuring that the operating instructions and CLOSO are made available to personnel as appropriate.
- d. The arrangements for introducing operating instructions, their review, amendment, control and approval, including Defence Nuclear Safety Regulator (DNSR) approval, if specified.
- e. The arrangements for initiating a review of Operating Instructions in the light of operational experience indicating, for example, difficulties in following or understanding them. See also guidance to Authorisation Condition 23 on breach of operating rules.

f. The arrangements for ensuring that when significant changes are made to operating instructions they are submitted to an appropriate internal safety authority for approval, and DNSR if specified.

g. The arrangements for managing the interface with the Approving Authority (incorporating the Design Authority), for the provision of information to enable Authorisees to provide operating instructions including any instructions necessary in the interests of safety and any instructions necessary to ensure that any CLOSO are implemented.

AUTHORISATION CONDITION 25 - OPERATIONAL RECORDS

GUIDANCE NOTE

Introduction

1. The purpose of this Condition is to ensure that adequate records are kept regarding the operation, inspection and maintenance of any safety-related facility, Nuclear Powered Warship (NPW), transport activity or Naval Reactor Plant (NRP).

Scope

2. Operational records are those relating to examination, inspection, maintenance, testing and operation of any facility, NPW, transport activity or NRP which may affect safety and records of the amount and location of all radioactive material, including nuclear fuel and radioactive waste, used, processed, stored or accumulated upon the site at any time.

Guidance to Authorisees

3. The Authorisation Condition Compliance Statement should be sufficiently comprehensive to provide the basis for evidence that the safety management organisation and arrangements, including interfaces, are adequate. Consideration should be given to the following:

a. Management responsibilities of all personnel responsible for records associated with the operation, inspection and maintenance of the facility, NPW, transport activity, NRP, process or system.

b. The arrangements for identifying the records to be kept and the retention period. The arrangements for ensuring that records of operations are produced, controlled and retained. Operational records should, where appropriate, include the results of the operation, inspection and maintenance, and the environmental exposure levels experienced.

c. The arrangements for ensuring that baseline records are established and re-established following modifications or changes in operations.

d. The arrangements for the recording and keeping of records of the amount and location of all radioactive material, including waste stored or accumulated on sites and Nuclear Powered Warships.

e. The arrangements for security of records, including duplication and diversity of storage to minimise the risk of accidental destruction.

f. The arrangements for managing the interface with the Approving Authority (incorporating the Design Authority) to establish what records are to be made of the operations conducted with facilities, NPW, transport activity or NRP and systems as necessary to support approval for service use.

g. The arrangements for operational records permit the Authorisee to review previous operations so as to:

(1) establish an operational baseline for a plant, facility or Nuclear Weapon System;

- (2) confirm that the facility, NPW, transport activity and NRP performance is maintained through life;
 - (3) confirm the continuing validity of the safety case;
 - (4) establish that assumptions regarding operations made in the safety case are realistic;
 - (5) support justification of continued operation in the case of abnormal/ anomalous events, defects etc;
 - (6) allow analysis to support improvements in design or operation Authorisation Condition 14 (AC14);
 - (7) support the berth assessment process, Further Authorisation Condition 2;
- h. A systematic approach should be taken to identify what records should be kept and the reasons for retaining each type of record. This should include such items as operating logs, records of maintenance activities, records of specific trials (which may be covered by Test Forms or Nuclear Procedures), etc.
- i. The arrangements should ensure that the records are maintained so as to meet the requirements of AC6 for security, access and means of retrieval. The coherence of the arrangements with those of other Authorisees is an important factor, where appropriate.

DNSR Expectation

4. The Defence Nuclear Safety Regulator (DNSR) will specify that Authorisees should provide DNSR with records of high activity sealed sources as defined in the Environmental Permitting (England and Wales) Regulations 2010 (SI 2010/675) or the High-Activity Sealed Radioactive Sources and Orphan Sources Regulations 2005 (SI 2005/2686) as appropriate which are held on the Authorised site, and which are not already held under a notification granted by Environment Agency/Scottish Environment Protection Agency, for example as mobile radioactive apparatus in accordance with RSA 93-equivalent or EPR10-equivalent arrangements.

5. MOD has determined that the following radioactive material does not constitute High-Activity Sealed Sources and should not be included in notifications:

- any component of a nuclear weapon;
- any nuclear fuel element;
- any radioactive substance inside a nuclear reactor;
- containers of radioactive material where the radioactive material would not constitute a sealed source in the absence of the container, and the container is for the purpose of storage or transport rather than to ensure the integrity of the source as in ISO 2919:1999.

AUTHORISATION CONDITION 26 - CONTROL AND SUPERVISION OF OPERATIONS

GUIDANCE NOTE

Introduction

1. The purpose of this Condition is to ensure that safety-related operations are carried out only under the control and supervision of Suitably Qualified and Experienced Personnel (SQEP).

Scope

2. This guidance relates to all operations that may affect nuclear or radiological safety.

Guidance to Authorisees

3. The Authorisation Condition Compliance Statement should be sufficiently comprehensive to provide the basis for evidence that the safety management organisation and arrangements, including interfaces are adequate. Consideration should be given to the following:

a. The management responsibilities of all the personnel responsible for ensuring that no operations are carried out that may affect nuclear or radiological safety except under the control and supervision of SQEP who have been appointed for that purpose.

b. The arrangements through which the Authorisee gains assurance that personnel, including contractors, working on safety significant tasks are SQEP and appointed for that purpose by the Authorisee.

c. The arrangements for ensuring that personnel working on safety significant tasks on the Authorised site, who are not part of the site Authorisee's organisation, are SQEP and properly appointed for the purpose.

d. The arrangements for ensuring that copies of the operating instructions and conditions and limits of safe operation/operating rules are made available to operating personnel.

e. The arrangements to ensure that there are adequate staffing levels to meet the requirements of the safety case.

AUTHORISATION CONDITION 27 - SAFETY MECHANISMS, DEVICES AND CIRCUITS

GUIDANCE NOTE

Introduction

1. A facility, Nuclear Powered Warship (NPW), transport activity or Naval Reactor Plant (NRP) is designed to have multiple safety systems to provide defence in depth against maloperation, faults or accidents. It is important that at all times there are sufficient safety systems in good working order because by definition they must be able to function on demand and such instances are unpredictable. The purpose of this Condition is therefore to ensure that there are always sufficient and operable safety mechanisms, devices and circuits to provide the necessary defence in depth.

Scope

2. This guidance relates to safety mechanisms, devices and circuits (SMDC) identified in the safety case.

Guidance to Authorisees

3. The Authorisation Condition Compliance Statement should be sufficiently comprehensive to provide the basis for evidence that the safety management organisation and arrangements, including interfaces are adequate. Consideration should be given to the following:

- a. The management responsibilities of all personnel responsible for SMDC, safe operation and for providing instructions that ensure safe operation and maintenance.
- b. The arrangements for ensuring SMDC identified in the safety case are incorporated into operating documentation and approved via the appropriate clearance route (see also Authorisation Condition 24 (AC24)).
- c. The arrangements for ensuring that any element of the facility, NPW, transport activity, NRP or system that may affect nuclear or radiological safety is protected by a SMDC, if identified in the safety case.
- d. The actions to be taken following the operation of those SMDC essential for ensuring safety.
- e. The arrangements for ensuring safe systems of work, including a system of permits to work, is implemented, that the safety system is maintained, tested according to specified procedures, and that safety-related trip or alarm levels are not changed without authorisation.
- f. The arrangements for reporting failures of SMDC on occasions when operation of the SMDC is invoked, and any operation with SMDC not in accordance with the safety case or other instruction.
- g. The arrangements for managing the interface with the Approving Authority (incorporating the Design Authority) to establish which operating conditions and limits should be governed by the provision of suitable and sufficient SMDC and who will provide information in respect of such safety mechanisms, devices and circuits.

h. The arrangements for ensuring that at all times there are sufficient safety systems operational to ensure operation within the 'safety envelope' defined in the safety case. Any failure to comply with this or any failure of a SMDC discovered for instance during testing should invoke incident reporting arrangements made under AC7. Similarly, should a demand be placed on any SMDC for any reason, the circumstances should also be reported as an incident.

AUTHORISATION CONDITION 28 - EXAMINATION, INSPECTION, MAINTENANCE AND TESTING

GUIDANCE NOTE

Introduction

1. A nuclear installation, like any other complex machine, requires maintenance and if such maintenance is not carried out properly it has the potential to undermine the safety case and put safety at risk. The purpose of this Condition therefore, is to ensure that regular and systematic examination, inspection, maintenance and testing is scheduled, by and under the control of suitably qualified personnel and that records of maintenance activities are kept.

Scope

2. This guidance relates to the correct conduct of Examination, Inspection, Maintenance and Test (EIMT) and the provision of an EIMT schedule.

Guidance to Authorisees

3. The Authorisation Condition Compliance Statement should be sufficiently comprehensive to provide the basis for evidence that the safety management organisation and arrangements, including interfaces are adequate. Consideration should be given to the following:

- a. The management responsibilities of all personnel responsible for:
 - (1) producing and controlling the EIMT schedules for all nuclear safety related equipment;
 - (2) ensuring that all nuclear safety related equipment is examined, inspected, maintained and tested and is in a safe condition to enable approved operations to be undertaken;
 - (3) ensuring that only Suitably Qualified and Experienced Persons carry out the EIMT activities, including supervision of the task;
 - (4) ensuring that when any EIMT reveals that safe operation or safe condition may be affected the appropriate action is taken to ensure that the matter is investigated and reported in accordance with the arrangements made under Authorisation Condition 7 (AC7).
- b. The arrangements for producing EIMT Schedules, including how they are derived from the safety cases, describing the operations and the periodicity of EIMT.
- c. The arrangements for ensuring that EIMT schedules are carried out on time (unless Defence Nuclear Safety Regulator has agreed to an extension of the interval specified in the EIMT schedule). It is therefore in the interests of the Authorisee to:
 - (1) identify the limiting safe periodicity for EIMT items;
 - (2) identify a periodicity for EIMT, within the limit defined above, which will give flexibility to suit operational needs.

- d. The arrangements for operating and reviewing the schedule, including recording of results and ensuring that those personnel carrying out the work have the appropriate qualifications and experience.
- e. AC30, Periodic Shutdown, requires EIMT schedules to be adhered to, even if the shut down is necessary to carry out EIMT.
- f. The arrangements for:
 - (1) allowing the suspension or delay in carrying out particular EIMT, specifying the levels at which such suspensions or delays are authorised;
 - (2) ensuring that appropriate action is taken in the event of a failure during EIMT and the requirements for reporting in such circumstances.
 - (3) managing Interfaces between EIMT schedules of different Authorisees.
- g. The arrangements for managing the interface with the Approving Authority (incorporating the Design Authority) to establish the EIMT requirements.

AUTHORISATION CONDITION 29 - DUTY TO CARRY OUT TESTS, INSPECTIONS AND EXAMINATIONS

GUIDANCE NOTE

Introduction

1. The purpose of this Condition is to enable the Defence Nuclear Safety Regulator (DNSR), following consultation, to require the Authorisee to perform any tests, inspections and examinations which it may specify and to be provided with the results.

Scope

2. This guidance relates to the carrying out of tests, inspections and examinations as specified by DNSR in addition to any carried out under Authorisation Condition 28 (AC28).

Guidance to Authorisees

3. The Authorisation Condition Compliance Statement should be sufficiently comprehensive to provide the basis for evidence that the safety management organisation and arrangements, including interfaces are adequate. Consideration should be given to the following:

- a. The management responsibilities of all personnel responsible for the arrangements to carry out inspections, tests and examinations.
- b. The arrangements for carrying out such inspections, tests and examinations.
- c. The appropriate approval routes for carrying out such inspections, tests and examinations.
- d. The arrangements for assessing such inspections, tests and examinations and providing the results to DNSR.
- e. The arrangements for ensuring the provision of evidence to agreed dates, taking account of the operational requirements.
- f. The arrangements in place for producing and keeping records. Records are considered under AC6.

AUTHORISATION CONDITION 30 - PERIODIC SHUTDOWN

GUIDANCE NOTE

Introduction

1. It may be necessary for operations to be shut down at regular intervals for inspection and testing of essential components. The Examination, Inspection, Maintenance and Testing (EIMT) schedule will define the required intervals. The purpose of this Condition is, therefore, to ensure that shut down is in accordance with the EIMT schedule and these important examination and maintenance activities are carried out. The Condition also gives Defence Nuclear Safety Regulator (DNSR) the power to intervene and require the Authorisee to seek DNSR's consent to restart operations following the completion of the necessary maintenance.

Scope

2. See Introduction.

Guidance to Authorisees

3. The Authorisation Condition Compliance Statement should be sufficiently comprehensive to provide the basis for evidence that the safety management organisation and arrangements, including interfaces are adequate. Consideration should be given to the following:

- a. The management responsibilities of all personnel responsible for the arrangements that ensure that periodic shutdowns are undertaken to meet EIMT requirements.
- b. The arrangements to ensure shutdown to enable scheduled EIMT to be undertaken.
- c. The arrangements for considering, justifying and obtaining the required approval to extend the period before scheduled shutdown and reporting the satisfactory completion of the EIMT.
- d. The arrangements to ensure start up is not commenced unless approved by DNSR where such consent has been required by DNSR.
- e. The arrangement for recording the extension and amending future shutdown plans where applicable.
- f. The arrangements in place for producing and keeping of relevant records of scheduled shutdowns and the work carried out. Records are considered under Authorisation Condition 6 (AC6) and AC25.
- g. The arrangements for managing the interface with the Approving Authority (incorporating the Design Authority) to enable such EIMT to take place.

AUTHORISATION CONDITION 31 - SHUTDOWN OF SPECIFIED OPERATIONS

GUIDANCE NOTE

Introduction

1. If Defence Nuclear Safety Regulator (DNSR) has concerns about the safety of any activity, and the Authorisee is unable or unwilling to provide the necessary safety justification for continued operation, then DNSR must have the power to order the cessation of the activity. The purpose of this Condition is to give DNSR the power to instruct Authorisees to cease the activity within a given period. Following a direction to cease the Authorisee will require a consent from DNSR to restart the activity.

Scope

2. This guidance relates to the directed cessation of any defence nuclear activities.

Guidance to Authorisees

3. The Authorisation Condition Compliance Statement should be sufficiently comprehensive to provide the basis for evidence that the safety management organisation and arrangements, including interfaces are adequate. Consideration should be given to the following:

- a. The management responsibilities of all personnel responsible for ensuring that there are arrangements to respond to a requirement to shutdown, if directed by DNSR.
- b. The process by which the Authorisee will respond to DNSR's direction to shutdown.
- c. The arrangements through which the restarting of activities will be justified and a consent obtained from DNSR following a shutdown under a DNSR direction.
- d. The arrangements for managing the interface with the Approving Authority (incorporating the Design Authority) to enable shut down within a given period.

AUTHORISATION CONDITION 32 - ACCUMULATION OF RADIOACTIVE WASTE

GUIDANCE NOTE

Introduction

1. The purpose of this Condition is to ensure that the Authorisee has adequate arrangements to ensure that the production and accumulation of radioactive waste is minimised. The Condition also gives Defence Nuclear Safety Regulator (DNSR) the power to ensure that radioactive waste is stored under suitable conditions, and that adequate records are kept to enable DNSR to monitor the management of radioactive waste.

Scope

2. This guidance relates to the arrangements for the storage and minimising the rate of production and the total quantity of radioactive waste accumulated. It also includes the generation and the maintenance of records of the radioactive waste accumulated.

Guidance to Authorisees

3. The Authorisation Condition Compliance Statement should be sufficiently comprehensive to provide the basis for evidence that the safety management organisation and arrangements, including interfaces are adequate. Consideration should be given to the following:

- a. The management responsibilities of all personnel responsible for the accumulation and recording of radioactive waste.
- b. The relevant Environment Agency/Scottish Environment Protection Agency Authorisations (EA/SEPA), permits, Noting Letters and Agreements or their equivalents under EPR10. Where the disposal of any radioactive waste has been authorised or permitted by EA/SEPA, the arrangements in respect of its prior accumulation should be in accordance with any requirements which may have been specified as part of that authorisation or permit, and the existence of such requirements should be explicitly stated. For activities under Crown control the EA and SEPA issue, respectively, approvals or letters of agreement of formal authorisations, or their equivalents under EPR10.
- c. The arrangements for minimising the rate of production and total quantity of radioactive waste accumulated.
- d. The arrangements for managing the accumulation and storage of radioactive waste.
- e. The arrangements for the generation of records and the recording of radioactive waste accumulated. These requirements are in addition to the general record keeping requirements in respect of nuclear matter (which includes radioactive waste) considered under Authorisation Condition 4.
- f. The arrangements for ensuring that any conditions, with respect to accumulation of waste, required by the disposal authorisation are clearly identified and met.
- g. Any radioactive waste as a result of an accident involving radioactive material.

AUTHORISATION CONDITION 33 - DISPOSAL OF RADIOACTIVE WASTE

GUIDANCE NOTE

Introduction

1. An Authorisee may wish to store radioactive waste rather than dispose of it even when a suitable disposal route is available. The purpose of this Condition is to give Defence Nuclear Safety Regulator (DNSR) the power to direct the Authorisee to dispose of radioactive waste in these circumstances. DNSR will only give such direction where the disposal is to be carried out in accordance with (as applicable):

a. An Authorisation or permit granted by the appropriate Agency under the Radioactive Substances Act (RSA) 1993 or Environmental Permitting Regulations (EPR) 2010 as appropriate;

b. A corresponding approval or letter of agreement, or equivalent under EPR10, granted by the appropriate Agency under their Memorandum of Understanding with MOD in the case of premises occupied by or on behalf of the Crown for naval, military or air force purposes, to which RSA93 and EPR10 Schedule 23 do not apply;

c. A consent granted by DNSR under Further Authorisation Condition 3 in the case of a radioactive discharge from a Nuclear Powered Warship directly to the environment.

2. In this context the appropriate Agency means, in relation to England, the Environment Agency, in relation to Wales, Natural Resources Wales and, in relation to Scotland, the Scottish Environment Protection Agency.

Scope

3. This guidance relates to the disposal of accumulated or stored radioactive waste.

Guidance to Authorisees

4. Any DNSR direction under this Condition will require disposal to be made in accordance with an existing Authorisation, approval, letter of agreement or consent, as the case may be. The Authorisation Condition Compliance Statement should therefore reference the management arrangements already established for compliance with such Authorisation, approval, letter of agreement or consent and provide assurance that such arrangements would be implemented.

AUTHORISATION CONDITION 34 - LEAKAGE AND ESCAPE OF RADIOACTIVE MATERIAL AND RADIOACTIVE WASTE

GUIDANCE NOTE

Introduction

1. The purpose of this Condition is to place a duty on the Authorisee to ensure so far as reasonably practicable that radioactive material and radioactive waste is adequately controlled or contained so as to prevent leaks or escapes, and that in the event of any fault or accident which results in a leak or escape, the radioactive material or radioactive waste can be detected, recorded and reported to Defence Nuclear Safety Regulator (DNSR).

Scope

2. This guidance relates to any potential leakage or escape of solid, liquid or gaseous radioactive material or radioactive waste even when there is no immediate effect on nuclear or radiological safety. The guidance does not apply to discharges or releases of radioactive waste in accordance with an authorisation granted under the Radioactive Substances Act (RSA) 1993 permit granted under Environmental Permitting (England and Wales) Regulations 2010 (EPR10) or equivalent arrangements approved by DNSR.

Guidance to Authorisees

3. The Authorisation Condition Compliance Statement should be sufficiently comprehensive to provide the basis for evidence that the safety management organisation and arrangements, including interfaces are adequate. Consideration should be given to the following:

- a. The management responsibilities of all personnel responsible for controlling and containing radioactive material and radioactive waste in order to prevent its leakage or escape.
- b. The arrangements for controlling and containing radioactive material and radioactive waste in order to prevent its leakage or escape.
- c. The arrangements for detecting any leakage or escape of radioactive material or radioactive waste.
- d. The arrangements for notifying, recording, investigating and reporting any leakage or escape of radioactive material or radioactive waste. These should be in accordance with the arrangements made under Authorisation Condition 7 (AC7). This should cover not only equipment which provides continuous indication (level alarms, radiation alarms etc.) but also the monitoring activities associated with the storage, such as health physics surveys and regular visual checks.
- e. The Authorisee should define the levels at which reporting of leakage as an incident under AC7, is to be carried out.
- f. Any equipment used for compliance with this Condition should also be subject to the maintenance and testing requirements of AC28.

g. Maintenance and testing of integrity of waste storage facilities and associated systems and functionality of alarms etc should form part of the arrangements and should meet the requirements of AC28.

AUTHORISATION CONDITION 35 - DECOMMISSIONING

GUIDANCE NOTE

Introduction

1. It is important that when a facility, Nuclear Powered Warship (NPW), transport activity or Naval Reactor Plant (NRP) reaches the end of its operational life it is decommissioned in a safe and controlled manner and not left to pose a hazard for current and future generations. The purpose of this Condition is therefore to require the Authorisee to have adequate arrangements for safe decommissioning. It also gives Defence Nuclear Safety Regulator (DNSR) the power to direct the Authorisee to commence decommissioning or to ensure decommissioning takes place in accordance with any national strategy. The Condition also gives DNSR the power to halt any decommissioning activity if DNSR has concerns about its safety.

Scope

2. This guidance relates to the decommissioning where there are nuclear or radiological hazards.

3. Compliance with applicable Authorisation Conditions is required until it is demonstrated to DNSR's satisfaction that there has ceased to be any danger from ionising radiations.

Guidance to Authorisees

4. The Authorisation Condition Compliance Statement should be sufficiently comprehensive to provide the basis for evidence that the safety management organisation and arrangements, including interfaces are adequate. Consideration should be given to the following:

- a. The management responsibilities of all personnel responsible for decommissioning.
- b. The overall policy, production of detailed or outline decommissioning and disposal plans with clearly defined 'hold points', the proposed disposal routes and any anticipated problems or areas of future difficulty for decommissioning.
- c. The processes governing the maintenance of the capability (including, funding, personnel, equipment and facilities etc.) necessary to ensure that decommissioning can be achieved within a safe timescale.
- d. The arrangements to:
 - (1) categorise equipment and facilities according to their hazard potential;
 - (2) ensure that the documentation is produced by Suitably Qualified and Experienced Persons (SQEP);
 - (3) ensure that the documents are reviewed by independent suitably SQEP.
 - (4) ensure that the documents are approved at the appropriate level;
 - (5) produce and keep records of the relevant safety documentation;
 - (6) apply lessons learned from other decommissioning projects.

e. DNSR may consent to de-Authorisation where there is a clear programme for the removal of all residual activity to a level agreed, where applicable, with the ONR and Environment Agency/Scottish Environment Protection Agency, and there is a demonstrable commitment that this programme will be met.

f. The management interface arrangements with the Approving Authority (incorporating the Design Authority) to enable decommissioning within a given period.

AUTHORISATION CONDITION 36 – ORGANISATIONAL CAPABILITY

GUIDANCE NOTE

Introduction

1. The purpose of this Condition is to ensure that the Authorisee maintains adequate financial and human resources to ensure the safety of Authorised activities, and has adequate arrangements to control any change to its organisational structure or resources which could affect safety. These arrangements require the Authorisee to assess the safety implications of any proposed changes before they are carried out. For changes that could have a significant effect on safety if they are inadequately conceived or executed the Condition gives the Defence Nuclear Safety Regulator (DNSR) the power to require the Authorisee to submit a safety case to DNSR, and to prevent the change from taking place until DNSR is satisfied that the safety implications are understood and that there will be no lowering of safety standards. The Condition also gives DNSR the power to halt any change that has commenced if there is a concern that the safety implications have not been adequately considered.

Scope

2. This guidance provides advice on the arrangements for maintenance of adequate financial and human resources and the management of change to the organisation which delivers and manages safety. The scope of organisational changes ranges from high level changes, e.g. management board reorganisations or agency mergers, to low level changes; this includes the reduction of manpower in response to cost saving measures and the increased use of contractors. The arrangements should reflect the roles needed to carry out the full range of Authorised activities including normal operations, decommissioning projects, maintenance, examination and testing, emergency response, etc. The governance of nuclear safety and Intelligent Customer functions are an integral part of the nuclear baseline.

Guidance to Authorisees

3. The Authorisation Condition Compliance Statement should be sufficiently comprehensive to provide the basis for evidence that the safety management organisation and arrangements, including interfaces are adequate. Consideration should be given to the following:

Adequate Arrangements

4. The Authorisee should demonstrate that adequate arrangements have been made and implemented to provide and maintain adequate financial and human resources, and to control any changes to the organisational structure or resources. Such arrangements should include a description of the Authorisee's:

- a. nuclear baseline;
- b. procedures for organisational change;
- c. arrangements for assessing and obtaining the financial resources necessary to continue to ensure the safety of Authorised activities.

Nuclear Baseline

5. The nuclear baseline should be documented, and that documentation should identify and justify all safety significant aspects of the organisation, including:

- a. The purpose of the organisation.
- b. Senior management and their responsibilities.
- c. Lines of accountability from the workforce to senior management.
- d. Description of the staff comprising the organisation, including:
 - (1) numbers of staff required;
 - (2) identification of posts with safety responsibilities, including those with safety responsibilities to the Authorisee but not part of his organisation, requiring the post holders to be Suitably Qualified and Experienced Persons (SQEP); there needs to be an emphasis on sufficient in-house technical resource and Intelligent Customer aspects;
 - (3) identification of posts with specific safety responsibilities requiring the post holders to be Duly Authorised Persons;
 - (4) terms of reference and job descriptions; and
 - (5) training, qualification and experience requirements plan.
- e. Arrangements for the employment of contractors.

Procedures for Organisation Change

- 6.
- a. **Role of Senior Management.** A statement of senior management commitment should be produced, including: acceptance of their responsibility; recognition that the management of safety is a key business objective; and a description of control of their organisation.
 - b. **Project Management.** The arrangements for proactive management of the change should be described, including the means by which proposed changes are to be planned, developed, assessed and subsequently implemented.
 - c. **Review and Assessment.** The arrangements for independent review and assessment, depending upon categorisation, should be described, including any arrangements for independent peer review.
 - d. **Audit and Feedback.** The arrangements for audit of an organisation post implementation of change should be described, to provide assurance that the change has been correctly implemented, and that the arrangements are robust on completion.

Categorisation

7. As with equipment modifications, changes to the organisational structure or resources are to be categorised according to their safety significance. This is to enable the application of a degree of scrutiny and review commensurate to the impact of the proposed change. This in turn should be based upon an assessment of the consequences of a management failure due to the organisational changes and the subsequent loss of control of a safety significant activity.

Documentation

8. The arrangements should provide for adequate documentation to justify any proposed change. This should include:

- a. Recognition of the safety implicated aspects of the nuclear baseline arrangements.
- b. Consideration of options.
- c. Principles for change.
- d. Demonstration of how the revised organisation is to function, highlighting the effect of change from the datum.

Submission

9. The Authorisee's arrangements should cover the submission of any documentation called for review by DNSR.

Approval of Specified Arrangements

10. The Authorisee should recognise the need for DNSR to review any proposed change and be prepared to stop the change or operational programme if DNSR is not satisfied with the safety implications.

11. Organisations may use their Compliance arrangements for Authorisation Condition 22 as a framework.

Annex C to Chapter 1: Guidance on the Application of Further Authorisation Conditions

- FAC1 Duty of Co-operation
- FAC2 Operational Berths
- FAC3 Radioactive Discharges
- FAC4 Transport Packages

FURTHER AUTHORISATION CONDITION 1 - DUTY OF COOPERATION

GUIDANCE NOTE

Introduction

1 This condition results from the mobility of reactors and weapons in the Defence Nuclear Programmes, and the separate responsibilities of Approving Authorities. The first purpose of the condition is to maintain coherent arrangements between Authorisees to ensure the safe transfer of reactors or weapons from one to the other. The second purpose of the condition is to maintain arrangements for co-operation between Authorisees and Approving Authorities to ensure that appropriate design control is exercised throughout reactor or weapon life and across life-cycle phases (in the nuclear weapons programme this complements the requirements of Approving and Design Authorities Conditions (ADAC)). Finally, the condition ensures that arrangements are made for co-operation with independent organisations (e.g. contractors) and internally within the Authorisee's organisation where this is necessary to maintain safety.

Scope

2 This guidance relates to the factors which Authorisees should consider to ensure that they co-operate with other Authorisees, with the Approving Authorities and with other organisations (both external and internally).

Guidance to Authorisees

3 The responsibility for nuclear and radiological safety within the Defence Nuclear Programmes remains ultimately with the Authorisee and cannot be delegated to another body/person.

4 The Further Authorisation Condition Compliance Statement should be sufficiently comprehensive to provide the basis for evidence that the safety management organisation and arrangements are adequate. Consideration should be given to the following:

- a. The management responsibilities for all personnel who interface with other Authorisees which transfer reactors or weapons across the boundary;
- b. The documented arrangements which provide for the coherent management of such transfers including reference to the other Authorisees' arrangements;
- c. The management responsibilities for all personnel who interface with Approving Authorities which provide information on reactors or weapons;
- d. The documented arrangements which provide for intelligent management of such information including reference to the Approving Authorities' arrangements;
- e. The arrangements by which the Authorisee provides assurance about nuclear and radiological safety;
- f. The contractual or other enforceable arrangements to cover the nuclear and radiological safety responsibilities of external organisations;

g. The documented arrangements for internal co-operation including links with related Authorisation Conditions (AC), notably AC17 and AC36, necessary to ensure that the Authorisee's safety management arrangements are effective and consistently implemented.

FURTHER AUTHORISATION CONDITION 2 - OPERATIONAL BERTHS

GUIDANCE NOTE

Introduction

1. This Condition results from the need for Nuclear Powered Warships (NPW) to berth at operational locations outside Authorised sites including those in foreign countries. The purpose of the Condition is to ensure that regulatory consent is obtained for the use, and the scope of such use, of an operational berth by a NPW. Operational Berths (OB) form de facto temporary nuclear sites. The management arrangements need to take account of the hazards and risks in a targeted and proportionate manner while remaining cognisant of national and international political aspects. In the case of foreign berths, arrangements consistent with those in the UK need to be demonstrated, so far as is reasonably practicable. As with other aspects of NPW operations, the basic requirement is that the risks associated with the use of the berth should be As Low As Reasonably Practicable (ALARP).

Scope

2. There is no specific limitation on the activities that may be conducted at an OB. However, the activities need to be fully scoped and described, with the appropriate arrangements put in place to ensure adequate margins of safety and demonstration of ALARP. A clear articulation of the scope of activity is therefore an essential precursor to justifying the use of a berth. The submission should be linked to the scope of activity, with a targeted and proportionate response to high risk activities. Wherever possible, source information (e.g. Naval Reactor Plant (NRP) and Nuclear Weapon safety analyses) should be referenced. It should also be clearly demonstrated that any conditions or limits identified in source documents have been implemented. Siting principles (e.g. ONR SAP ST.1 *et seq*) should be addressed, and the “Devonport Comparator” should be considered to be a maximum acceptable population density without an appropriate ALARP case being made. Regulatory consent will be limited to those activities included within the scope; additional activities that have nuclear safety implications will require further specific formal regulatory consent.

Visiting Nuclear Powered Warships

3. Visiting NPW will be considered on the same basis as Royal Navy NPW. Arrangements should be in place at all UK (including berths in Authorised sites) and Overseas Territory berths for visiting NPW that mirror those for UK NPW up to the edge of the quay, berth or other structure. Arrangements aboard the vessel are exempt from UK legislation as described in Part 1 Annex A to Chapter 2. The Standard Statements of the United Kingdom, United States and France (see Part 2 Annex E to Chapter 1) should be taken as assurance of the standards of safety for their NPW.

REPPIR

4. Although legally only applicable to UK and Gibraltar, the principles of Radiation (Emergency Preparedness and Public Information) Regulations 2001 (REPPIR) should be applied to all OB. A Report of Assessment should be prepared for all OB, but for those outside UK or Gibraltar it will only need to be submitted to the Defence Nuclear Safety Regulator (DNSR). In determining “reasonable foreseeability”, the use of time at risk arguments to reduce probability should not be employed. However, any emergency arrangements required (e.g. co-located support) need only be in place when the berth is occupied. Where there is likely to be an urgent need for berthing before co-located assets can be deployed, contingency arrangements should be identified, which may be generic for all berths if this is deemed

appropriate. Consent to use an OB will be conditional upon reassessment of the berth by the operator at intervals not exceeding three years, based upon the REPPIR review frequency.

FURTHER AUTHORISATION CONDITION 3 - RADIOACTIVE DISCHARGES

GUIDANCE NOTE

Introduction

1. This condition results from the need for environmental controls equivalent to those in legislation to apply to all parts of the Defence Nuclear Programmes. The purpose of this Condition is to ensure that discharges of radioactive material are minimised and controlled and subject to regulatory consent.

Scope

2. The discharge of radioactive material to the environment from defence licensed sites is regulated by the statutory regulators (Environment Agency/Scottish Environment Protection Agency (EA/SEPA)) under the Environmental Permitting (England and Wales) Regulations 2010 (EPR10) and the Radioactive Substances Act 1993 (RSA93). EPR10 Schedule 23 and RSA93 do not apply to premises occupied on behalf of the Crown for naval, military or air force purposes (Section 42 and Schedule 4 refer respectively). However, radioactive discharges from non-licensed, Authorised sites are subject to regulation by EA/SEPA in accordance with agreements between MOD and EA/SEPA. This EA/SEPA regulation specifically does not cover discharges directly to the environment from Nuclear Powered Warships (NPW) either within licensed or Authorised sites or outwith such sites.

3. By the nature of reactor and weapon design, gaseous radioactive discharges arise from both the weapon and propulsion programmes. Discharges of low-level liquid radioactive waste arise from the propulsion programme, and liquid radioactive waste may also arise from the weapon programme as a result of oxidation and condensation of original gaseous material.

4. The scope of the Defence Nuclear Safety Regulator (DNSR) regulation under Further Authorisation Condition 3 (FAC3), and in particular the direction referred to at Clause (2) thereof, is specifically limited to those parts of the programme which are not subject to regulation by EA/SEPA either under EPR10, RSA93 or by agreement with MOD: i.e. to discharges directly to the environment from NPW. Thus DNSR will only issue consents under FAC3 in relation to the following activities:

- a. low-level gaseous radioactive discharges from NPW directly to the environment;
- b. the discharge of low-level liquid radioactive waste from NPW directly to the environment where it is not practicable for this to be transferred ashore for processing and discharge under EA/SEPA regulation; for practical purposes it is anticipated that this will be restricted to the discharge of low-level liquid radioactive waste from nuclear powered warships at sea.

5. All other radioactive waste from NPW should be transferred ashore for processing and discharge under EA/SEPA regulation.

6. Further, DNSR consents under FAC3 will cover only discharges arising from routine NPW operations and specifically not discharges which may arise as a result of an accident or emergency.

Submissions for Consent

7. In all cases discharges are anticipated to be low but, as a minimum, one-off assessments should be carried out on a pessimistic basis to estimate the maximum quantities of radioactive material which may be discharged. Comparison with applicable quantities set out in Exemption Orders made under EPR10 or RSA93 or equivalent may confirm that no regulatory consent to discharge is required. Alternatively such consent may be required either on a regular or precautionary basis.

8. Duty Holders as identified below are responsible for carrying out the necessary assessments and seeking DNSR consent as required:

a. Site Authorisees (with support from Approving Authorities) are responsible for carrying out the assessments and seeking DNSR consent as required to discharge gaseous radioactive waste from NPW within their Authorised site;

b. Authorisees for the “at sea” phase (with support from Approving Authorities) are responsible for carrying out the assessments and seeking DNSR consent as required to discharge gaseous radioactive waste from NPW at operational berths and at sea;

c. Authorisees for the “at sea” phase (with support from Approving Authorities) are responsible for carrying out the assessments and seeking DNSR consent as required to discharge liquid radioactive waste from NPW at sea.

9. The submission should address the following key objectives:

a. to show that all discharges of radioactive waste are minimised and controlled;

b. to identify the arrangements for maintaining records of discharges and the particular details which will be recorded;

c. to demonstrate that the resulting radiation doses received by members of the public are as low as reasonably practicable;

d. to estimate by calculation/modelling etc. the radiological consequences arising (or upper bound thereof), in particular the resulting radiation doses to members of the public, and to show that these are below dose constraints for radioactive waste discharges as set out in extant Government or similar publications;

e. to identify any requirement for environmental monitoring in order to validate the estimated radiological consequences or conversely to demonstrate that in view of the very low levels of the discharges no such monitoring is required.

10. Submissions for consent to discharge should address each applicable paragraph of the FAC, and should identify a date for review.

11. While not prescriptive, it is anticipated that submissions will cover all routine discharges over a defined period (a period of one year will normally be suitable), with limits proposed on a bounding basis in respect of each identified site (i.e. Authorised site or Operational Berth) and, on an aggregated basis, for all discharges outwith designated sites (i.e. at sea). In principle, the form of the submission should be consistent with EA requirements under EPR10 or RSA93 but moderated as appropriate on a proportionate basis reflecting the very low levels of discharge in this case. For example simple bounding estimates may be used to estimate radiological consequences where it can be shown that these are well below regulatory concern. It is anticipated that this will normally be the case.

DNSR Expectations

12. DNSR will conduct assessments in accordance with the principles and methodologies adopted for this purpose by EA under EPR10 or RSA93, moderated as appropriate on a proportionate basis reflecting the very low levels of discharge in this case. Detailed guidance is set out in a DNSR Technical Assessment Guide¹.

13. Regulatory consent to discharge will be conditional upon continued compliance with the arrangements set out in the submission, including periodic review. DNSR may specify the duration of a consent, and may review consents in light of any significant change in circumstances. Any breach of a consent should be notified to DNSR immediately.

¹ DNSR/TAG/008, DNSR Guidance on the Regulation of Radioactive Discharges.

FURTHER AUTHORISATION CONDITION 4 - TRANSPORT PACKAGES

GUIDANCE NOTE

Introduction

1. This Condition results from the Defence Nuclear Safety Regulator's (DNSR's) role as Defence Competent Authority for transport packages which is consequent on exemptions in legislation. The purpose of this Condition is to ensure that transport of radioactive material is adequately safe from a radiological and nuclear safety viewpoint. The associated requirements for containment, control of radiation, and control of contamination are more stringent than those often adopted on a site because carriers cannot in general control potential hazards in the manner which is customary on a nuclear site, and because any radiation shine or release of radioactive (RA) material from a package in transport is likely to be directly onto a public road or other area frequented by members of the public.

Scope

2. Any transport of RA material outside a fixed site. For the precise scope see the International Atomic Energy Agency (IAEA) 'Regulations for the Safe Transport of Radioactive Material, 2012 Edition' (SSR-6) (hereafter referred to as the Regulations) paragraphs 106 and 107.

3. In Further Authorisation Condition (FAC) 4 and this Guidance Note the meaning of 'transport' is as defined in paragraph 106 of the Regulations, i.e. 'transport' comprises 'all operations and conditions associated with and involved in the movement of radioactive material; these include the design, manufacture, maintenance and repair of packaging, and the preparation, consigning, loading, carriage including in-transit storage, unloading and receipt at the final destination of loads of RA material and packages'.

Guidance to Authorisees and Duty Holders

Competent Authority Approval

4. Competent Authority approval is required for certain packages, in particular Type B and Type C packages and those containing fissile material (see the Regulations paragraph 802 etc.). Submissions for such packages should be made 12 months before the intended first use or before the expiry of an extant certificate.

5. In general package approval certificates issued by DNSR will be valid for 5 years, after which a 'Periodic Review' and re-approval by DNSR is required prior to continued use.

Presentation of Safety Cases for Packages

6. Safety cases for packages requiring Competent Authority approval should be presented in a form which is reasonably easy for assessors to gain an overview of the design and design substantiation prior to delving into the detail. DNSR has issued further guidance on this subject in the DNSR Applicants Guide (see Annex A to Chapter 1 of this JSP). Package Design Safety Reports should follow the format defined by the DNSR Applicants Guide, which is specifically designed to ensure that all relevant clauses within the Regulations are duly considered.

7. In respect of format and presentation safety cases of US origin compliant with the US NRC/Department of Energy requirements for the format of 'Safety Analysis Reports for Packagings' are acceptable to DNSR if they adequately address all appropriate issues and

contain a 'cross reference' table setting out where in the report each requirement of the regulations is addressed (see the DNSR Applicant's Guide).

Interpretation of the Regulations

8. In interpreting the Regulations and the adequacy of management arrangements for safety Duty Holders should take note of:

International Atomic Energy Authority Standards, including:

GS-R-3
TS-G-1.1
TS-G-1.2
TS-G-1.3
TS-G-1.4
TS-G-1.5
TS-G-1.6

Guidance issued by ONR (formerly the DfT) including:

'An Applicant's Guide to the Suitability of Elastomeric Seal Materials for Use In Radioactive Material Transport Packages'

'A DfT Guide to the Approval of Freight Containers as Type IP-2 and Type IP-3 Packages'

US Guidance

On occasion it may be appropriate to take note of the approaches required and/or recommended by the NRC (in CFR 71 and the NUREGs) when addressing aspects of the design and substantiation of package designs, in particular where the point is not clearly covered by IAEA or UK/EU standards.

Periodic Review

9. Safety cases for 'Periodic Reviews' of packages should generally be presented to the standard required for new packages. This does not preclude justification of 'grandfather rights' for older designs.

Marking, Labelling, and Placarding: Security Considerations

10. Packages and associated conveyances should normally be marked, labelled, and placarded in accordance with the Regulations. However if the package has a dedicated escort/guard, and the escort/guard is in possession of both the information that would normally be visible on the package and/or conveyance and appropriate emergency response orders, then if necessary to improve security visible placards and labels may be omitted.

Transport of Radioactive Material within Fixed Sites

11. Compliance with the requirements for the transport of RA material between sites will almost always be sufficient to meet the requirements for the safety of transport of RA material within a large site. Alternative approaches are however permissible.

Emergency Response

12. Given appropriate interface arrangements it is acceptable for MOD rather than the consignor to be responsible for transport emergency response plans

DNSR Expectations

13. DNSR uses internationally accepted standards as expressed in the extant issue of the 'Regulations for the Safe Transport of Radioactive Material' (SSR-6) issued by the UN International Atomic Energy Agency (see Part 1 Ch 2). For consistency with other Authorisation Conditions, FAC4 has been drafted in a matter that is similar to the wording of the ONR Licence Conditions. However Duty Holders should be aware that DNSR is most unlikely to accept any management arrangements for the transport of radioactive material which do not provide that:

a. all 'transport' activities are to be carried out in accordance with the extant issue of the Regulations, except where specifically agreed with DNSR;

b. packages for RA material are to have safety cases which demonstrate compliance with the Regulations as interpreted by DNSR;

c. safety cases for packages containing both Class 7 and Class 1 material (as defined in the United Nations regulations) are to address the possibility of an explosion within the package and to demonstrate compliance with any requirements of the Chief Inspector Explosives (MOD);

d. safety cases for packages containing both fissile material and a substantial quantity of Class 1 material may be assessed by reference to SAP (Part 2 Chapter 2).

14. It follows that in practice all packages are to be designed, manufactured, inspected, tested, loaded, and used in accordance with the Regulations, and that submissions are to be made to DNSR for those packages for which the Regulations require Competent Authority approval.

15. Duty Holders, including consignors and carriers, are to rehearse their accident and emergency arrangements at such intervals and at such times and to such extent as DNSR may specify.

Annex D to Chapter 1: Guidance on the Application of the Authorisation Conditions for the Approving Authority

Introductory Note (which explains why some AC do not feature in this guidance)

- 1 Interpretation
- 6 Documents, Records, Authorities and Certificates
- 7 Incidents on the Site (Incidents)
- 9 Instructions to Persons on the Site (Information on Hazards)
- 10 Training (Information on Training)
- 11 Emergency Arrangements
- 12 Duly Authorised or Other Suitably Qualified and Experienced Persons (Suitably Qualified and Experienced Persons)
- 13 Nuclear Safety Committee
- 14 Safety Documentation
- 15 Periodic Review
- 16 Site Plans, Designs and Specifications (Diagrams, Designs and Specifications)
- 17 Management Systems
- 19 Construction or Installation of New Plant (Design of a Naval Reactor Plant, Component or Relevant Support Equipment)
- 21 Commissioning (Approval for Use)
- 22 Modification or Experiment on Existing Plant (Modification to a Naval Reactor Plant, Component or Relevant Support Equipment)
- 23 Operating Rules (Conditions and Limits of Safe Operation)
- 24 Operating Instructions
- 25 Operational Records
- 27 Safety Mechanisms, Devices and Circuits
- 28 Examination, Inspection, Maintenance and Testing
- 30 Periodic Shutdown
- 31 Shutdown of Specified Operations (Withdrawal of Approval)
- 35 Decommissioning
- 36 Organisational Capability
- FAC1 Duty of Co-operation

Introductory Note

1. The Authorisation Certificate for the Nuclear Reactor Plant Authorisee (NRPA) distinguishes two separate duties: that of conventional Authorisee for naval reactor plants outside of Authorised sites (the “at sea” phase of the life cycle which also includes time at operational berths) and the duty as the Approving Authority (AA). The following Authorisation Condition (AC) Guidance Notes have been developed to aid the NRPA in its AA role with the interpretation of applicable Authorisation Conditions (AC) and to provide guidance on the content of the AC Compliance Statement.

2. The AA makes a significant contribution to nuclear and radiological safety in the NNPP, having essentially three functions:

- responsibility for the intrinsic or inherent safety of naval reactor plant (NRP);
- responsibility for the provision of information to Authorisees;
- responsibility for the receipt of information and assurance from Authorisees to underwrite the continued safety of NRP.

3. However, it is only the Authorisees, and not the AA, who conduct activities with NRP and radioactive material, and as a consequence, a number of the AC are not relevant to the AA role. DNSR considers that 25 AC (including FAC1) are relevant to the AA, but in a number of cases the AC need to be interpreted in a subtly different way to reflect the functions of the AA. In some cases, the title of an AC does not lend itself to easy assimilation by the AA and an additional/alternative title is provided.

4. This guidance therefore addresses only the 25 relevant AC and re-interprets them, where necessary, to the AA functions. DNSR will accept “nil return” compliance statements from the NRPA (as AA) in respect of the 12 AC not included in this guidance.

5. The term Approving Authority is considered to include the NRP Design Authority (DA), Technical Authority (TA) and Independent Nuclear Safety Assessor (INSA). DNSR expects that all these bodies will need to contribute to compliance with the 25 AC relevant to the AA role. The AA will also be responsible for acquiring and providing NRP components (prior to integration) and support equipment which may be relevant to nuclear and radiological safety; the same considerations apply to these as apply to NRP.

6. For clarity in this guidance, the NRPA in Approving Authority role is referred to as the Approving Authority (AA) for ease of language in differentiating its role from that of other NNPP Authorisees (including NRPA in “at sea” role).

AUTHORISATION CONDITION 1 - INTERPRETATION

GUIDANCE NOTE

Purpose and Scope

1. The purpose of this Authorisation Condition (AC) is to ensure that there is no ambiguity in the use of certain terms that are found in the text of the AC.

AUTHORISATION CONDITION 6 - DOCUMENTS, RECORDS, AUTHORITIES AND CERTIFICATES

GUIDANCE NOTE

Introduction

1. The purpose of this Condition is to ensure that adequate records are held by the Approving Authority for a suitable period to ensure that the safety case for operation is available at all times. To ensure that design and construction information is available for decommissioning, is available to assist investigations in the event of an accident or incident and is available for the statutory number of years after the cessation of operations for the purpose of assisting any claims of damage to health as a result of exposure to ionising radiation.

Scope

2. This guidance refers to the management of records associated with the Authorisation Conditions and statutory requirements.

Guidance to Approving Authority

3. The maintenance of adequate records for design, safety justification, production, testing, operation, support, modification and decommissioning is essential to the long-term safety of the Defence Nuclear Programmes and to satisfy legislative requirements.

4. The Authorisation Condition Compliance Statement should be sufficiently comprehensive to provide the basis for evidence that the safety management organisation and arrangements, including interfaces are adequate. Consideration should be given to the following:

a. The management responsibilities of all personnel responsible for the production of documents, records, authorities and certificates and for the preservation of all documentation.

b. The management arrangements for controlling documentation and how its storage and preservation is carried out, including the generation of a record retention schedule, record schedules and the means of record retrieval. This should take account of the challenge of obsolescence of hardware and any associated software, and also loss of operator skills. Arrangements should demonstrate how the continued viability of the records is maintained and how often the recording method is subject to periodic review for its longevity.

c. The arrangements for assessing the minimum time scale for the maintenance of records unless agreement to the contrary has been reached with Defence Nuclear Safety Regulator.

d. The arrangement for safeguarding records against hazards which may render the records unusable. These hazards include such events as fire, flood and adverse environments. Safeguards may include duplication of records or high integrity storage.

AUTHORISATION CONDITION 7 - INCIDENTS ON THE SITE (INCIDENTS)

GUIDANCE NOTE

Introduction

1. This purpose of this Condition is to ensure that the Approving Authority has adequate arrangements in place:

a. To assist Authorisees and Duty Holders in the investigation and reporting of incidents that may occur whilst the NRP, component or relevant support equipment is under their control.

b. For the notification, recording, investigation and reporting of any condition or anomalous condition that may affect nuclear or radiological safety of the NRP, component or relevant support equipment revealed through Approving Authority sponsored activities.

Scope

2. This guidance relates to the provision of support to an Authorisee or Duty Holder during the investigation and reporting activity resulting from an incident, as defined in the glossary, to the more routine investigations associated with minor defects to equipment or procedural anomalies. The arrangements should address, amongst other things, the notification, recording, investigation and reporting of any anomalous conditions that may be identified by the Approving Authority. It includes the communication of lessons learned to avoid repetition and minimise the consequences of similar events.

Guidance to Approving Authority

3. The Authorisation Condition Compliance Statement should be sufficiently comprehensive to provide evidence that the safety management organisation and arrangements, including interfaces are adequate. Consideration should be given to the following:

a. The management responsibilities of all personnel responsible for ensuring the investigation and reporting of incidents.

b. The arrangements governing the notification, recording, investigation and reporting of anomalous conditions revealed through Approving Authority activities. The arrangements should include:

(1) the processes and procedures employed to compile, approve, maintain the arrangements up to date;

(2) the processes and procedures necessary to integrate the Approving Authority management arrangements with those of each Authorisee; and

(3) the arrangements for alerting and advising the Authorisees and DNSR.

c. The arrangements to co-operate with Authorisees in the categorisation of accidents, incidents and anomalous events.

d. The arrangements for:

- (1) appointing personnel to implement and supervise the arrangements;
- (2) categorising incidents, occurrences and deviations;
- (3) ensuring staff awareness of the need for reporting incidents and events;
- (4) ensuring an open approach to the reporting and assessment of incidents;
- (5) specifying the appropriate level of investigation;
- (6) referring the reports to the Nuclear Safety Committee and to DNSR;
- (7) implementing recommendations;
- (8) ensuring staff awareness of the lessons learned from incidents and anomalous events;
- (9) reviewing and analysing all incidents for trends in location, type, cause etc. and promulgating the lessons learned.
- (10) analysing incidents and anomalous events occurring elsewhere and applying any applicable lessons learned;
- 11) auditing the incident reporting and assessment system;
- (12) providing an annual report to the respective safety committee on the effect of incidents on the validity of the respective safety justification;
- (13) the control and storage of documentation recording incidents.

DNSR Expectation

4. All incidents with the potential to adversely affect safety are to be notified to DNSR and a verbal brief provided at the earliest practicable opportunity following the incident. This will enable DNSR to fulfil its duties under the defence ministerial reporting requirements. The timing of the notification will depend upon the safety significance or regulatory profile of the incident or event and will range between:

- (1) immediate notification by pager, telephone or fax;
- (2) notification on the next working day;
- (3) notification on the next Inspector's visit;
- (4) notification during the Inspector's review of the Approving Authority's event reporting process.

5. The Approving Authority is to provide routine reports covering all safety related incidents not falling into the more serious category above.

6. DNSR to be informed of the assessment of incidents.

7. DNSR to be informed of any other incident/event/occurrence that might attract public and/or media attention.

8. The Approving Authority is to submit proposals covering the period for retention of records relating to incidents for agreement by DNSR.

AUTHORISATION CONDITION 9 - INSTRUCTIONS TO PERSONS ON THE SITE (INFORMATION ON HAZARDS)

GUIDANCE NOTE

Introduction

1. The purpose of this Condition is to ensure that the Approving Authority implements adequate arrangements to provide each Authorisee with information so that they are aware of the hazards and consequences associated with the NRP, component or relevant support equipment, the associated precautions to be observed and the action to be taken in the event of an accident or emergency.

Scope

2. This guidance covers the provision of information to Authorisees to enable them to assess the risk from the presence of NRP, component or relevant support equipment, the precautions to be observed and the action to be taken in the event of an accident or emergency.

Guidance to Approving Authority

3. The Authorisation Condition Compliance Statement should be sufficiently comprehensive to provide the basis for evidence that the safety management organisation and arrangements, including interfaces are adequate. Consideration should be given to the following:

- a. The management responsibilities of all personnel responsible for ensuring the provision of hazard information to Authorisees.
- b. The arrangements for determining, approving and maintaining up to date the information provided to Authorisees, including an audit trail back to the source document.
- c. The arrangements for transmitting information to the Authorisees.
- d. Where appropriate the arrangements for assessing that the Authorisees have correctly interpreted the information.

AUTHORISATION CONDITION 10 – TRAINING (INFORMATION ON TRAINING)

GUIDANCE NOTE

Introduction

1. The purpose of this Condition is to ensure that the Approving Authority has arrangements to provide information to Authorisees on suitable training for those who conduct activities with the NRP, component or relevant support equipment to enable them to establish their training needs.

Scope

2. This guidance covers the generation and transfer of information to Authorisees to enable them to establish their training needs.

Guidance to Approving Authority

3. The Authorisation Condition Compliance Statement should be sufficiently comprehensive to provide the basis for evidence that the safety management organisation and arrangements, including interfaces are adequate. Consideration should be given to the following:

- a. The management responsibilities of all personnel responsible for ensuring the provision of safety training information.
- b. The processes and procedures employed in order to generate the information on training requirements.
- c. The arrangements for ensuring that information provided to Authorisees is kept up to date.

AUTHORISATION CONDITION 11 - EMERGENCY ARRANGEMENTS

GUIDANCE NOTE

Introduction

1. The purpose of this Condition is to ensure that the Approving Authority has arrangements to provide information and support to Authorisees in the event of an accident or emergency.

Scope

2. This guidance relates to the provision of information and support to Authorisees in the event of an accident or emergency and during the following render safe and recovery activities.

Guidance to Approving Authority

3. The Authorisation Condition Compliance Statement should be sufficiently comprehensive to provide the basis for evidence that the safety management organisation and arrangements, including interfaces are adequate. Consideration should be given to the following:

- a. The management responsibilities for those personnel who are responsible for ensuring the provision of emergency response information and support.
- b. The arrangements for providing suitable information and support to Authorisees in the event of an accident or emergency.
- c. The arrangements for demonstrating the adequacy of the arrangements for providing suitable information and support to Authorisees in the event of an accident or emergency.

DNSR Expectation

4. In accordance with AC11(5), DNSR expects the Approving Authority to rehearse its emergency response support arrangements at intervals not exceeding 1 year, other than by agreement with DNSR; the scope of the rehearsal to be agreed with DNSR on a case-by-case basis. Ideally, the rehearsal should be conducted in support of an Authorisee's emergency arrangements rehearsal.

AUTHORISATION CONDITION 12 - DULY AUTHORISED AND OTHER SUITABLY QUALIFIED AND EXPERIENCED PERSONS (SUITABLY QUALIFIED AND EXPERIENCED PERSONS)

GUIDANCE NOTE

Introduction

1. The purpose of this Condition is to ensure:
 - a. That only Approving Authority's staff that are Suitably Qualified and Experienced Persons (SQEP) perform duties which may affect the safety of the NRP, component or relevant support equipment; and
 - b. That adequate arrangements exist to provide information to Authorisees about the qualifications and experience required by their personnel responsible for conducting operations with the NRP, component or relevant support equipment.

Scope

2. This guidance relates to SQEP within the Approving Authority and also the provision of information to Authorisees to assist them in determining their SQEP requirements.

Guidance to Approving Authority

3. The Authorisation Condition Compliance Statement should be sufficiently comprehensive to provide the basis for evidence that the safety management organisation and arrangements, including interfaces are adequate. Consideration should be given to the following:
 - a. The management responsibilities of all personnel responsible for post profiling and identification of required qualifications and experience of individuals who are to fill each nuclear safety related post.
 - b. A description of the system for post profiling, the required qualifications and experience of the individuals who are to fill each nuclear safety related post.
 - c. The methods of defining the classification of each post and the arrangements for managing the classification.
 - d. The arrangements that ensure that only SQEP carry out the duties that may affect nuclear or radiological safety.
 - e. The arrangements for the management of 'waivers'.
 - f. The arrangements for identifying and planning for the provision of future SQEP requirements.
 - g. The arrangements for providing information to Authorisees to assist them in determining the qualifications and experience required by their staff.

DNSR Expectation

4. With regard to AC12 (1) Defence Nuclear Safety Regulator (DNSR) expects:

- a. The Approving Authority to classify posts, typically in three classifications, in the organisation according to the safety significance of the post and to agree the classification scheme with DNSR.
- b. To give agreement to those posts in the highest classification and to agree the qualifications and experience relevant to each of the posts.
- c. To give agreement to waivers where it is proposed to appoint a person to a post in the highest classification where the person proposed does not possess all the qualifications and experience agreed for the post.

AUTHORISATION CONDITION 13 - NUCLEAR SAFETY COMMITTEE

GUIDANCE NOTE

Introduction

1. The purpose of this Condition is to ensure that the Approving Authority sets up a senior level committee to consider and advise the Approving Authority on matters which affect the safe design, construction, commissioning, manufacturing, operation and decommissioning of the NRP and any other matter relevant to safety. The committee must have members who are adequately qualified to perform this task including members who are independent of the Approving Authority. The Condition gives DNSR the power to veto the appointment of or continued presence of any member. The committee is intended to act as a check on the Approving Authority's decision making process to ensure that safety considerations are given due weight. However, the committee is intended to be purely advisory and must not be considered to have an executive function. Where the Approving Authority rejects the advice of the committee the Condition requires the Approving Authority to notify DNSR; in this way DNSR can investigate the justification of the Approving Authority's safety related actions.

Scope

2. This guidance relates to the Nuclear Safety Committee (NSC) and any subordinate committee(s) or working group(s) that report to NSC. The scope also covers all those aspects that are required by other Conditions and any topic requested by the Approving Authority.

Guidance to Approving Authority

3. The Authorisation Condition Compliance Statement should be sufficiently comprehensive to provide the basis for evidence that the safety management organisation and arrangements, including interfaces are adequate. Consideration should be given to the following:

- a. The management responsibilities of all personnel associated with the NSC.
- b. The Terms of Reference (ToRs) for the NSC and any subordinate committee(s) or working group(s) that reports to the NSC. The arrangements for providing the ToRs to DNSR for approval.
- c. The overarching committee and working group structure within the Approving Authority, defining the interactions between the NSC, committees and working groups.
- d. The constitution of each committee, in particular the rules of attendance, what constitutes a quorum, the number of independent members, and members' experience and qualifications.
- e. The arrangements for managing the committee(s) and working group(s) reporting to the NSC.
- f. The arrangements for making appointments to the NSC, subsidiary committee(s) and working group(s), including the provision of information to DNSR covering the name, experience, qualifications and details of current and past posts held by each member.
- g. The arrangements for emergency meetings or out of committee decisions, when urgent advice is sought, but a properly constituted meeting is not practicable.

- h. The arrangements that ensure a record of the committee(s) membership, the minutes of meetings, papers and reports considered are maintained.
- i. The status of the NSC advice and the action to be taken in the event that the advice of the NSC or subsidiary committee(s) is rejected.
- j. The arrangements for notifying DNSR, as soon as practicable, if it is intended to reject, in whole or in part, any advice given by any such committee together with the reason for such rejection.

DNSR Expectation

- 4. DNSR will specifically approve the ToRs of the NSC.

AUTHORISATION CONDITION 14 - SAFETY DOCUMENTATION

GUIDANCE NOTE

Introduction

1. The purpose of this Condition is to ensure that the Approving Authority has arrangements for the preparation and assessment of the safety related documentation used to justify the intrinsic safety of NRP, components and relevant support equipment. The arrangements for the assessment of safety related documentation are intended to ensure an independent review of the quality and accuracy of the Approving Authority's safety related decisions and activities to ensure they have been adequately justified. It also includes the preparation and assessment of safety information provided to the Authorisees to enable them to justify the safety of their operations.

Scope

2. This Condition requires the Approving Authority to have management arrangements to encompass:

a. All safety documentation that has implications for NRP, components and relevant support equipment; and

b. The design activities including research, trials, development, manufacture, operation, setting to work and decommissioning of the equipment.

Guidance to Approving Authority

3. The Authorisation Condition Compliance Statement should be sufficiently comprehensive to provide the basis for evidence that the safety management organisation and arrangements, including interfaces are adequate. Consideration should be given to the following:

a. The management responsibilities of all personnel responsible for the production and approval of the safety documentation.

b. The arrangements to:

(1) prepare, peer review and assess safety documentation;

(2) ensure that safety documentation is categorised in accordance with its safety significance;

(3) ensure that safety documentation is produced by Suitably Qualified and Experienced Person(s) (SQEP);

(4) ensure that safety documentation is reviewed by independent SQEP;

(5) determine whether documentation which has higher categories of safety significance should be subjected to an Independent Nuclear Safety Assessment by SQEP, independent of the groups responsible for the production of the safety case or for activities;

(6) submit documents, where appropriate, after peer review to the Approving Authority's own Nuclear Safety Committee;

(7) ensure that documentation is submitted to Defence Nuclear Safety Regulator (DNSR) in accordance with the categorisation scheme or as specified by DNSR. This includes the provision of the Nuclear Safety Committee's comments as appropriate;

(8) ensure that safety documentation is approved and reviewed at appropriate intervals. The level at which safety documentation is reviewed should be in accordance with the Approving Authority's categorisation scheme.

c. The requirement for safety documentation to cover procurement, commissioning, operation, maintenance, modification, decommissioning of equipment or systems, supporting infrastructure if appropriate, and the management of radioactive waste products including their storage and disposal.

d. State the approval level of the safety documentation.

e. The arrangements for transmitting safety information to the Authorisees and Duty Holders.

DNSR Expectation

4. With regard to AC14 (1) DNSR expects:

a. The Approving Authority to categorise safety documentation according to safety significance.

b. To give agreement to safety documentation in the highest class.

c. To be able to 'call in' any documentation.

AUTHORISATION CONDITION 15 - PERIODIC REVIEW

GUIDANCE NOTE

Introduction

1. The purpose of this Condition is to ensure that the Approving Authority periodically stands back and reviews the safety case against current standards to see if there are reasonably practicable improvements that could be made to NRP, component or relevant support equipment.

Scope

2. This review should seek to ensure the continued safety of the NRP, components and relevant support equipment for the period up to completion of the next review and should include:

- a. The review of any information provided to Authorisees to justify the continued safety of their operations; and
- b. The examination of all safety information and modifications, irrespective of their safety category.

Guidance to Approving Authority

3. The Authorisation Condition Compliance Statement should be sufficiently comprehensive to provide the basis for evidence that the safety management organisation and arrangements, including interfaces are adequate. Consideration should be given to the following:

- a. The management responsibilities of all personnel responsible for the periodic review of safety cases.
- b. The form of the review being undertaken. There are two types of review: the rolling programme of reviewing and updating safety cases and Statements of Compliance, and the less frequent stand-alone periodic review of the Safety Justification.
- c. The arrangements for reviewing safety justifications when any change, significant external event or emergent information arises.
- d. The procedure for managing the unplanned situation, especially as to whether the operation may continue.
- e. The arrangements for reporting and ensuring that the results of all reviews are subjected to scrutiny by a sufficiently independent and competent body before submission to the Nuclear Safety Committee.
- f. The arrangements for agreeing, prioritising, planning and implementing recommendations from the review and obtaining agreement from DNSR when significant safety or programme implications are identified.
- g. The arrangement for reviewing the safety justification if operation beyond the original justified period or equipment/system design life is considered.

- h. The arrangement for determining the scope and review periodicity, linking this to its life cycle and ensuring that the safety justification remains valid and is reviewed at intervals agreed by DNSR, e.g. whilst a typical timescale for periodic review is 10 years, for the NRP this may be linked to the Long Overhaul Period programme.
- i. The means by which the standards and processes for the review reflect current best practice, are systematic, address developments in technology and safety management, consider operating experience and emergent problems, address ageing, incorporate lessons learned from other sites and industries and address the principle of continuous improvement.
- j. The arrangements for ensuring that a holistic view is adopted during each review.
- k. The arrangements for the provision of information to Authorisees to support their reviews.

AUTHORISATION CONDITION 16 - SITE PLANS, DESIGNS AND SPECIFICATIONS (DIAGRAMS, DESIGNS AND SPECIFICATIONS)

GUIDANCE NOTE

Introduction

1. The purpose of this Condition is to ensure that, when requested, DNSR is provided with up to date diagrams, design information and specifications relating to the NRP, component or relevant support equipment as the DNSR may specify.

Scope

2. This guidance relates to all diagrams, design information and specifications during all phases from research to decommissioning.

Guidance to Approving Authority

3. The Authorisation Condition Compliance Statement should be sufficiently comprehensive to provide the basis for evidence that the safety management organisation and arrangements, including interfaces are adequate. Consideration should be given to the following:

- a. The organisation to ensure that there is an effective management system to respond to requests from DNSR.
- b. The processes and procedures governing the provision of information to DNSR, including the provision of amendments to the information already provided.

AUTHORISATION CONDITION 17 – MANAGEMENT SYSTEMS

GUIDANCE NOTE

Introduction

1. The purpose of this Condition is to ensure that the Approving Authority establishes and implements management systems which give due priority to safety. This is to include the making and implementation of adequate quality management arrangements for all activities associated with the design and approval of NRP, including the preparation and review of safety documentation. The Approving Authority is to make and implement adequate arrangements to provide assurance about the quality of operations conducted by Authorisees in order to support continued approval for service use.

Scope

2. This guidance covers the management systems used to control and monitor those actions necessary in the interest of safety and to demonstrate compliance with the AC and in particular the arrangements made under them. This Condition relates to the management systems, including quality management arrangements, of the Approving Authority and their monitoring of the quality of operations conducted by Authorisees, Duty Holders and contractors.

Guidance to Approving Authority

3. The Authorisation Condition Compliance Statement should be sufficiently comprehensive to provide the basis for evidence that the safety management organisation and arrangements, including interfaces are adequate. Consideration should be given to the following:

- a. The management responsibilities of all personnel responsible for establishing, co-ordinating and maintaining the management systems.
- b. The arrangements for ensuring that any of the management system processes (e.g. financial, commercial, project, industrial safety or environmental) give due priority to safety.
- c. The quality management arrangements, making reference to any accredited system being operated.
- d. The arrangements for monitoring and reviewing management system documents and procedures.
- e. The arrangements for periodic internal and external audits and the arrangements for rectification of shortfalls and deficiencies identified during audits.
- f. The arrangements for monitoring the quality of operations conducted by Authorisees in order to support continued approval for service use.

AUTHORISATION CONDITION 19 - CONSTRUCTION OR INSTALLATION OF NEW PLANT (DESIGN OF A NAVAL REACTOR PLANT, COMPONENT OR RELEVANT SUPPORT EQUIPMENT)

GUIDANCE NOTE

Introduction

1. The purpose of this Condition is to ensure that the Approving Authority provides and implements adequate control over the design of any new NRP, component or relevant support equipment. This includes ensuring that at each stage of the design process appropriate safety documentation is produced to demonstrate the safety of the plant. The condition gives the power to DNSR to prevent the commencement of the next stage of design until it is satisfied with the safety analysis and/or to put hold points during the design process to ensure the installation is being constructed in accordance with the stated intent. DNSR's control can be either through using the direct powers in the Condition or through secondary powers built into the Approving Authority's arrangements.

Scope

2. This guidance relates to the control of design, manufacture, construction or installation of new plant or system which may affect nuclear safety.

Guidance to Approving Authority

3. The Authorisation Condition Compliance Statement should be sufficiently comprehensive to provide the basis for evidence that the safety management organisation and arrangements, including interfaces are adequate. Consideration should be given to the following:

- a. The management responsibilities of all personnel who are responsible for ensuring correct design/manufacture/construction and installation activities.
- b. The personnel responsible for managing and supervising work and those responsible for categorising the proposed work.
- c. The arrangements for categorising all proposed work according to the hazard potential.
- d. The arrangements to:
 - (1) ensure that documentation is produced to justify the safety of the undertakings;
 - (2) ensure that such documentation is produced by Suitably Qualified and Experienced Persons (SQEP);
 - (3) ensure that the documents are reviewed by independent SQEP;
 - (4) ensure that the documents are approved through the appropriate due process;
 - (5) produce and keep records of the relevant safety documentation; and
 - (6) apply lessons learned from other similar projects.

e. The arrangements for managing the activities during all phases of design, including the assessment of hazards specific to the manufacture and construction, and interactions with the Authorised/Licensed sites. This should demonstrate an integrated approach.

f. The design and procurement processes, which should integrate:

(1) the arrangements for identifying, agreeing and recording the safety requirements to be satisfied by the NRP, component or relevant support equipment;

(2) the system to develop, agree and, where necessary, modify the programme of safety related work;

(3) the arrangements for ensuring the adequacy of the evidence generated, including aspects such as the management of trials, modelling and assessments, documentation and build standard reconciliation;

(4) the arrangements for developing and proving NRP, component or relevant support equipment processes and procedures (e.g. Standard Operating Procedures) used post manufacture;

(5) the arrangements associated with establishing and proving the manufacturing capability, and for ensuring that the quality and build standards are maintained in accordance with the design intent;

(6) the arrangements governing the assessment of the safety of the evidence generated; and

(7) the arrangements for the design to be kept under control to meet the required safety characteristics in the defined environments, including the arrangements governing the specification and recording of the design.

g. The arrangements for the production of a project programme and management plan that includes the arrangements for dividing the work into stages, where appropriate, each of which will have a safety justification and require approval before commencement. Approval hold points and the associated activities should be identified for internal approval activities (typically, internal audit, Independent Peer Review, Nuclear Safety Committee and the Design Authorities), as well as those associated with external approval activities undertaken by DNSR.

h. The arrangements controlling interactions with DNSR.

AUTHORISATION CONDITION 21 – COMMISSIONING (APPROVAL FOR USE)

GUIDANCE NOTE

Introduction

1. The purpose of this Condition is to ensure that the Approving Authority has adequate arrangements for the approval for use of a new or modified NRP, component or relevant support equipment.
2. The Condition gives DNSR powers to control various stages of approval. This is to ensure that the Approving Authority demonstrates that the design or modification has been completed according to the design intent, and the necessary safety implications associated with commissioning and use have been considered, assessed and shown to be acceptable and the appropriate safety documentation is complete. Usually a hold point is put at the start of inactive commissioning, i.e. testing systems before the introduction of radioactive materials, and at the start of active commissioning. This latter hold point is to ensure that it has been demonstrated that the plant is functioning and safe to allow the introduction of radioactive materials. Finally the Condition gives DNSR the power to control the approval for use by requiring the Approving Authority to ensure that appropriate documentation has been produced and to seek DNSR's consent for approval.

Scope

3. This guidance relates to the approval of all NRP, components and relevant support equipment.

Guidance to Approving Authority

4. The Authorisation Condition Compliance Statement should be sufficiently comprehensive to provide the basis for evidence that the safety management organisation and arrangements. Including interfaces are adequate. Consideration should be given to the following:
 - a. The management responsibilities, interfaces and boundaries of all personnel who are responsible for the approvals.
 - b. The arrangements to demonstrate that design intent has been maintained during the design and build phases or the modification.
 - c. The arrangements with any Authorisee to develop, record, agree and, where necessary, modify the commissioning programme. Inactive and active commissioning should be planned and executed to show that the design intent has been met.
 - d. The safety documentation justifying the approval for use and the description of the level of approval required.
 - e. The arrangements for maintenance of configuration control, the approval of safety related design changes and the approval of concessions.
 - f. The arrangements for approving the commissioning and in-service processes and procedures.

- g. The arrangements for approval in stages, including inactive and active commissioning, where appropriate, recognising that each stage may require DNSR consent, before starting the next stage.
- h. The arrangements that ensure there are comprehensive and accurate records of test and trial results and that assessment of the results are kept.
- i. The arrangements that ensure that new or modified items which may affect safety are not approved until the appropriate stage of commissioning has been completed and a report of such commissioning has been produced and a safety analysis has been developed and considered.
- j. The arrangements controlling interactions with the Defence Nuclear Safety Regulator.

AUTHORISATION CONDITION 22 - MODIFICATION OR EXPERIMENT ON EXISTING PLANT (MODIFICATION TO A NAVAL REACTOR PLANT, COMPONENT OR RELEVANT SUPPORT EQUIPMENT)

GUIDANCE NOTE

Introduction

1. The purpose of this Condition is to ensure that the Approving Authority has adequate arrangements to control all modifications, trials or experiments to NRP, component or relevant support equipment. The Condition also gives DNSR the power to control such modifications to ensure that they cannot commence until the Approving Authority has adequately demonstrated the safety of the proposal. DNSR's control can be either through using the direct powers in the Condition or through secondary powers built into the Approving Authority's arrangements.

Scope

2. This guidance covers the control and assessment of modifications throughout all phases of the concept, assessment, design, manufacture, implementation and disposal cycle.

Guidance to Approving Authority

3. The Authorisation Condition Compliance Statement should be sufficiently comprehensive to provide the basis for evidence that the safety management organisation and arrangements, including interfaces are adequate. Consideration should be given to the following:

a. The management responsibilities, interfaces and boundaries of all personnel who are responsible for ensuring that modifications, managed, controlled and supervised.

b. The processes and procedures undertaken to categorise, assess, approve and implement changes to the design of NRP, component or relevant support equipment. This should include the:

(1) processes and procedures employed to initiate modification action when arising from within the Approving Authority or externally;

(2) processes and procedures undertaken to assess a proposed modification;

(3) arrangements for the review and approval of a modification;

(4) arrangements for governing the dissemination of information following a modification;

(5) safety categorisation system employed;

(6) the safety documentation justifying the safety of the modification, and the level of approval required, including the provision of information to support the safety documentation of the Authorisees;

(7) arrangements to control the modifications and alterations, ensuring that operating instructions and procedures are consistent with the Safety Justification and the design intent;

(8) the arrangements for ensuring that the procedures for modifications, trials or experiments are implemented, properly controlled, authorised and conducted.

(9) processes and procedures used to update the design and as built records, manufacturing records and documentation defining the interfaces.

c. The arrangements for implementing the modification, in stages, where appropriate, with each stage requiring DNSR consent, if specified, before commencement of the next stage.

d. Producing a 'hold point' strategy and the arrangements for defining the appropriate level of approval for each stage.

e. The principal interactions with the Defence Nuclear Safety Regulator.

AUTHORISATION CONDITION 23 - OPERATING RULES (CONDITIONS AND LIMITS OF SAFE OPERATION)

GUIDANCE NOTE

Introduction

1. The safety of a NNPP activity results from many factors including the design of the NRP and its behaviour under fault or accident conditions. The purpose of this Condition is to ensure that the Approving Authority produces a safety analysis that identifies all the necessary conditions and limits that ensure that the NRP, component or relevant support equipment is kept within parameters which ensure safety during normal operation and in fault or accident conditions.

Scope

2. This guidance relates to the conditions and limits necessary in the interest of safety, which may also be referred to as Operating Rules which are generated to prevent a breach of the safe operating envelope of the NRP, component or relevant support equipment.

Guidance to Approving Authority

3. The Authorisation Condition Compliance Statement should be sufficiently comprehensive to provide the basis for evidence that the safety management organisation and arrangements, including interfaces are adequate. Consideration should be given to the following:

- a. The management responsibilities, interfaces and boundaries of all personnel who are responsible for defining, approving, producing, reviewing and maintaining the Operating Rules.
- b. The arrangements controlling interactions with Authorisees, including the arrangements for transmitting information between the Approving Authority and Authorisees.
- c. The arrangements controlling interactions with the Defence Nuclear Safety Regulator.
- d. The arrangements employed by the Approving Authority for reviewing, approving and maintaining up-to-date the Operating Rules.

AUTHORISATION CONDITION 24 - OPERATING INSTRUCTIONS

GUIDANCE NOTE

Introduction

1. The safety of a NNPP activity is influenced by the actions of people who control, maintain or service the NRP, component or relevant support equipment. It is important given the often complex nature of the safety case for all actions carried out by people to be done in accordance with procedures derived from the safety case. It is also important that actions are not carried out on an ad hoc basis without evidence. The purpose of this Condition is to ensure that the Approving Authority has arrangements to provide Authorisees with information necessary to enable the provision of written Operating Instructions for all operations which may affect safety, including any instructions to implement Conditions and Limits of Safe Operation.

Scope

2. This guidance relates to the provision of information and operating instructions to the Authorisees for operations that may affect nuclear or radiological safety. Such operations include the routine day-to-day operations and related activities such as research, trials, maintenance, commissioning and decommissioning.

Guidance to Approving Authority

3. The Authorisation Condition Compliance Statement should be sufficiently comprehensive to provide the basis for evidence that the safety management organisation and arrangements, including interfaces are adequate. Consideration should be given to the following:

- a. The management responsibilities, interfaces and boundaries of all personnel responsible for the provision of information necessary to enable the provision of written operating instructions.
- b. The processes and procedures undertaken to ensure that adequate information is generated, including the arrangements for reviewing, amending, controlling, approving and maintaining up-to-date such information.
- c. The arrangements for controlling interactions with Authorisees, including the arrangements for providing Authorisees with 'instructions necessary in the interest of safety' and the conditions and limits of safe operation.
- d. The arrangements controlling interactions with the Defence Nuclear Safety Regulator.

AUTHORISATION CONDITION 25 - OPERATIONAL RECORDS

GUIDANCE NOTE

Introduction

1. The purpose of this Condition is to ensure the Approving Authority has arrangements for specifying to Authorisees the records to be made of the operation, inspection and maintenance of any NRP, component or relevant support equipment necessary to support continued Approval for use.

Scope

2. Operational records are those relating to examination, maintenance, inspection, testing and operation of any NRP, component or relevant support equipment.

Guidance to Approving Authority

3. The Authorisation Condition Compliance Statement should be sufficiently comprehensive to provide the basis for evidence that the safety management organisation and arrangements are adequate. Consideration should be given to the following:

- a. Management responsibilities, including interfaces and boundaries of all personnel responsible for the specification of records associated with the operation, inspection and maintenance of the NRP, component or relevant support equipment.
- b. The processes and procedures undertaken in order to define and agree the NRP, component or relevant support equipment operational records required.
- c. The arrangements for specifying to Authorisees the operational records to be provided.
- d. The arrangements controlling interactions with the Defence Nuclear Safety Regulator.

AUTHORISATION CONDITION 27 - SAFETY MECHANISMS, DEVICES AND CIRCUITS

GUIDANCE NOTE

Introduction

1. The purpose of this Condition is to ensure that the Approving Authority has arrangements to specify for Authorisees which conditions and limits for operation of a NRP, component or relevant support equipment require the provision of safety mechanisms, devices and circuits.

Scope

2. This guidance relates to the conditions and limits for operation of a NRP, component or relevant support equipment in which the safety analysis has identified or recognised the need for Safety Mechanisms, Devices or Circuits (SMDC).

Guidance to Approving Authority

3. The Authorisation Condition Compliance Statement should be sufficiently comprehensive to provide the basis for evidence that the safety management organisation and arrangements are adequate. Consideration should be given to the following:

- a. The management responsibilities, interfaces and boundaries of all personnel responsible for defining the requirements for SMDC.
- b. The processes and procedures governing the:
 - (1) identification of those conditions and limits that require the introduction of safety mechanisms, devices and circuits by an Authorisee; and
 - (2) reassessment of the requirements following a change, typically in the operating conditions and limits.
- c. The arrangements controlling interactions with Authorisees.

AUTHORISATION CONDITION 28 - EXAMINATION, INSPECTION, MAINTENANCE, AND TESTING

GUIDANCE NOTE

Introduction

1. The purpose of this Condition is to ensure that the Approving Authority has adequate arrangements to specify to Authorisees the requirements for the regular and systematic examination, inspection, maintenance and testing of all plant, components and relevant support equipment. The arrangements must also provide for the specification of an examination, inspection, maintenance and testing schedule for NRP, component or relevant support equipment.

Scope

2. This guidance relates elements of the NRP, component or relevant support equipment which are to be subject to regular and systematic Examination, Inspection, Maintenance and Testing (EIMT) and are to be included in a maintenance schedule.

Guidance to Approving Authority

3. The Authorisation Condition Compliance Statement should be sufficiently comprehensive to provide the basis for evidence that the safety management organisation and arrangements, including interfaces are adequate. Consideration should be given to the following:

- a. The management responsibilities, interfaces and boundaries of all personnel responsible for identifying EIMT requirements and communicating these to the Authorisees.
- b. The arrangements for deriving and approving the examination, inspection, maintenance, and testing policy, including how they are derived from the safety analysis.
- c. The processes and procedures governing the specification of examination, inspection, maintenance and test requirements to Authorisees.

AUTHORISATION CONDITION 30 - PERIODIC SHUTDOWN

GUIDANCE NOTE

Introduction

1. It may be necessary for a NRP, component or relevant support equipment to be shut down at regular intervals for examination, inspection, maintenance and testing. The purpose of this Condition is to ensure that the Approving Authority has arrangements to define the periodicity for shutdown, examination, inspection, maintenance and testing. The Condition also gives Defence Nuclear Safety Regulator (DNSR) the power to intervene and require the Approving Authority to seek DNSR's consent to granting approval to restart operations following the completion of the necessary maintenance.

Scope

2. Periodic Shutdown refers to the shutdown of either the whole or part of the NRP, component or relevant support equipment to enable the safe conduct of examination, inspection, maintenance or testing according to the requirements of the maintenance schedule.

Guidance to Approving Authority

3. The Authorisation Condition Compliance Statement should be sufficiently comprehensive to provide the basis for evidence that the safety management organisation and arrangements, including interfaces are adequate. Consideration should be given to the following:

- b. The management responsibilities, interfaces and boundaries of all personnel responsible for managing and specifying the requirements for periodic shutdowns.
- b. The processes and procedures governing the planning of the examination, maintenance, inspection and testing to be undertaken by the Approving Authority, including the safety justification.
- c. The arrangements for considering, justifying and approving extensions, or reductions, to the period before scheduled shutdown and verifying the satisfactory completion of the EIMT.
- d. The arrangements controlling interactions with Authorisees.
- e. The arrangements for dealing with situations where examination, maintenance, inspection and testing reveals faults, or conditions which jeopardise safe operation or indicate a potentially unsafe condition, including the notification of the Defence Nuclear Safety Regulator.

AUTHORISATION CONDITION 31 - SHUTDOWN OF SPECIFIED OPERATIONS (WITHDRAWAL OF APPROVAL)

GUIDANCE NOTE

Introduction

1. The purpose of this Condition is to give DNSR the discretionary power to direct the Approving Authority to withdraw the Approval for Use of any NRP, component or relevant support equipment and to require the consent of DNSR prior to reinstating any Approval.

Scope

2. This guidance relates to the withdrawal of the Approval for Use of any NRP, component or relevant support equipment. The Approving Authority must have arrangements in place to instruct any Authorisee to shutdown specified operations with any NRP, component or relevant support equipment for which Approval for Use is withdrawn.

Guidance to Approving Authority

3. The Authorisation Condition Compliance Statement should be sufficiently comprehensive to provide the basis for evidence that the safety management organisation and arrangements, including interfaces are adequate. Consideration should be given to the following:

- a. The management responsibilities, interfaces and boundaries of all personnel responsible for ensuring that there are arrangements to respond to a direction by DNSR to withdraw approval.
- b. The processes and procedures employed by the Approving Authority to implement a direction from DNSR to withdraw Approval for Use and to instruct any Authorisee to shutdown specified operations.
- c. The arrangements for seeking DNSR consent to reinstate Approval for Use.

AUTHORISATION CONDITION 35 - DECOMMISSIONING

GUIDANCE NOTE

Introduction

1. The purpose of this Condition is to ensure the Approving Authority has made adequate plans for the decommissioning of a NRP, component or relevant support equipment.

Scope

2. This Condition relates to the planning of decommissioning of NRP, component or relevant support equipment that present nuclear or radiological hazards.

Guidance to Approving Authority

3. The Authorisation Condition Compliance Statement should be sufficiently comprehensive to provide the basis for evidence that the safety management organisation and arrangements, including interfaces are adequate. Consideration should be given to the following:

- a. The management responsibilities, interfaces and boundaries of all personnel responsible for planning decommissioning.
- b. The processes and procedures for ensuring that adequate capability exists to withdraw and decommission NRP, component or relevant support equipment including decommissioning as part of the normal CADMID cycle.
- c. The arrangements for the production, agreement and management of a decommissioning plan for NRP, component or relevant support equipment.
- d. The arrangements for providing documentation to justify that safety has been duly consider in the proposed decommissioning plan and its submission to the Defence Nuclear Safety Regulator.

AUTHORISATION CONDITION 36 – ORGANISATIONAL CAPABILITY

GUIDANCE NOTE

Introduction

1. The purpose of this Condition is to ensure that the Approving Authority maintains adequate financial and human resources to ensure safety, and has adequate arrangements to control any change to its organisational structure or resources which could affect safety. These arrangements require the Approving Authority to assess the safety implications of any proposed change before they are carried out. For changes that could have a significant effect on safety if they are inadequately conceived or executed the Condition gives the Defence Nuclear Safety Regulator (DNSR) the power to require the Approving Authority to submit a safety statement, and to prevent the change from taking place until DNSR is satisfied that the safety implications are understood and that there will be no lowering of safety standards. The Condition also gives DNSR the power to halt any change that has commenced if there is a concern that the safety implications have not been adequately considered.

Scope

2. This guidance provides advice on the arrangements for maintenance of adequate financial and human resources and the management of change to the organisation which delivers and manages safety. The scope of organisational changes ranges from high level changes, e.g. management reorganisations or project team mergers, to low level changes; this includes the reduction of manpower in response to cost saving measures and the increased use of contractors. The arrangements should not be restricted to those roles set out in the Approving Authority's nuclear baseline; rather, the arrangements should reflect the roles needed to carry out the full range of Authorised activities including Design Authority roles, decommissioning projects, maintenance, examination and testing, emergency response, etc. The governance of nuclear safety and Intelligent Customer functions are an integral part of the nuclear baseline.

Guidance to Approving Authority

3. Consideration should be given to the following:

Adequate Arrangements

4. The Approving Authority should demonstrate that he has made and implemented adequate arrangements to provide and maintain adequate financial and human resources, and to control any changes to the organisational structure or resources. Such arrangements should include a description of the Approving Authority:

- a. nuclear baseline;
- b. procedures for organisational change;
- c. arrangements for assessing and obtaining the financial resources necessary to continue to ensure the safety of Authorised activities.

Nuclear Baseline

5. The nuclear baseline should be documented, and that documentation should identify and justify all safety significant aspects of the organisation, including:

- a. The purpose of the organisation.
- b. Senior management and their responsibilities.
- c. Lines of accountability from the workforce to senior management.
- d. Description of the staff comprising the organisation, including:
 - (1) numbers of staff required;
 - (2) identification of posts with safety responsibilities, including those with safety responsibilities to the Approving Authority but not part of his organisation, requiring the post holders to be Suitably Qualified and Experienced Persons; there needs to be an emphasis on sufficient in-house technical resource and Intelligent Customer aspects;
 - (3) identification of posts with specific safety responsibilities requiring the post holders to be Duly Authorised Persons;
 - (4) terms of reference and job descriptions; and
 - (5) training, qualification and experience requirements plan.
- e. Arrangements for the employment of contractors.

Procedures for Organisation Change

- 6. a. Role of Senior Management. A statement of senior management commitment should be produced, including: acceptance of their responsibility; recognition that the management of safety is a key business objective; and a description of control of their organisation.
- b. Project Management. The arrangements for proactive management of the change should be described, including the means by which proposed changes are to be planned, developed, assessed and subsequently implemented.
- c. Review and Assessment. The arrangements for independent review and assessment, depending upon categorisation, should be described, including any arrangements for independent peer review.
- d. Audit and Feedback. The arrangements for audit of an organisation post implementation of change should be described, to provide assurance that the change has been correctly implemented, and that the arrangements are robust on completion.

Classification

7. As with equipment modifications, changes to the organisational structure or resources are to be classified according to their safety significance. This is to enable the application of a degree of scrutiny and review commensurate to the impact of the proposed change. This in turn should be based upon an assessment of the consequences of a management failure due to the organisational changes and the subsequent loss of control of a safety significant activity.

Documentation

8. The arrangements should provide for adequate documentation to justify any proposed change. This should include:

- a. Recognition of the safety implicated aspects of the nuclear baseline arrangements.
- b. Consideration of options.
- c. Principles for change.
- d. Demonstration of how the revised organisation is to function, highlighting the effect of change from the datum.

Submission

9. The Approving Authority arrangements should cover the submission of any documentation called for review by Defence Nuclear Safety Regulator (DNSR).

Approval of Specified Arrangements

10. The Approving Authority should recognise the need for DNSR to review any proposed change and be prepared to stop the change or operational programme if DNSR is not satisfied with the safety implications.

11. Organisations may use their Compliance arrangements for Authorisation Condition 22 as a framework.

12. The arrangements defining interactions with the DNSR, including the submission of any documentation requested by DNSR and the procedures for seeking DNSR agreement.

FURTHER AUTHORISATION CONDITION 1 - DUTY OF CO-OPERATION

GUIDANCE NOTE

Introduction

1. This Condition results from the mobility of reactors and weapons in the Defence Nuclear Programmes, and the separate responsibilities of approving authorities. The first purpose of the condition is to maintain coherent arrangements between Authorisees to ensure the safe transfer of reactors or weapons from one to the other. The second purpose of the condition is to maintain arrangements for co-operation between Authorisees and Approving Authorities to ensure that appropriate design control is exercised throughout the plant life and across life-cycle phases (in the nuclear weapons programme this complements the requirements of Approving and Design Authorities Conditions (ADAC)). Finally, the condition ensures that arrangements are made for co-operation with independent organisations (e.g. contractors) and internally within the Authorisee's organisation where this is necessary to maintain safety.

Scope

2. This guidance relates to the factors which the Approving Authority should consider to ensure that it co-operates Authorisees, with the Technical/Design Authorities and with other organisations (both external and internally).

Guidance to Approving Authorities

3. The responsibility for nuclear and radiological safety within the NNPP remains ultimately with the Authorisees and cannot be delegated to another body/person. This responsibility cannot, however, be discharged by the Authorisees without information from and co-operation with those responsible for the design and approval of the NRP, component or relevant support equipment i.e. the Approving Authority.

4. The Further Authorisation Condition Compliance Statement should be sufficiently comprehensive to provide the basis for evidence that the safety management organisation and arrangements are adequate. Consideration should be given to the following:

a. The responsibilities of Approving Authority personnel for the interface arrangements with the Authorisees and Duty Holders, and within the Approving Authority, including the management structure, responsibilities and interactions between the associated organisations, committees and individuals.

b. The arrangements to ensure the provision of adequate information on the NRP, components and relevant support equipment safety to each Authorisee and Duty Holder, and within the Approving Authority, to enable them to discharge their nuclear and radiological safety responsibilities.

c. The arrangements the Approving Authority has in place to gain assurance that the activities undertaken by Authorisees and Duty Holders will not compromise the intrinsic safety of the NRP, component or relevant support equipment.

d. The contracts and customers supplier agreements etc. with customers, suppliers, Authorisees and within the Approving Authority.

DNSR Expectation

5 DNSR expects the Approving Authority to agree a 'Documented Arrangement' with an Authorisee or Duty Holder where there is an interface which affects nuclear safety; this is to define the responsibilities of the parties as they affect the other.

Annex E to Chapter 1: Standard Statements

Statement by the United Kingdom Government on Operation of Nuclear Powered Warships in Foreign Ports

Statement by United States Government on Operation of US Nuclear Powered Warships in Foreign Ports (Revised September 1964)

Declaration of the French Government on Visits of Nuclear Powered Warships To Foreign Ports

Statement by the United Kingdom Government on Operation of Nuclear Powered Warships in Foreign Ports

1. The UK Government certifies that the reactor safety aspects of design, crew training and operating procedures of the nuclear propulsion plant of UK nuclear powered warships are reviewed by the UK Defence Nuclear Safety Committee (DNSC) and other appropriate UK authorities, and are as defined in officially approved manuals. The UK Government also certifies that all safety precautions and procedures followed in connection with operations in UK ports will be strictly observed in foreign ports.
2. In connection with the operation of UK nuclear powered warships in foreign ports:
 - (a) No effluent or other waste will be discharged from the ship which would cause an ascertainable hazard through an increase in the general background radioactivity of the environment; waste disposal standards are consistent with the recommendations of the International Commission on Radiological Protection.
 - (b) During the period of the visit, the personnel of the nuclear powered warship will be responsible for the radiological control onboard the ship and for environmental monitoring of the vicinity. The host Government may, of course, take such surveys as it desires, in the vicinity of the warship, to assure itself that the visiting ship is not creating a radioactive contamination hazard.
 - (c) The appropriate authorities of the host Government will be notified immediately in the event of an accident involving the reactor of the warship during a port visit.
 - (d) The UK Government assumes the responsibility to salvage or otherwise make safe any nuclear powered warships that might be incapacitated in a foreign port.
 - (e) The UK Government does not make technical information on the design or operation of its nuclear powered warships available to host Governments in connection with port entry. The UK Government cannot, therefore, permit the boarding of its nuclear powered warships for the purpose of obtaining technical information concerning their propulsion plants or operating instructions.
 - (f) The Royal Navy will inform the appropriate host Government authorities as early as practicable, but normally at least 24 hours in advance, as to the estimated time of arrival and, pursuant to prior consultation with the host Government, the intended location of mooring or anchoring of its nuclear powered warships.
 - (g) The United Kingdom will, of course, welcome the customary protocol visits to its nuclear powered warships by representatives of the host Government.
3. Claims arising out of a nuclear incident involving a visiting nuclear powered warship will be dealt with through diplomatic channels in accordance with customary procedures for the settlement of international claims under generally accepted principles of law and equity.

Statement by United States Government on Operation of US Nuclear Powered Warships in Foreign Ports (Revised September 1964)

1. The United States Government certifies that reactor safety aspects of design, crew training and operating procedures of the nuclear propulsion plants of United States nuclear powered warships are reviewed by the United States Atomic Energy Commission and the statutory Advisory Committee on Reactor Safeguards, and are as defined in officially approved

manuals. The United States Government also certifies that all safety precautions and procedures followed in connection with operations in United States ports will be strictly observed in foreign ports.

2. In connection with the operation of United States nuclear powered warships in foreign ports:

(a) No effluent or other waste will be discharged from the ship which would cause a measurable increase in the general background radioactivity of the environment; waste disposal standards are consistent with the recommendations of the International Commission on Radiological Protection.

(b) During the period of the visit, the personnel of the nuclear powered warship will be responsible for radiological control on board the ship and for environmental monitoring in its immediate vicinity. The host Government may, of course, take such surveys as it desires, in the vicinity of the warship, to assure itself that the visiting ship is not creating a radioactive contamination hazard.

(c) The appropriate authorities of the host Government will be notified immediately in the event of an accident involving the reactor of the warship during the port visit.

(d) The United States Government assumes the responsibility of salvage or otherwise make safe any United States nuclear powered warship which might be incapacitated in a foreign port.

(e) The United States Government does not make technical information on the design or operation of its nuclear powered warships available to host Governments in connection with port entry. The United States Government cannot, therefore, permit the boarding of its nuclear powered warships for the purpose of obtaining technical information concerning their propulsion plant or operating instructions.

(f) The United States Navy will inform the appropriate host Government authorities as early as practicable but normally at least 24 hours in advance as to the estimated time of arrival and pursuant to prior consultation with the host Government, the intended location of mooring or anchoring of its nuclear powered warships.

(g) The United States will, of course, welcome the customary protocol visits to its nuclear powered warships by representatives of the host Government.

3. Claims arising out of a nuclear incident involving a visiting nuclear powered warship will be dealt with through diplomatic channels in accordance with customary procedures for the settlement of international claims under generally accepted principles of law and equity.

Declaration of the French Government on Visits of Nuclear Powered Warships to Foreign Ports

1. The Government of France certifies that all aspects of reactor safety of French nuclear powered warships, with regard to design, crew training and the operation of these reactors have been reviewed by a national interministerial commission on nuclear safety composed of members of the Armed Forces and the Commissariat à l'Energie Atomique (Atomic Energy Commission), and that said aspects conform to the standards officially recognised in France and are defined in the officially approved manuals.

2. The French Government certifies that all rules for the operation of reactors will be observed in both French and foreign ports.

3. French nuclear powered warships visiting foreign ports will observe the following rules:
- (a) No radioactive effluent or other waste which could cause an appreciable increase in radioactivity in the environment will be discharged by the ship during the visit; waste disposal standards are consistent with the recommendations of the International Commission on Radiological Protection.
 - (b) During the entire visit, the Commander of the ship will be responsible for radiological control onboard his unit and for environmental monitoring in its immediate vicinity. The host country may, of course, if it so desires, effect this monitoring in the vicinity of the ship to make sure that the visiting ship is not creating a radioactive contamination hazard.
 - (c) In the event of an accident involving the reactor of the ship during a port visit:
 - The authorities of the host country will be informed immediately.
 - The French Government will assume responsibility for the application of measures necessary for the safety of the ship, as well as its possible refloating or towage.
 - (d) The French Government does not make available technical information on the design or operation of its nuclear powered warships to host Governments in connection with port entry. The French Government cannot, therefore, permit the boarding of its nuclear powered warships for the purpose of obtaining either technical information concerning their propulsion systems or operating instructions.
 - (e) The customary protocol calls by representatives of the host country will be welcomed aboard French nuclear powered warships.
 - (f) Once the French Navy has received a visit authorisation from the host Government and has consulted with the appropriate authorities, it will communicate in good time the (location of) mooring or anchoring stations which it desires for its nuclear powered warships.
4. The French Government will be prepared to seek settlement of claims for damages through diplomatic channels in the event of a nuclear accident.

Chapter 2 Guidance for DNSR Staff

Introduction

1. Part 1 Chapter 3 of this JSP outlines the regulatory processes that the Defence Nuclear Safety Regulator (DNSR) uses. It explains that safety submissions are assessed to inform the regulatory judgements when deciding whether to permission activities and agree submissions or not. DNSR staff (supported through contract) require guidance in order to apply consistent and acceptable approaches to their assessment and judgement. This chapter provides that guidance in the form of Safety Assessment Principles (SAP). It is published in this JSP in the interests of transparency so that Authorisees and Approving Authorities may have visibility of the approach that DNSR staff take.

2. The Office for Nuclear Regulation (ONR) undertook a review of its SAP, publishing a revised set at the end of 2006 which are routinely updated. DNSR engages closely with ONR to ensure the relevance of ONR SAP to activities and facilities in the Defence Nuclear Programmes, and DNSR formally adopts and integrates them for use by DNSR staff. However, the ONR SAP do not address specific issues associated with the Nuclear Weapon Programme (NWP), and further interpretation is also published in respect of the Naval Nuclear Propulsion Programme (NNPP). This is explained below.

3. Both DNSR and ONR staff use SAP, together with the supporting Technical Assessment Guides (TAG) which are published separately, to guide regulatory judgements.

Structure

4. Figure 1 shows how SAP and interpretation for the Defence Nuclear Programmes are structured. The applicability of any SAP (or its interpretation) in forming a judgement is determined by DNSR staff, in discussion if appropriate with the Authorisee or Approving Authority making a submission.

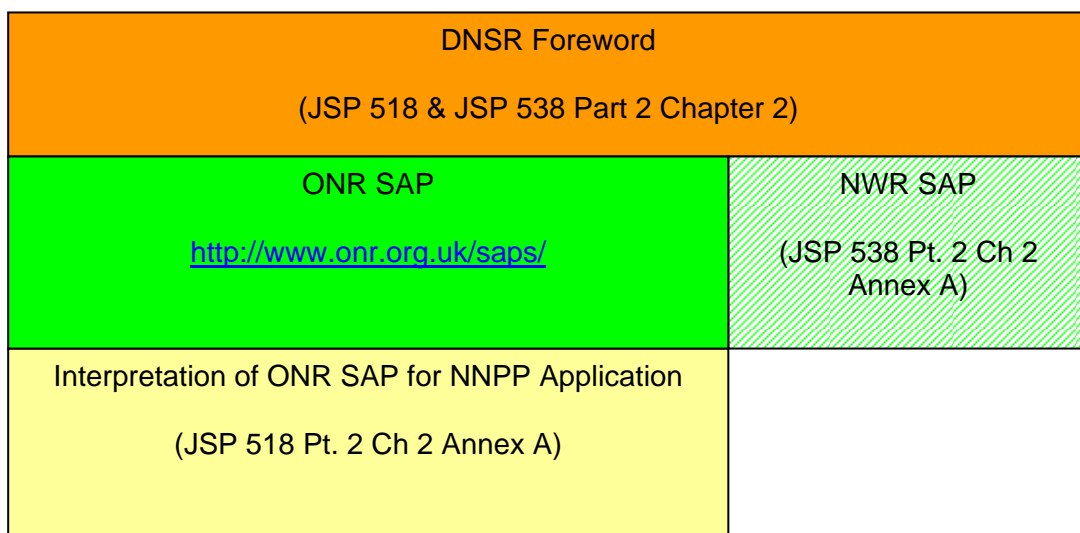


Figure 1

Annex A to Chapter 2: Interpretation of Safety Assessment Principles for Naval Nuclear Propulsion Programme Application

Foreword

Table 1	NNPP Interfaces, Interdependencies and Transfers of Through Life Responsibilities
Table 2	Safety Cases
	Table 2.a Safety Analysis - Systematic Approach, Hazard Identification
	Table 2.b Safety Analysis - Demonstration of Sound Engineering Practice, Derivation of Operating Limits, EIMT, Commissioning Trials etc. and ALARP Considerations
	Table 2.c Safety Analysis – Optimisation of Protection and Balanced Plant Design
Table 3	Engineering Justification
	Table 3.a Engineering Justification - Inherent and Passive Safety
	Table 3.b Engineering Justification - Codes and Standards
	Table 3.c Engineering Justification - Redundancy, Diversity and Segregation and Single Failure Criterion
	Table 3.d Engineering Justification - High Integrity Design
	Table 3.e Engineering Justification - Ageing and Degradation
	Table 3.f Engineering Justification - Materials Control, Welding and Inspection
	Table 3.g Engineering Justification - Purpose and Limitations of Commissioning
Table 4	Design Basis Analysis
Table 5	Design for Safety
	Table 5.a Design for Safety - Consistency with Function
	Table 5.b Design for Safety - Safety Systems
	Table 5.c Design for Safety - Monitoring and Control
Table 6	Role of Operator
Table 7	Numerical Targets

Foreword

1. On behalf of the Office for Nuclear Regulation (ONR) the HSE issued updated Safety Assessment Principles (SAP) for Nuclear Facilities towards the end of 2006 for use by ONR assessors and site inspectors. The Defence Nuclear Safety Regulator (DNSR) uses the same principles in its assessment of the Naval Nuclear Propulsion Programme (NNPP), and to facilitate this, DNSR was engaged in the formulation of the SAP. The benefits of adopting common assessment principles include:

- helping to demonstrate that the NNPP applies, so far as reasonably practicable, standards as high as those applied in the civil industry, in line with the Secretary of State (SofS) for Defence's policy;
- the avoidance of any potential to place different requirements at licensed and authorised sites;
- facilitating joint regulatory working to the benefit of both regulators and the regulated.

2. DNSR believes that the SAP are generally applicable to the assessment of projects and programmes within the NNPP. The SAP do not represent a prescriptive compliance requirement². DNSR continues to take an interest in Authorisees' internal prescription and guidance to check consistency (not compliance) with SAP.

3. Notwithstanding the above statement, and DNSR's engagement in the formulation of the SAP, there are inevitably areas where a DNSR assessor or inspector might need to interpret a SAP in a particular way to take account of the special constraints applicable to the NNPP. This is recognised in the So Far As Is Reasonably Practicable (SFAIRP), As Low As Reasonably Practicable (ALARP) and As Low As Reasonably Achievable (ALARA) section of the SAP where at paragraph 14 on page 5 it is stated that the *principles should be applied in a reasonably practicable manner*. Similarly, paragraph 23 on page 6 of the SAP concludes: *.....In short, the principles are a reference set from which the inspector needs to choose those to be used for the particular nuclear safety situation*. DNSR has reviewed the SAP to identify particular principles where further interpretation is beneficial for application in the defence environment, and has considered how they should be interpreted in the NNPP context to achieve an ALARP position in nuclear safety which also optimises holistic programme safety while remaining consistent with SofS for Defence's policy.³

4. There are other SAP which are of special relevance to the NNPP because of (for example):

- the nature of the plant and the way it is operated;
- the development of the NNPP safety justification structure has led to perceived weakness or lack of clarity in these areas.

5. DNSR has also attempted to identify these SAP to indicate specific regulatory expectations to assessors and Authorisees.

6. Specific interpretations, observations and guidelines are given below, under headings 1 to 7. They are inevitably somewhat disjointed since they pick up on specific SAP and supporting paragraphs, most of which DNSR considers to be applicable without interpretation. To aid identification of the relevance of these interpretations, they are presented as follows:

- by topic area or sub-area in descriptive form, eg. safety analysis;

² Note paragraph 3 of the Introduction on Page 4 of the SAP.

³ Expressed in JSP 815 Defence Environment and Safety Management.

- reference to relevant SAP and/or supporting paragraphs to which the interpretation will be applied;
- how DNSR assessors and inspectors will evaluate Authorisees' submissions in these topic areas taking account of the relevant SAP and any special constraints applicable to the NNPP.

7. The SAP, their supporting paragraphs and the interpretation provided here for the NNPP give only high level guidance to inspectors and assessors; more detailed guidance for assessors in particular has been, and will continue to be, provided in ONR's Technical Assessment Guidelines (TAG). Engagement with ONR on development of their TAG is managed through the Regulatory Policy Committee.

Interpretation of ONR SAP in the context of the NNPP is presented against a number of topic areas. These are identified below and discussed in detail in the following tables.

1. NNPP interfaces, interdependencies and transfers of through life responsibilities
2. Safety Cases
 - a Safety Analysis – Systematic Approach, Hazard Identification (HAZIID)
 - b Safety analysis – Demonstration of Sound Engineering Practice, Derivation of Operating Limits, EIMT, Commissioning Trials, etc. and ALARP Considerations
 - c Safety Analysis - Optimisation of Protection and Balanced Plant Design
3. Engineering Justification
 - a Inherent and Passive Safety
 - b Codes and Standards
 - c Redundancy and Diversity; Single Failure Criterion -
 - d High Integrity Design
 - e Ageing and Degradation
 - f Materials Control, Welding and Inspection
 - g Purpose and Limitations of Commissioning
4. Design Basis Analysis
5. Design for Safety
 - a Consistency with Function
 - b Safety Systems
 - c Monitoring and Control
6. Role of Operator
7. Numerical Targets

1. NNPP INTERFACES, INTERDEPENDENCIES AND TRANSFERS OF THROUGH LIFE RESPONSIBILITIES

Fundamental Principle	Responsibility for Safety	FP.1
Associated SAP Paragraphs	72 and 102	
Associated Reading	Duty of Cooperation DNSR TAG D011 – DNSR Guidance on Safety Analyses and Safety Case Interfaces in Defence Nuclear Programmes	FAC1
DNSR Specific Guidance to Assessors		

The SAP are written for the case where there is generally a facility operator for a static plant who is the licensee and clearly has responsibility for day to day and through life safety of his plant.

The situation is complicated in the NNPP by the mobile nature of the plant and the fact that its facility operator while at sea has other very serious safety responsibilities besides nuclear.

Accordingly, a safety management system has been developed whereby the Naval Reactor Plant Authorisee (NRPA) lays down strict prescription in the manner of operation of the plant by naval engineers, based upon advice from the design authority (DA). Some aspects of this system have been tested over time, but others have had to be developed or modified to take account of revised contracting arrangements and to ensure good management of site risks.

DNSR inspectors and assessors, in applying the SAP, need to look for:

- An identifiable facility operator with responsibility for day-to-day safety of plant operations or maintenance who understands and accepts that responsibility.
- Support from the NRP DA via the NRPA to ensure that the planned operations are within the design intent, and do not give rise to unexpected hazards.
- Satisfactory, clear and jointly agreed interface arrangements between Authorisees responsible for the plant at other stages of its life cycle to enable the facility operator to discharge his responsibility for day-to-day safety (see FAC1)
- Appropriate engagement of the NRPA to ensure that the through-life safety of the plant is not compromised.

This is a vital function in the NNPP which currently lacks a direct parallel in the civil nuclear industry (though other safety critical industries have to manage more complex interfaces). Accordingly, DNSR intends to issue an NNPP specific TAG to help both assessors and Authorisees understand reasonable expectations for the management of interfaces between Authorisees to ensure day-to-day and through-life safety.

2. SAFETY CASES

2.a Safety Analysis – Systematic Approach, Hazard Identification (HAZID)

Engineering principles: key principles	Safety function	EKP.4
Engineering principles: safety classification and standards	Safety categorisation	ECS.1
Engineering principles: safety systems	Demonstration of adequacy	ESS.11
Fault analysis: general	Identification of initiation faults	FA.2
Fault analysis: PSA	Need for PSA	FA.10
Fault analysis: assurance of validity of data and models	Sensitivity studies	FA.22
Associated SAP Paragraphs	80, 92a, 92b, 346, 504, 506, 527, 529, 536, 540, 547 and 565	
Associated Reading	DNSR TAG D011 – DNSR Guidance on Safety Analyses and Safety Case Interfaces in Defence Nuclear Programmes ONR TAG T/AST/051 The Purpose, Scope and Content of Safety Cases	
DNSR Specific Guidance to Assessors		
<p>The SAP indicate many desirable features of a safety analysis and the process used to generate it. DNSR assessors should seek:</p> <ul style="list-style-type: none"> • Identification of the failure modes of the plant or equipment by a systematic, auditable and comprehensive hazard identification (HAZID) process appropriate to the nature and function of the plant. • Identification of the safety function(s) to be delivered within the facility by a structured analysis starting with principal Critical Safety Functions and HAZID. • A staged process from HAZID through analysis in a fault schedule (which can also incorporate a safety schedule) to safety function identification and confirmation, and initiating sequences for input to a PSA. <p>The PSA can be considered a high level output from a hazard analysis process which starts with HAZID. HAZID should engage creative thought to identify potential routes to radiological hazards. This process is an integral part of design development and analysis. There should be some interaction between the PSA and design (an example concerning balanced safety cases is mentioned at 2.c below) for which an early draft PSA should be planned.</p> <p>PSA should be based upon best estimate data so that designers and operators can focus on true high risk areas. However, PSA must not be unduly optimistic, and uncertainties which potentially undermine confidence in the PSA results might justify a conservative or bounding case approach to input data. This should be avoided if at all possible where the PSA output is sensitive to the specific data, and frequent simple sensitivity analyses should be used to prevent a distorted PSA output.</p>		

Safety analyses in the NNPP have not always demonstrated consistency with the basic requirements outlined above, and DNSR assessors should drive to see them achieved in future analyses. The SAP include other desirable features which may inform DNSR assessors in making their judgements.

2.b Safety Analysis – Demonstration of Sound Engineering Practice, Derivation of Operating Limits, EIMT, Commissioning Trials, etc. and ALARP considerations

The regulatory assessment of safety cases	Safety case characteristics	SC.4
Engineering principles: commissioning	Commission Testing	ECM.1
Engineering principles: Maintenance, inspection and testing	Identification of requirements	EMT.1
Associated SAP Paragraphs	92d, 92e, 92f, 93, 184, 187, 573 622 and 623	
DNSR Specific Guidance to Assessors		
<p>The SAP call up the need to demonstrate the maintenance of a sound design intent by:</p> <ul style="list-style-type: none"> • Application of sound engineering practice at all stages of the design and manufacture of the plant. • Derivation of operating limits and essential maintenance from the design and safety analysis. • Definition and satisfactory completion of commissioning trials to demonstrate as far as possible the design intent. <p>The paragraphs and principles listed above provide insight into different aspects of safety analysis. It is not immediately clear that this linkage must be visible and traceable from the safety case, as the link is not made obvious in the supporting text to the Regulatory Assessment of Safety Cases section.</p> <p>In the NNPP there remains some disconnect between the safety case and the demonstration of these essential links between design and operation; it remains an area for improvement.</p> <p>The DNSR assessor should emphasise this requirement of the safety case to Duty Holders and test that it has been achieved, quoting specific paragraphs and principles (eg. those listed above) as appropriate.</p> <p>The conditions and limits of safe operation (CLOSOs) are required by AC23; these should be identified within a safety case.</p> <p>The demonstration that the ALARP principle has been applied appropriately is another essential output from the safety case. There is a danger both within and without the NNPP that ALARP is treated purely as a cost benefit analysis (CBA) exercise. Though CBA may form an important part of an ALARP justification, the application of current sound engineering practice in new plant is overriding. It should be done whether or not it results in a quantifiable lowering of risk and even if the risk is below the BSO⁴.</p>		

⁴ T/AST/005 Technical Assessment Guide - Guidance on the Demonstration of ALARP

2.c Safety Analysis – Optimisation of Protection and Balanced Plant Design

Fundamental principles	Optimisation of protection	FP.3
The regulatory assessment of safety cases	Safety case characteristics	SC.5
Engineering principles: key principles	Safety measures	EKP.5
Fault analysis: PSA	Need for PSA	FA.10
Associated SAP Paragraphs	94, 146e and 529	

DNSR Specific Guidance to Assessors

References to optimisation, balanced case and balanced design appear in the SAP and it is important that the DNSR assessor interprets these in a manner appropriate to the context of the naval plant. Optimisation of protection is a fundamental principle which also supports ALARP. However, optimised protection during one phase of a NRP life cycle may not achieve the same end in the next phase, and the assessor examining this phase must be flexible in his or her judgement.

Furthermore, the nuclear powered warship's crew are subject to many risks beside nuclear, such that optimisation of their safety may not be the equivalent of optimisation of the nuclear risk during the operational phase of the nuclear powered warship's life (this is a factor which will affect many DNSR judgements).

This constraint will not apply to workers and local population while the nuclear powered warship is in a port or dockyard; nuclear safety as it affects them must be shown to be ALARP. However, the balance of plant and dockyard protection systems to achieve tolerable and ALARP risks might not necessarily be optimised for the docked phase due to the constraints of the operational phase, and DNSR assessors need a broad understanding to be able to test whether the right balance has been achieved.

Another desirable characteristic of a safety case is that of balance in the case and the design such that predominant risks are not driven by single or a small number of failure modes to an unacceptable degree; similarly, an over-reliance on single protection systems or barriers should be avoided. As paragraph 529 of the SAP states: *PSA should assist the designers in achieving a balanced and optimised design...* and early first cut PSA work should be carried out to identify any imbalances while they can still be addressed in the basic design, protection systems or operating procedures. In assessing NNPP safety cases, DNSR should:

- Apply the SAP relating to balanced safety justification.
- Challenge shortfalls to test whether they are driven by the fundamentals of the NRP.
- Test whether an apparent imbalance is mitigated by reliable evidence of low failure probability in making its judgement.

3. ENGINEERING JUSTIFICATION

3.a Engineering Justification - Inherent and Passive Safety

Engineering principles: key principles	Inherent safety	EKP.1
Engineering principles: external and internal hazards	Fire, explosion, missiles, toxic gases, etc. – use and storage of hazardous materials	EHA.13
Engineering principles: control of nuclear matter	Storage in a condition of passive safety	ENM.6
Radioactive waste management	Storage of radioactive waste and passive safety	RW.5
Associated SAP Paragraphs	136 – 138, 142c and 146	

DNSR Specific Guidance to Assessors

The SAP mention both inherent and passive safety as desirable features of a design. In the nuclear powered warship context, DNSR assessors need to take account of consistency with function in assessing how well Duty Holders meet these principles.

The nuclear powered warship brings together explosives and other hazardous materials within the same containment as a reactor which combines fissile material and a moderator. This breaks the simplest interpretation of inherent safety⁵. The key point is whether inherent safety is maximised consistent with the plant's function (see EKP.1).

Methods and approaches for the minimisation of unnecessary hazards are outlined at paragraph 137, and DNSR assessors are encouraged to test the application of these principles in the context of ALARP. That is not to say that DNSR should ignore the concept of inherent safety; for example, where a new plant, plant line-up or evolution is proposed which increases the inherent hazard, this should be challenged and a justification that it is both essential to the plant function and that this aspect of its function is worth the increased hazard, should be sought. However, the fundamental concept of the nuclear powered warship will be treated as a “given” even though it is in some ways inimical to inherent safety.

The SAP refer to passive safety in the context of the storage of radioactive materials (see ENM.6 and RW.5). It is not the same as inherent safety which would require removal of the hazard, but seeks hazard control by fundamental, simple, robust, physical measures in preference to safety systems which need to respond actively to a fault. This feature is also desirable in reactor design and is readily applicable to civil plants. It is harder to engineer in the nuclear powered warship context where space is limited, but should not be dismissed as a principle to be applied. As an example, the HPDHR system on the NRP can be considered a passive system *once triggered and once flows are established*; the adoption of hang-open non-return valves to permit DHR via SGs is a passive system which is not reliant on an active triggering system.

⁵ The same could be said of any nuclear reactor design; a Magnox reactor combines metallic magnesium and uranium in a block of coal with vertical gas passages

3.b Engineering Justification - Codes and Standards

Engineering principles: safety classification and standards	Safety classification of structures, systems and components	ECS.2
Engineering principles: safety classification and standards	Standards	ECS.3
Engineering principles: safety classification and standards	Codes and standards	ECS.4
Engineering principles: safety classification and standards	Use of experience, tests or analysis	ECS.5
Engineering principles: maintenance, inspection and testing	Type-testing	EMT.3
Associated SAP Paragraphs	155, 156, 159, 160, 161, 188, 266 and 278	

DNSR Specific Guidance to Assessors

The safety classification assigned to each system, structure or component (SSC) provides the basis for identifying appropriate codes and standards for the design, manufacture and operation of SSCs. An SSC important to safety is one which delivers a safety function and provides a direct role in nuclear safety, or one which indirectly affects nuclear safety and whose failure could adversely affect an SSC which delivers a safety function. Design codes such as ASME III for nuclear components embody knowledge, experience and best practice, and achievement of their requirements provides a level of assurance that the delivery of a safety function can be met. Assessors should check that codes applied in the NNPP are selected and used appropriately, as the most common failure in this area is the use of codes outside their intended scope.

It is preferable to base an SSC important to safety on normally accepted codes and standards but ECS.4 & 5 recognise that this may not always be possible and suggest other means on which an acceptable case may be based. This should not be seen as a simple alternative; the burden of evidence is likely to be significant, depending on the classification and importance. One approach is to draw on existing codes and standards which ensure a conservative design that is commensurate with the safety classification and the importance of the delivery of the safety function. However, this will not always be possible, particularly in the NNPP where constraints and particular design objectives apply (this is explored in 3.c below). This can demand the development of NRP specific codes, potentially supported by limited operational experience and testing. This is not new in the UK nuclear powered warship programme, and the NRP Technical Authority has a good record of developing its own, sound design approaches. A recent development in the NNPP is the potential to achieve a significant advance in design leading to improved nuclear powered warships and nuclear safety by the use of information and even designs from the much larger US submarine programme. Again, these designs have been supported by internal design codes, which are not necessarily in the public domain. The DNSR assessor needs to follow a similar approach to that for earlier UK internal codes, ie.

- Understand why normally accepted codes and standards are not appropriate, and agree that the constraints and/or benefits demand the use of non-standard codes.
- Agree that the non-standard code is soundly supported by the best available operational and test data, and makes the best possible use of read-across from the accepted codes and standards.

- Check that appropriate conservatism has been applied where operational and test data is very limited.
- Test that the code is not tailored to support the existing design.

Paragraph 159 indicates that there may be situations where codes and standards *should be supplemented or modified as necessary to a level commensurate with the importance of the safety function(s) being performed*. Assessors should note that, although design to established codes and standards provides the basis for delivering safety functions, the standard of analysis demanded may be substantially higher, depending on the classification of the SSC. For example, in structural integrity cases, pressure vessel failure statistics suggest a failure frequency of the order of 10^{-5} per year as a typical limit to the level of reliability that might be inferred from compliance with the design, manufacture, testing and inspection requirements of established codes. So, high integrity or incredibility of failure classifications usually involve additional measures beyond basic compliance with design codes to substantiate the higher reliability claim. NRPA publication 4-1-11, Classification, provides guidance in Table 1 relative to the required reliability.

The guidance at paragraph 161 cautions against combining different codes and standards for justifying a single aspect of an SSC; assessors should be cautious of the selection of different codes where this appears to be tailored to support the existing design rather than as a design improvement tool. It can sometimes be justified, however. An example is the demonstration of defect tolerance in structural integrity cases where ASME III design rules are supplemented by assessment to the R6 procedure; two standards are used because of the inherent limitations of the ASME design rules. The sub-division of responsible DAs and systems used in the NNPP means that different codes and standards may be employed for different aspects of the same SSC. In such cases, assessors need to be aware of potential incompatibility between standards.

It must also be recognised that some codes do not deliver firm design rules, but guidance as to how a design substantiation may be achieved, and the principles to be adopted in estimating the strength of particular legs of the case⁶. The code does not deliver a right or wrong answer. This is difficult for DNSR to assess, as it could require the assessor to gain the same detailed understanding of science and mechanics of potential failure as the designers. However, one objective of regulation is to build trust with Authorisees and their internal safety authorities such that the regulator can gain assurance by a number of probing questions to the Authorisee. The assessor may also suggest to the Authorisee early regulator involvement in the design process to de-risk a time-consuming regulatory assessment at a critical time in the project.

⁶ An example of this is the output from the Technical Advisory Group on Structural Integrity (TAGSI).

3.c Engineering Justification - Redundancy, Diversity and Segregation and Single Failure Criterion

Engineering principles: design for reliability	Failure to safety	EDR.1
Engineering principles: design for reliability	Redundancy, diversity and segregation	EDR.2
Engineering principles: design for reliability	Common cause failure	EDR.3
Engineering principles: design for reliability	Single failure criterion	EDR.4
Engineering principles: safety systems	Determination of safety system requirements	ESS.2
Engineering principles: safety systems	Dedication to a single task	ESS.19
Engineering principles: safety systems	Avoidance of connections to another system	ESS.20
Engineering principles: safety systems	Reliability	ESS.21
Engineering principles: safety systems	Minimum operational equipment requirements	ESS.24
Engineering principles: safety systems	Computer-based safety systems	ESS.27
Engineering principles: reactor core	Shutdown systems	ERC.2
Associated SAP Paragraphs	168, 172, 175, 261, 352, 358, 444 and 445	
Associated Reading	IAEA Safety Standards – GSR Part 4 and SSG-2	
DNSR Specific Guidance to Assessors		
<p>EDR.1-4 and their associated paragraphs are sound design principles aimed at increasing the reliability of a safety critical function or safety mechanism. In considering the application of these SAP to the NNPP, there is a need to explore a potential difference between typical civil nuclear operations and the naval propulsion programme. For naval plant a loss of output can put lives at risk as effectively as a nuclear accident⁷. The potential effect of a loss of output in an operating nuclear powered warship is explored briefly in Section 7, paragraph 4 herein on societal risk. However, its implications affect many SAP covering redundancy and diversity, safety systems, role of the operator, etc. The high risk of nuclear powered warship operations which can be mitigated by propulsion availability, especially though not exclusively during wartime, was recognised in the early design principles for the naval reactor plant. Thus the concept of a responsible control system, the battleshort switch, and permitted abnormal operating modes were all part of</p>		

⁷ ie. a shutdown plant is not necessarily a safe plant on a nuclear submarine

the design basis. Reliance on a battleshort protection system bypass is not an acceptable means to deliver peacetime propulsion availability, but the other design bases are still valid.

Increasing the reliability of a safety critical function will generally also support nuclear powered warship safety, but increasing the reliability of a safety mechanism which triggers plant shutdown without considering the risk of spurious shutdown may be inimical to nuclear powered warship safety. The delivery of high propulsion reliability may be in conflict with the desire to have diverse protection systems where that could increase the probability of spurious trips. DNSR assessors should be open, though challenging, to the argument from naval reactor designers that they can achieve a high reliability of protection from a small number of simple high integrity systems with the benefit of ease of EIMT as well as greater responsibility.

There are also severe space constraints in nuclear powered warships which will make it difficult to achieve the desired segregation and diversity (EDR.2). Paragraph 352 in the SAP is a counsel of perfection with regard to the segregation and protection of safety systems, which it will not always be practicable to achieve⁸. DNSR assessors should apply practical interpretation in line with the SFAIRP qualification described at paragraphs 9-17 of the SAP when considering the achievement of diversity and separation of function, taking account of nuclear powered warship constraints.

Another potential ramification is that safe nuclear powered warship operation is helped by reactor protection which permits fast recovery and can continue to deliver propulsion for a time from a sub-critical reactor. Achievement of these is facilitated by the use of software based control systems, which may not be consistent with SAP ESS.19, 20 and 21 (though ESS.27 recognises the possibility of using software-based control).

Thus some deviation from SAP may be justified to enhance the holistic safety of nuclear powered warship operation, and the DNSR assessor should evaluate critically any arguments advanced along such lines. However, the balance of risk, particularly to the public, changes when the nuclear powered warship is in port or port approaches such that the SAP should be applied. A switch to more conventional control algorithms and different operating procedures may well be possible to deliver optimum safety in all life cycle phases. The DNSR assessor should challenge, and seek to understand any arguments that this is impracticable, and demand an ALARP justification if it results in a significant public risk.

ERC.2 of the SAP relating to diverse shutdown systems is an example of the above, and a brief exploration of DNSR expectations might be helpful. It carries the rider that it applies to civil reactors; naval reactors have a single means of both reactor control and fast shutdown, which is argued for various reasons to be more reliable than the control system in a civil reactor. Civil reactors also use the reactor control rods for fast shutdown, but include alternative reactivity reducers which are (more or less) fast acting and (more or less) diverse depending on the reactor type. It is arguable whether these achieve diverse fast shut-down or diverse hold-down. The arguments (involving nuclear powered warship safety) against diverse fast shutdown in a nuclear powered warship at sea are understood by DNSR, and its absence gives rise to no significant public risk. The same is not self-evident for a nuclear powered warship in port, and, where no diverse hold-down system is made available, DNSR needs to understand the justification for this departure from civil practice, supported by an ALARP case if appropriate.

⁸ This is not to say that segregation cannot be achieved because it's a submarine. The DNSR assessor should rigorously test the justification for shortfalls against this SAP, while understanding the limitations and constraints of submarine operation

The Single Failure Criterion (SFC) is quoted at EDR.4 and paragraph 175 in the SAP and has no direct equivalent in the naval nuclear safety principles. As written, and interpreted in a literal manner, it would be hard to meet for any nuclear plant, so it has to be asked “what is the objective sought in improving reliability by design?”

The SFC is a widely used test of safety functions, particularly their redundancy. It has application in high-integrity industries including aerospace and petrochemicals as well as nuclear utilities. The IAEA promotes the SFC as an essential requirement of the design of nuclear power plant and its Safety Standard NS-G-1.2, referenced at SAP paragraph 175, gives much more detail on the application of the SFC at paragraphs 3.73 to 3.80. DNSR assessors and interested Authorisees are encouraged to use this as a practical guide, recognising that ALARP considerations apply to this principle.

The two UK civil nuclear generating companies have developed the basic SFC concept and included it within their internal safety guidelines; DNSR assessors might reasonably expect NNPP Authorisees to do the same. They should seek and evaluate similar relevant guidelines from NNPP internal safety authorities such as the NRPA (and then test adherence to them).

Note that the SFC refers to safety functions including negative reactivity insertion, heat removal and ECCS. Specific hardware systems and components contribute to the achievement of these functions and they should each include appropriate levels of redundancy, diversity and segregation which are commensurate with the required continuous duty or demand-related reliability.

The SFC described in the IAEA reference above, covers normally permissible states of plant availability to include the worst possible configuration of the safety group. DNSR interpretation is that this refers to operation within the design basis including any reduced operational or maintenance states permitted by the design basis. It does not include beyond design basis conditions, nor does it cover abnormal and time-limited conditions such as urgent or unplanned maintenance. A corollary is that any assumed failure must be reasonably foreseeable within the design basis. Where specific measures have been taken to ensure the high integrity of systems or components, postulating a random failure of those systems or components in the context of a test of the SFC would not be appropriate. Obvious examples are where an incredibility of failure or a special case procedure safety case has been assembled in recognition of the safety significance or lack of defence in depth of a component or system.

Consequential failures, sometimes referred to as cascaded failures, resulting from the assumed random single failure should be considered as an integral part of the single failure. This is because the key issue is the tolerance to the initiating failure not the analysis of all failures in the system.

The IAEA differentiates between random active and random passive failures. Examples of active failure events include the failure of a pump to start, a valve to operate or an incorrect action on the part of an operator. Passive failures are exemplified by the random and spontaneous leakage or rupture of a pressure system or tank or the undisclosed blockage of a flow line with debris. The view is that random active failures are of far greater significance because, in general, the failure rate will be several orders of magnitude higher than for passive failures. This can be offset by well designed maintenance and test regimes which DNSR should test as part of its assessment.

3.d Engineering Justification - High Integrity Design

Engineering principles: pressure systems	Removable closures	EPS.1
Engineering principles: Integrity of metal components and structures: highest reliability components and structures	Safety case and assessment	EMC.1
Engineering principles: Integrity of metal components and structures: highest reliability components and structures	Use of scientific and technical issues	EMC.2
Engineering principles: Integrity of metal components and structures: highest reliability components and structures	Evidence	EMC.3
Engineering principles: Integrity of metal components and structures: highest reliability components and structures	Defects	EMC.5
Associated SAP Paragraphs	234, 240, 241, 248, 249, 250, 260, 277, 278 and 356	

DNSR Specific Guidance to Assessors

Principle EPS.1 paragraph 234 is aimed at the provision of measures to prevent the failure of a removable closure to a pressurised component or system whose failure could lead to a major release of radioactivity. It includes design provisions and procedural controls to ensure the integrity of bolted joints. Examples of removal closures for the NRP include the access covers for inspection of the pressuriser and removable closures to vessels eg. the RPV closure head. In principle it could also be applied to the design of the containment. Paragraph 234 specifically calls for **adequate** levels of diversity and redundancy in closure methods. The adequacy judgement will need to consider the consequences of failure taking into account the potential for radioactivity release and personnel exposure, and the barriers to environmental release. Thus a removable closure (including valves) to a normal operating plant at full pressure might demand a full diverse protection if it is outside the containment, while a temporarily removable closure within containment to a depressurised plant during maintenance might not need any additional protection (beyond the containment).

Taking the RPV head as an example of a major closure within the containment, failure is prevented by design, manufacture, and inspection and testing to recognised codes and standards in combination with procedural controls. Redundancy may be claimed from the provision of additional studs to limit the effects of a stud failure on the integrity of the joint. Full protection against failure through diversity of closure as implied in the text at paragraph 234 may not be a reasonably practicable option, but a degree of diversity may exist to limit the consequences of a failure eg. the provision of both mechanical and toroid seals as leak-limiting features of the RPV closure head. Assessors should also gain assurance that effective procedural controls are in place to maintain the integrity of removable closures, prevent tampering and demonstrate the integrity of such closures through the plant life.

In some structural integrity cases there may be either limited or no defence against the consequences of a gross or disruptive failure of the component such that the failure frequency of the component becomes an initiating event frequency. In such situations, a high reliability claim is required for non-redundant components. Assessors should note that where high reliability is claimed, a disruptive or gross failure frequency of less than $10^{-5}/y$ needs to be justified. However, as mentioned in 3.b above, a working rule is that a failure frequency of the order of 10^{-5} is the limit to what might be claimed from compliance with conventional pressure vessel design codes such as ASME III, and there is generally insufficient nuclear operating experience to substantiate failure frequencies of less than $10^{-5}/y$ from statistical data⁹. For this reason, among others, the assessment of structural integrity cases tends to be based on deterministic methods using established engineering practice rather than a probabilistic approach as used in a fault analysis or PSA studies. The justification of high reliability is made by invoking additional analysis and by specific examination of service loads and failure modes to infer that the failure frequency is acceptable (see also paragraph 248). The second part of paragraph 278 draws attention to the importance of considering all sources of loading which contribute to the crack driving force which, for the NNPP, may include thermal stress and residual stresses. This collection of deterministic arguments infers conceptual defence in depth and is referred to as an *alternative argument*, as the usual route of the provision of explicit engineered protection and defence in depth (redundancy, diversity and segregation) supported by failure frequency data is not available. The approach is the same as that invoked in the past where it is referred to as an 'alternative demonstration' under Principle 21 of the SPSC, or the 'special case procedure' in the early editions of the SAP.

High reliability claims attract a rigorous design substantiation and assessment. The guidance in paragraphs 249 and 250 points out that the need for such claims should be avoided where practicable by the provision of physical defence in depth¹⁰. Assessors should therefore give careful scrutiny to why such a claim is necessary and seek assurance that the provision of physical defence depth has been given careful consideration. For structural integrity cases the requirements to meet such claims are detailed in EMC.1 to EMC.3

Assessors are reminded of the need to adopt a proportionate approach to the assessment of structural integrity cases. The gross failure of certain structures, systems and components (SSCs), though undesirable from an availability perspective, may have limited implications for nuclear safety. In these cases a degree of nuclear safety protection is offered and there should be a commensurate reduction in the requirements of the structural integrity demonstration, reflected in the safety classification. This should be reflected in the failure frequency, though the integrity case should be primarily based on established engineering practice as embodied in design codes¹¹.

EMC.5 refers to a demonstration that safety-related components and structures are both free from significant defects and are tolerant of defects. The definition of a defect is covered in paragraph 240, the key word being *significant*. Note that the requirement to avoid significant defects covers both those that are structurally significant and those that might impede subsequent examination. A structurally significant defect in terms of defect tolerance is a crack-like defect which is judged to be a threat to the integrity of an SSC *at some stage in the plant life*. This threat should be judged by comparing the margin between the sizes of defects of structural concern (as derived from the fracture assessment) with the results of manufacture, pre-service and in-service examinations (paragraph 277).

⁹ referred to in paragraph 241 as a *general lack of adequate reliability data for the disruptive failure of metal components and structures*

¹⁰ This is consistent with guidance in DNP CoP no.3

¹¹ From which a nominal failure frequency might be inferred

The twin concept of defect avoidance and defect tolerance underpins the philosophy of high reliability claims under EMC.1. The linkage between the defect of structural concern and the screening undertaken by examinations¹² is also crucial to high reliability claims. EMC.1 and EMC.5 therefore seek the same goals, but EMC.1 strives for a rigorous demonstration commensurate with a high reliability claim.

¹² Noting that NDE does not constitute a deterministic case that defects > qualified size are absent, but can underpin confidence based on process control and qualification

3.e Engineering Justification - Ageing and Degradation

Engineering principles: ageing and degradation	Safe working life	EAD.1
Engineering principles: ageing and degradation	Lifetime margins	EAD.2
Engineering principles: ageing and degradation	Periodic measurement of material properties	EAD.3
Engineering principles: ageing and degradation	Periodic measurement of parameters	EAD.4
Engineering principles: ageing and degradation	Obsolescence	EAD.5
Associated SAP Paragraphs	178, 195 - 198 and 201	
Associated Reading	DNSR TAG D007 – Management of Ageing in Defence Nuclear Programmes	
DNSR Specific Guidance to Assessors		
<p>Ageing and degradation mechanisms have the potential to undermine confidence in the delivery of safety functions and maintenance of defence in depth. The management of ageing and degradation is a key aspect of the periodic review of safety (PRS) process and is closely linked with the achievement of Authorisation Conditions 15 and 23. The Authorisee should show that threat from ageing and degradation mechanisms has been considered and the risks managed. This includes demonstrating knowledge of the type and rate of degradation mechanisms, and where appropriate, linking this knowledge to the control of plant parameters to manage the threat. It also includes provision for monitoring for the unexpected. For the plant as a whole this is achieved by a policy of maintaining an adequate margin between the intended operational life and the predicted safe working life of SSCs (EAD.1, EAD.2 and paragraph 195).</p> <p>A corollary is that an adequate margin between the operating conditions (normal and emergency) and a limiting condition needs to be maintained throughout the plant life. The limiting condition is derived from the loading and material properties and an adequate margin is one that is not negated by, for example, uncertainty in the loading, defect size, material properties, rate of degradation or a combination of these factors; it is not possible to assign a specific margin that is adequate for all situations. Again, to ensure a proportionate approach, the safety classification and failure mode should be taken into account in formulating judgments on the adequacy of these margins. Target margins in a particular case should therefore be derived from the safety classification, the level of uncertainty in the parameters and the failure mode.</p> <p>The management of the integrity of the RPV belt line is an example of where material properties, in particular fracture toughness, are degraded through life due to irradiation embrittlement. This risk is managed by gaining knowledge of the material properties, the rate of degradation and defining a safety margin to ensure that the risk of brittle fracture is managed to a level commensurate with a high-integrity requirement.</p> <p>Principles EAD.3 and the associated guidance in paragraphs 196-8 and 201 cover the periodic measurement of material properties. Paragraph 196 highlights the need to</p>		

establish the level of uncertainty at the start of life, and paragraphs 197 and 198 provide guidance on surveillance and testing which are linked to confirming that the margins in the safety case are adequate. Where a component forms a principal means of ensuring nuclear safety the regulatory expectation is that the periodic measurement of material properties under EAD.3 is achieved by testing representative samples. Thus for a RPV or other component where the Authorisee claims incredibility of failure (IoF), a materials surveillance programme is required to monitor the rate of degradation and to allow material properties to be established throughout the operational life and as part of any case to extend the operational life beyond the designed life ie. plant life extension (PLEX).

For a modern plant, the regulatory expectation is that the lead plant should have a materials' surveillance programme using representative materials for an SSC designated by the Authorisee as IoF and some designated as high integrity. Additional surveillance programmes may be required for subsequent plant if the materials and manufacturing processes or operating conditions are judged to be significantly different from those of the lead plant. It is the responsibility of the Authorisee to identify and justify departures from this ideal situation.

For legacy plant, it should be demonstrated that alternative arrangements are in place to provide the data to a level of confidence commensurate with the integrity claim or safety classification. Where there is uncertainty eg. from use of accelerated testing or reading across data from other plant, this needs to be considered and reflected in the assumptions used in the safety case and in setting the operating margins.

The rate of degradation may be dependent on the control of certain plant parameters eg. temperature, fluidity and dose rate are important parameters which influence the rate of irradiation embrittlement and subsequent fracture toughness properties of RPV steels. Principle EAD.4 identifies the need for these to be periodically monitored to enable an accurate prediction of the material condition to be made.

Further guidance on Ageing and Degradation is provided in DNSR TAG D007.

3.f Engineering Justification - Materials Control, Welding and Inspection

Engineering principles: integrity of metal components and structures: highest reliability components and structures	Safety case and assessment	EMC.1
Engineering principles: integrity of metal components and structures: general	Defects	EMC.5
Engineering principles: integrity of metal components and structures: design	Requirements for examination	EMC.8
Engineering principles: integrity of metal components and structures: design	Weld positions	EMC.10
Engineering principles: integrity of metal components and structures: manufacture and installation	Materials	EMC.13
Engineering principles: integrity of metal components and structures: manufacture and installation	Techniques and procedures	EMC.14
Engineering principles: integrity of metal components and structures: manufacture and installation	Control of materials	EMC.15
Engineering principles: integrity of metal components and structures: manufacture and installation	Contamination	EMC.16
Engineering principles: integrity of metal components and structures: manufacture and installation	Examination during manufacture	EMC.17
Engineering principles: integrity of metal components and structures: pre- and in-service examination and testing	Examination	EMC.27
Engineering principles: integrity of metal components and structures: pre- and in-service examination and testing	Margins	EMC.28
Engineering principles: integrity of metal components and structures: pre- and in-service examination and testing	Redundancy and diversity	EMC.29
Engineering principles: integrity of metal components and structures: pre- and in-service examination and testing	Control	EMC.30
Associated SAP Paragraphs	260, 262, 265, 271 and 277	
DNSR Specific Guidance to Assessors		

Principle EMC.10 is one of several principles covering the requirement for defect avoidance and concerns the positioning of welds to take account of stress and the environmental conditions. The guidance at paragraph 262 expands on specific issues and indicates that in some situations eg. the RPV belt line welds should be relocated to avoid the threat posed by the environment. The guidance at paragraph 262 is illustrative of the type of issues DNSR inspectors or assessors need to consider.

Historically for the NRP, environmentally accelerated corrosion has proved to be a significant degradation mechanism and so the positioning of welds in regions where there is the potential for local environments should be avoided where reasonably practicable. The need to consider access for in-service examination should also be taken into account as a design activity in the location under Principle EMC.8

Welding inevitably gives rise to some level of residual stress in the weld, heat-affected zone and adjacent parent material. Welding also has the potential to introduce several types of defect. These defects in conjunction with the imposed stresses may pose a threat to structural integrity. Welding defects may also provide conditions where there is a risk of defect propagation by a degradation mechanism. Welding is a difficult operation with some techniques. For example TiG and manual metal arc welding require a high level of manual skill. The control of welding operations is therefore a key requirement of meeting the design intent.

Paragraph 265 gives examples of the environmental considerations, but there are several other measures associated with the control of welding operations which are of equal importance to achieving quality and avoiding defects. These measures include, but are not limited to the following: welder qualification, procedural qualification, qualification test pieces, pre and post weld heat treatments and in process examinations. These may feature in meeting the intent of Principles EMC.13 to EMC.17.

The control of materials in EMC.15 is another principle aimed at defect avoidance. Control of the materials used in fabrication is based on the effective implementation of QA procedures which cover identification, storage and issue. Storage arrangements are particularly important in welding where the threat of contamination and moisture needs careful management to ensure weld quality. Certification, chemical analysis and marking are also important aspects of the control of materials. Examples include the tight control of chemical composition necessary to limit the effects of irradiation damage to RPV steels, and the control of carbon in austenitic stainless steels to prevent sensitisation during welding and subsequent vulnerability to stress corrosion cracking. Adequate arrangements for the marking and storage of materials are also relevant to the archiving of materials (see interpretation on ageing and degradation).

Examination during manufacture is part of a package of measures including build records, QA, material procurement, testing etc. which collectively provide assurance of the achievement of the required standard of manufacture. Principle EMC.27 draws attention to the importance of deploying reliable examinations to underpin build quality and to screen out structurally significant defects during manufacture and at any subsequent stage in the plant life including pre-service and in-service examination (paragraph 271). The importance of demonstrating the absence of defects of structural concern through linking the fracture assessment to the results of examinations is emphasised in Principle EMC.28. The reference to reliability in Principle EMC.27 is to ensure that the examinations can indeed detect and size defects to a level of confidence commensurate with the integrity claim. The demonstration of the reliability of examinations is the aim of EMC.30 which covers inspection qualification.

DNSR inspectors and assessors should adopt a proportionate approach in implementing these measures taking cognisance of the safety classification. However, for a modern plant where the Authorisee identifies an IoF failure mode, a regulatory expectation is that

at least one screened inspection for defects of structural concern should be carried out as part of the pre-service inspection (PSI)¹³, particularly if access to the location is precluded during service. Start of life inspections should also be made to provide a fingerprint for locations identified for in-service inspection (ISI). The comparison between the pre-service and in-service examination results is a crucial part of demonstrating knowledge of degradation rates and their management to support high reliability claims.

The value of redundant inspections sought under EMC.29 needs to be placed in the context of the reliability target sought. Redundant inspections through repeat independent inspections are principally designed to compensate for random effects that may result in the failure to detect significant defects. Diversity of inspection is designed to counter common-mode or systematic failure to detect defects. Compliance with the code requirements offers a degree of redundancy and diversity in examinations, but, dependent on the integrity claim and the difficulty of the examination, there may be a need to go beyond code requirements.

For example in the absence of the deployment of at least one qualified inspection at the PSI stage, the dismissal of redundant inspections at different stages in build will only increase the risk of a structurally significant defect entering service. As noted above this position will be exacerbated if access restrictions preclude ISI through-life so the cost of repeat inspections would need to be weighed against the potential resources associated with maintaining the through-life SJ.

Paragraph 277 emphasises the importance of linking the defects of structural concern as derived by the fracture assessment to the results of both pre-service and in-service examinations carried out under EMC.27. In principle, the fracture assessment should be carried out prior to the specification of the examination requirements, but the extent to which this can be done will depend on the knowledge of the loading and materials properties. For components where high reliability is sought, the aim is to achieve defect avoidance and the intent is to achieve a component that is as defect-free as possible under Principle EMC.1.

A proportionate approach (see the comment against EMC.5 and paragraph 260) is therefore required. However, even for lower structural integrity classifications where at least one line of protection is available it would not be commensurate with the need to prevent accidents and demonstrate ALARP to place a component into service in situations where the reasonably foreseeable defect size from manufacture or a real defect was commensurate with the structurally significant defect size. This risk is usually managed by meeting code acceptance criteria, or by undertaking a specific fracture assessment.

¹³ Or agreed alternative inspection

3.g Engineering Justification - Purpose and Limitations of Commissioning

Engineering principles: commissioning	Commission testing	ECM.1
Engineering principles: maintenance, inspection and testing	Type-testing	EMT.3
Associated SAP Paragraphs	182, 184b, 188 and 266	
Associated Reading	IAEA Safety Standard – NS-G-2.9	
DNSR Specific Guidance to Assessors		
<p>The principal purpose of commissioning is to <i>characterise the facility as a basis for evaluating its behaviour during its operational life</i> (paragraph 184b). It is to be expected during the commissioning of a complex plant that there may be some surprises in the characterisation of its performance (not to be confused with design errors). To minimise the frequency and significance of surprises and improve the diagnosis of their cause, a staged commissioning programme should be adopted with component and sub-system test and characterisation at appropriate points in the build programme. Allowance must be made in the programme for the feedback of plant level performance characterisation established during commissioning into operating documentation. This stage can introduce a last-minute delay to getting the plant into service; however it is a vital safety-related task, and the assessor should check that suitable time and resource allowance has been made to cover this.</p> <p>Commissioning requirements must be driven by the design safety case, as they can only be identified by a full understanding of the design intent. The plant designers are responsible for specifying the requirements and the commissioning stages to confirm the design intent and achieve the required plant characterisation. They are also responsible for ensuring that the staged commissioning can be effected safely with suitable arrangements, and for specifying temporary monitoring arrangements to be implemented at plant level, when required. The assessor should therefore expect to see a linkage between the design bases and substantiations and the commissioning trials specified. The arrangements needed to ensure safety during commissioning are the responsibility of the plant builder, though the designers may assist with recommendations.</p> <p>Commissioning may be used to confirm some aspects of the design intent, though it is much more effective when effected at component and sub-system level. Plant level commissioning at its most limited will demonstrate only that start-of-life (SoL) functional requirements are met. Commissioning should never be considered as a fall-back to identify errors in the design; robust processes must be in place to drive these out during the design process, and the discovery of a design error during commissioning should be considered a serious failure which will substantially delay commissioning while the error is corrected, the root cause investigated, and the plant re-characterised.</p> <p>Testing is not the same as commissioning as plant characterisation is not the intent, but it is often carried out within the same programme slot for practical reasons, particularly at component and sub-system level. Testing outside normal operating conditions may be driven by:</p> <ul style="list-style-type: none"> • compliance with design codes; • calculated conditions when the plant is operating in permitted abnormal modes; • calculated conditions for accident scenarios within the design basis. 		

Designers are responsible for specifying tests at component, sub-system and plant level, and for ensuring that design substantiations cover test as well as operating conditions to support safety during the testing operation. Again, the assessor should expect to see a clear linkage between the design bases and substantiations and the tests specified.

EMT.3 refers to type-testing prior to installation aimed at demonstrating that systems, structures and components (SSC) important to safety will meet their specification and reliably deliver their safety functions. Type-testing covers a wide range of testing related activities which are applied to demonstrate:

- a) that there are no inherent design faults that could adversely affect performance, life or reliability;
- b) that the manufacturer's production processes, including testing, setting-up and QA, are satisfactory;
- c) stability when subjected to various influencing factors such as supply voltage, temperature and humidity changes, electromagnetic interference;
- d) evidence that the specification is met.

Fatigue or endurance testing under a normal operating profile is a good example of type-testing, though one which is not often carried out in the NNPP due to the small number of units involved. DNSR assessors should note that the principle is relevant to normal operating service which may not necessarily be the same as design basis.

Type-testing also covers proof (or pressure) testing and so is linked to paragraph 266 covering the integrity of metal components. Proof testing accords with the best practice embodied in established codes and standards. However, for metal pressure vessels, pipework and systems the guidance in paragraph 266 cautions against the confidence that can be gained from passing such tests. While proof testing is an important test of the strength properties of the materials and section thicknesses, it has limitations for the assurance of the absence of crack-like defects of structural concern. Similarly, paragraph 188 infers that it is frequently not possible to test components under the most onerous in-service conditions prior to installation. DNSR assessors should be aware of the limited value of type/proof testing in such cases, and should note that code compliance may be a necessary but not complete condition for acceptance. They should establish that the design authority has identified the most onerous in-service and fault conditions, the point in the component's or system commissioning or life cycle this is first tested, and any subsequent inspection required.

The execution of commissioning at sites often remote from the design authority (DA) needs to be managed by a competent organisation including DA and operator representation as well as experienced builders and dedicated commissioning engineers. The assessor should pay particular attention to the build authority's management arrangements to check that a satisfactory commissioning organisation is planned and put in place at the appropriate times.

IAEA Safety Standard No. NS-G-2.9 is commended to assessors and Authorisees as a guide to commissioning nuclear power plants. The particular circumstances applicable to the NNPP need to be taken into account in applying these guidelines. A forthcoming DNSR-specific TAG on commissioning will address the latter.

4. DESIGN BASIS ANALYSIS

Engineering principles: external and internal hazards	Design basis events	EHA.3
Engineering principles: external and internal hazards	Frequency of exceedance	EHA.4
Engineering principles: external and internal hazards	Operating conditions	EHA.5
Engineering principles: external and internal hazards	Analysis	EHA.6
Engineering principles: external and internal hazards	'Cliff-edge' effects	EHA.7
Fault analysis: general	Design basis analysis, PSA and severe accident analysis	FA.1
Fault analysis: design basis analysis	Consequences	FA.7
Associated SAP Paragraphs	217, 498, 512 – 526	

DNSR Specific Guidance to Assessors

Conservative design, good operational practice and adequate maintenance and testing should minimise the likelihood of faults. Nevertheless, faults, incidents and events may still occur and plant must be capable of tolerating them. Nuclear plants must therefore be designed to cope with, or be shown to withstand, a wide range of disruptions without unacceptable consequences by virtue of the plant's inherent characteristics or safety measures. This is known as the design basis.

The design basis analysis (DBA) should be used to inform and support the plant design, which may well be an iterative process. The DBA would be expected to provide information on a variety of plant operational issues, as described in paragraph 526. A suitably conducted DBA would, for example, demonstrate whether or not the safeguards available against a particular design basis hazard are sufficient and where additional or improved protection is necessary.

It should be noted that in accordance with FA.7, the consequence element of the DBA is to be performed on a conservative basis. Conservatism would usually be applied to parameters including decay heat level, release fractions and failure probabilities of claimed safeguards. Initiating event frequencies (except natural hazards) should, however, be established on a best-estimate basis (see paragraph 515).

Internal and external hazards need to be included in the DBA, dependent upon the consequences and frequency of occurrence.

Further requirements for DBA are given in the ONR SAP at paragraphs 512 to 526.

5. DESIGN FOR SAFETY

5.a Design for Safety - Consistency with Function

Engineering principles: pressure systems	Flow limitation	EPS.2
Engineering principles: safety systems	Avoidance of spurious operation	ESS.22
Associated SAP Paragraphs	235	

DNSR Specific Guidance to Assessors

The aim of EPS.2 is to limit the consequences of postulated breaches in piping systems that are connected to or from branches off the primary pipework by the provision of flow limiting devices. Flow limiting devices include isolation valves as well as flow restrictors. The supporting text (paragraph 235) provides guidance on the positioning and reliability of such features, but also seeks assurance that the protection claims are soundly based and that the fitment of a flow limiting device does not undermine the system integrity eg. by dynamic loading or water hammer. A pipe branch is usually sized for its duty, so the fitting of a flow restrictor may not be a practicable option if delivery of a safety function¹⁴ is compromised.

For the NNPP, this is one of a package of measures which may be used to improve LOCA protection. Other measures may include, for example, minimising pipe diameters¹⁵ or operating pressures, and improving make-up capacity. The DNSR assessor should adopt a wider interpretation of EPS.2, and take cognisance of other design features which may meet the intent of minimising the consequences of postulated breaches from the primary circuit.

For the NRP, the phrase *main pressure circuit*, first and foremost is associated with the primary circuit, though the concept of limiting consequences of failure should also be considered in the design of the secondary steam pipework where for example an excessive steam demand accident (ESDA) provides a direct threat to nuclear safety.

Principle ESS.22 highlights the importance of avoiding spurious operation which may degrade safety. In terms of nuclear safety the principle is aiming to minimise spurious tripping whilst trying to maximise protection. Spurious tripping puts the plant through unnecessary additional transients and can potentially leave the plant in abnormal modes. Additionally, there is a human factors concern where the operators may not respond properly when a real trip occurs if they have been previously subjected to a number of spurious ones. The principle should be automatically satisfied if the trip settings are specified correctly and the system has adequate reliability.

The SAP are only concerned with nuclear safety, but this principle is very important to managing the safety of the NNPP where there is a requirement to balance nuclear safety with nuclear powered warship safety, and the DNSR assessor will be conscious of this.

¹⁴ Or indeed an operating function

¹⁵ Consistent with function

5.b Design for Safety - Safety Systems

Engineering principles: safety systems	Requirement for safety systems	ESS.1
Engineering principles: safety systems	Determination of safety system requirements	ESS.2
Engineering principles: safety systems	Dedication to a single task	ESS.19
Engineering principles: safety systems	Avoidance of connections to other systems	ESS.20
Associated SAP Paragraphs	10, 333, 337, 353, 354 and 516	
Associated Reading	IAEA Safety Standard – SSR-2/1	

DNSR Specific Guidance to Assessors

The introductory paragraph to this section of the SAP (paragraph 333) notes that Safety Systems are the highest category of plant equipment. In this context plant equipment is systems that provide a specific function rather than individual structures or components. The SAP glossary is generally consistent with IAEA Standard, NS-R-1 (Safety of Nuclear Power Plants: Design). NS-R-1 identifies that for plant equipment, Safety Systems and Safety Related Systems have equal importance. Safety Related systems scopes all plant equipment whose malfunction or failure could lead to radiation exposure but is not a safety system (which acts in response to a fault to prevent or mitigate a radiological consequence).

The requirement for safety systems should be determined from early design stage analyses of the plant. The supporting text to SAP ESS.2 (paragraph 337) states that the design basis and probabilistic safety analyses (PSA) should determine the safety provisions, functions and required reliabilities. For the NNPP to date, analyses such as PSA are typically not carried out at the design stage but later in life when the design has been frozen and cannot therefore influence the design. This Principle states how the safety system requirements should be derived. For new designs, the DNSR assessor should ensure that appropriate analyses are conducted early in the design stages where their outcome can have the greatest influence on the selection of safety provisions and thus lead to risks that are ALARP.

ESS.19 states: *A safety system should be dedicated to the single task of performing its safety function.* Although this should be the design goal, paragraph 353 recognises that this may not always be achievable, and it might be particularly difficult for a NRP. The SFAIRP argument (paragraph 10 of the SAP) should be used to justify where this Principle is not met. In such cases, the whole system should be classified as a safety system irrespective of the classification of secondary functions.

To maintain integrity of safety systems, ESS.20 states that connections between a safety system and a system external to the plant should be avoided. The intent of this Principle is to prevent failures of the external system propagating to the safety system. For example, power range testing external instrumentation may be connected to the safety system during commissioning but all failure modes should be shown to have no effect on the safety system's functions. Paragraph 354 acknowledges that this may be impractical and advises that the function of these external systems should be limited to monitoring and should have adequate isolation features. Again, the SFAIRP argument should be used to justify where this Principle is not met.

Paragraph 516, at the Fault Analysis section of the SAP, states: *Correct performance of safety-related and non-safety equipment should not be assumed where this would alleviate the consequences.* This essentially states that if a system may be used to alleviate the consequences of a safety system failure, it should also be classified as a safety system. If it is of a lower classification (non-safety system), the fault analysis should assume that it will not perform as intended.

5.c Design for Safety - Monitoring and Control

Engineering principles: reactor core	Monitoring of safety related parameters	ERC.4
Associated SAP Paragraphs	456	
DNSR Specific Guidance to Assessors		
<p>The Reactor Core section of the SAP includes ERC.4 (Monitoring of Safety-Related Parameters). In this context <i>safety-related</i> refers to the safety parameters of the core.</p> <p>With regard to in-service monitoring, the DNSR assessor should review the set of instrumentation provided to monitor in-core conditions. If in-core instrumentation is so limited as to preclude any direct measurement of core parameters important to safety, the assessor should check that this omission is supported by a SFAIRP argument. In such cases it would be reasonable that the provision of alternative indirect systems that detect consequential changes within the plant are provided. These may include sensors external to the core, including fission product and gamma monitors.</p>		

6. ROLE OF OPERATOR

Engineering principles: human factors	Allocation of safety actions	EHF.2
Engineering principles: human factors	Identification of actions impacting safety	EHF.3
Associated SAP Paragraphs	343, 344, 377 and 519	

DNSR Specific Guidance to Assessors

The role of the operator for a nuclear powered warship plant has important differences from that of a static land-based plant. At sea, many operator actions will be aimed at restoring a level of power output to protect nuclear powered warship safety, or even continue the mission. Alongside, greater operator intervention may be required to compensate for protection systems that have been optimised for the at-sea situation. The nuclear powered warship operators and plant managers may also find themselves without immediate access to design or safety authority support; they are unusually highly educated and trained operators in order to prepare them to make autonomous decisions when necessary. For these reasons blanket adherence to some of the provisions in SAP and TAG would be inappropriate (eg. the 30 minute rule¹⁶).

In considering the role of the operator in an emergency, DNSR assessors should consider:

- The information available to the operator. This should include both the presentation of plant information from instrumentation and the sources of operating advice and guidance that are available in the likely scenario being considered. Assessors should caution against presumed access to detailed guidance from shore authorities for at-sea events.
- The level of training and education of operators (and managers). This should consider the whole of the SQEP resource available in the scenario under consideration, bearing in mind that this will be different at sea from alongside. The scope and content of the training and education should also be considered to ensure that it is comprehensive and appropriate to both the plant and the situations that are reasonably foreseeable. Where appropriate guidance is given, and this is routinely examined (eg. response to emergency operating procedures (EOPs) during simulator and at-sea training), it is reasonable to take credit for operator action as part of the overall protection of the naval plant
- When alongside with SQEP support available, the “operator” should also be taken to include additional resource available either from the Naval Base, or through deployable backup (eg. The Nuclear Accident Backup Support Team (NABUST)). For sequences that have time for responses to be formulated, assessors may take credit for the ability of the operator to mitigate potential situations without the need to fully specify what would be done by whom. This will always be a judgment but it is probably reasonable to assume that something could be done within 24 hours of resource being available. Therefore, for those locations which are remote from support, mobilisation and transport times should be taken into account.

In addition to the response to an event, assessors should also consider the role of the operator in prevention. While a nuclear powered warship power plant that requires no operator intervention to remain safe may be unrealistic, the design of the NRP should wherever possible seek to provide a benign response to transients and simplicity of operation, thus avoiding the need for rapid operator action to stay within parameters.

¹⁶ Paragraph 344 of the SAP set this against civil nuclear power reactors

7. NUMERICAL TARGETS

Numerical targets and legal limits	Assessment against targets	NT.1
Numerical targets and legal limits	Time at risk	NT.2
Associated SAP Paragraphs	568 - 638	
Associated Reading	Numerical targets and legal limits in Safety Assessment Principles for Nuclear Facilities. An explanatory note. HSE Dec 2006.	
DNSR Specific Guidance to Assessors		
<p>Assessors should note paragraph 570 of the SAP that the numerical targets are guides to inspectors to indicate where there is a need for consideration of additional safety measures. The Basic Safety Limits (BSLs) and Basic Safety Objectives (BSOs) translate the tolerability of risk framework and guide into decision making by inspectors and assessors. While the BSOs generally reflect the start of the broadly acceptable levels of dose/risk, as noted in paragraph 4 of the SAP Numerical Targets Explanatory Note, the BSOs for normal operation are set at a level reflecting that achieved by industry. The BSOs are not design targets or surrogates to denote when As Low As Reasonably Practicable (ALARP) levels of risk have been achieved. There is an overriding legal duty on Duty Holders to consider whether they have reduced risks to ALARP, regardless of whether the BSO has been met. The BSO represents a level below which it would not be a good use of regulatory resource, nor consistent with a proportionate regulatory approach, to generally pursue further improvements in safety.</p> <p>Sufficient guidance on use of the numerical targets and legal limits is contained in SAP, the accompanying Numerical Targets Explanatory Note and the associated Technical Assessment Guides referred to in the text of these references, with the exception of Target 6 and NT.2. Further guidance on Target 6 is detailed below and guidance on NT.2, justification and management of short term high risk activities, is in Annex C of an earlier version of JSP 518 (Issue 2, April 2004); it is expected that this latter guidance will be promulgated as NRPA guidance or standards.</p> <p>TARGET 6</p> <p>Target 6 is a subsidiary target of Target 5 and applies to a single accident in an individual facility. The original intent of this target was that it would apply to the totality of accidents at the facility that could affect any person on the site. However, such a target was considered too onerous (see paragraph 39 of the Explanatory Note). Target 6 aims to produce a balanced approach to ensure that no single accident can make an excessive contribution to the overall site BSO and BSL of Target 5. The inspector or assessor should be assured that the fault sequence is appropriately categorised for consideration as a single accident, and not subject to excessive summation before comparison with the target, which would lead to a more onerous requirement.</p> <p>The consideration of societal risk at paragraphs 622-623 is complicated during nuclear powered warship operation. Severe reactor accidents or non-availability can result in loss of the nuclear powered warship with an immediate loss of over 100 lives. Since this is unlikely to be a purely nuclear accident, the way in which nuclear ALARP is influenced by societal concerns should take account of the influence by those concerns on non-nuclear ALARP, so the targets at paragraph 623 (Target 9) are not directly applicable. However, any cost benefit analysis (CBA) applied to the evaluation of such an accident needs to take account of the full potential loss of life, not individual nuclear risk values.</p>		

The risk from the postulated nuclear incident will also need to be balanced with other sources of whole boat risk to avoid the potential for a focus on nuclear safety increasing the risk to the nuclear powered warship. The conventional or nuclear powered warship risk to the crew from normal nuclear powered warship operations is approximately an order of magnitude higher than the achievable nuclear risk, and such risk can be exacerbated by loss of propulsion. This lacks an obvious parallel in civil nuclear operations (ie. that a loss of output can put lives at risk as effectively as a serious nuclear accident) and its implications affect many SAP covering redundancy and diversity, safety systems role of the operator, etc.

Loss of a vital strategic asset (in the case of a deterrent-carrying nuclear powered warship), and the negative impact to the UK submarine programme of any nuclear accident or nuclear powered warship loss might also be factored into the societal risk calculation, though it is likely that the latter is covered by the potential loss of life from a single mishap.

The application of Target 9 to nuclear powered warship maintenance and port visits gives rise to a different complication. Since the population density and its orientation relative to the nuclear powered warship will vary from site to site, the nuclear powered warship operating organisation could be required to achieve different safety standards at different sites. The nuclear powered warship operating organisation or Authorisee may choose instead to set dose and/or fission product release targets to meet or better the societal risk targets at paragraph 623 at the "worst-case" site which the nuclear powered warship might visit. DNSR inspectors should test the accuracy and realism of such an approach while accepting its validity in principle.

Annex B to Chapter 2: DNSR Technical Assessment Guides (TAGs)

Status of DNSR Technical Assessment Guides (at July 2014)

TAG Ref	Title	Issue Date
TAG/001	Emergency Arrangements	Issue 1 Oct 09 Issue 1.1 Dec 13
TAG/002	Operational Berths	Issue 1 Oct 09 Issue 2 Dec 13
TAG/003	Lines of Defence	Issue 1 Jul 11
TAG/D004	Hydrodynamic Experiments	Issue 1 Aug 12
TAG/005	Numerical Targets 1 & 2	Issue 1 Feb 10
TAG/D006	See Note 1	--
TAG/D007	Management of Ageing in Defence Nuclear Programmes	Issue 1 Jan 14
TAG/008	Radioactive Discharges	Issue 1 Mar 11
TAG/D009	Radioactive Material Transport Package Approval	Issue 1 Nov 11
TAG/D010	Control of Lifting Operations	Issue 1 Apr 12
TAG/D011	Safety Analyses and Safety Case Interfaces	Issue 1 Aug 12
TAG/D012	High Reliability Due Process	Issue 1 Apr 14

Note 1: DNSR Guidance on INY provided in AWE Report 52/12 issued January 2012

GLOSSARY

This section provides a common JSP 518/538 glossary of the meaning of terms as used specifically in regulatory documents.

Accident. Any unintended event, including operator errors, equipment failures or other mishaps, the consequences or potential consequences of which are not negligible from the point of view of protection or safety¹⁷.

Accreditation. A regulatory mechanism through which the Head of the Defence Nuclear Safety Regulator sets the Conditions permitting an Accreditee to establish his own safety arrangements where adequacy must be demonstrable to the satisfaction of the Defence Nuclear Safety Regulator (DNSR).

Accreditation Certificate. A certificate provided by DNSR-Hd defining the scope of activities Accredited.

Accreditee The post-holder Authorised by DNSR-Hd to operate in compliance with the Approving and Design Authorities Conditions.

Agreement.

Explanation: An Agreement allows an Authorisee/Accreditee to proceed in accordance with its own arrangements.

Reason for use: Where the need to obtain DNSR's Agreement is written into the Authorisee/Accreditee's arrangements, it prevents an Authorisee/Accreditee from proceeding unless the course of action has been agreed. Agreement is a non-prescriptive means to foster ownership of safety management in the Authorisee/Accreditee, and it is more economic than it would be for DNSR to use its primary powers to specify all the consents that it would need to deploy.

ALARP. Shorthand for achieving (generally nuclear) risk that is As Low As Reasonably Practicable.

Approval.

Explanation: An Authorisee/Accreditee is required to submit its arrangements for Approval if so specified by DNSR.

Reason for use: An Approval is used to freeze an Authorisee/Accreditee's arrangements. Once approved no alteration or amendment can be carried out without further Approval by DNSR.

Approve. The action used throughout the Conditions (AC and ADAC), in which context it has the purpose of freezing arrangements and giving permission to proceed. Once regulatory Approval is given to a set of arrangements, they must not be changed or varied unless and until the changes have been formally re-approved.

Explanation: An Authorisee, Accreditee, Approving Authority or Design Authority is required to submit its arrangements for Approval if so specified by DNSR.

Approving and Design Authority (JSP 518). The Approving and Design Authority has the responsibility for safety across life cycle boundaries and delivery of a through life Design Authority function.

Approving and Design Authorities (JSP 538). The Approving and Design Authorities have the responsibility for the intrinsic safety of the nuclear weapon including components and

¹⁷ IAEA Safety Glossary 2007. Terminology used in nuclear, radiation, radioactive waste and transport safety.

relevant support equipment across the NWP life cycle boundaries which are subject to their Approval and delivery of a through life Design Authority function.

Approving and Design Authorities Conditions. Those obligations that are applied by the DNSR-Hd as a condition of being Accredited to conduct specified activities in relation to the Nuclear Weapon Programme.

Assurance. The action taken to report to another party that the specified arrangements, organisation, situation or activities are in place in accordance with expectations. The process includes monitoring, audit, inspection and sampling, but excludes direct involvement to alter or take responsibility for specific actions or decisions. This does not preclude the ability to instruct operations to cease.

Audit. A systematic, independent and documented process for obtaining evidence and evaluating it objectively to determine the extent to which audit criteria are fulfilled.

Authorisation. A regulatory mechanism through which the DNSR-Hd sets the Conditions permitting an Authorisee to establish their own safety arrangements whose adequacy must be demonstrable to the satisfaction of the DNSR.

Authorisation Certificate. A certificate provided by DNSR-Hd defining the scope of activities Authorised.

Authorisation Conditions. Those obligations that are applied by DNSR-Hd as a condition of being Authorised to conduct specified activities in relation to the Defence Nuclear Programme (DNP).

Authorised Site. A defined site within which nuclear activities are controlled by an Authorisee in compliance with the Authorisation Conditions and Further Authorisation Conditions.

Authorisee. The post-holder Authorised by the DNSR-Hd to operate in compliance with the Authorisation Conditions and Further Authorisation Conditions.

Authority. DNSR-Hd is charged with Authorising the conduct of defined activities that may entail a direct or indirect risk to nuclear safety, and with providing assurance that the requisite level of nuclear safety is being achieved.

Barrier. A means to:

- a. prevent or inhibit the movement of people or radioactive substances, or some other phenomenon (e.g. fire);
- b. provide shielding against radiation;
- c. protect against some other potentially hazardous event.

Broadly Acceptable. A level of risk that is low enough that it should not cause particular concern to informed individuals potentially affected by it. The regulatory authorities consider that while even broadly acceptable risks should be rendered as low as reasonably practicable, they are unlikely to seek positive demonstration that such risks have been minimised.

Cause. The origin, sequence or combination of circumstances leading to a hazardous event.

Commissioning. The process by means of which systems and components of facilities and activities, having been constructed, are made operational and verified to be in accordance with the design and to have met required safety criteria¹⁸.

¹⁸ IAEA Safety Glossary 2007. Terminology used in nuclear, radiation, radioactive waste and transport safety

Competence. The ability to put skills and knowledge into practice in order to perform a job in an effective and efficient manner to an established standard.

Compliance Statement. A statement which identifies the management arrangements to achieve compliance with the Authorisation Conditions, Further Authorisation Conditions or Approving and Design Authorities Conditions.

Consent.

Explanation: A Consent is required before an Authorisee/Accreditee can carry out any activity for which DNSR has so specified.

Reason for use: A Consent is used to ensure an Authorisee/Accreditee does not carry out an activity before DNSR has been satisfied that the proposed course of action is safe and all necessary procedures and controls are in place, or that pre-requisites from a hold point control document have been met.

Consequence. The (usually undesirable) outcome deriving directly or indirectly from a hazardous event or a combination of events and circumstances.

Constraint. A limiting value of dose imposed by an operating authority on an employee or group of employees for a specified period, as an additional restriction to the legal limits, in order to further enforce the minimisation of individual dose.

Decommissioning. Administrative and technical actions taken to reduce hazards progressively and thereby allow the removal of some or all of the regulatory controls from a facility.

Defence. Many defence activities are conducted by contractors or partner organisations; the term "Defence" encompasses these as well as organisations within the Ministry of Defence.

Defence Nuclear Material. A generic term covering nuclear weapons and Special Nuclear Materials for the DNP.

Defence Nuclear Programme (DNP). The Defence Nuclear Programme comprises the Naval Nuclear Propulsion Programme (NNPP) and the Nuclear Weapon Programme (NWP).

Defence Safety and Environmental Authority (DSEA). DSEA regulates safety and environmental protection for those conducting defence activity, be they Armed forces personnel, MOD civilians, or contractors.

Design Authority. An approved Duty Holder who manages the system that ensures that vital features of the nuclear weapon system, facility, utility or nuclear plant are identified and maintained throughout life. The Design Authority is responsible for the provenance of the design documentation included in the safety case together with the through life specification of technical requirements and configuration management to maintain the design intent.

Design Intent. The Design Intent refers to the plan that the designer had for a particular component, system or subsystem to deliver a specific function. This function itself will be part of a plan for the delivery of key design parameters and attributes, including safety performance, set by the customer; this represents the highest level design intent. The design intent should be documented at various levels by functional and procurement specifications, design drawings, design descriptions and substantiations, including safety justifications. Where it is referred to in this JSP it must be taken to mean the Design Intent at the appropriate level according to context.

Design Organisation. An organisation responsible for designing a specific type of equipment.

Direction.

Explanation: A Direction requires an Authorisee/Accreditee to take a particular action.

Reason for use: A Direction is used for matters of major or immediate importance.

Diversity. The presence of two or more systems or components to perform an identified function, where the systems or components have different attributes so as to reduce the possibility of common cause failure, including common mode failure¹⁹. See also Redundancy.

Dose. See Effective Dose.

Duly Authorised Persons (DAP). Suitably Qualified and Experienced Persons who are Authorised to control and supervise operations which may significantly affect nuclear or radiological safety, where those responsibilities go beyond their normal managerial duties or across line management responsibilities. See also AC12 in Annex B to Chapter 2.

Duty Holder. A person who has direct responsibility for, and control of, activities that influence, directly or indirectly, the safety of the DNP.

Effective Dose. The quantity obtained by multiplying the equivalent dose to various tissues and organs by a weighting factor appropriate to each and summing the products. When comparing effective doses received to annual limits the contributions from external exposure and the committed effective dose from intakes of radionuclides in the same period should be included. Effective dose is measured in Sieverts (Sv).

Emergency Arrangements. Arrangements which are put in place in advance to enable the implementation of the emergency plan when required.

Emergency Plan. A plan designed to secure, so far as is reasonably practicable, the health and safety of persons who may be affected by such reasonably foreseeable emergencies as have been identified in a hazard identification and risk evaluation.

Endorse. To endorse a document is to express agreement to its content. Endorsement does not apply to subsequent revisions unless these too are subject to separate assessment and endorsement.

Environment. The total set of all external natural or induced conditions to which a materiel is exposed, during a specified period of time.

Event. An event is any occurrence:

- a. that has or could have resulted in an unintended release of radioactive material, a failure of a line of defence or protection or a similar occurrence;
- b. that could have given rise to a significant radiological consequence, on or off site;
- c. that could significantly prejudice the requirements of a safety case or a breach of safety case requirements;
- d. that may affect the safe operation or safe condition;
- e. of safety interest or concern, including:
 - (1) human error;
 - (2) equipment or process failures that cause near misses;
 - (3) abnormal occurrences.

External Hazard. Natural or man-made hazards to a site and facilities that originate externally to both the site and the process, i.e. the Duty Holder may have very little or no control over the initiating event.

¹⁹ IAEA Safety Glossary 2007. Terminology used in nuclear safety and radiation protection.

Facility. That part of a nuclear site identified as being a separate unit for the purposes of nuclear or radiological risk. This may be a single reactor, a group of processing plants as on a nuclear fuel-cycle facility or a dock and its support systems containing a naval reactor plant. *The term 'Facility' includes both the terms 'nuclear installations' as defined in the Nuclear Installations Act 1965 (as amended) and 'plant' as used in nuclear site licences granted by ONR. It also includes nuclear weapons, components and relevant support equipment.*

Fissile Material. Any matter containing Uranium 233, Uranium 235 (>0.72%), Plutonium 239 or Plutonium 241, either singly or in any combination.

Further Authorisation Conditions. Conditions that address issues unique to the DNP (mobility of submarines and weapons for which there are no equivalent Licence Conditions).

Hazard. The potential for harm arising from an intrinsic property or disposition of something to cause detriment²⁰.

Hold Point. A point in any project or operation in the DNP beyond which progress is prohibited until predetermined criteria which provide safety assurance or risk mitigation are satisfied.

Incident. An undesired circumstance or near miss that has the potential to cause an emergency.

Independent Nuclear Safety Assessment (INSA). Provides an independent assessment of the adequacy of the Safety Justification documentation with regard to its basis, completeness and whether it demonstrates that the risk presented is acceptable in terms of the Safety Principles and Safety Criteria. INSA is independent of the organisation which generates the Safety Justification. INSA provides a continuous wide ranging independent review of the DNP in the context of national and international nuclear safety standards and Safety Principles and Safety Criteria.

Independent Peer Review (IPR). The examination of safety justification documentation by suitably qualified and experienced persons independent of the project to consider its acceptability and completeness and whether the safety case presented is acceptable when compared to established standards and criteria. The IPR will be commissioned by the organisation responsible for making the Safety Justification. Independence can stem from the use of resources outside the department producing the Safety Justification. An IPR will be done against well-defined terms of reference.

Individual Risk. The risk to any individual of premature death from cancer or other radiation effects as a result of exposure to ionising radiation during any one year, whether the death occurs during the year of exposure or subsequently.

Initiating Event. The cause and start point of a fault sequence which may originate either outside or inside a site or facility.

Inspection: The mechanism used to scrutinise management arrangements and the capability to carry out specified activities.

Intelligent Customer. The Duty Holder should have the necessary expertise and capability to be able to control and supervise its contractors, so as to maintain the ultimate responsibility for safety – this is referred to as 'intelligent customer' capability. The concept of the 'intelligent customer' relates to the organisation as a whole rather than the capabilities of individual personnel. The Duty Holder should retain sufficient intelligent customer capability to know what is required, to fully understand the need for a contractor's services, to specify requirements, to supervise work and to technically review the output before, during and after the work.

²⁰ Reducing risks, protecting people: HSE's decision making process, HSE Books 2001 ISBN 0 7176 2151 0.

Internal Hazard. A hazard to plant and structures that originates within the site boundary and over which the Duty Holder has some form of control over the initiating event.

Joined-up Regulation. The Duty Holder produces information once on a given topic and receives one response from one regulator, which incorporates the judgement of the other²¹.

Licensed Site. A site in respect of which a Nuclear Site Licence has been granted by ONR under the Nuclear Installations Act 1965 (as amended), whether or not that Licence remains in force.

Licensee. The body corporate that has been granted a Nuclear Site Licence under the Nuclear Installations Act 1965 (as amended), which permits it to carry out a defined scope of activities on a delineated site.

Management Arrangements. Documented methods which describe how particular operations or activities will be controlled to meet the requirements of the Authorisation Conditions or relevant Safety Cases.

Modification. Any alteration to buildings, plants, operations, processes or safety cases including any replacement, refurbishment or repairs to existing buildings, plants or processes and alterations to the design of plants during the period of construction.

Naval Reactor Plant. The significant systems fundamental to the operation of the Nuclear Steam Raising Plant (NSRP). A meaning assigned to a nuclear reactor comprised in a nuclear powered warship (NPW), interpreted as if the NIA65 (as amended) applied.

Naval Reactor Plant Authorisee (NRPA). The Internal Safety Authority for the Naval Reactor Plant, authorised by DNSR for at-sea operation of the plant, and as Approving Authority for all phases of the plant life.

Normal Operation. Operation within specified operational limits and conditions²².

Note. To acknowledge the existence of a document or arrangements. Noting a document does not imply that DNSR has examined the document or arrangements.

Notification. When so notified, an Authorisee, Accreditee, Approving Authority or Design Authority is required to submit information to DNSR.

Nuclear Emergency. This refers to a reactor accident, nuclear fuel accident, neutron source accident or a nuclear weapon accident, which may lead to a release of fissile or radioactive material or fission products.

Nuclear Matter. Subject to any exceptions prescribed in NIA and the Nuclear Installations (Excepted Matter) Regulations 1978, nuclear matter is:

- a. any fissile material in the form of uranium metal, alloy or chemical compound (including natural uranium), or of plutonium metal, alloy or chemical compound, and any other fissile material which may be prescribed; and

²¹ Definition from the LoU between ONR and UK DNSR states that: 'Joint regulation is an aspiration for Duty Holders to provide once, on a given topic, and receive co-ordinated responses from the regulators. In practice, it will be achieved by close alignment of Licence and Authorisation Conditions, common understanding of risks and hazards by regulators, sharing of information, and the adoption of common regulatory principles and philosophies.

²² IAEA Safety Glossary 2007. Terminology used in nuclear safety and radiation protection.

- b. any radioactive material produced in, or made radioactive by exposure to the radiation incidental to, the process of producing or utilising any such fissile material as aforesaid.

Nuclear Safety. The state achieved when the probability and potential consequences of a Nuclear Emergency have been reduced to an acceptably low level and the potential for personnel exposure arising from normal work with ionising radiation has been reduced to levels which are as low as reasonably practicable.

Nuclear Safety Related. An equipment or system that provides a supporting role to nuclear safety and where failure leads to erosion of nuclear safety margins.

Nuclear Steam Raising Plant. A pressurised water reactor within a primary circuit and those other (non-nuclear) systems necessary to generate steam to enable propulsion.

Nuclear Weapon (NW). In this JSP the term is used to describe a nuclear device or warhead, excluding the delivery system.

Nuclear Weapon System. The entire stockpile of nuclear weapons, including facilities, activities and equipment necessary for operational use and safety.

Operating Instructions. Referred to in Authorisation Condition 24, in which they are defined as written instructions that:

- a. provide step by step instructions on how to carry out an operation to ensure that it is done in the way assumed in the safety case;
- b. ensure that operating conditions and limits are implemented;
- c. are necessary in the interests of safety.

Operating Organisation. A body empowered to conduct nuclear operations within the DNP, either by itself or through prescription of a safe boundary and limits to an approved Duty Holder who is the respective operating authority.

Operating Rules. Referred to in Authorisation Condition 23 and are defined as the conditions and limits which bound the safety case from which they were derived. The conditions and limits ensure that the operation is conducted safely and could arise from consideration of:

- a. the calculated limits of performance, to ensure that the limits and conditions of the design basis are not exceeded;
- b. the limits of analysis, beyond which the performance of the system is unknown;
- c. the limitations in the scope of safety case;
- d. the need to ensure that engineered safeguards are in place.

Operational Berth. Any berth outside an Authorised site and not covered by an Authorised site's arrangements, which may be visited by a NPW. An Operational Berth may be in the UK, a British Overseas Territory (BOT) or a foreign country.

Operation(s). Operation includes maintenance, examination, testing and operation of the plant and the treatment, processing, keeping, storing, accumulating or carriage of any radioactive material or radioactive waste. "Operating" and "Operational" shall be construed accordingly.

Periodic Review of Safety. A comprehensive assessment of equipment, operations and safety cases against current standards required at appropriate intervals to demonstrate that the risks continue to be as low as reasonably practicable and that ageing and other time-related phenomena will not render operations unsafe before the next review.

Permissioning. The mechanism by which DNSR regulates hazardous activities, through the imposition of formal requirements on, for example, Operators²³, Designers, Builders or Maintainers to gain permission before conducting certain defined activities. The term 'permissioning' is used to encompass the regulatory controls 'consent', 'approval' and 'agreement'.

Radiation Emergency. Any event (other than a pre-existing situation) which is likely to result in any member of the public being exposed to ionising radiation arising from that event in excess of any of the doses set out in Schedule 1 (of REPPIR) and for this purpose any health protection measure to be taken during the 24 hours immediately following the event shall be disregarded.

Radiation Safety. An integral part of nuclear safety and requires the implementation of radiation protection measures which ensure that personal exposure arising from normal work with ionising radiation is kept to levels which are as low as reasonably practicable.

Radioactive Material. Radioactive material is as defined in the Radioactive Substances Act 1993.

Radioactive Substance. Radioactive substance is as defined in Ionising Radiations Regulations 1999.

Radioactive Waste. Radioactive waste is as defined in Radioactive Substances Act 1993.

Reactor Accident. An unexpected event which is likely to lead to, or has resulted in, a release of fission products external to the fuel cladding.

Redundancy. Provision of alternative (identical or diverse) structures, systems or components, so that any one can perform the required function regardless of the state of operation or failure of any other²⁴. See also Diversity.

Risk. The chance that someone or something is adversely affected in a particular manner by a hazard²⁵.

Risk Assessment. The quantitative evaluation of the likelihood of undesired events and the likelihood of harm or damage being caused, together with the value judgements made concerning the significance of the results.

Safety Case. In this document, 'safety case' refers to the totality of an Authorisee's, Accreditée's or Duty Holder's documentation to demonstrate safety. It must include a justification for the activity and demonstration of ALARP nuclear risk. A fuller definition of the requirements of a Safety Case is given in ONR TAG No. T/AST/051, "Guidance on the purpose, scope and content of nuclear safety cases".

Safety Category. The classification of nuclear weapons, nuclear plant, modifications or engineering work, or operations according to the potential consequences of failure.

Safety Clearance Letter. A letter issued by the NRPA signifying agreement that the nuclear risk to the public, workers and crew from initial criticality and subsequent operation of the "as-built" Naval Reactor Plant is ALARP. See also JSP 518 Annex C to Chapter 3 for details of the process to agree NRP criticality.

²³ i.e. those effecting safety related work subject to regulatory controls

²⁴ IAEA Safety Glossary 2007. Terminology used in nuclear, radiation, radioactive waste and transport safety

²⁵ Reducing risks, protecting people: HSE's decision making process, HSE Books 2001 ISBN 0 7176 21510

Safety Criteria. The numerical values against which the calculated risks arising from activities are compared as an aid in judging whether those risks are acceptable.

Safety Principle. A point of accepted best practice in corporate and engineering management which is (or is to be) adopted in the pursuit of nuclear safety.

Safety System. A system that acts in response to a fault to prevent or mitigate a radiological consequence.

Site Safety Case. The documentation which demonstrates that sites and organisations supporting nuclear weapons and nuclear powered warships at various stages in their Defence Nuclear Programme life cycle maintain ALARP nuclear risk while so doing²⁶.

Special Nuclear Material. Plutonium, High Enriched Uranium (HEU) and Tritiated materials.

Specification:

Explanation: A Specification issued by DNSR requires an Authorisee/Accreditee to implement the specified arrangements.

Reason for use: A Specification is the means by which DNSR can implement discretionary control over an Authorisee/Accreditee's arrangements.

Suitably Qualified and Experienced Persons. The term used in Authorisation Conditions 12 & 26 which is defined as those persons whom the Authorisee, Approving Authority or Design Authority considers suitably qualified and experienced to perform duties which may affect nuclear and radiological safety.

Target. A value of individual dose or collective dose set by an intelligent customer, or may be self-imposed by an operator or designer, so that in the design of new nuclear plant, nuclear weapon or component or in the planning of an activity involving radiation exposure, dose is minimised by good dose management and dose limiting values are not exceeded.

Transport. The deliberate physical movement of radioactive material (other than that forming part of a means of propulsion) from one place to another²⁷. From a regulatory perspective 'transport' comprises all operations and conditions associated with, and involved in, the movement of radioactive material; these include the design, manufacture, maintenance and repair of packaging, and the preparation, consigning, loading, carriage including in-transit storage, unloading and receipt at the final destination of loads of radioactive material and packages [from IAEA SSR-6 para 106].

Unacceptable. A level of risk that is high enough to cause serious concern to informed individuals who are subjected to it. The regulatory authorities consider that such a risk should not be permitted in normal circumstances, and only permitted in order to avert greater risks in the course of serious emergency.

Utility. A supporting plant system such as a power distribution system which has no inherent radiological hazard but which is safety related because failure could have an adverse effect on the safety of another facility or nuclear plant.

²⁶ The ALARP justification may include consideration of risks in other stages of the life cycle. Note that specific or unusual site activities in response, for example, to emerging defects, might require individual ALARP justifications.

²⁷ IAEA Safety Glossary 2007. Terminology used in nuclear, radiation, radioactive waste and transport safety

ABBREVIATIONS

This section provides a common JSP 518/538 list of abbreviations as used specifically in regulatory documents.

AA	Approving Authority/Authorities
AC	Authorisation Condition(s)
ADA	Approving and Design Authority
ADAC	Approving and Design Authorities Conditions
AF&F	Arming Fuzing and Firing
ALARP	As Low As Reasonably Practicable
ASND	Autorité de Sûreté Nucléaire et à la radioprotection pour les activités et installations intéressant la Défense
AWE	Atomic Weapons Establishment
BR	Book of Reference
BSL	Basic Safety Level
BSO	Basic Safety Objective
CASD	Continuous at Sea Deterrence
CBA	Cost Benefit Analysis
CLOSO	Conditions and Limits of Safety Operation
CSSE	Chief Strategic Systems Executive
DA	Design Authority
DAP	Duly Authorised Person(s)
DBA	Design Basis Analysis
DfT	Department for Transport
DMR	Defence Maritime Regulator
DNESB	Defence Nuclear Environment and Safety Board
DNM	Defence Nuclear Material
DNP	Defence Nuclear Programme
DNRF	Defence Nuclear Regulatory Forum
DNRSC	Defence Nuclear Regulation Stakeholder Committee
DNSC	Defence Nuclear Safety Committee
DNSR	Defence Nuclear Safety Regulator
DO	Design Organisation
DOSR	Defence Ordnance Safety Regulator
DRDL	Devonport Royal Dockyard Ltd
DSTL	Defence Science and Technology Laboratory
DSEA	Defence Safety & Environment Authority
EA	Environment Agency
EAC	Environmentally Assisted Cracking
ECSS	Emergency Core Cooling System
EIMT	Examination, Inspection, Maintenance and Testing
EOP	Emergency Operating Procedures
EPR	Environmental Permitting Regulations
ESDA	Excessive Steam Demand Accident
EU	European Union
FAC	Further Authorisation Condition(s)
GoG	Government of Gibraltar
HASS	High Activity Sealed Source
HAZID	Hazard Identification
HIRE	Hazard Identification and Risk Evaluation
HMNB	Her Majesty's Naval Base
HS&EP	Health, Safety and Environmental Protection
HSE	Health and Safety Executive
HSWA	Health and Safety at Work etc. Act 1974

IAEA	International Atomic Energy Agency
ICRP	International Commission for Radiological Protection
IM	Insensitive Munitions
INES	International Nuclear Event Scale
INSA	Independent Nuclear Safety Assessment
IoF	Incredibility of Failure
IP	Intervention Plan
IRR	Ionising Radiations Regulations
IS	Intervention Strategy
ISR	Immediate Safety Requirement
JSP	Joint Service Publication
LC	Licence Condition(s)
LCP	Life Cycle Phase
LLC	Local Liaison Committee
LOCA	Loss of Coolant Accident
LOD	Line(s) of Defence
MAA	Military Aviation Authority
MOD	Ministry of Defence
MPS	Multi-Point-Safe
NEBUST	Nuclear Emergency Backup Support Team
NBC	Naval Base Commander
NIA	Nuclear Installations Act 1965?
NNPP	Naval Nuclear Propulsion Programme
NPR	Nuclear Propulsion Regulator
NPW	Nuclear Powered Warship
NR(EIAD)R	Nuclear Reactor (Environmental Impact Assessment of Decommissioning) Regulations
NRP	Naval Reactor Plant
NRPA	Naval Reactor Plant Authorisee
NRTE	Naval Reactor Test Establishment
NRW	Natural Resources Wales
NSC	Nuclear Safety Committee
NT	Numerical Target
NW	Nuclear Weapon
NW ADA	Nuclear Weapon Approving and Design Authority
NWP	Nuclear Weapon Programme
NWR	Nuclear Weapon Regulator
NW SPSC	Nuclear Weapon Safety Principles and Safety Criteria
OB	Operational Berth
OECD	Organisation for Economic Cooperation and Development
ONR	Office for Nuclear Regulation
PRS	Periodic Review of Safety
PLEX	Plant Life Extension
PRT	Power Range Testing
PSA	Probabilistic Safety Analysis/Assessment
PSI	Pre-Service Inspection
PUS	Permanent Under Secretary
QA	Quality Assurance
RA	Radioactive
RAM	Radioactive Material
R&D	Research and Development
REPIR	Radiation Emergency (Preparedness and Public Information) Regulations
RPC	Regulatory Policy Committee
RPV	Reactor Pressure Vessel
RSA	Radioactive Substances Act 1993?
RSD	AMEC Regulatory Support Business Area

SAP	Safety Assessment Principle(s)
SEPA	Scottish Environment Protection Agency
SFAIRP	So Far As Is Reasonably Practicable
SFC	Single Failure Criterion
SI	Statutory Instrument
SIN	Safety Improvement Notice
SINS	Security-Informed Nuclear Safety
SJ	Safety Justification
SMDC	Safety Mechanisms, Devices and Circuits
SNM	Special Nuclear Material
SNMR	Special Nuclear Material Requirements
SofS	Secretary of State
SOL	Start-of-Life
SPS	Single-Point-Safe
SPSC	Safety Principles and Safety Criteria
SQEP	Suitably Qualified and Experienced Persons
SSC	System, Structure or Component
Sv	Sievert
SW PT	Strategic Weapons Project Team
TAG	Technical Assessment Guide
TEA	The Energy Act 2013
WH	Warhead