

# Regulation of Weapons and Naval Programme Activity

## G/INS/004 - Issue 002

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## **1. Purpose and Scope**

1.1 This guidance note complements general guidance by setting out the particular legal and regulatory circumstances that apply in the regulation by the ONR of nuclear and radiological safety associated with weapons and naval programmes. It applies to both programmes and to all ONR Inspectors who have duties that relate to these programmes.

1.2 The overall purpose of the guidance is to help secure an approach to the regulation of nuclear safety that matches the particular characteristics of the MoD programmes and achieves sufficient coherence and co-ordination between the ONR and the Defence Nuclear Safety Regulator (DNSR). It covers aspects of ONR regulation at both licensed and non-licensed MoD sites.

1.3 This guidance covers only ONR regulation. Other parts of HSE also carry out regulatory duties at MoD licensed and un-licensed sites. These are not covered.

## **2. Policy**

2.1 The policy of the SoS for Defence is to comply with all relevant safety and environmental legislation unless exemptions/disapplications/derogations apply. If these do apply, it is SoS's policy to apply standards and arrangements that are, so far as is reasonably practicable, at least as good as those required by the legislation. ONR regulates accordingly, but taking due account of particular circumstances in the application of ALARP to some aspects of MoD activity.

2.2 ONR will work with DNSR to ensure that the activities of the two regulators are consistent and proportionate to the radiological risks across the whole weapons and NNPP domains.

2.3 ONR will liaise with DNSR and utilise its expertise as necessary to ensure that disproportionate attention is not allocated to licensed infrastructure facilities in the absence of ONR access to and influence over Naval Reactor Plant (NRP)/weapons design.

2.4 HSE/ ONR, under HASAWA s6 and s3, has the regulatory vires to take a legitimate interest in the duties of designers, suppliers and manufacturers (ie the procurement process).

2.5 Under the terms of the MoD/HSE Agreement (naval programme) and the legal requirements of AWE Act 91 Amendment Order 1997 (weapons programme), ONR will not seek to influence reactor/weapon design. However, safety cases covering associated operations are regulated by the ONR. There may be circumstances when this leads to the need to clarify design-related issues in making regulatory decisions. If any queries arise in reaching such decisions that appear to impinge on design issues, they will be put to DNSR for resolution.

### **3. Responsibilities**

3.1 Within ONR, the Head of the Defence Facilities Division is responsible for defence related nuclear regulatory activities as set out in the MoD/HSE Agreement, Annex B para 4, and for implementation of liaison arrangements at para 35-38 of the same Annex.

3.2 Heads of Unit in the Defence Programme whose duties include regulation of MoD activity are responsible for ensuring, amongst other things, that ONR activity in inspection and assessment is co-ordinated with that of DNSR.

3.3 ONR Inspectors with MoD regulatory duties are responsible for ensuring that in implementing ONR regulatory strategies, due regard is taken of DNSR activity.

### **4. Definitions**

4.1 **The MoD/HSE Agreement.** In 1981 a General Agreement was signed between the then Director General of the HSE and the Second Permanent Under Secretary of the MoD. This was revised in 1996 and has been subject to successive two-yearly reviews. It sets out how HSE's normal activities are modified to take account of legal and international obligations connected to MoD-related activity and the nature of MoD activity. Annex B of this agreement refers to nuclear matters. The extant version of this Agreement is dated 2000.

4.2 **MoD/HSE Letters of Understanding.** From time to time 'Letters of Understanding' have been agreed between the ONR and MoD regulators to amplify and clarify working-level arrangements made under the general provisions of the MoD/HSE agreement.

4.3 **The 1958 Agreement.** This was an agreement between the USA and the UK for co-operation on the use of atomic energy for mutual defence purposes and the transfer of technology. It places restrictions on access to related information that remain in force today.

4.4 **The Polaris Sales Agreement of 1963.** This agreement, also known as the Nassau Agreement, allowed the UK to acquire Polaris missiles and related technology from the USA, now extended to cover Trident. It also leads to some restrictions relating to aspects of the weapons programme.

4.5 **NRP - the Naval Reactor Plant.** This is taken by the ONR to be all structures, systems and components related to a submarine's nuclear steam-raising plant.

4.6 **Nuclear device.** All those devices whose design intent is to be able to produce an uncontrolled nuclear reaction.

4.7 **Z berths.** Nuclear submarine berths are now designated Z Berths. At Z berths only normal operations and non-nuclear work is permitted. Z berths are located at various points around the UK and are normally used for port visits or operational activity.

4.8 **Authorisees.** DNSR operates a formal regulatory system of 'authorisation'. This is based on authorisation conditions that are similar to ONR licence conditions. For licensed sites, their application and compliance requirements are governed by civil contract rather than statute. All licensed dockyard sites are also authorised sites. Those sites not licensed by the ONR (but regulated under IRRs, MHSWR and REPPIR) are authorised by DNSR.

4.9 **Authorised site.** A site, which may include the NRP, on which nuclear related activity is carried out under the control of an Authorisee (MoD Department, or contractor such as BAES, RRDL, DRDL) authorised to do so contractually or otherwise (MoD Departments) by DNSR.

4.10 **NNPP.** The Naval Nuclear Propulsion Programme. All MoD activities associated with nuclear powered submarines, from design to disposal.

4.11 **DNSR.** The Defence Nuclear Safety Regulator.

## 5. Guidance

5.1 The normal ONR regulatory approach to licensed sites has to be modified for MoD-related activity for the following reasons:

- Licence conditions do not apply to the extent that they could affect the design of a nuclear device or devices (other than a reactor) that are intended to simulate the properties of a nuclear device.
- By agreement, the ONR will not seek to modify the design of the NRP.
- Nuclear devices/NRP are such that what is reasonably practicable under SAPs may differ from normal civil expectations because design constraints relating to military requirements need to be considered alongside civil nuclear safety expectations. Aspects of the civil legal framework do not apply to the MoD context.
- An extensive internal MoD regulatory framework exists (DNSR) and account has to be taken of the possibility of avoidable duplication as well as the potential benefits of co-ordinated activity. This framework is distinct from any that may be developed by civil licensees in that it covers the extensive elements of UK nuclear safety activity that are not subject to licensing.

- In the NNPP, the source of the hazard is a mobile reactor and ALARP judgements have to be made in the context of all usages. For example, it is conceivable that ALARP improvements that appear to be reasonable in a licensed site context may actually lead to greater risks to the ship's company in a sea-going context. ONR ALARP views therefore have to be derived in conjunction with DNSR, who have oversight of the whole programme.

**5.2 MoD organisation.** The MoD is a complex and large organisation, with many interactions and points of potential influence. To work effectively with this key stakeholder, ONR Inspectors need to have sufficient working knowledge of those elements of its structure most relevant to the ONR 's role. An overview of these is given in [Annex A](#) of this document. More detail can be found on the MoD website.

**5.3 Legal Constraints.** The MoD is subject to the requirement of the HASAWA and associated regulations (except where exemptions from the regulations apply). However, since the Crown cannot be prosecuted for breaches of the law a system of Crown censures has been agreed to cover circumstances where formal enforcement would otherwise be appropriate (this does not apply to licensed activity). Details of this and the application of regulations are given in [Annex B](#) to the MoD/HSE Agreement. The biggest constraints with regard to the nuclear licensing framework are:

- The AWE Act specifically excludes from licensing and licence conditions those aspects that affect the design of nuclear devices (other than a reactor) or nuclear devices intended to simulate the properties of a nuclear device.
- The licensing requirements of NIA '65 do not apply to a reactor 'comprised in a means of transport' (ie submarine), which is interpreted by the MoD/HSE agreement as a reactor that is in compliance with its safety case for commissioning or normal operation. However, on a licensed site, licence condition requirements do apply to submarines.

The implications of these legal constraints and other factors are considered further in [Annex B](#).

**5.4 Constraints due to the MoD/HSE Agreement and its working level arrangements.** The HSE/MoD General Agreement is available via the [Public Services Sector Online Community](#). Annex B of this agreement deals with MoD and MoD related nuclear sites. It is also embodied in MoD Joint Services Publication JSP 375 Vol 1 Chapter 8-1. The way in which these affect regulation of MoD activity is set down in Annex C of this BMS guidance. Together, these lead to changes in:

- Application of NIA 65 to the NRP and nuclear devices.
- Handling of Licence Instruments (see also [Annex B para 13](#)).
- Access to submarines.
- Provision of and access to information.
- Influence over design.
- Reporting of incidents and distribution of information.
- Nuclear accident response.


- Co-ordination of regulatory activity and reactive/emergency responses.

**5.5 Application of ALARP.** There are some aspects of NRP/weapons design that are incompatible with ONR 's civil-derived expectations, leading to the possibility that unjustified attention may be applied to supporting infrastructure in the absence of the ability to influence the design of the source of the hazard. For example, the fact that a nuclear submarine has to dive to certain depths and achieve certain speeds within defined costs means that the pressure hull volume is constrained. This may limit the scope and justification for redundancy and segregation of some safety systems. In addition, there may not necessarily be a straightforward read-across of experience of relevant good practice from civil practice to MoD-domain practice. For these reasons, informing ALARP judgements is not straightforward. Further examples of NRP ALARP factors are given in [Annex D](#).

**5.6 The defence 'imperative'.** This has caused a number of difficulties, largely centered around identifying and understanding defence imperatives, and lack of guidance in precisely how and when they should be taken into account. Guidance on this is given within [Annex D](#).

**5.7 Joint ONR/DNSR working.** The ONR and DNSR are committed to the operation of regulatory systems that ensure co-ordinated and cohesive oversight of NNPP and weapons activity. In overall terms it is intended to achieve this through:

- Sharing information provided by authorisees and licensees.
- Joint determination of regulatory strategies.
- Joint determination where appropriate of the most appropriate form of regulatory action and the organisation that will take the lead.

This is embodied in the [Letter of Understanding](#) [595kb] . Detail is provided in [Annex E](#), which sets out some practical arrangements for giving effect to the closer working that is envisaged.

**5.8 ONR regulation at non-licensed but authorised sites.** Authorised sites are not subject to licence requirements but are formally regulated under an equivalent regime by DNSR. The vires for ONR regulation at these sites (Vulcan, HM Naval Base Clyde, HM Naval Base Devonport, Z berths) are not licence conditions but the HASAWA and the IRRs, REPIIR and MHSWR. In addition, the ONR contributes to and participates where appropriate in regulatory strategies developed by DNSR for these sites. A strategy for ONR regulatory activity at these sites is presented in G/INS/005.

**5.9 Security.** Access to and handling of information used by the ONR for MoD regulation are subject to MoD rules and procedures. These are more stringent than the Cabinet Office rules that govern general HSE security arrangements. Details are promulgated internally within the Defence Facilities Programme.

## **6. Associated documents**

6.1 Sector Information Minute [SIM/07/2001/46](#) (MOD/HSE Agreement).

6.2 DNSR/ONR 'Letter of Understanding' dated 16 November 2006.

## 7. Records/document retention

7.1 All ONR records and documents underpinning regulatory decisions in the defence environment will be managed and retained in accordance with normal ONR arrangements and requirements for permissioning activities (NB: licensees also have associated duties under LC6 and LC25).

### Annex A

#### MoD Organisation

1 This Annex briefly describes those elements of the Ministry of Defence and associated organisations that are most relevant to ONR regulatory activity.

2 In overall terms, the Secretary of State for Defence is responsible for safety relating to MoD and defence activities. Delivery of safety is achieved through the procurement function within the Defence Equipment and Support (DES) organisation which is responsible for the introduction of safe equipment, and the support function within DES which is responsible for safety of in-service equipment and support activities, and the naval staff organization which is responsible for ensuring that equipment is operated safely. The Strategic Systems Executive has particular responsibilities in relation to the operational availability of the UK strategic deterrent.

#### Defence Equipment

3 The equipment procurement function was until recently an autonomous organisation, the Defence Procurement Agency (DPA), based at Abbey Wood near Bristol. Now part of DES, it is responsible for the procurement of equipment for the UK armed forces. It is also responsible for the management of major upgrades. It employs approximately the same number of staff as HSE. Within the organisation, a number of Integrated Project Teams (IPTs) are responsible for managing and co-ordinating procurement and support activity in nuclear related fields. The IPTs have extensive management and co-ordination roles, amongst other key nuclear safety duties (NB IPTs are not confined to the procurement arm of DES).

4 **Attack submarines IPT (ASM IPT).** ASM IPT is responsible for enhancements to Swiftsure and Trafalgar class submarines and the introduction of the new Astute class attack submarines, that will progressively replace the S and T classes. The contract for Astute gives the prime contractor, BAE Systems, the responsibility and freedom to achieve specified performance parameters.

5 **Nuclear Propulsion IPT (NPIPT).** NPIPT provides in-service support relating to reactor plant readiness for operation. The NPIPT leader is a formal DNSR authorisee for operation of the (NRP) at sea and at Z berths. NPIPT provides a focus for development within the Naval Nuclear Propulsion programme (NNPP) and controls associated work undertaken by the NRP Design Authority, Rolls Royce Naval Marine. It also manages the MoD's due process for sentencing relevant nuclear safety documentation and development of standards for the whole life of the NRP within its authorisee domain.

6 **Nuclear weapons IPT (NWIPT).** The NWIPT's responsibilities relate to delivery of the nuclear warhead programme, its lifetime availability and capability, operation of AWE, and management of MoD liabilities on BNFL and UKAEA sites.

## **Defence Support**

7 The defence support function is responsible for providing and directing logistics support to the UK armed forces. It consists of approximately 20000 staff world-wide and until recently was an autonomous organisation known as the Defence Logistics Organisation (DLO). It has now joined the DPA to form the DES. Its responsibilities include provision and maintenance of suitable support facilities at licensed (ONR) and authorised (DNSR) naval sites. The Naval Base Commanders (NBCs) at Clyde and Devonport, who all have nuclear safety responsibilities, are part of the support function and are formally authorised by DNSR in respect of naval base nuclear submarine operations.

8 **Submarine Support IPT (Sub IPT).** The SubIPT is responsible for in-service support to operational nuclear submarines. This includes planning and management of maintenance and refit activity (other than NRP and S&T class major upgrade work, which are managed by NPIPT and ASM IPT respectively).

## **Defence Nuclear Safety Regulator (DNSR)**

9 DNSR is responsible for setting regulatory policy for the defence nuclear programme and for providing assurance to the Secretary of State for Defence that the MoD executive organizations described above are achieving the necessary levels of compliance and performance. In practice DNSR accounts for this responsibility to the Chairman of the Defence Nuclear and Environmental Safety Board (DNESB) and thence to the MoD 2nd PUS. DNSR consists of the Nuclear Propulsion Regulator (NPR) and the Nuclear Weapon Regulator (NWR). Assessment and technical support work is carried out under contract by the Regulatory Support Department of Serco Assurance (nuclear safety) and the Defence Science and Technology Laboratory, DSTL (radiological safety). DNSR does provide advice and guidance to IPT's, Naval Bases and defence contractors, but cannot be formally tasked to do so. It is accountable to the DNESB Chairman. DNSR consists of approximately 20 staff, in addition to the assessment and technical support resource provided by Serco and DSTL. Regulatory authority is derived from MoD safety policy. This authority is applied either on a civil law contractual basis or via MoD policy and procedures, depending on the circumstances, unlike the ONR which operates on a statutory criminal law basis.

10 The way in which DNSR and the ONR work together is set out in [Annex E](#).

## **Naval Base Commanders (NBCs)**

11 NBCs are responsible, within DES, for nuclear safety within the Naval Bases at Clyde and Devonport. These bases have a Base Nuclear Safety Organisation (BNSO) that acts as an assurance department for the Authorisee (the NBC). At the licensed nuclear MoD sites, responsibility for nuclear safety is vested in the relevant licensee organisation. At naval bases, nuclear safety for operational submarines is justified by the Site (Facility) Safety Cases. Justification for operating in degraded states (ie maintenance and repair) is required to be justified by the Site Authorisees within their Safety Cases. Local management arrangements for control of nuclear work are centered around Procedure Authorization Groups (PAGs). These groups consist of representatives from the submarine, repair/maintenance organisation, design authority and host squadron. Management arrangements are set down in BR3018, 'Technical Organization and Administration for Nuclear submarines'. NBCs also have responsibilities for nuclear accident response at designated Z berths.

12 The licensed dockyard sites operate a similar system of PAGs, and Test Groups, as mandated by the MoD nuclear safety organisation. However, because these sites fall under ONR regulation, the PAG and Test Group management arrangements are regarded by the ONR as part of the licensee's management of safety framework, although they derive from the MoD nuclear safety framework.

## **Design Authorities**

13 For current class operational submarines, the design authority for the NRP is Rolls Royce Naval Marine (SubIPT has responsibilities for non-NRP elements, for example propulsion and electrical generation systems). For new build submarines, BAE Systems are the overall design authority, contracting to RRNM as the delegated design authority for the NRP. For nuclear weapons, the design authority resides within the AWE licensee organisation (Mr Ingram, Hansard, 10 May 2004).

14 **Enforcement of design-related activity.** Under the terms of the MoD/HSE Agreement and the AWE Act, the ONR will not seek or cannot seek to influence the design of the NRP or weapon. In general terms design, manufacture and supply do otherwise fall within the regulatory vires of HSE/ ONR under s6 of HASAWA and certain aspects of the standard licence. ONR will therefore, when appropriate, carry out enforcement activity in relation to procurement and supply processes, although clearly will not seek to influence design in so doing. This will be in conjunction with DNSR, see Annex E. A typical example would be if issues arose at site that related to the quality of supplied components.

15 **NRP Safety Cases.** The justification and demonstration of safety for the NRP differs from that for a civil installation. It derives from the Reactor Plant Safety Justification maintained by the design authority. At present this does not cover safety associated with the non-intact shut down state as regulated by the ONR on licensed sites. Licensees have developed such safety cases based on information developed for the operational state. This has led to what are thought to be gross pessimisms being used for the shut down state.

16 **Safety case for weapons.** The safety justification for weapons in the assembly life-cycle phase splits up into a number of safety cases. The actual device has a Nuclear Explosives Safety Case (NESC) that addresses the lifecycle of the device from receipt and handling of the sub-components through assembly, the tooling and equipment involved in handling and operations, testing and despatch. The converse operations for disassembly are also addressed. The facilities involved in the various stages of manufacture and support for the sub-assembly programme have individual facility safety cases. The two nuclear licensed sites also have site safety cases that address the combined facility safety cases for the site and the infrastructure to support the sites' operation.

17 Where safety cases, or elements, are associated with the deployed nuclear device, in particular its reliability and potential for spurious operation, then these are considered to be associated with the design of the device. Under the AWE Act 1991 Amendment Order 1997 these are not subject to scrutiny under the nuclear licence conditions. Equally, aspects of weapon component make-up, stockpile logistics and programme constraints are not directly considered by the ONR. In these cases, if appropriate, the ONR would seek assurance from DNSR that materials, numbers and programmes are justified.

18 Safety cases demonstrating the safety of facilities, processes and handling within and between facilities on licensed sites fall within the scope of regulation under the NIA in that these operations contribute to the risk to public and workers on site.

## **DG Nuclear**

19 Director Submarines (DSM) exercises a co-ordinating, oversight and controlling role over the whole of defence nuclear programmes, including nuclear safety.

## **Chief Scientific Adviser**

20 Amongst many other duties, the MoD Chief Scientific Adviser (CSA) chairs the Investment Appraisal Board (IAB) and is the internal MoD 'customer' for the UK strategic deterrent capability. The IAB considers all major MoD capital expenditure proposals. For those that relate to nuclear safety, the initial consideration is usually likely to be well before the true safety benefit has been identified. Formulation of safety proposals are therefore likely to rely on a considerable degree of engineering and safety judgement. The ONR is likely to need to be ready to be involved in this. Within CSA's organisation, Director Strategic Technologies (D Strat Tech) has 'customer' responsibility for nuclear weapon technical capability.

## **Strategic Systems Executive (SSE)**

21 **CSSE**. Historically the MoD has always retained a 'Chief Strategic Systems Executive' post, initially at two star level, now one star. SSE is responsible for managing the overall delivery of the Trident programme and risks to it, to ensure that continuous at-sea deterrence is maintained for the life of the programme. SSE is also responsible for meeting UK obligations under the Polaris Sales Agreement (as amended for Trident). In these roles SSE has primacy over platform (eg Submarine Support) and equipment (eg Nuclear Weapons) IPTs. SSE is accountable to the First Sea Lord (professional head of the Royal Navy) for this work.

22 **Strategic Systems IPT**. SSE is currently now 'dual-hatted' as head of the Strategic Systems IPT, which has responsibility for ensuring specific levels of strategic weapons systems capability and availability through life (compared with the Nuclear Weapons IPT, which deals with the weapon itself).

## **Annex B**

### **Constraints Imposed by Legal Requirements**

1 Overall it is the policy of the Secretary of State for Defence that, 'unless granted specific exemptions, disapplications or derogations, the MoD will comply with all legislation which applies to its activities regarding safety and environmental protection.' Where such exceptions are introduced it is a requirement placed on MoD to introduce arrangements that will be, as far as is reasonably practicable, at least as good as those required by the legislation. Under these circumstances, DNSR has the duty to regulate nuclear safety in the same manner, and to no less stringent standards, than the ONR regulation of the UK civil nuclear industry. Where the law does apply, the civil regulator will have legal authority, and DNSR then acts as a MoD internal regulator. The way the legal framework is applied to submarines is set out in para 2 - 11 in relation to the chronology of a submarine's life. Nuclear weapons are covered briefly in para 15.

**2 Core Construction.** Core construction takes place at Rolls Royce Derby. This is a licensed nuclear site, regulated by ONR. It is not an authorised site and DNSR does not exercise any regulatory duties there. The HASAWA and related regulations (e.g. IRR, MHSWR and REPPiR) apply as for any other licensed nuclear site.

**3 Core and plant testing.** This are carried out at the Vulcan Naval Reactor Test Establishment, Dounreay and at the Neptune reactor at Derby. Vulcan is adjacent to the licensed site at UKAEA Dounreay but is not itself licensed. It is an authorised site and regulated as such by DNSR. ONR regulatory activity is implemented through HASAWA, MHSWR, IRRs and REPPiR (plus other relevant regulations). The Neptune test reactor is on the RRM licensed site.

**4 Submarine construction.** This takes place at Barrow. The nuclear submarine construction site and adjacent 'wet berth' lie within the licensed site boundary, as does the new core store. Barrow is also an authorised site, with the two site boundaries coinciding. Regulatory activities are broadly divided into the plant (regulated by DNSR) and facilities (regulated by ONR) although in practice there is a great deal of joint regulation and co-ordinated activity. When the NRP is under construction it is not covered by a safety case for commissioning or operation and is not, therefore, a 'reactor comprised in a means of transport'. The relevant part of the nuclear site licence is for 'installations for the purpose of installing new unirradiated reactor cores into submarines', ie the facilities used to build the reactor rather than the plant itself. The way in which licence conditions apply to the plant is described in para 13.

**5 Commissioning.** Commissioning of a new NRP or core can take place at Vulcan, Barrow and Devonport. Amongst many checks and tests the core is run at full power (Power Range Testing - PRT) although since the fission product inventory is small the potential for a significant off-site release is reduced. Checks and trials are also carried out after maintenance and repair work on non-licensed sites. This maintenance and repair work can include intrusive work on primary systems, for example main coolant pump changes, but not on the core itself. These checks and trials include full power calorimetric trials of operational plant, carried out at Vulcan and at the naval bases at Clyde (Faslane and Coulport) and Devonport. These can be carried out with a used core and the potential for significant off-site release is higher, although still less than that associated with a civil generating plant. PRTs at Vulcan and Devonport do not take place on the licensed site and are regulated by DNSR. DNSR take the lead in the regulation of PRTs at Barrow, However, this still needs to be permissioned by ONR. Full power trials at Clyde and Devonport naval bases are regulated primarily under authorised arrangements by DNSR. The HSE/ ONR has regulatory duties there under HASAWA, MHSWR, IRRs and REPPiR.

**6 Naval Bases.** HSE has regulatory vires in connection with UK naval bases and Barrow up to the baseline of UK territorial waters. Thus, if a nuclear submarine runs aground within this limit it is subject to the requirements of the HASAWA (but not licence conditions). ONR regulatory attention at the Naval Bases is primarily on the HASAWA, IRRs, MHSWR and REPPiR. DNSR take the regulatory lead under authorisation arrangements.

**7 Rosyth.** Rosyth is a former naval base and dockyard, part of which is now a licensed nuclear dockyard regulated by ONR. Although still a licensed site, it is effectively de-commissioning. Activities are limited to de-commissioning and waste management. It is also home to a number of end-of-life nuclear submarines, although these are not on the licensed site. It is also an authorised site.

**8 Move into LOP(R).** A LOP(R) is a nuclear submarine long overhaul period (re-fuel) and involves the move of a nuclear submarine from a naval base outside the licensed site boundary to a refuelling dock within the licensed nuclear site. Licence conditions apply to every activity carried out on a licensed site. Thus, as soon as the submarine enters the dock on the licensed site it is subject to the requirements of licence conditions. A safety case is required to cover all activity from the moment the submarine enters the dock until it leaves it. Clearly, the safety case may be different for different stages of the LOP(R). Before and after the stay in the LOP(R) dock, and once off the licensed site, the submarine is subject to ONR regulation only under HASAW, MHSWR, IRRs and REPPIR. DNSR regulates these phases under authorisation conditions. LOP(R)s take place at 9 dock and 14 dock at Devonport.

**9 Other dockings.** Nuclear submarines may be docked for work other than LOP(R) work on licensed sites at Devonport, Rosyth and Barrow. In practice only Devonport is used (currently 9 dock, 4 dock and 15 dock in future). The shiplift at Faslane can also be used for dockings but this is regulated under authorisation conditions by DNSR. When nuclear submarines use 9 dock, 14 dock or 15 dock for non-LOP(R) dockings they are subject to licence conditions requirements.

**10 Z berths.** Z berths are used for operational and recreational purposes. In the UK they are located in Scotland (Loch Goil, Rothesay, Loch Ewe and Skye), Southampton, Liverpool, Portsmouth and Portland, as well as at the Naval Bases at Devonport and Clyde. Overseas Z berths at Gibraltar, Diego Garcia, the Falklands and Bermuda are outside ONR jurisdiction. The ONR regulates the UK Z berths under HASAWA, MHSWR, IRRs and REPPIR.

**11 DDLP submarines.** When nuclear submarines are taken out of service they enter DDLP (De-fuel, De-equip and Lay-up Preparation). In this state the nuclear reactors are permanently shut down and held down and the submarines enter a period of care and maintenance pending final de-fuel and, ultimately, disposal. Submarines in this state are stored at Devonport and Rosyth. Since they are not on licensed sites and remain within MOD control they are subject to regulation by DNSR.

**12 Design and procurement in the NNPP.** Rolls Royce Naval Marine are the design authority for the NRP, except for Astute where this role is exercised by BAE Systems, sub-contracted to RRNM. RRNM perform the DA function (other than for BAES) under contract to NPIPT. The NPIPT leader is subject to formal authorization by DNSR for NRP support and management matters. The ONR does not exercise any regulatory control over NPIPT. However, the ONR does have regulatory vires over design and supply under s6 of the HASAWA and indirectly through LC17. The extent of this is modified by the agreement under the MoD/HSE Agreement that the HSE/ONR will not seek to influence the design of the NRP. In practice any ONR regulatory concerns relating to the Design Authority or procurement would be pursued through DNSR.

**13 Application of Licence Conditions to the NRP.** The licensing requirements of the Nuclear Installations Act do not apply to a reactor 'comprised in a means of transport'. This is taken, by agreement, to mean a reactor that has been completed and is in accordance with its commissioning or operational safety case. The 'operational safety case' is taken to include the period of a LOP(R) or other shut-down operations, even though the reactor may be incomplete or inoperable or otherwise non-intact (custom and practice in some parts of the naval programme has been for safety cases for this condition to be derived from the NRP Authorisee's safety case for the NRP in an essentially complete state). Regardless of the disapplication of licensing requirements, the

requirements of licence conditions do apply to all activities carried out on the licensed site, including reactor repair, maintenance and modification activity such as that occurring during a LOP(R). Thus, for example, LC14 and LC23 apply. Both these are concerned with the safety case that is bound to cover aspects of reactor design, as are other LCs. However, under the MOD/HSE Agreement, ONR will not seek to influence the design. If inspection activity reveals ONR reservations over aspects of the design, these will be put to DNSR who will take whatever action it considers appropriate in accordance with its regulatory strategy. There is one exception to this. When work on a licensed site is under the direct control of MoD (i.e. a Crown body) this is not subject to regulation by the ONR under licence condition requirements. This will rarely apply on licensed sites. NB: activities that take place on a licensed site but involve operation of plant by ship staff (ie Crown employees) are still subject to licence condition requirements when these activities are under the control of the licensee.

**14 Crown censures and notices.** There is no Crown exemption from the HASAWA. However, the Crown cannot be prosecuted for breaches of the law, including failure to comply with improvement or prohibition notices. In lieu, HSE has made arrangements for the raising of Crown Censures in respect of occurrences where it is HSE's opinion that, but for Crown immunity, there would have been sufficient evidence to provide a realistic prospect of conviction in the courts. Crown Notices are also used in lieu of Prohibition Notices and Improvement Notices. Further detail is provided in SIM07/2001/46 and the Enforcement Guide (England and Wales) on the intranet, or from HSE's Defence, Fire and Policy Unit.

**15 Nuclear Weapons.** The Atomic Weapons Establishment Act 1991 (Amendment Order 1997) precludes the application of licence conditions to the extent that such conditions may affect the design of nuclear devices or devices intended to simulate the properties of a nuclear device. 'Device' is taken to mean all those devices whose design intent is to be able to produce an uncontrolled nuclear reaction. Such devices are also exempt from licensing requirements when they are at other sites. HASAWA, MHSWR, IRRs and REPIR do apply. Other activities associated with nuclear devices on licensed sites are subject to licensing requirements. Regulation of the safety of nuclear devices is the responsibility of the Head of Nuclear Weapon Regulation within DNSR. Otherwise, regulation of all aspects of nuclear activity at these sites falls to the ONR under respective nuclear site licences.

## **Annex C**

### **Constraints Imposed by the MOD/HSE Agreement**

1 When the HSW Act came into force there was a general perception within MoD that health and safety regulation was incompatible with some of their activities. They were concerned that HSE actions might affect operational capability. Against this background HSE and MoD negotiated an administrative agreement, known as the General Agreement. The Agreement was signed in 1981 by the Director General of HSE and MoD's second Permanent Under Secretary. Under the 1981 Agreement MoD recognised the need to observe the HSW Act. HSE agreed to take defence imperatives into account in considering the reasonable practicability of precautions relating to MoD activity, to observe security requirements, and undertook not to seek to monitor observance of health and safety legislation in defence operations and military training.

2 In 1994 HSE put forward a case for reviewing the General Agreement. It was argued that the existing agreement left considerable scope for interpretation, particularly as to

what constituted "defence operations" and "military training activities". It meant that a range of work inspected by HSE elsewhere was not inspected when carried out by MoD. This created inconsistencies where contractors working in operational units were subject to inspection but MoD personnel were not. It also did not reflect the fact that the HSW Act applies to all MoD's activities or take account of changes in the climate of opinion about the accountability of public bodies and open government. Furthermore, MoD had been reluctant to share classified information concerning the hazards associated with the submarine reactor.

3 A new General Agreement was signed in May 1996. It consists of the Agreement itself and four annexes:

- i) Annex A sets out the arrangements for inspection of MoD establishments by HSE;
- ii) Annex B is of most relevance to ONR Inspectors. It deals with arrangements for specified MoD and MoD related nuclear sites;
- iii) Annex C deals with arrangements for inspection of HM Ships and Submarines; and
- iv) Annex D deals with special arrangements for particularly sensitive activities.

4 Reviews of this agreement were carried out in 1998 and 2000, with the outcome of the latest review set out in SIM/07/2001/46, available on the Intranet.

5 The practical implications for ONR regulation are that:

- HSE will take account of the Code of Practice on Open Government and MoD security regulations when disclosing information; classified information will not be disclosed except with prior discussion and agreement with MoD;
- HSE inspectors who propose to invoke the administrative procedures for the formal censure of government departments in relation to MoD will consult HSE's Defence, Fire and Policy Unit, who will advise the MoD Directorate of Defence Health & Safety if such action is to be taken. For NSD this liaison will be through the Head of the Defence Facilities Division;
- disagreements between MoD and HSE about the application of the General Agreement which cannot be resolved locally will be put to the MoD/HSE Joint Liaison Committee (JLC) if necessary;
- installations that are licensed on MoD sites never include the NRP, rather licences are granted in respect of installations that are used to build and refuel nuclear submarines.
- where MoD has arranged for adequate emergency plans to be in place that cover the off-site consequences of incidents on a nuclear licensed MoD-related site, and have suitable agreements with the licensee, NSD may accept these as the licensee's arrangements;
- if the appropriate part of MoD notifies NSD that it has safety concerns about a proposed regulatory activity, NSD undertakes to inform DNSR before granting a licence or issuing a licence instrument in adequate time to allow a response, unless a delay would be detrimental to the regulatory process;

- MoD will facilitate NSD forming an opinion on the area within which members of the public need to be supplied with information on radiation emergencies under REPPiR;
- MoD agree to assist licensees and other employers to meet their duties to provide information, in particular by providing sufficient technical and other safety related information to the licensee; NSD will ensure appropriate arrangements for the handling of classified information;
- liaison arrangements for the resolution of issues are set out; these feed into the MoD/HSE Joint Liaison Committee arrangements under the General Agreement; if access is required to a submarine, the Head of Establishment shall arrange any necessary agreement from the Commanding Officer of the submarine, if applicable;
- ONR shall be informed of safety related incidents that occur on the sites in accordance with the requirements of the appropriate legislation. ONR shall consult with MoD before passing any information concerning such an incident outside of ONR and only provide detailed information on the circumstances surrounding the incident with MoD's agreement. MoD Ministers shall discharge their responsibilities by reporting to Parliament incidents affecting the Sites (NB this will place restrictions on the normal FAST 1 process);
- particular arrangements apply to nuclear accident response in that:
  - MoD provides the overall co-ordinating function, and a GTA is not appointed
  - ONR and MoD share information about any incident with a view to keeping interested parties correctly informed
  - ONR is invited to participate in MoD's central government response, co-ordinated through the Nuclear Accident Information and Advisory Group (NAIAG)
  - ONR will participate in and provide independent advice to any Strategic Co-ordinating Group set up in response to an incident (MoD's response will be led by the Military Co-ordinating Authority - MCA)
- The ONR may seek clarification on information provided on the NRP or nuclear devices, facilitated where necessary by DNSR, but will not seek to influence their design;

6 In every day regulatory terms this means that additional factors may need to be taken into account in:

- Making ALARP judgements
- Influence over NRP/weapons design.
- Issue of Licence Instruments where MoD raises concerns.
- Access to submarines (principally operational ones).

## **Annex D**

### **ALARP Factors**

1 The MoD is committed to the application of civil nuclear safety standards with regard to activity on nuclear licensed sites, and to the same standards so far as is reasonably practicable for other sites where nuclear-related activity takes place. In both cases, the ALARP principle applies. However, what is acceptable in ALARP terms for civil practice may not be achievable for some MoD activities. This is because of the particular constraints imposed on the design of the hazard that arises from its incorporation into weapons of war and the fact that the ONR is precluded from seeking to influence this design. In some cases, military requirements prevent the levels of designed safety that would be expected in a civil design, and the overall level of risk that might be accepted at the ALARP point is higher than that for civil practice (lower levels may also be achievable). That is not to say that the relevant standards are different, just that constraints on the design may lead to an ALARP end point that is different from ONR expectations based on its experience of civil different practice.

2 There are a number of aspects of ONR regulation and ALARP judgement that are peculiar to the MoD domain:

- The body of ONR experience or understanding of 'relevant good practice' in MoD activity may be not as extensive as that applicable to the civil domain.
- ONR is precluded from influencing NRP and weapons design, and in some instances may not have access to relevant information.
- Application of design base accident SAPs would inevitably lead to queries and challenges relating to design, which would be contrary to the HSE/MoD Agreement.
- Particular defence needs may have to be taken into account.

3 [Table 1](#) highlights a number of areas in the NRP where military requirements preclude the levels of engineered and operational safety that would be expected in a civil plant (it is not appropriate to do this for nuclear weapons). It is intended to be an aid to reaching proportionate judgements. These areas may be such as to indicate a slightly lesser level of achieved safety than for a civil plant and therefore lead to attempts to seek compensatory increases in the levels of safety provided by support facilities, thereby leading to civil standards of overall achieved safety. Features of the submarine may also lead to constraints on shore facilities, for example the space available in supporting infrastructure such as the Reactor Access House. However, as noted in para 2.3 of the main text, this is contrary to ONR policy for MoD regulation. The reason for adopting this policy is to avoid expenditure on support facilities that could be better spent on reducing hazards at source, ie weapon/NRP design, if MoD was persuaded that this was justified (by DNSR - ONR is precluded from seeking to do this).

4 The overall approach to be adopted will therefore be to seek formal assurance from DNSR that safety of NRP/weapon as designed is ALARP against the threats to safety arising from activities carried out on the licensed site. It is entirely right that this will be a robust process and ONR will not simply accept these assurances without a degree of challenge. Support and associated facilities will be regulated by the ONR as for any other civil nuclear activity. In seeking this confirmation, the ONR will also seek confirmation that risks arising from the NRP/weapons are tolerable against HSE's tolerability of risk framework, and that responsible design authorities have processes for establishing levels of risk arising from their design that meet the internal authorisation requirements relating to safety cases.

5 A number of matters are de facto Government policy and as such are excluded from ALARP considerations:

- Present siting of MoD licensed sites
- The need to sustain a nuclear weapons capability
- The use of nuclear plant to power submarines
- Proximity of explosives to some nuclear activities

6 **Reaching ALARP judgements.** ALARP judgements on activities that are subject to direct ONR regulation cannot be made without taking into account hazards associated with those activities that are outside the scope of ONR regulation. As an example of this, slightly unrealistic but to make a point, insistence by ONR that a submarine needed additional independent cooling systems with associated hull penetrations may increase safety in a LOP(R) but could reduce the safety of the ship's company in war-fighting situations where hull penetrations are a source of potentially life-threatening battle-damage.

7 It follows that ALARP judgments are only likely to be properly reached in full dialogue with DNSR, who regulate those hazards inaccessible to ONR regulation. Expectations for the conduct of this dialogue are covered by the DNSR/ONR Letter of Understanding.

8 **Particular defence needs.** There has been considerable ONR uncertainty over the past few years over the way in which due account should be taken of the particular needs of defence in relation to ONR regulation of licensed nuclear sites. This is presently under review but some broad principles are set down here:

- The MoD/HSE Agreement was established as a basis for the way in which HSE monitored MoD's 'observance of health and safety legislation in respect of members of the military, naval and airforces of the Crown, MoD civilian employees, and others affected by MoD activities...'
- The Agreement commits HSE to ensuring, in judging the adequacy of MoD's performance, that **'the requirements of defence** as well as cost must be considered' and that HSE monitors MoD's observance 'having due regard to **defence imperatives**' (this is the exact wording in the Agreement).
- The whole focus of this Agreement is on MoD's health and safety duties as an employer and creator of risk, and the need for HSE to take account of the peculiarly different circumstances surrounding some of the activities of an employer whose daily business can involve danger (live firing exercises, bomb disposal, simulated air combat etc)
- Advice from the HSE Defence, Fire and Police Unit (telecon Britten/McDowell 15 June 2006) is that no particular meaning is attached to the word 'defence imperative', ie it is no different in principle from other imperatives such as Fire Service imperatives (where higher levels of risk to fire-fighters are accepted in the dose levels permitted for fighting fires in nuclear facilities when they carry out their statutory duty to fire-fight). The wording was not particularly intended to apply to situations such as the contract refueling of submarines in licensed nuclear facilities. The subject does not feature at all in the nuclear annex to the General Agreement.

- In overall terms, the advice was that defence needs should be taken into account as would be the case with the more strategic needs of any other stakeholder (for example in electricity supply, or vaccine for a potential flu pandemic), but that resolution of conflicts between ONR expectations for safety and MoD interests should be part of the normal ALARP process.

**9 ALARP in the defence context.** The ONR/DNSR workshop of 7/8 June 2006 addressed this issue and identified some common points that can be used to guide thinking in this area:

- consideration of defence needs is part of the normal ALARP process and it is not appropriate to identify as a separate matter a 'defence imperative' process.
- the usual regulator/duty-holder processes should be followed, with emphasis on effective dialogue to identify any potential problems early.
- the duty-holder has to be involved.
- ONR's role is solely to identify and represent the nature and significance of any unacceptably heightened risk that may accrue if the MoD insists on a particular course of action.
- in extremis, ONR may withhold a permission if it believes these risks are intolerable and ALARP is grossly unbalanced.
- if the MoD continues with the proposed action, they will effectively have taken responsibility for safety, a decision that would be expected to be taken only at the highest level in connection with real defence-of-the-realm considerations (although the decision-making process is a matter for MoD and not ONR).
- since the ONR is not competent to judge the significance of defence interests, DNSR's assistance will be essential to the ALARP discussion.
- In general it is preferable for the MoD to represent its concern over defence needs during ALARP/permissioning considerations, rather than for NR to try to anticipate the possibility that it may arise and condition its thinking accordingly. Such concerns would be expected to be set down formally in writing.

**Table 1**

**NRP ALARP Constraints**

<b>Military requirement</b>	<b>Design constraints</b>	<b>Implications</b>
1 Capability to operate at significant under water depth and retain hull integrity against challenges (eg depth excursions, shock, collision).	Space limitations arising from small diameter of pressure hull. Limitations in number of pressure hull penetrations.	1.1 Limited redundancy, diversity and segregation of safety systems. EDR.2. 1.2 Compact reactor plant layout with limited opportunity for significant in-service maintenance and inspection. EMT.6. 1.3 Limited space for passive (and active) engineered safeguards. EKP.3, EDR.2. 1.4 Limited scope for minimising potential

		for interactions between safety-related plant and systems and failed structures against internal and external hazards. ELO.4.
2 Submarine to be capable of high speed and manoeuvrability.	Highly reactive core, small reactors.	2.1 Limited ability to monitor core conditions during operation. ERC.4.
3 Submarine should be capable of continuing to operate as far as is practicable when threatened or damaged.	High reliance on operator intervention. High degree of cross-connection of systems. Need to be able to operate in abnormal and degraded plant conditions.	3.1 30 minute risk may not be applicable para 344. 3.2 Limitations on diversity, redundancy and segregation. EDR.2. 3.3 Fault analysis will need to cover other than 'planned' operating modes para 504.
4 The need for self-sufficiency and high underwater endurance.	High inventory of fissile material, low shut-down margin.	
5 Handling of munitions.	Proximity of explosives and other high-hazard materials	5.1 Limited ability to provide protection against fire and explosion hazards. EMA 13-17.
6 Minimum numbers of personnel.	Limited space for crew numbers. Extensive remotely operated systems.	6.1 High 'shift' workload. EHF.5. 6.2 Limited space for optimising man-machine interfaces. EHF 6 and 7. 6.3 High training demands on qualified staff EHF.8.
7 Operating systems (planes, rudder, masts etc).	Extensive use of high pressure air and hydraulic systems (fire hazards).	7.1 As for 5.1.
8 Domestic and life support systems.	Extensive space requirements. High fire hazard compartment.	8.1 As for 1.3. 8.2 As for 5.1.


## Annex E

### Joint ONR/DNSR Working

1 The ONR is fully committed to working with DNSR to achieve regulation of nuclear safety across the NNPP and weapons domains in such a way that it achieves proportionate and consistent regulation across all risks without any gaps or duplication in scrutiny. There are a number of reasons for doing this:

- To minimise the possibility that some activities may escape regulation completely, in fields where interactions and spheres of responsibilities are complex.
- To avoid duplication of the regulatory burden upon duty-holders.
- To make the most of the expertise and capability, sometimes different, available separately to each regulator.
- For the ONR and DNSR to make the most of the regulatory 'gearing' and leverage that is achievable through more effective stakeholder interaction.

2 As noted at para 5.7, it is intended to achieve this through a combination of shared information, co-ordination of regulatory strategies, joint determination of reactive action, and mutual recognition of roles and responsibilities.

3 Principles. The practical arrangements for making the most of ONR and DNSR activities are set out below and are intended to advance the principles set out in the [Letter of Understanding](#) 

4 Practical arrangements. In practice, the management arrangements also set out in the Letter of Understanding mean that Unit Heads will have to ensure that:

- Strategies and plans are developed, delivered and reviewed on a joint basis as far as possible, with hold point control documents<sup>1</sup> and regulatory leads agreed jointly.
- Effective communication arrangements are in place between regulators and also between regulators (jointly) and duty holders, including communication of plans to duty holders and regular exchange meetings between regulators.
- Abnormal occurrence and FOI request responses are jointly formulated (including formal enforcement proposals).
- Emergency exercises are planned and evaluated together.
- Outcomes of assessments are shared.
- LLC report drafts are exchanged before LLC meetings.
- Seek, wherever possible, to achieve coverage of safety submissions such that any one discipline is covered by only one regulatory authority.
- Arrange periodic meetings between ONR and DNSR assessors on projects of mutual interest.
- Arrange 'letters of comfort from DNSR' when the ONR needs regulatory assurance in respect of NRP/weapon design or programmes, recognising DNSR as the competent authority in the area of interest.

1 Hold point control documents define a hold point/control logic that presents the sequence of all hold points whether imposed internally as part of the Dutyholders' managerial arrangements, or externally as part of the permissioning regime. They

describe the nuclear safety implicated activity associated with each hold point, the criteria and deliverables for release, and the regulatory authority due to authorise release (ONR or DNSR or both).