



ONR GUIDE			
<b>Regulation of GB's Defence Nuclear Programme</b>			
<b>Document Type:</b>	Nuclear Safety Inspection Guide		
<b>Unique Document ID and Revision No:</b>	NS-INSP-GD-056 Revision 3		
<b>Date Issued:</b>	21 January 2016	<b>Review Date:</b>	January 2019
<b>Approved by:</b>	A Lindley	Head of Operational Inspection	
<b>Record Reference:</b>	TRIM Folder 1.1.3.775. (2016/34134)		
<b>Revision commentary:</b>	Revised to align with the Energy Act 2013, and the first MOD-ONR General Agreement, together with the updated Letter of Understanding with DNSR. It also includes information on strategic and other factors to consider in making regulatory decisions. It incorporates aspects of regulating non-licensed Naval sites, previously contained in GD-057, which has now been withdrawn.		

### TABLE OF CONTENTS

1. INTRODUCTION .....	2
2. PURPOSE AND SCOPE .....	2
3. GUIDANCE TO INSPECTORS .....	3
4. REFERENCES .....	8
5. GLOSSARY .....	9
APPENDIX 1 – LEGAL CONSTRAINTS AND OTHER RELEVANT CONSIDERATIONS.....	10
APPENDIX 2 – CONSIDERATION OF STRATEGIC FACTORS.....	14
APPENDIX 3 – ORGANISATIONAL ASPECTS OF MOD'S DEFENCE NUCLEAR PROGRAMME .....	17
TABLE 1 - SCOPE OF REGULATION IN THE DNP BY ONR AND DNSR.....	19
TABLE 2- NUCLEAR HAZARDS ON NON-LICENSED NAVAL SITES.....	20

## 1. INTRODUCTION

- 1.1. The ONR Defence Programme regulates nuclear and conventional safety across a number of licensed and non-licensed nuclear sites, which are operated in pursuit of maintaining the UK's nuclear defence capability, under the auspices of the Ministry of Defence (MOD). There are aspects of regulating these sites that are not straightforward because of legal and other constraints that apply, brought about in-part by the UK Government's priority to maintain continuous at-sea deterrence (CASD).
- 1.2. The unique aspects of regulating the MOD's defence nuclear programme (DNP) are captured in the formal MOD-ONR General Agreement (GA) [Ref: 1]. The GA outlines the legal situation and the relationship between the two organisations in discharging their respective roles and responsibilities for regulation of the DNP. In addition, as allowed for in the GA, ONR has concluded a Letter of Understanding (LoU) [Ref: 2] with the MOD's Defence Nuclear Safety Regulator (DNSR), which provides a framework for complete, effective and coordinated regulation of licensed and non-licensed defence-related nuclear sites. This guidance has been updated to reflect changes since the creation of ONR as a separate statutory body in April 2014 and the abovementioned agreements which were concluded in 2015.
- 1.3. Several of the MOD's Defence Nuclear Programme (DNP) licensed sites are not owned by the MOD, they are nevertheless undertaking activities exclusively in pursuit of the MOD's mission, and are thus largely reliant on MOD funding. Some of the DNP sites are not licensed, however some, or parts of these sites, are "Authorised" on behalf of the Secretary of State (SoS) for Defence, by DNSR. The naval reactor plant (NRP) itself is also "Authorised", as are some parts of the DNP licensed sites. The Authorised sites are subject to Authorisation Conditions, which are very similar to those attached by ONR to site licences and are subject to regulation by DNSR.
- 1.4. It is the policy of the SoS for Defence to comply with all relevant safety and environmental legislation unless specific exemptions 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.

## 2. PURPOSE AND SCOPE

- 2.1 The purpose of this document is to provide guidance for inspectors directly involved in the regulation of nuclear, radiological and conventional safety on the MoD defence-related nuclear sites. It applies to both Weapons and Propulsion sub-programmes and to all ONR Inspectors who have duties related to these sub-programmes. The sites in question are the 7 licensed nuclear sites at :-

- |  |                            |
|--|----------------------------|
| • Aldermaston Weapons Manufacturing Site       | Licensed to AWE plc;       |
| • Burghfield Weapons Assembly Site             | Licensed to AWE plc;       |
| • Devonport Royal Dockyard at Plymouth         | Licensed to DRD Ltd;       |
| • Barrow Dock Hall - Submarine Construction    | Licensed to BAESM Ltd;     |
| • Rolls Royce Nuclear Fuel Production at Derby | Licensed to RRMPO Ltd;     |
| • Rolls Royce Neptune Test Reactor at Derby    | Licensed to RRMPO Ltd; and |
| • Rosyth Dockyard; submarine dismantling       | Licensed to RRD Ltd.       |

And the non-licensed sites owned and operated by MOD, situated at:-

- HM Naval Base Devonport
- DRDL Devonport site (5 Basin adjacent to the licensed site);
- HM Naval Base Clyde (comprising Coulpport & Faslane);
- Vulcan Naval Reactor Test Establishment near Dounreay (operated by MOD but owned by NDA); and

- Submarine Operational Berths at nine locations in England and Scotland.
- 2.2 The non-licensed sites are operated by MOD, a Crown body, and as such are not subject to the UK licensing regime. However, there is no Crown exemption from the general duties imposed by the Health & Safety at Work Act 1974 (HASWA) and by Regulations made under it, or other relevant health and safety regulations, except where specific exemptions have been applied by the SofS.
- 2.3 Under the terms of the MOD-ONR GA and the legal requirements of AWE Act 1991 Amendment Order 1997, ONR does not seek to influence the design of the submarine naval reactor plant (NRP) or the nuclear device. However, there may be circumstances when ONR needs to clarify design-related issues in making regulatory judgements and taking decisions. If any queries arise in reaching such decisions that appear to impinge on matters that may affect the weapon or NRP designs, they should be communicated to DNSR for advice and resolution. Furthermore, cooperation and information exchange with DNSR is necessary to provide ONR with confidence that MOD is maintaining adequate standards of safety on its non-licensed sites or where exemptions apply to facilities or activities on licensed sites.
- 2.4 The DNP comprises various types of organisation on the above sites, including those owned and operated by the Crown, owned by the Crown but operated by Contractors (GOCO) and contractor owned and operated. The relevant DNP sites and activities that are subject to regulation by ONR and DNSR are outlined in Table 1.
- 2.5 Legal exemptions mean that ONR does not regulate nuclear security or transport of radioactive materials related activities within the DNP.

### 3. GUIDANCE TO INSPECTORS

#### General

- 3.1 Inspectors should be aware of the following:-
- 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 is intended to simulate the properties of a nuclear device. ONR has agreed not to seek to modify the design of any nuclear device.
  - ONR has agreed not to seek to modify the design of the submarine NRP.
  - The MOD has its own internal independent regulatory framework under the auspices of its Defence Safety Authority (DSA). DNSR is part of the DSA and it leads on MOD's internal regulation of nuclear safety within the DNP. Coordination with DNSR is essential to ensure complete regulatory coverage, to help avoid regulatory duplication and for providing certain assurances to ONR that contribute to its regulatory judgement and to assist in issuing permissions for significant safety related activities.
  - The nature of the DNP facilities and activities that form the source of the principal radiological hazard may not always align with civil nuclear installations, and standards can differ. The first is a reactor which is comprised in a means of transport i.e. a submarine for most of its life, which may need to deploy at short-notice. The physical constraints and need to balance operational submarine safety demands with nuclear safety on the submarine may limit the extent of some safety features that may be indicated in the ONR SAPs e.g. redundancy and segregation of engineered safety systems. Secondly, nuclear devices bring together high explosives and fissile and other nuclear material, which would be prudent to keep apart in most situations.

ONR inspectors should recognise both the context of use and the agreements entered into with MOD, as well as the potential for MOD to seek further exemptions in the interests of national defence or security. Therefore ONR's views on, or judgements featuring ALARP considerations, should be derived carefully, and usually in conjunction with DNSR.

## Legal and Other Constraints

3.2 All ONR licensed nuclear sites come under the scope of the Energy Act 2013 and are thus subject to the standard licence conditions attached in Schedule 2 of the site licences. In addition, the licensed sites are subject to the HASWA, its relevant statutory provisions (RSP) and other relevant health and safety legislation. For nuclear related activities, as well as HASWA, the statutes of particular relevance for ONR regulation of the Defence sites are:-

- Ionising Radiation Regulations 1999 (IRR)
- Radiation Emergency Preparedness Public Information Reg's 2001 (REPPPIR)
- Management of Health & Safety at Work Regulations 1999 (MHSWR)
- Reform (Fire Safety) Order 2005 and the Fire Scotland Act (2005)
- Reactors (Env'l Impact Assess for Decommissioning) Reg's (EIADR) (1999)

ONR is the statutory enforcing authority for the above legislation on licensed sites. On the Authorised sites ONR enforces the above legislation but only where nuclear related activities are taking place that may be licensable under other circumstances. In relation to the Operational Berths (also termed Nuclear Warship Sites), ONR is the enforcing authority for the IRRs and REPPPIR regulations only. HSE retains responsibility and authority for those areas that ONR does not enforce eg non-Authorised parts of HM Naval Base Clyde and the Operational Berths.

3.3 There are two notable legal constraints on the licensed nuclear sites; these are as follows: -

- The AWE Act specifically excludes from licensing and imposing licence conditions on 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.
- Sect 1(1)(a) of the NIA Act excludes from licensing requirements 'a reactor comprised in a means of transport' (i.e. a submarine), which is interpreted in the MOD-ONR GA 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.

Further information and guidance in relation to the implications for ONR inspectors of these legal constraints and other relevant factors is provided in Appendix 1.

3.4 The above non-licensed sites (except Operational Berths) have the status conferred on them by the Secretary of State (SoS) for Defence as "Authorised" defence sites, and they are regulated by DNSR, which places Authorisation Conditions (AC) on the sites' operators, which are almost identical to licence conditions contained in Schedule 2 of the site licences granted by ONR.

3.5 The non-licensed sites operated by MOD remain subject to the requirements of the RSP of HASWA. It is worth noting that MOD may be granted specific exemptions from regulations by the SoS in the interests of national security (e.g. through Reg 40 of the IRRs and Reg 18 of REPPPIR). Furthermore, since MOD is a Crown body it cannot be

prosecuted for breaches of the law, nor can standard improvement or prohibition notices be issued by ONR. There are procedures in place [Ref: 3] to allow for MOD to be sanctioned by ONR through issuing a Crown censure or Crown Notice in response to circumstances where formal enforcement would otherwise be warranted. The further complication with aspects of enforcing conventional and radiological safety requirements on non-licensed sites mentioned above, has resulted in an ONR-HSE agreement being concluded [Ref: 4] to further clarify some of these responsibilities; in essence ONR enforces on areas on these sites that are Authorised by MOD.

3.6 Notwithstanding the constraints mentioned above in relation to the design of the NRP and the nuclear device, in general terms, design, supply and manufacture of items that may affect nuclear safety otherwise fall within the legitimate interest of ONR. The Energy Act part 3, s6 of HASWA and implied requirements within the standard licence conditions, notably LC17 Management Systems, permit ONR to carry out inspection and enforcement activity in relation to organisations that supply facilities or plant and equipment that may affect nuclear safety on a licensed site. Normally any inspection or enforcement should be done in conjunction with DNSR, who has the primary interest in the quality of supplied components for the weapon and the NRP.

3.7 The MOD-ONR GA and the associated LoU sets out the principles and commitment to establishing arrangements for regulation of the DNP, including through close cooperation with DNSR. Inspectors should note the following particular aspects of the GA and LoU that may affect their work when regulating the DNP sites:-

- Legal position and other clarification of NRP and nuclear devices: 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.
- Handling of Licence Instruments: if ONR is notified of safety concerns related to a proposed regulatory activity, ONR undertakes to inform DNSR before issuing a licence instrument in adequate time to allow a response, unless a delay would be detrimental to the regulatory process;
- Access to sites and submarines: The need for unfettered access to sites is recognised by MOD. 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;
- Provision of and access to information: MOD will facilitate ONR forming an opinion on the area within which members of the public need to be supplied with information on radiation emergencies under REPPiR;
- Reporting of incidents and distribution of information: ONR will be notified of incidents that occur on the sites in accordance with the law. ONR should consult with MOD before passing any information related to notified incidents 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 places restrictions on the ONR incident reporting arrangements through the INF 1 process);
- Nuclear emergency response; particular arrangements apply to nuclear accident response in that:
  - MOD provides the overall co-ordinating function, and a Government Technical Advisor (GTA) is not appointed
  - 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); and

- Co-ordination of regulatory activity and incident/emergency response: where MOD has emergency plans in place that contribute to provision of an off-site emergency plan related to a licensed site, and have suitable agreements with the licensee, ONR should recognise these as part of the licensee's arrangements.

### **ALARP Considerations in Regulating the MoD's Defence Nuclear Programme**

- 3.8 The MOD policy is to apply civil-derived nuclear safety standards as far as is reasonably practicable. However, what is acceptable in ALARP terms for civil nuclear facilities may be different for some MOD facilities and activities. As mentioned above there are some aspects of NRP, and weapon 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. There may not necessarily be a straightforward translation of experience from civil based relevant good practice to MOD facilities and activities. For these reasons, making ALARP judgements is not straightforward and should usually be done in conjunction with DNSR. That is not to say that the relevant manufacturing, operating and maintenance standards need to be different, but that constraints on the design and other operational factors may lead to an ALARP position that diverges from ONR expectations, based on its experience of civil industry practice.
- 3.9 In making regulatory judgements inspectors should be aware that engineered safety features and management controls may differ from those implemented at a civil plant and therefore the assessment of ALARP should reflect this. ONR inspectors should not attempt to seek compensatory or additional safety measures that may be deemed as unreasonable under the circumstances and should initiate a discussion with DNSR to inform any judgement based on ALARP considerations. In fact, design 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. As an illustrative, but extreme example to make the point, insistence by ONR that a submarine needed redundant, segregated and diverse cooling systems with associated hull penetrations may increase safety in a maintenance period, but would reduce the safety of the ship's company at sea, where additional hull penetrations have the potential to threaten lives through susceptibility to combat-inflicted damage.
- 3.10 When seeking assurance from DNSR it is reasonable that ONR should not always simply accept these assurances without some amount of questioning necessary to provide a suitable degree of understanding of the risks being presented and DNSR's underpinning justifications. ONR may also seek confirmation that risks arising from the NRP/weapons are tolerable and that responsible design authorities have processes for establishing levels of risk arising from their design that meet the internal MOD authorisation requirements relating to the production of adequate safety cases.
- 3.11 There may be occasion when MOD, or the licensee at the behest of MOD, declines to reduce risks SFAIRP because of overriding strategic defence needs, thereby invoking the so-called 'Defence Imperative'; although this has never arisen in practice. A more detailed consideration of these relevant strategic factors can be found in Appendix 2.

## Interfaces with MOD, including Coordinated Regulation with DNSR

- 3.12 The MOD is a large complex organisation, and many potential areas for interaction exist for ONR. To work effectively, and to influence at the right level, ONR Inspectors should have sufficient working knowledge of those elements of its structure most relevant to our role. A framework exists for routine formal regulatory interface meetings with relevant MOD personnel. They include annual high-level (Level 0) meetings between ONR CNI and Director Submarines and Director General of the Defence Safety Authority (DSA) and biannual meetings (Level 1) between the DCNI and senior Defence Equipment & Support (DE&S) MOD officials. In addition ONR is invited to discuss relevant regulatory issues at two out of four of the Submarine Enterprise Safety Directors' Forum (ESDF) quarterly meetings; chaired by MOD. ONR also attends selected meetings of the Defence Nuclear Safety Committee (DNSC) as an observer; the DNSC advises SofS directly. Further information on the relevant organisational elements within the MOD is provided in Appendix 3.
- 3.13 ONR has a close working relationship with DNSR in regulating nuclear safety across the MOD DNP. A coordinated and collaborative approach is taken with the aim of achieving complete, efficient and effective regulation, which is proportionate to the risks presented, without any gaps or duplication in oversight. ONR should seek, together with DNSR, to influence safety standards through a coordinated approach to duty-holder and stakeholder interactions and to make the most of relevant expertise and capability available to each regulator. These overall aims are developed in the ONR-DNSR LoU and pursued in practice through close cooperation at a working level on the sites and in local progress groups and through quarterly joint management oversight meetings.
- 3.14 The more practical aspects for implementing the LoU include the following:
- Strategies and plans are developed, delivered and reviewed on a joint basis;
  - Joint inspections are undertaken where mutually beneficial;
  - Joint regulatory oversight meetings are routinely held;
  - Effective communication arrangements are in place between the regulators and duty holders, including communication of plans to duty holders and regular exchange meetings between regulators;
  - Freedom of Information (FOI) request responses are jointly formulated;
  - Emergency exercises are planned and usually evaluated together;
  - Outcomes of assessments are shared;
  - Draft Local Liaison Committee (LLC) reports are exchanged before publication on the ONR website and prior to LLC meetings, if possible;
  - Seeking, wherever appropriate, to avoid duplication in assessing safety submissions, such that any one specialist discipline is covered by only one regulatory body;
  - An annual workshop led alternately is held between ONR and DNSR inspectors on matters of mutual interest and to review implementation of the LoU; and
  - Specific letters of assurance are received from DNSR to support ONR issuing permissions or other regulatory decisions, where confirmation in respect of NRP/weapon design risks is needed, recognising DNSR as the competent authority in these matters.

## Aspects of Regulating the Non-licensed Naval Nuclear Sites

- 3.15 On the non-licensed Naval sites ONR should not give disproportionate attention to risks arising from similar activities on licensed sites, such as those at docks on the licensed site at Devonport, compared with for example, those at the ship-lift on the Faslane site. To achieve this balance requires recognition of the work of DNSR and that it deploys considerable effort in the oversight of facilities and activities on its

Authorised sites, through use of the Authorisation Conditions (AC). Recognising the DNSR role, it is ONR practice to provide a relatively low level of inspection and enforcement effort, complemented with joint ONR/DNSR reactive work, as required, and effective ONR/DNSR information exchange. As a general guideline, the level of ONR regulation for non-licensed sites should be similar to that which would be exercised for an equivalent major hazards industrial site, or that which would be exercised on an equivalent installation under IRRs etc on a licensed site. It is expected that ONR Inspectors will liaise closely with our in-house conventional and fire safety inspectors and DNSR in the development of site intervention plans.

- 3.16 A proportionate inspection plan should be developed to gain the necessary confidence that the sites are complying with regulatory requirements. It is not possible to prescribe a periodicity for these inspections but it seems reasonable for the ONR nominated site inspector to inspect at the Vulcan and HM Naval Bases at Clyde and Devonport typically at least once a year. For submarine operational berths inspections should be less frequent as it depends on operational circumstances and whether a boat will be docking, as the only radiological hazard is contained within the boat. For a Berth in regular use, regulatory contact is likely to be limited to those in connection with planning for and observing the REPIIR related emergency exercises, augmented by additional visits if necessary, if for example a significant incident should occur.
- 3.17 ONR does not have routine access to relevant safety cases and other justifications germane to nuclear safety on these sites, although information contained in evaluations and reports made under REPIIR Regulations 4 and 6 may assist in our understanding, at a broad level, of the magnitude and nature of the hazards existing on the sites. Thus it is important that the responsible ONR site inspectors should have routine dialogue with DNSR. A general indication of some of the nuclear hazards at various non-licensed sites is provided in Table 2.

#### 4. REFERENCES

1. MOD – ONR General Agreement: January 2015 (See ONRs website at: <http://www.onr.org.uk/documents/2015/mod-agreement.pdf>)
2. ONR – DNSR Letter of Understanding: April 2015 (see ONR website at: <http://www.onr.org.uk/documents/2015/onr-dnsr-letter-of-understanding.pdf>)
3. ONR - MOD Crown Censure and Notices (ONR process yet to be agreed with MoD, refer to Cabinet Office PIN 45 in the interim)
4. HSE - ONR Agreement under HASWA s13 and TEA s90: Specifying functions that ONR will perform on behalf of HSE on Authorised defence sites: 14 April 2015 (see ONR website at: <http://www.onr.org.uk/documents/2015/onr-hse-defence-site-aa.pdf>)
5. MOD/DNSR Notification to ONR of Nuclear Warship Sites - March 2015 (HOW2 under Other Legal Agreements and Notices.)



## 5. GLOSSARY

**Authorised Site.** A site on which nuclear related activity is carried out under the control of an 'Authorisee' (MoD Department or contractor) authorised to do so by DNSR on behalf of the SofS for Defence. The 'authorisation' process is aimed at regulating the DNP under an equivalent regime to that applied to civil nuclear sites. DNSR issues authorisation conditions (ACs) that are similar to ONR licence conditions; their application is governed by MOD policy or civil contract rather than statute.

**Authorised Activities.** Those activities that are authorised by DNSR but do not take place on a licensed or authorised site.

**DNSR-ONR Letter of Understanding (LoU).** An LoU agreed between ONR and the MoD Defence Nuclear Safety Regulator (DNSR) provides clarification and additional detail on the working-level arrangements made under the provisions of the MOD-ONR General Agreement.

**MOD-ONR General Agreement.** Agreement made with ONR in 2015 which supersedes aspects of the MOD-HSE agreement of 2008. It sets out how ONR's regulatory activities are modified to take account of legal and other constraints related to DNP international obligations connected to MOD-related activity and the nature of the work of the MOD's DNP in relation to Government's defence priorities.

**Naval Reactor Plant (NRP).** This is considered by ONR to be the submarine reactor core and all associated structures, systems and components that comprise a submarine's steam-raising plant. The MOD NRP Authorisee has a document outlining the limits of authorisation in relation to the reactor plant.

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

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

**Operational Berths (also known as Nuclear Warship Sites).** Nuclear submarine operational berths are situated around the UK at strategic locations and they allow for submarines to berth alongside or anchor in order to undertake routine non-invasive operations and shore visits.

**Polaris Sales Agreement 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.

**The 1958 Mutual Defence Agreement.** This is 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 also places restrictions on access to related information that remain in force today.

## APPENDIX 1 – LEGAL CONSTRAINTS AND OTHER RELEVANT CONSIDERATIONS

A1.1 It is the policy of the SoS for Defence that, 'unless granted specific exemptions, dis-applications 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 relevant legislation. Under these circumstances, DNSR has the delegated authority to regulate nuclear safety in the same manner, and to no less stringent standards, than ONR's regulation of the UK civil nuclear industry. Where the law does apply, ONR has legal enforcing authority, whereas DNSR regulates under MOD policy arrangements. The way the legal framework is applied to submarines is set out below in relation to the life-cycle stages of a submarine. Nuclear weapons are also mentioned in the final paragraph.

A1.2 **Core Manufacture:** Core manufacture takes place at Rolls-Royce Marine Power Operations Ltd's (RRMPOL) licensed nuclear sites, which are encompassed by the larger Raynesway Rolls Royce site in Derby. To date DNSR has decided not to Authorise any parts of the Raynesway site, however DNSR retains an interest in product quality as it may affect through-life nuclear safety and this is discharged through the NRP Authorisee (NRPA), who is part of the Nuclear Propulsion Project Team (NPPT).

A1.3 **Reactor Core Testing:** This is now carried out only at the licensed Neptune test reactor situated on the RRMPOL site in Derby. The Vulcan Naval Reactor Test Establishment at Dounreay is no longer available for NRP testing purposes as it shut down in 2015 for final defuelling and decommissioning. Vulcan remains as an Authorised site and is regulated mainly by DNSR, however ONR retains authority for regulating HASWA and its RSPs.

A1.4 **Submarine Construction:** New boat construction takes place at Barrow in the Devonshire Dock Hall and commissioning in the adjacent 'Wet Dock Quay', both areas are within the licensed site boundary, as is the new-core storage facility. Barrow is also an authorised site, with its boundary coinciding with the licensed site boundary. Regulatory activities are broadly divided into the plant (regulated by DNSR) and facilities (regulated by ONR) although in practice there is a strong element of joint regulatory activity. When the Naval Reactor Plant (NRP) is under construction it is not covered by a safety case for commissioning or operation, and is therefore not deemed to be a 'reactor comprised in a means of transport'. Part II of Schedule 1 of the Barrow nuclear site licence describes 3 types of installations '...those adapted for incorporation of enriched uranium into a New Core Cartridge'; '...those for storage of fuel elements other than storage incidental to carriage and those for 'installations for the purpose of installing new un-irradiated reactor cores into submarines', i.e. the facilities used to installing a new reactor core rather than assembling the core itself. Further information on the way in which licence conditions apply to the NRP is provided in paragraph A1.12 below.

A1.5 **Testing and Commissioning:** Overall testing and commissioning of a new NRP or core is undertaken through activities taking place at Barrow, Derby, Devonport and the Clyde Naval Base. Among the range of commissioning tests a new core undergoes initial criticality and is then run up to full power, these activities are collectively termed Power Range Testing (PRT) and take place at the wet-dock quay on the Barrow licensed site for PRT in a newly constructed submarine. As a result of PRT the fission product inventory is small and the potential for a significant off-site release of radioactivity is minimised. Following maintenance and repair work on non-licensed sites other specific testing is carried out to re-commission any affected plant. This maintenance and repair work can include intrusive work on primary systems, for example main coolant pump changes, but not on the core itself. Tests can include full power calorimetric trials of operational plant, such tests can be carried out at the HM Naval Bases at Clyde and Devonport. These tests can be with a used core where the potential for significant off-site release is higher, although still considerably less than that associated with a civil nuclear power plant. PRT at Devonport does not take place on the

licensed site and is regulated by DNSR. ONR takes the lead for regulation at Barrow up to the point of commencement of PRT, which is subject to an ONR regulatory hold-point, its release being through a derived power agreement. Full power trials at HMNB Clyde and HMNB Devonport are regulated primarily by DNSR under Authorisation Conditions.

**A1.6 Submarines Operating at-sea:** Submarines operating at-sea, inside UK territorial waters, remain subject to the legal duties of the relevant statutory provisions of HASWA; unless exempted by the SofS. However ONR does not have any enforcing authority even though the boats are considered to be part of GB. Beyond territorial waters, DNSR lead on regulating safety of boats and weapons at-sea through issuing Authorisations to individual post-holders in relation to the NRP and the weapon. The Authorisation certificate for the NRP also includes Operational Berths (see para A1.11).

**A1.7 Submarine Dockings for Maintenance or end-of-life Preparations:** Submarines are docked at Devonport for extensive periods to undertake intrusive maintenance activities, which may also include re-fuelling, or to be prepared for long-term lay-up prior to defuelling and final dismantling. These dockings are given various acronyms to connote the class of boat and activities being undertaken eg very deep maintenance periods (VDMP) for Vanguard class boats in 9 Dock. These periods in dock involve moving a submarine from the naval base or the authorised site outside the licensed site boundary, to a dock within the licensed nuclear 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. Clearly, the safety case may be different for different stages of the docking and the activities being undertaken. Once the submarine leaves the licensed site, it is subject to nuclear safety regulation by DNSR under Authorisation Conditions. Even when docks are vacant, safety cases are in place to demonstrate that any residual hazards are controlled, these may include new and irradiated fuel, radioactive waste; and for maintenance of plant that contributes to the safety of activities when the submarines are periodically docked-down.

**A1.8 Redundant Submarines:** When nuclear submarines are taken out of service ideally they should be promptly defuelled, decommissioned and laid-up (DDLUP), prior to final dismantling; this removes the majority of the radiological hazard. However, a number of submarines have been laid-up and stored afloat at Devonport without being defuelled (pending new low-level defueling facilities being built at Devonport). In this state the nuclear reactors are permanently shut down, the control rods are locked down, and the submarines enter a period of care and maintenance, prior to de-fuelling. The submarines stored in this configuration are not on the licensed nuclear site, they are thus regulated mainly by DNSR. In other circumstances storage of laid-up fuelled submarines would be licensed due to them exceeding the ONR criteria for bulk storage of radioactive material.

**A1.9 Submarine dismantling:** Rosyth is a former operational naval base and dockyard, part of which is a licensed site; comprised of two separated areas on the larger Babcock site. The first area is an ILW store, and the second encompasses Docks No 2 and No 3 (the latter is in the process of being de-licensed). The licensee is to decommission and dismantle seven DDLUP submarines, which are afloat in the basin adjacent to the licensed site. Pending the submarines entering the licensed site, they are subject to Authorisation by DNSR. Following dismantling of the 7 boats, no further submarines will be dismantled at Rosyth.

**A1.10 Operational Submarine Dockings:** The main centres for operational submarines are the Naval Bases at Clyde (Coulport and Faslane) and Devonport. Submarines can be docked on these sites and some limited maintenance carried out. Nuclear safety is overseen by DNSR under Authorisation Conditions. It should be noted that once a new submarine has left the Barrow licensed site for sea-trials the safety case does not allow for its return.

**A1.11 Operational Berths:** (also called Nuclear Warship Sites [NWS] in the Enforcing Authority Regulations) are locations around the UK, and elsewhere in the world, where

submarines may berth for routine non-invasive operational purposes. In the UK there are Berths on the Authorised sites at the Devonport and Clyde Naval bases. Others are located at Loch Goil; Loch Ewe, Barrow, Southampton, Portsmouth and Portland, in addition there are anchorages at Spithead and Stokes Bay (also classified as NWS). Overseas Operational Berths (e.g. Gibraltar and Diego Garcia) are outside ONR's jurisdiction. Under the Enforcing Authority Regulations ONR regulates the UK Operational Berths only in respect of compliance with the IRR 99 and REPIR 2001. There is a requirement in the Enforcing Authority Regulations for MoD to notify ONR (Ref: 5) where nuclear warship sites are located for use as a Berth and when they are deemed to be no longer in use. HSE remains responsible for enforcement of the relevant statutory provisions of the HASWA at these berths.

**A1.12 Design and Procurement in the Naval Nuclear Propulsion Programme:** Rolls-Royce Submarines (RRS) is the Technical Authority (TA) for the Nuclear Steam Raising Plant (NSRP), except for Astute where this role is exercised by BAE Systems, but sub-contracted to RRS who perform this function under contract to NPPT. The Head of the Nuclear Propulsion Project Team (NPPT) is subject to formal authorisation by DNSR for NRP support and management matters. ONR does not exercise any regulatory control over NPPT. However, ONR does have regulatory authority over design and supply of plant that may affect safety on licensed sites under Energy Act Part 3, Section 6 of the HSWA and indirectly through LC17. The extent of this is modified by the MOD-ONR Agreement, in that ONR has agreed not to seek to influence the design of the NRP. In practice any ONR regulatory concerns relating to design or procurement that may affect safety on a licensed site should be pursued jointly with DNSR.

**A1.13 Application of Licence Conditions to the NRP:** The licensing requirements of the NI Act do not apply to a reactor 'comprised in a means of transport'. This is taken, by agreement, to mean activities involving nuclear reactors operating or under commissioning in a submarine. The 'operational safety case' is taken to include the period of a VDMP 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; additional information contained in the NRP safety cases have been used to support justifications in site safety cases). 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 VDMP. Where direct considerations of the safety case are concerned these are likely to implicate aspects of reactor design. However, under the MOD-ONR GA, ONR will not seek to influence the design. If inspection activity reveals ONR reservations over aspects of the design, these will be raised with DNSR who will take whatever action it considers appropriate in the circumstances. It is worth noting that activities undertaken on a licensed site involving operation of plant by employees of the Crown (eg naval ship-staff) remain subject to licence condition requirements when these activities are under the control of the licensee.

**A1.14 Crown Censures and Notices:** There is no Crown exemption from the duties under the HASWA. However, the Crown, including MOD as a Crown body cannot be prosecuted for breaches of the law. In lieu of formal legal enforcement, ONR has made arrangements for the raising of Crown Censures in respect of occurrences where it is ONR's opinion that, but for Crown immunity, there would have been sufficient evidence to provide a realistic prospect of conviction in the courts. In similar fashion Crown Notices are used instead of Prohibition and Improvement Notices where the circumstances and evidence suggests that legal enforcement would have been appropriate. ONR's procedure for issuing MOD with Crown censure and Notices can be found in Ref 3 to this document.

**A1.15 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. A '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. HASWA and any RSP however 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 and radiological safety on these sites falls to ONR.

## APPENDIX 2 – CONSIDERATION OF STRATEGIC FACTORS

A2.1. Historically within ONR and its predecessor organisations, the particular needs of the MOD's DNP have been considered in relation to a 'Defence Imperative', which has been referred to in previous explanations of our approach to regulation of the DNP. However it should be noted that the 'Defence Imperative' has never been formally defined or cited in the basis for regulatory decisions made in the past; nor is it referred to in the MoD-ONR GA. In the absence of a formalised definition, ONR has taken it to mean, those circumstances where the interests of national defence are deemed by MOD to be sufficiently important that they may influence the application of established safety measures and practices. In these circumstances the obligations that would normally apply to the duty-holder to reduce risks to an acceptably low level, may need to be assessed in relation to the potential effect of implementing these measure on national defence.

A2.2. The underlying safety philosophy adopted for evaluating societal and individual risk is described in the publication "The Tolerability of Risk from Nuclear Power Stations" (1991). The document contains information on the regulatory approach to risk and provides a basis for an enforcement framework. It summarises the tolerability of risk as:

*"a willingness by society as a whole to live with a risk so as to secure certain benefits and in the confidence that the risk is one that is worth taking and that it is being properly controlled".*

Therefore within this definition it is possible to view national defence as a societal benefit where the associated risks are tolerable, since it concerns wider benefits in the public interest that are not simply related to normal health and safety risks. Nevertheless the law still applies and the associated overarching legal duty to protect people and reduce risks so far as is reasonably practicable (SFAIRP) will need to be considered.

### **Legal Considerations**

A2.3. Section 3 of this Guide, the supporting references and Appendix 1, outlines legal and other constraints including exemptions, disapplication, etc relevant to regulating the MOD's DNP. However there is no means of exemption for duty-holders (in this case both MOD and licensees) from the requirement to reduce risks to workers and the public SFAIRP also referred to as low as reasonably practicable (ALARP). Interpretation of this duty may need to be subject to judgement by both duty-holders and ONR as the statutory enforcing authority. However, ultimately and where necessary, the decision of whether risks are ALARP, will be determined by the law courts.

A2.4. The legal test in determining that risks are deemed to be ALARP is well established and it represents the quantum of risk averted on the one hand balanced against the money, time and trouble incurred to avert that risk, until the balance of effort expended is deemed to be grossly disproportionate to the risk being averted. For ONR inspectors establishing what is ALARP is concerned solely with weighing specific health and safety risk reduction benefits against the sacrifice needed to make identified safety improvements; including judging where and when gross disproportionality may apply. ONR therefore considers that wider societal benefits related to measures involved in the nation's defence, for example maintaining a continuous at-sea deterrence (CASD), conferred by conducting, or not conducting a particular undertaking, lie outside normal assessments of ALARP.

A2.5. In relation to the nuclear industry, the ALARP balance has never been subject to legal challenge or scrutiny by a court-of-law, but has been considered within the auspices of public enquiries into development of nuclear installations. In addition, assessments have been made of how a Court may view the balance of effort needed to avert even a small nuclear or radiological risk, as opposed to other conventional safety risks. It has been suggested that society is perceived to have a greater aversion to radiological safety risks than to other non-radiological risks to safety. Furthermore, where Courts have considered cases brought

against nuclear licensees for safety shortfalls, the size of fines imposed by the Courts on duty-holders that are found guilty are often much greater than for similar offences involving conventional risks. It should however be remembered that the MOD has Crown immunity from both prosecution and serving of formal legally based enforcement notices.

### **Other factors**

A2.6. Inspectors should be aware that the policy of the Secretary of State (SoS) for Defence is to comply with all relevant safety and environmental legislation unless specific exemptions 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.

A2.7. In principle, strategic imperatives are considered to be akin to other similar imperatives e.g. where higher levels of risk to workers are tolerated for example to fire-fighters in facilities when they respond to a fire or other emergency where they may receive elevated doses of radiation in the course of making a facility safe. This may also apply in non-emergency but urgent situations, where MOD defence related activities require work to be undertaken outside the standards that ONR would expect to apply in non-urgent situations. In this case, MOD should state clearly that their assessment identifies that the work is required in the interests of the 'Defence Imperative' and will be reviewed in due course when the particular urgency has passed. In addition, this approach could also be adopted for activities being undertaken on a licensed nuclear site, where they may impinge on maintaining the UK's CASD.

A2.8. Claims related to the 'Defence Imperative' may sometimes appear in safety cases in the context of 'time', or 'trouble' aspects, on the sacrifice side of the ALARP balance. ONR Inspectors should in the first instance make a judgement based on whether they consider that the legal duty to reduce risks SFAIRP has been met, independently of defence related considerations.

A2.9. As part of an ONR assessment of a licensee or MOD proposal it may be identified that risks are deemed not to be acceptable in respect of actions by MOD, or through the licensees, on its behalf. Where ONR identifies a clear safety shortfall and risks are considered not to have been reduced SFAIRP in relation to a nuclear facility or activity, ONR will need to consider if enforcement action is appropriate. At this point other strategic factors, such as MOD's identification of national defence interests, as a wider consideration of the public's interest, may legitimately be considered.

### **Enforcement**

A2.10. In applying ONR's enforcement management guidance, inspectors should establish the seriousness of any non-compliance with reference to what the risk gap, between what the duty-holder's position is assessed to be when compared to ONR's expectations in relation to relevant safety standards. Following identification of the extent of the shortfall, consideration should then be given to other duty-holder and strategic factors in finally determining the options for action. The strategic factors taken into account by the inspector include consideration of the public interest, for example the broader socio-political impact of any possible enforcement action. However, currently it is not explicitly stated in any guidance how ONR will take these factors into account when considering, for example MOD's provision of the UK's CASD.

A2.11. Where a licensee (and by association MOD) has submitted a safety justification in support of a request for ONR's permission under a primary or derived power for an activity, e.g. to bring a submarine into dock for maintenance, and ONR's assessment concludes with a recommendation that the permission should not be issued on ALARP grounds, then ONR should consider the shortfall in the ALARP standard in the context of relevant strategic factors, and a decision would be made by the person with the delegated authority whether to permit the activity after consideration of all the factors involved in determining the tolerability of the

safety risk. It should be recognised that irrespective of any relevant strategic factors there may be situations where the demonstration has not reduced risks SFAIRP but the risk gap is deemed to be such that it would be disproportionate to withhold permission. If the decision is made to grant permission then the rationale for doing so should be recorded by the decision maker. If the decision is made not to grant the permission (e.g. not to issue an LI) then it would be for MOD, in conjunction with the licensee, to invoke the 'Defence Imperative'.

A2.12. If MOD decides that a proposed action should continue when ONR has not granted permission i.e. they are deemed to have invoked the 'Defence Imperative', they will have sole responsibility for safety during the proposed activity. It is envisaged that such a decision should be taken by a person by a person with appropriate authority within MOD and in the interests of national defence. In such cases the decision to proceed is made by MOD, since ONR is not able to judge the significance of national defence interests. In general, it is preferable for the MOD to present the defence related aspects of a proposal during permissioning/ALARP considerations, rather than for ONR to anticipate the possibility that it may arise subsequently.

A2.13. Similarly, should the 'Defence Imperative' be invoked by MOD, where an ONR permission has not been sought, but a significant breach of the law has occurred then this should be a factor to consider when determining appropriate enforcement options. For example, the relevant national defence interests may be taken into account by persons with delegated authority when reviewing recommendations for enforcement action resulting from application of the ONR enforcement management guidance. If the outcome of applying the guidance leads to a recommendation to prevent an activity, or shut down a facility, or preserve a scene, or take items into possession, after having taken the 'Defence Imperative' into account, it would be necessary for ONR management with delegated authority to consult with MOD to establish a way forward, in advance of implementing a recommendation.

A2.14. ONR does not of itself have the ability to judge the significance of the implications for national defence interests related to any particular safety issue; only MOD are sufficiently informed to do this. It is the licensee who has the duty to make any safety arguments to ONR. The responsibility for identifying a situation that may challenge the 'Defence Imperative' therefore lies with the MOD, and communicated to ONR by the licensee, who is in control of the safety risks on the licensed site.

A2.15. In conclusion, ONR inspectors should judge whether risks have been reduced SFAIRP, independently of any considerations of national defence interests. If this judgement concludes that risks have not been reduced SFAIRP, then other strategic factors should be taken into account in determining appropriate and proportionate enforcement options. This approach is consistent with ONR's policy and procedures on enforcement, which includes management review and approval of decisions on enforcement action by persons with the necessary delegated authority. It also recognises the boundaries of ONR knowledge and authority to judge matters potentially affecting national defence, and acknowledges that in such situations MOD should decide on when the 'Defence Imperative' should be invoked.



## APPENDIX 3 – ORGANISATIONAL ASPECTS OF THE MOD's DNP

This Appendix provides some information of those parts of the MOD that are most relevant to ONR's work in regulating aspects of the Defence Nuclear Programme.

### A3.1 MOD Ministers and Senior Personnel

The Secretary of State (SoS) for Defence is responsible to Parliament for the safety and security of the UK's Defence activities, including nuclear, radiological and transport safety. It is worth noting that the SoS can grant authorisations for certain sites and exemptions from some health and safety legislation. Safety is achieved through management of all the life-cycle stages from design, procurement, manufacturing, commissioning, operation, maintenance and safe decommissioning. The above phases are not discrete and there are complex inter-connections and dependencies between different organisational parts of MOD.

Below the political and senior civil servants in Whitehall, there are three principal organisations within MOD that ONR interfaces with. These can be broadly characterised as the equipment supply arm; the operational arm and the regulatory body. However some straddle the boundaries of the life-cycle phases of DNP sites and activities; the following sub-sections include both organisational and safety aspects and are intended for general awareness purposes only.

### A3.2 Director General Nuclear (DG Nuc)

The DG Nuclear is a new post created in 2016, who is responsible for overall delivery of the DNP, this is a high level post; not given to a serving member of the armed forces. This role includes control and supervision of major capital expenditure proposals for upgrading and building new facilities to ensure delivery of CASD. Longer term improvements to safety and other safety related proposals which rely on engineering and safety judgement, may require an input or advice from ONR in relation to major proposals.

### A3.3 Defence Equipment & Support (DE&S) a Bespoke Trading Entity

Overall DE&S is responsible for providing equipment which is safe to use and the means to procure and maintain the equipment that the MOD requires for all three services to fulfil its mission. This entity is led by a Chief Executive Officer who is a senior civil servant within MoD (4\* equivalent). For the DNP the Chief of Fleet Support & **Chief of Materiel (Fleet) (COMF)**; a 3\* Vice Admiral within DE&S is responsible for the delivery of the maritime equipment programme and the availability of ships and submarines. COMF is a member of the Navy Board and leads on support to all maritime platforms, including naval aircraft and the defence supply chain.

Under the control of COMF is the Submarines Operating Centre (SMOC), which is divided into two organisational units one providing a support function, and the other an acquisition function. Both of these units are headed by a 2\* who is usually a Rear Admiral. The **Director Submarines Support (DSMS)** role is to ensure the readiness of the submarine operational fleet is achieved within budget and in compliance with relevant safety standards. The holder of the post of DSMS also holds the post of **Chief Strategic Systems Executive (CSSE)** and in this role oversees delivery of the Trident programme and risks to it, to ensure that CASD is maintained for the life of the programme. CSSE is also responsible for meeting UK obligations under the Polaris Sales Agreement (as amended for Trident). CSSE is accountable to the First Sea Lord for this work.

The **Director Submarines Acquisition (DSMA)** is responsible for managing the overall delivery of the Successor class of submarines and any subsequent future underwater capability such as replacing the Astute class.

For ONR purposes DSMS is an important interface, as a number of the DE&S project and enabling teams report to DSMS and overall are responsible for managing and co-ordinating the operational support activity related to weapons and the nuclear powered submarines. In

addition they have an oversight role of the five licensees which operate the seven Defence licensed nuclear sites.

### **Nuclear Propulsion Project Team (NPPT).**

NPPT provides in-service support relating to reactor plant readiness for operation. The NPPT leader is a formal DNSR authorisee, known as the Naval Reactor Plant Authorisee (NRPA), for operation of the Naval Reactor Propulsion Plant at sea and at operational berths. NPPT provides a focus for development within the Naval Nuclear Propulsion Programme (NNPP) and controls associated work undertaken by the Nuclear Steam Raising Plant (NSRP) Technical Authority, which is Rolls-Royce Submarines. 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.

### **Strategic Weapons Project Team (SWPT)**

The SWPT's responsibilities relate to delivery of the nuclear warhead programme, its lifetime availability and capability, operation of AWE, and management of MoD liabilities on other nuclear sites.

### **In-Service Submarines (ISM)**

The Head of ISM is responsible for in-service support to all operational nuclear submarines. This includes planning and management of maintenance and refit activity.

### **Other functions within SMOC in support of DSMs**

There are several other functionally based teams in place which are responsible for providing specific advice and oversight functions in support to both DSMs and they include Head of Programmes, Maritime Domain Organisational capability, Head of Commercial and the **Chief Engineer**. ONR may interface with the latter when discussing aspects of nuclear safety, including safety cases where appropriate.

### **Design and Technical Authorities**

For current Trafalgar & Vanguard class operational submarines, the technical authority for the NRP, which includes the nuclear steam raising plant (NSRP) is Rolls-Royce Submarines (RRS). ISM has responsibilities for other plant and equipment such as the propulsion and electrical generation systems. For the new Astute class submarines, BAE Systems are the overall design authority, contracting to RRS as the delegated design authority for the NRP. Revised design management arrangements have been introduced for remaining Astute attack submarines and for the Successor ballistic missile carrying submarines. For nuclear weapons, the design/technical authority resides within the AWE licensee's organisation.

### **Naval Reactor Plant Safety Cases**

The justification and demonstration of safety for the NRP differs from that for a civil installation. It derives from the NRP Safety Cases maintained by the Technical Authority for each design of PWR. At present this does not cover safety associated with the non-intact shut down state as regulated by ONR on licensed sites. Licensees have developed such safety cases based on technical information available in relation to the operational state.

### **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 reverse operations for disassembly are also incorporated. The facilities involved in the various stages of manufacture and support for the sub-assembly programme have individual facility safety cases. The two AWE licensed sites' safety cases encompass the combined facility safety cases for the sites and the infrastructure to support the sites' operations.

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 licence conditions. Equally, aspects of weapon component make-up, stockpile logistics and programme constraints are not directly regulated by ONR. In these cases, if appropriate, ONR would seek assurance from DNSR that materials, numbers and programmes are justified. Safety cases demonstrating the safety of facilities, processes and handling within and between facilities on the AWE licensed sites fall within the scope of regulation under the Energy Act 2013 and NIA.

### **A3.4 Navy Command (NC) and HM Naval Bases**

Although organisationally separate in MOD, for delivering safety there is a very close relationship between NC the equipment user and the DE&S as the equipment provider. NC is headed up by a Fleet Commander; usually a 3\* Vice Admiral. For ONR purposes the interface with NC is mainly through the Naval Base Commanders (NBCs) at HMNB Devonport and Clyde. Parts of both of these sites are formally authorised by DNSR in respect of naval base nuclear submarine operations.

NBCs are responsible, for nuclear safety within the Naval Bases at Clyde and Devonport, the individual in post is delegated by MOD as the Authorisee for the site. Each base has a Base Nuclear Safety Organisation (BNSO) that acts as an assurance department for the Authorisee. At the bases, nuclear safety for operational submarines is justified in the Site (Facility) Safety Cases. Justification for operating in non-standard configurations, such as during maintenance and repair, is provided by the Authorisees through their AC14 arrangements. The management systems for control of nuclear-related work are heavily influenced by the Procedure Authorisation Groups (PAGs) and other Test Groups. These groups consist of representatives from the submarine, repair/maintenance organisation, design-authority and host squadron. NBCs also have responsibilities for nuclear emergency response at designated Operational Berths.

The licensed dockyard sites operate a similar system of PAGs, and Test Groups, as mandated by the MOD arrangements. However, because these sites fall under ONR regulation, the PAG and Test Group management arrangements are regarded by ONR as part of the licensee's management systems established to comply with the requirements of the licence conditions, although they derive from MOD requirements. The NRTE at Vulcan is no longer considered to be a naval base by MOD and does not have a Base Commander, however it is Authorised by DNSR and comes under the auspices of NC.

### **A3.5 MoD's Internal Safety Regulation - Defence Safety Authority (DSA)**

The DSA was created in 2015 to bring together all the separate military regulators within MOD. The SofS delegates authority for regulation of nuclear and radiological safety in the DNP to the Director General of DSA (3\* level) - who in turn delegates to the Head of DNSR. The Head of DNSR also reports to the DG DSA.

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

DNSR is part of the DSA and is responsible for setting regulatory policy for the DNP and for providing assurance to the Secretary of State for Defence that the MOD executive organisations are meeting the necessary standards of nuclear and radiological safety. Although the Head of DNSR has direct access to the Permanent Under-Secretary (PUS) for significant safety matters, in practice DNSR reports through the Director General of DSA who is in turn accountable to the MOD PUS (a 4\*). DNSR comprises the Nuclear Propulsion Regulator (NPR) and the Nuclear Weapon Regulator (NWR). DNSR's assessment and technical support work is carried out by the Regulatory Support Department (RSD) of AMEC and the Defence Science and Technology Laboratory (DSTL). DNSR also provides advice and guidance to SWPT and NPPT, Naval Bases and defence contractors, on applicable nuclear safety standards. Delegated regulatory authority is applied either on a civil law contractual basis or via MOD policy and procedures, depending on the circumstances.

TABLE 1- SCOPE OF REGULATION IN THE DNP BY ONR AND DNSR

SITE/FACILITY	Crown Control	GOCO <sup>1</sup>	Contractor Owned and Operated	ONR Licensed	DNSR Authorised	Legal/Organisational Position
AWE Aldermaston		✓		✓	✓	The site is owned by the MOD. Operations are contracted out to AWE Management Ltd, and site is licensed to AWE plc. ONR has statutory regulatory authority up to the point of assembly of the fissile material to conventional explosives. The DNSR Authorisee for weapons design and modification related matters, is the Managing Director of AWE plc.
AWE Burghfield		✓		✓	✓	Position as above for AWE (A)
Devonshire Dock Complex at Barrow-in-Furness			✓	✓	✓	BAE owned and licensed to BAESM Ltd; the licensed and authorised sites coincide and are encompassed in a larger industrial complex. ONR has statutory authority for prescribed activities and DNSR takes the lead for active commissioning activities in the completed submarine; although LCs still apply through commissioning. DNSR's authority covers NRP safety case and related manufacture and assembly.
Devonport Royal Dockyard Ltd			✓	✓	✓	Owned and operated by Babcock International and licensed to DRDL, the site is contiguous with parts of 5 Basin and its associated berths, parts of which are Authorised but not licensed. The reactors are comprised in a means of transport when in 5 Basin. 3 Basin is not licensed or authorised and contains a number of fuelled laid-up submarines, which themselves are Authorised. It is notable that laid-up submarines meet the ONR criteria for bulk storage of radioactive material, and in other circumstances would be licensed.
RRMPOL Derby Manufacturing and Neptune Sites			✓ <sup>2</sup>	✓		Rolls Royce leased <sup>2</sup> and operated, there are 2 separate licensed sites that are part of the larger Raynesway Rolls Royce industrial site. Although not Authorised DNSR has an interest through the activities of the NRP Authorisee.
Rosyth Royal Dockyard Ltd				✓	✓	Site owned by Babcock International and licensed to RRDL. Authorised submarines are laid up in the basin adjacent to the licensed site. Licensed nuclear site is encompassed within a much larger industrial site and is in two separate areas of the larger site ie an ILW store and Dock No 2.
HM Naval Base Clyde	✓				✓	Clyde comprises both Coulport and Faslane and is owned by MOD; it is not licensed as it is under Crown control. Only parts of these 2 sites, where nuclear related activities are undertaken are Authorised e.g. Faslane ship-lift.
HM Naval Base Devonport	✓				✓	Owned by the MOD and adjacent to the DRDL site but not licensed as it is under Crown control.
Vulcan Naval Reactor Test Establishment	✓				✓	The site is adjacent to Dounreay and is owned by the NDA, but by agreement is used by MOD. The site is not licensed as it is under Crown control for day-to-day activities.
UK Submarine Operational Berths	✓				✓	DNSR take the lead through NRP at-sea Authorisation. ONR only enforces IRRs & REPPiR.
ACTIVITY						Legal/Organisational Situation
Defence Nuclear Material Transport	✓				✓	CDG Regulations confer the Competent Authority role to the SoS for Defence, and DNSR undertake this role.
Naval Reactor Plant (NRP) Design through-life	✓				✓	ONR-MOD Agreement applies and ONR does not seek to influence the NRP design, as it will ultimately be comprised in a means of transport. DNSR has an interest through the NRP Authorisee's activities to the end of boat life.
Nuclear Weapon Design through-life	✓				✓	These are DNSR Accredited activities and are exempt from licensing through the AWE Regulations 1971. At-sea weapons are under Crown control, so subject only to HASWA duties in UK territorial waters.

Note 1: GOCO – Government Owned Contractor Operated

**TABLE 2 - NUCLEAR HAZARDS ON NON-LICENSED NAVAL SITES**

<b>OPERATIONAL HAZARD</b>	<b>COMMENT</b>
<b>HM Naval Base Clyde (comprising Faslane &amp; Coulport)</b>	
Operation of submarine reactors at full power.	Power operations may take place alongside at Faslane and Coulport. The jurisdiction of the HASWA extends to the baseline of UK territorial waters, ie it includes the geographical boundary designated as falling under the statutory authority of the Queen's Harbour Master (QHM).
Maintenance.	This can include intrusive work on the NRP and in the reactor compartment.
Explosives handling.	This includes weapons handling.
Treatment, storage and disposal of LLW & ILW.	ILW is stored at Faslane only.
Submarine and ship movements.	Some submarine movements involve situations of limited manoeuvrability due to the presence of other boats in close proximity.
Ship-lift operations.	SSN & SSBNs are periodically moved into the Faslane ship-lift for maintenance and other operations.
<b>HM Naval Base and Babcock Devonport Site</b>	
Operation of submarine reactors at power.	Power operations may take place alongside in Naval Base berths and also at the 5 basin PRT berth. The jurisdiction of HASWA extends to the baseline of UK territorial waters, ie it includes the geographical boundary designated as falling under the statutory authority of the QHM.
Maintenance.	This can include intrusive work on the NRP and in the reactor compartment.
Explosives handling	This includes weapons handling.
Treatment, storage and disposal LLW & ILW)	ILW (for example spent ion-exchange resins) and LLW.
Submarine and ship movements.	Some submarine movements involve situations of limited manoeuvrability.
Building/facility renewal.	Significant SRC building/dismantling works are in hand.
Storage of DDLP submarines.	De-fuel, De-equip and Lay-up Preparation (DDL P) – several fuelled SSN's are stored afloat, pending disposal, in 3 Basin adjacent to the licensed DRDL site (i.e. not on the Naval Base but on the larger Babcock International Devonport site).
De-commissioning	De-commissioning activities in a number of areas.
<b>Naval Reactor Test Establishment (NRTE) Vulcan</b>	
Reactor operations.	The test reactor is now shutdown but contains fuel which must be kept safe prior to defuelling.
ILW and LLW waste handling.	The Decontamination and Waste Treatment Facility contains spent ILW ion-exchange resins which are in a state of interim care and maintenance, pending final treatment and disposal.
Fuel storage.	Used fuel is stored on site in the test facility and in storage ponds.
Main Coolant Pump (MCP) refurbishment.	Vulcan facilities are used to refurbish nuclear submarine MCP, which may contain activated components.
<b>Submarine Operational berths (or Nuclear Warship Sites)</b>	
Submarine Operational Berths	Operational Berths are used for port visits and general non-invasive activities. Apart from arrival and departure, the reactor plant will not normally be run at high power and NRP maintenance is not permitted.