Defence
Safety Authority

DSA 03-OME Part 1 (JSP 520)- Defence Code of Practice (DCOP) and Guidance Notes for OME Acquisition

Defence OME Safety Regulator

DOSR

DSA VISION

Protecting Defence personnel and operational capability through effective and independent HS&EP regulation, assurance, enforcement and investigation.

PREFACE

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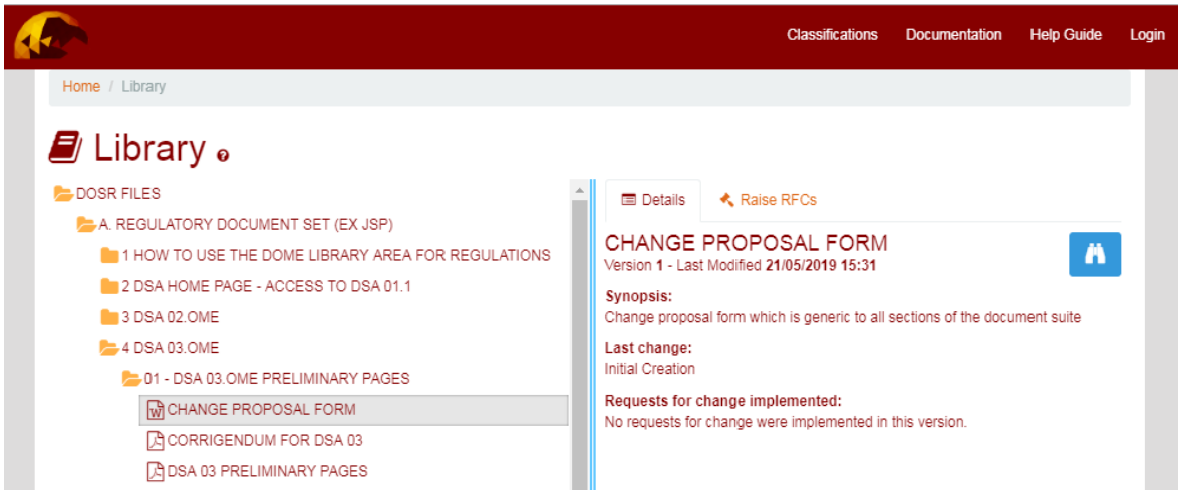

Figure 1. Change Proposal Form (Word version) Location

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5. Technical change proposals will need to be submitted to the associated Working Group for review and approval or rejection.

6. When incorporating changes care is to be taken to maintain coherence across regulations.

7. Changes effecting Risk to Life will be published immediately.

8. Other changes will be incorporated as part of routine reviews.

REVIEW PROCESS

9. The DOSR PRG team will ensure these OME Regulations remain fit for purpose by conducting reviews through the DOSR Governance Committees, involving all Stakeholders.

FURTHER ADVICE AND FEEDBACK

10. The document owner is the DOSR. For further information about any aspect of this document, or questions not answered within the subsequent sections, or to provide feedback on the content, contact:

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AMENDMENT RECORD

Version 1.0					
No	**Section**	**Para**	**Amendment Summary**	**Agreed**	**Date**
1	Annex	H3	Addition of Weapons to Table H3	Class-1	30/04/20

Contents: Safety and Environmental Case Development

1 The Safety and Environmental Case

1. Defence Standard (DefStan) 00-56[1] defines a Safety Case as "A structured argument, supported by a body of evidence that provides a compelling, comprehensible and valid case that a system is safe for a given application in a given operating environment."

2. A simple way of understanding the Safety Case is to consider the following basic questions:

a. What are you looking at? – (system description, scope and assumptions).

b. What could go wrong? – (hazard identification and analysis).

c. How bad could it be? – (risk estimation).

d. What has been or can be done about it? – (risk evaluation and risk reduction plans).

e. What if it happens? – (emergency and contingency arrangements).

3. The Safety Case should answer these questions for the whole system under consideration and for the uses defined. The Safety Case should also use plain English to make it easily understandable to all recipients.

4. Guidance about meeting the requirements of JSP 418[2] for incorporation into an Environmental Case are presented within the Project Oriented Environmental Management System Manual[3] (POEMS).

5. In recent years "Safety" and "Environment" Cases have been combined together, into a Safety and Environmental Case. The purpose is to demonstrate that safety and environmental requirements have been met and risk has been reduced to a level that is either Broadly Acceptable or Tolerable and As Low As Reasonably Practicable (ALARP) for safety; and meets the requirements of JSP418 for the environment. A Safety and Environmental Case should provide evidence that:

a. Safety requirements have been met.

b. The Ordnance, Munition and Explosive (OME) system(s) is compliant with the environmental requirements of JSP418.

c. Hazards have been adequately identified and analysed, and associated risks assessed in an appropriate manner.

d. All identified hazards have been addressed and controls applied, to ensure all residual safety risks have been reduced to a level that is either Broadly Acceptable or Tolerable and ALARP.

[1] DefStan 00-56 Safety Management Requirements for Defence Systems.
[2] JSP418 Sustainable Development and Environmental Manual.
[3] See Acquisition System Guidance (ASG).

e. All measures have been taken to ensure that safety and environmental levels achieved can be sustained through life, both in operation of the system and through support.

6. The degree of evidence required and work involved in developing a Safety and Environmental Case should be commensurate with the risk posed by a particular system, its complexity and maturity. There is a need to gather and manage the evidence throughout the life of project from concept to beyond disposal. Retention of evidence beyond disposal must be considered as claims can arise for some time after the equipment disposal.

7. The generation of a Safety and Environmental Case is an iterative process and should start as early as possible in the OME system's acquisition lifecycle. As a Safety and Environmental Case develops it is supported by a series of Safety and Environmental Case Reports (SECR). These reports summarise the arguments made and evidence provided, progress against the safety programme and endorses (via the Safety and Environmental Panel (SEP) / Safety and Environmental Management Committee (SEMC)) the arrangements for managing safety through life.

8. The Safety and Environmental Case should be subjected to independent review, as stated within DSA 02.OME. Further guidance is detailed within DSA 03.OME (JSP 520).

2 Reporting the OME Safety and Environmental Case

1. OME SECRs provide a status report on the OME safety activities undertaken to that point and are the functional output from the evidence contained in the Safety and Environmental Case. The requirement for a SECR is detailed in DSA 02.OME.

2. An OME SECR shall be developed for each OME related capability. Where more than one option is being considered for a given capability, separate reports must be produced for each option. As potential options are eliminated, the respective OME SECR must be closed off, but retained for future reference.

3. OME SECRs should be produced at key stages in the systems life and should demonstrate that the required levels of safety performance are being achieved and that all safety and environmental aspects are being addressed. The OME SECR provides senior managers and other stakeholders with visibility and assurance at specified milestones in the Acquisition Cycle that the Project Team Leader (PTL) is managing safety effectively. In accordance with Acquisition Safety and Environmental Management System (ASEMS)[4] PTLs are to personally sign the approval of SECRs.

4. At various stages throughout the Acquisition Cycle, the PT presents an OME Safety Submission to the OME Safety Review Panel (OSRP) for endorsement. As a minimum it should be presented at the following project milestones in the acquisition cycle:

a. Initial Gate.

b. Main Gate.

c. Entry to Service.

d. Withdrawal from Service.

5. In addition to the main milestones identified above and in accordance with DSA 02.OME, it will be necessary to have the live OME Safety and Environmental Case reviewed and the OME SECR issued at other stages during the Acquisition Cycle whenever changes affect the inherent safety of the system. Periodicity of producing regular SECRs arising from Safety and Environmental Case reviews, for the in-service phase (as distinct from introduction to service), should be proportional to the risks associated with the system and should align with the business approvals process. SECRs for the in-service phase should use real evidence of the actual in-service operation to demonstrate that the OME system is being used within defined limits and that necessary support elements are in place to sustain Safe Operation through life.

6. The Project Teams (PT) in consultation with the OSRP Secretariat will agree the milestones at which an OME Safety Submission will be presented for endorsement. Changes to the system or its safety programme may require these

[4] ASEMS Part 1 Policy

milestones to be revised and, as such, should be identified to the OSRP. Further guidance about the OSRP submission is provided within DSA 03.OME (JSP 520).

7. The exact content of a SECR will depend on many factors. These include the stage reached in the Acquisition Cycle, procurement strategy, the complexity of the OME, etc. At the Concept phase, for example, the evidence available in the OME SECR will be limited. By Acceptance (Demonstration to Manufacture Stage), most if not all detail should be available. Some acquisition strategies, such as Commercial off the Shelf (COTS) and Military off the Shelf (MOTS) will reach maturity in terms of OME safety data earlier than others. Given the variety of acquisition strategies available, the amount and type of evidence submitted may also vary but should demonstrate that all hazards and associated risks are either Broadly Acceptable or Tolerable and ALARP.

8. A generic template providing guidance for developing individual sections of the OME SECR is available at Annex B. Whilst use of this template is not mandatory, its use is strongly recommended. This template should be used in conjunction with Annex C and Annex D that provides a basis for the level of evidence that should be contained within an SECR at various stages throughout the Acquisition Cycle, to satisfy the OME Safety Submission to the OSRP. Whilst any other SECR format that contains relevant information identified within this template is acceptable, it is recommended that SECRs are structured in accordance with this template.

9. The OME Safety and Environmental Case should be integrated, or reconciled, with the system Safety and Environmental Case. This will assist in demonstrating that interface and other safety issues have been managed effectively, and that assumptions and cascaded Safety Requirements have been properly addressed. Where the OME and system SECR are combined, a compliance matrix to demonstrate how each of the DSA 02.OME requirements have been met (including signposting to the relevant section within the integrated SECR) should be provided.

10. The SECR can be implemented using the procedures described in Project Orientated Safety Management System[5] (POSMS) and Project Orientated Environmental Management System[6] (POEMS), or any other recognised good practice. Requirements for contractors for producing a Safety Case are contained in Def-Stan 00-56[7].

11. The DE&S Weapons Operating Centre (WOC) has a policy to standardize the use of tools and processes wherever practicable and has identified the use of Electronic Safety Case development tools as best practice. These tools will assist with the development, maintenance and review of Safety Cases, enabling the presentation of well structured safety arguments, supported by a body of evidence that can be centrally managed. These tools will also produce Safety & Environmental Case Reports in standard format for submission to the OSRP. Details of the processes are provided at Annex A.

[5] See Acquisition System Guidance (ASG).
[6] See Acquisition System Guidance (ASG).
[7] DefStan 00-56 Safety Management Requirements for Defence Systems.

3 OME Safety through the MTDS

1. The assessment of inherent OME safety risks presented to MOD personnel, third parties, materiel and the environment applies across the whole Acquisition Cycle and at any stage in a Manufacture to Target or Disposal Sequence (MTDS). MOD safety responsibilities require the PT to establish a safety management approach that addresses specific safety issues particular to each stage of the MTDS. The Safety Assessment shall also consider the integration of all elements necessary to deliver the defence capability, taking account of associated equipment and platforms, personnel training, maintenance facilities, tactics and procedures.

2. The OME Project Team Leader (PTL) retains responsibility for ensuring performance against the safety requirements is maintained and where practicable is improved within agreed boundaries. This shall include identifying the Duty Holders and seeking necessary assurance of continuing satisfactory arrangements across the MTDS as well as suitable and sufficient procedures for the modification, upgrade, concessions / production permits and rectification of faults and defects.

3. The following sections provide further details of the areas that PTs shouldl consider when assessing the safety of OME, and the associated standards that apply to each stage:

a. **Requirements Capture / System Design.** The Duty Holders are required to demonstrate a safe design and systems architecture in accordance with Def-Stan 07-85 Part1[8]. All requirements shall be periodically reviewed to consider the effects of emerging capabilities from new equipment, or the application of new / current military thinking, tactics, techniques and procedures on previous assumptions.

b. **Manufacture.** The Duty Holder responsibilities in this phase are limited, but the principles of Corporate Governance require the PTL to be satisfied that all Duty Holders' statutory duties (e.g. Manufacture and Storage of Explosives Regulations[9]) are the subject of a suitable and sufficient Safety and Environmental Management System (SEMS).

c. **Storage, Handling and Transport.** The Duty Holders are required to demonstrate compliance with the statutory duties and minimum standards for safe storage, handling, processing in accordance with DSA02.OME and transport as outlined in DSA02 DLSR Movement and Transport Safety Regulations, Dangerous Goods Manual (DGM) and remain compliant throughout their service life. Furthermore, they shall ensure that all MOD explosives (development and in-service) are classified in accordance with the requirements of the United Nations Recommendations on the Transport of Dangerous Goods as detailed in DSA02.OME. MOD explosives in this context includes all substances, and materiel containing substances, which are classified as Class 1 in the UN Recommendations on the Transportation of Dangerous Goods. Nuclear weapons containing conventional explosives can only be stored, processed and

[8] DefStan 07-85 Design Requirements for Weapons and Associated Systems.
[9] Manufacture and Storage of Explosives Regulations 2005.

handled in explosive facilities subject to the conditions of DSA02.OME and JSP538[10].

d. **Trials.** Where trials are performed at the direction of the MOD, whether on contractor's premises, UK or foreign ranges or in the service operating environment, the OME PTL (or nominated Duty Holder, including the sponsor) shall have a responsibility for ensuring the inherent OME safety of their equipment under trial, within the boundaries of the operating envelope. The Duty Holders are to jointly risk assess any operation outside that envelope. Such trials shall require an OSRP Assurance Statement[11] via an OME Safety Submission to the OSRP. Specific requirements relating to Land ranges are published in Military Aviation Authority (MAA) Regulations[12] and DSA02.OME. For trials or trials series, performed at the direction of MOD and involving the embarkation on, fitting to and discharge of OME from MOD-owned vessels, a pre-requisite of DSA02.DMR will be the issue of an OSRP Assurance Statement based on OSRP review of a formal safety submission. The evidence generated to support trials shall be proportional to the risk, taking cognisance of the known operating envelope, the likely controls and safeguards which will be in place and the likely time at risk.

e. **In-Service Use (including Armed Conflict and Peacetime).** The requirement to identify hazards and reduce levels of risk when operating in war and during transition to war remains paramount. Evidence shall be provided within the safety case to demonstrate sufficient design activity has occurred to allow procurement of OME that will be Safe and Suitable for Service[13] (S^3) when used within the 'assumed operating environment'. During peacetime use, limitations, restrictions and safeguards may be applied to satisfy safety criteria. Assessing the acceptability of relaxing these limitations and restrictions in wartime operations can only be made once the increased levels of risk are understood and balanced against the commensurate operational imperative. This requires inputs from multiple Duty Holders. However, the OME PT shall make inherent OME safety data available to Operational Duty Holders in order to inform the decision whether the operational imperative justifies the higher-level risk.

f. **In-Service Surveillance.** The purpose of In-Service Surveillance[14] (ISS) is to provide the information required to ensure that service OME remain safe, reliable and perform correctly throughout the period they are intended to. OME PTLs are required to produce Surveillance Plans for munitions for which they are responsible and In-Service proof plans where applicable. They are responsible for ensuring that proof and surveillance (including chemical stability testing), followed by appropriate sentencing and disposal is carried out for all munitions.

g. **Maintenance.** The OME PTL shall be satisfied that suitable and sufficient SEMS exists for the safe conduct of maintenance activities. System-specific information shall be supplied where the Safety and

[10] JSP538 Regulation of the Nuclear Weapon Programme.

[12] MAA01 Military
Aviation Authority Regulatory Policy.
[13] AOP15 Guidance On The Assessment Of The Safety And Suitability For Service Of Non-Nuclear Munitions For NATO Armed Forces.
[14] JSP762 Weapons and Munitions Through Life Capability.

Environmental Case demonstrates that full compliance with generic manuals, (including precautions required by DSA02.OME) is not reasonably practicable.

h. **Post Launch / Fire Hazards and Dynamic Safety.** The hazards presented by OME post-launch / fire are wide ranging and can be the responsibility of multiple Duty Holders. However, it is the responsibility of the OME PTL to identify hazards inherent to the design of the OME for which they are the Duty Holder and communicate where they have the potential to cause harm to MOD personnel, third parties, materiel and the environment. In addition to the consequences of inadvertent initiation, the hazards associated with intentional operation and discharge shall also be considered. Post launch hazards include impacting own forces and third parties, causing environmental damage through pollution, and endangering personnel with discarded debris such as unexploded munitions and battlefield damage. Inherent dynamic safety concerns the in-flight period within the defined system boundary, for example those hazards which result from either:

1) The ballistic performance of the round (such as deviation from the intended line of flight due to the operating environment, aerodynamic effects or ricochet), faults and failures with the potential to adversely affect the performance of inherent guidance, control and targeting systems.

2) Establishing the consequences and hence the risk of certain post-launch hazards will be dependent on operational issues, particularly during wartime operations, and hence beyond the scope of the OME PT's safety boundary. In such cases, data provided by the OME PT will feed into higher-level safety assessments and risk levels determined

i. Further guidance is provided within Annex E.

j. **OME Operating Environment Issues.** The issues shall be assessed as part of the Risk Assessment process. Safety and Environmental Cases shall include assessments of the hazard footprint calculated according to a suitable Hazard Analysis technique and inherent risks mitigated and / or the hazard footprint communicated to duty holders as appropriate.

k. **Disposal.** The risks associated with disposal at any point in the project lifecycle shall be established at an early stage and a suitable disposal plan generated. The OME PTL shall be satisfied that a suitable and sufficient SEMS exists to safely conduct any disposal activity and that known hazards and risks are communicated to appropriate Duty Holders. Fully established Explosive Ordnance Disposal (EOD) procedures shall be developed prior to use of the OME, including the identification of any specialist procedures, tools and techniques. Disposal plans shall demonstrate compliance with the core requirements (DSA02.OME). The term disposal covers a number of scenarios including:

1) Planned Disposal – The disposal of small quantities of life-expired or damaged stock. Although the operation may be performed by a third-party authority, responsibility for assessing the associated risks remains with the Duty Holder, i.e. the procurement / design authority.

2) Termination of service – The end-of-life or logistic disposal of large quantities of stock.

3) Unplanned Disposal / Emergency Contingencies – The emergency disposal in situ of items unsafe to move (ie, EOD and Render Safe Procedures [RSP]).

4) Contaminated Land (peacetime) – Legal obligations in training and storage facilities of obsolete OME and its safety disposal shall be assessed.

5) Battlefield Debris – Whilst the immediate consequences of the use of munitions may be readily apparent, the risks presented by discarded munitions and fragmented debris are also to be assessed. Legal obligations relating risks presented by discarded munitions and fragmented debris shall be assessed according to Explosive Remnants of War (ERW) and EOD clearance post-conflict requirements.

l. Further guidance on Disposal is presented within Annex F.

m. **Onward Sales.** When OME is passed to third parties for use after its MOD service life, the MOD has a duty of care to communicate what purpose the equipment is fit for and all hazards that have been identified. This may require additional work to establish the integrity of previously conducted assessments, in particular the validity of assumptions relating to the new operating environment and competence of users.

4 Arrangements for Special Cases-Code of Practice (COP)

Urgent Operational Requirements

Safety Management applies to Urgent Operational Requirements (UORs) as for any other project. However, it is recognised that, because of the short timescales and pressures under which UORs are procured, it may not be practical to apply the full requirements of the SEMS prior to a UOR coming into service. Nevertheless, MOD must ensure that it discharges its duty of care in an appropriate manner.

The basic principle to apply is that MOD must understand, and be able to demonstrate, that it can manage the main safety risks the system is likely to present. The possible shortfalls in the design must be clearly identified and shall be addressed if there is any planning for the future development, or extended use, of the system.

A top down Safety Assessment, concentrating on likely main hazards and accidents should be conducted. The SEP should ensure that mitigation action is robust, only relying, for instance, on training as a last resort. As part of this assessment the PT should request safety advice from the OME Safety Advisor. This advice will assess all available safety data and recommend additional risk control measures or limitations on use in areas where the evidence is inconclusive. The OME Safety Advice should form part of the UOR OME Safety Submission provided to the OSRP. The SEP should also ensure that those with responsibility for the deployment of the system, and the safety of personnel, are aware of the limitations under which the safety assessment was carried out.

Where OME is brought into service under UOR arrangements and then retained in service once the UOR has subsided, then the full requirements of DSA02.OME must be completed, within a reasonable timescale as agreed with the OSRP. This assessment must include the submission of a full SECR and associated documents, that form an OME Safety Submission, to an OSRP for independent review and endorsement in accordance with DSA02.OME. Irrespective of this, the PT should be continuing to gather evidence to demonstrate the full requirements of DSA02.OME, whilst the OME system is still classified as an UOR.

Further guidance on the Safety Assessment of UORs is provided within POSMS[15] and POEMS[16]

Safety of Life At Sea Stores

Safety Management applies to Safety of Life at Sea (SOLAS) stores as for any other project. However, MOD defines SOLAS stores as Low Risk OME and recognises and accepts that SOLAS stores have been tested to the requirements defined by the

[15] See Acquisition System Guidance (ASG).
[16] See Acquisition System Guidance (ASG).

SOLAS Life-Saving Appliance (LSA) Code and therefore do not need to be subjected to the full MOD Safety and Suitable for Service (S3)[17] testing.

Although it is not the intent to apply the full requirements of the Explosives Qualification process SOLAS stores will require an OSRP review. It is the responsibility of the PT, as the Duty Holder responsible for inherent OME safety, to demonstrate to the OSRP that stores classified as SOLAS satisfy the requirements of the LSA Code and that safety is being managed. Therefore, it is incumbent on the PT to demonstrate to the OSRP that:

a. The Risk Management principles are applied.

b. The SOLAS stores have been approved by International Maritime Organization (IMO) and Maritime Coastguard Agency.

c. DOSGST1 has been consulted during the design assessment process and that they are content with the energetic materials contained within the store.

d. If SOLAS stores are required to be flown then approval / concession in accordance with DSA03 DLSR Movement and Transport Safety Regulations, Dangerous Goods Manual (DGM). will be sought.

e. Arrangements are in place to manage the configuration and life of the SOLAS stock, in order that out-of-life stock are promptly removed from service.

f. The relevant Operational Safety Information has been and will continue to be provided to the Users[18].

g. The intended MTDS is compatible with the IMO approval and that relevant additional assessment of the store where intended use and user environments are different than the design intent have been successfully completed. This may be relevant for packs of SOLAS stores that are configured for deployment and resupply.

Small Arms Ammunition – Short Supply Procurement

Previous policy required full Safety and Suitability for Service (S3) of Small Arms Ammunition (SAA) prior to introduction into service. This process to demonstrate S3 typically required S3 Trials taking 12 to 18 months to complete followed by the production of S3 advice. Historically this supported a service life of 5 to 10 years. The full S3 process was cost effective and suitable in the past as the UK had large ammunition stockpiles that were rotated from war reserve to training requirement.

Due to increased pre-deployment training and a significant increase in SAA usage on operations, overall usage can reduce stockpiles and outstrip the ability of the usual manufacturers to resupply. Consequently, alternative similar ammunition often needs to be sought, at short notice, from new manufacturers in order to fill a shortfall.

Short Supply Ammunition is a collective term commonly used to cover NATO design SAA and Non Service Pattern Light Weapons (NSPLW) SAA. Short Supply Ammunition is not procured for stockpiling and as such only requires a reduced shelf life of 3 years.

[17] AOP15 Guidance On The Assessment Of The Safety And Suitability For Service Of Non-Nuclear Munitions For NATO Armed Forces
[18] See Annex A Part 7 for further guidance.

Traditional methods of gaining the evidence to give assurance of the shelf life of ammunition are lengthy, expensive and not conducive to or compatible with the short notice procurements necessitated by the recent operational tempo. Therefore a stream-lined system for procurement is necessary to allow procurement and supply of Short Supply Ammunition in an efficient manner.

The stream-lined system for procurement is presented within Annex G.

Non Service Pattern Light Weapons (NSPLW)

Prior to weapons being accepted as standard UK issue, and allowed to be fired by members of the Armed Forces, it is normal for service pattern light weapons, i.e. Small Arms (SA) weapons, to undergo an extensive series of tests, specified and overseen by the Defence Ordanance Safety Group (DOSG). These tests assess the weapon against the principles set out in Def-Stan 07-85[19]. Based on the results of these tests DOSG issues formal safety advice either recommending that the weapon may be considered as S3 or that manned firing for trials and evaluation purposes is supported, as the risks associated with manned firing are either Broadly Acceptable or Tolerable and ALARP.

However, there are occasions when UK service personnel may require to fire weapons which are non service issue and classed as NSPLW. For reasons of time, quantities deployed, cost or operational requirements it is not practical for these weapons to be subjected to the full series of tests, normally conducted. In these circumstances it is not possible for DOSG to give S3 advice or advice to enable manned firing.

Because the maintenance and safe, effective operation of NSPLW is typically not addressed by normal procedures, there is a need for a pre-firing assessment procedure to ensure the risks involved are reduced to either Broadly Acceptable or Tolerable and ALARP. Annex H lays down the assessment procedure to be followed before UK service personnel can be authorised to fire NSPLW.

Transferring the Safety and Environmental Case

Where a system is to be transferred to another management authority, it is the joint responsibility of the existing acquisition and operating authorities to ensure that the Safety and Environmental Case is complete and up to date. The handover and acceptance criteria must be systematic and documented.

A review and update of the through life SEMS should be undertaken and any incomplete or outstanding risk management activities identified. The resources required to implement any incomplete or outstanding actions should also be identified and agreed with the receiving management authority.

[19] DefStan 07-85 Design Requirements for Weapons and Associated Systems.

Annex A: Evidence Configuration Management

Introduction

1. **The DefStan 00-56[20] defines a Safety Case as '*a structured argument, supported by a body of evidence that provides a compelling, comprehensible and valid case that a system is safe for a given application in a given environment*". There is therefore a need to gather and manage the safety evidence throughout the life of project from concept to beyond disposal. Retention of safety evidence beyond disposal must be considered as claims can arise for some time after the equipment disposal. This applies equally to the Environmental Case.**

New Projects

2. **For new projects the Safety and Environmental Case is a planned activity and the Safety and Environmental Management Plan (SEMP) should specify the evidence required and its configuration management. For large programmes a specific 'Configuration Plan' maybe required.**

Retrospective Applications

3. **For existing projects, the Safety and Environmental Case retrospective application is required to be a planned activity and the SEMP should specify the evidence required and its configuration management. For large programmes a separate 'Configuration Plan' maybe required.**

Operating Centre and Commodity Projects

4. **For PT that manage a number of OMEs, the PT should employ a single configuration process / procedure agreed by the 'Letter of Delegation' holder that provides a consistent approach.**

Standards and Contracting

5. **DefStan 05-57[21] provides a basis to contract for 'configuration management' including safety case evidence.**

6. **For retrospective applications, good practice is to create a configuration plan / procedure agreed by the holder of the 'Letter of Delegation' that provides a consistent approach throughout the project lifecycle and that as a minimum addresses the following:**

a. Identifies all evidence that supports the Safety and Environmental Case that requires configuration management.

b. Provides change control management.

c. Provides a standard referencing methodology.

d. Defines evidence formats.

e. Identifies storage and backup requirements.

f. Identifies the relative importance of the evidence.

g. Defines disposal responsibilities and evidence retention requirements including the provision of funds.

[20] DefStan 00-56 Safety Management Requirements for Defence Systems.
[21] DefStan 05-57 Configuration Management of Defence Materiel.

Project Team Created Evidence

7. **Throughout the life of a project the PT will create Safety and Environmental Case evidence. This may include:**

a. Correspondence (letters, e-mails)

b. Notes of face-to-face discussions and telephone conversations.

c. Minutes of meetings.

d. Safety issue logs.

e. Response to incidents and accidents.

f. Log book entries.

g. Draft documents, etc.

8. **This safety evidence must be considered as part of the Safety and Environmental Case and good practice is to create a configuration management process agreed by the letter of delegation holder that provides a consistent approach throughout projects lifecycle.**

Standard Safety and Environmental Evidence Configuration Requirements

9. **Access to configured items should be restricted and controlled by an authorisation procedure to prevent accidental corruption of configuration and all reasonable steps to protect against malicious acts should be defined.**

10. **Safety and environmental evidence should be subject to configuration control as soon as possible. It is not acceptable for configuration control to be applied at the end of a task.**

11. **The status of safety and environmental evidence should be readily available (e.g. under development / draft, subject to technical assessment or frozen).**

12. **Ideally all Safety and Environmental Case configuration items should be included within the automated configuration system.**

13. **The Safety and Environmental Case Report should provide evidence configuration status accounting including, as applicable, the current version / revision / release, a record of changes, and the status of any applicable related problem, issue or audit.**

Tools

14. **The use of a tool to provide an automated configuration system is recommended. All tools used by the PT to aid configuration management should be defined in the plan / procedure and their suitability and reliability assessed and recorded.**

List of Safety and Environmental Evidence

15. **The following provides a list of PT and Project safety and environmental evidence (not exhaustive):**

a. ALARP assessments.

b. Audit evidence.

c. Board of Inquiry evidence and reports.

d. OSRP Assurance Statement.

e. Certificates and Clearances, including.

1) DOSR DOME Hazard Classification.

2) Explosive qualification.

3) Range safety measures.

4) Laser safety certification.

5) IM assessment.

6) Dangerous Goods by Air Committee (DGAC) Clearance.

7) Aircraft certification:

a) Aircraft Weapons Air Carriage and Release

b) Aircraft Self Damage (ASD).

c) Thermal Effects on Airborne Conventional Armament Stores and Equipment (TEACASE).

d) Aircraft Weapons Ballistic Committee (AWBC).

8) Logistic Parachute Delivery Clearance, commonly known as Air Drop Code.

f. Legacy documents:

1) Ordnance Board Proceedings.

2) OB Member's Letters.

3) CINO Safety Statements.

g. Competency Evidence.

h. Correspondence (emails, letters)

i. Cost Benefit analysis.

j. Disposal, emergency and contingency arrangements.

k. Environmental Hazard Analysis or Environmental Impact Screening and Statement.

l. Hazard Logs.

m. Human Factors safety evidence.

n. Incident and Accident investigations.

o. International agreements.

p. Interface agreements:

1) Customer Supplier Agreement (CSA).

2) Joint Service Agreements (Safety).

3) Joint Business Agreement (JBA).

4) Service Level Agreement (SLA).

5) Internal Business Agreement (IBA).

6) External Business Agreement (EBA).

q. Legislation, Regulation and Standards registers / list.

r. Letter Based OME Safety Submission.

s. Log book entries.

t. Minutes of meetings.

u. Notes of face-to-face discussions and telephone conversations.

v. OME Safety Advice.

w. OME Safety Submission Covering Letter.

x. OME Safety Instruction.

y. Roles and Responsibilities.

z. Safety analysis.

aa. Safety and Environmental Case Reports.

bb. Safety and Environmental Issues Registers.

cc. Safety and Environmental Management Plans.

dd. Safety and Environmental Requirements (Contractual).

ee. Safety Criteria Reports.

ff. Safety demonstrations and trials reports.

gg. Safety involved maintenance, processing, storage and transportation documents.

hh. Safety involved operator documentation.

ii. Safety involved training.

jj. Safety Metrics.

kk. Safety Training.

ll. Software safety evidence.

mm. Stakeholder Lists.

Audit

16. **To ensure that the Safety and Environmental Case evidence is being adequately managed regular audits of procedure compliance should be undertaken and the findings reported to the letter of delegation holder.**

Annex B: Safety and Environmental Case Report Template

1. This template can be used as guidance in conjunction with Annex C, that provides a basis for the level of evidence that should be contained within a SECR at various stages throughout the Acquisition Cycle. Whilst any other format that contains relevant information identified within this template is acceptable, it is recommended that the SECR is structured in accordance with this template.

Part 1: System Description

2. Section 1 – Capability

   a. Statement of Mission Need - As contained in the Key User Requirements (KURs) and expanded on in the User Requirements Document (URD) and the System Requirements Document (SRD).

   b. Operational Context and Threat – As contained in the KURs, URD and the SRD without adverse effect of security level of document.

   c. Capability Boundaries - Captured in the SRD, Contract and Certificate of Design.

   d. Capability Users - Which service is the system predominantly for or is it tri-service, as outlined in AOP15[22].

   e. General Constraints - Capability constraints are driven by the system limitations identified in the appropriate Certificate of Design.

3. Section 2 – Predicted Service Environment.

   a. Provide a summary of the predicted service environment, with reference to the completed Environmental Questionnaire within AOP15 Annex A, endorsed by the PTL.

4. Section 3 – Life Cycle Sequence

   a. Identify OME System Life Cycle Sequence (Also known as Manufacture to Target or Disposal Sequence (MTDS)), endorsed by the PTL.

   b. Provide a summary of the activities conducted at each of the lifecycle stages, including the OME state, e.g. whether it is an All Up Round, within its transportation packaging, etc.

   c. Provide a summary of how the Project is managing the interfaces with its stakeholders, including references to the formal agreements. Further guidance is provided within this document.

[22] AOP15 Guidance on The Assessment of The Safety And Suitability For Service Of Non-Nuclear Munitions For NATO Armed Forces.

5. Section 4 – System Definition

a. System Boundaries - What other components does the system interface with i.e. Data Programming Unit, Power Control Unit, All Up Round Container, Loader, if a munition what system of ordnance is identified?

b. System Interfaces - See Above plus additional equipment the system will interface with during its life cycle.

c. System Operation - The operational sequence of the system and its phase's i.e. Preparation, pre-launch operation during air- carriage, launch sequence and free flight etc.

d. Detailed Definition - A technical description of the system, supported by appropriate illustrations.

Part 2 – Safety and Environmental Requirments

6. The Safety and Environmental Case is the mechanism both for justifying that the Safety Requirements are appropriate and for demonstrating that they are being achieved. This section should identify the Safety Requirements, demonstrate that they are appropriate; and demonstrate that those requirements have been, or will be, achieved.

Part 3 – OME Review Category

7. Define the OME Review Category for the OME system and include supporting evidence. Guidance of defining the OME Review Category is provided in this document.

Part 4 – Safety and Environmental Management Plan

8. Section 1 – Risk Management.

a. Provide a summary of the Risk Management process undertaken, with reference to the relevant sections within the SEMP and the SEMS.

b. Present the Risk Criteria and provide a summary of the Risk Acceptance process.

9. Section 2 – Safety and Environmental Programme

a. Provide a summary of the SEMP, including a reference to this plan.

b. Reference the Safety and Environmental Programme – include a summarised programme as an appendix to the OME Safety and Environmental Case Report (SECR).

c. Provide a summary of the progress against the Safety and Environmental programme.

10. Section 3 – Review and Audit

a. Identify all internal and external Review and Audit arrangements applicable to the system.

b. Provide a summary of the review, status of actions and audit programme undertaken.

c. Define OME related defects, incident and accident reporting procedures.

d. Further guidance provided within the following DSA03.OME (JSP 520).

11. Section 4 – Roles and Responsibilities

a. Present the specific safety Roles, Responsibilities and Competence of the key personnel and organisations involved in the project, with reference to the relevant sections within the SEMP and / or the SEMS.

b. Further guidance is provided within this document.

Part 5 – Safety Assessment

12. Section 1 – Design Assessment

a. Explosive Classification.

1) Reference MOD Form 1655 (‘P’ or ‘T’ number, where appropriate).

b. Explosives Qualification.

1) Include Explosive Qualification Certificate.

c. Electrical Environment.

1) Provide a summary of any electrical / electromagnetic trials and assessments – include references to reports and detail which risk assessments these support.

d. Mechanical and Climatic Environment.

1) Provide a summary of any mechanical and climatic trials and assessments – include references to reports and detail which risk assessments these support.

e. Software.

1) Identify the Software Integrity Level of all safety related software – include appropriate references and detail which risk assessments these support.

13. Section 2 – Safety Trials

a. Provide a summary of the results of any Safety trials and assessment carried out, including references to reports and detail which risk assessments these support.

14. Section 3 – Range and Laser Safety

b. Provide a summary of any Range and Laser Safety Assessments, including references and detail which risk assessments these support. Range and Laser Safety Requirements and further guidance are provided within DSA03.OME (JSP 520)

15. Section 4 – Environmental Management and Assessment

a. Provide a summary of the environmental assessment against JSP418[23], including references and detail which assessment these support. In Particular, provide a summary of the Environmental Impact Scoping Study – include the completed Environmental Feature Matrix. Where appropriate, provide a summary of the Environmental Impact Assessment.

b. Further guidance is provided within Project Oriented Environmental Management System[24] (POEMS) manual.

16. Section 5 – Risk Management

a. Assumptions – Assumptions that underpin the scope of the Safety and Environmental Case , or the safety / environmental requirements, argument or evidence, should be stated. For example, this may include members of personnel, training levels, operational profiles, time in service, operational environment, etc.

b. Hazard Identification - Provide a reference to the Hazard Log, which, ideally, should be an annex to the SECR. Provide a summary of the Hazard Log, noting the significant risks.

c. Risk Assessment - Provide a summary on Accident Severity Categories, Accident Frequency Assessments and Risk Classifications, etc. Also the residual risk that is, or is anticipated to be, posed by the OME.

d. ALARP Status – Provide a statement for the identified potential accidents of either Broadly Acceptable or Tolerable and ALARP.

e. Actions – Present the Risk Management actions that are outstanding identifying both the risk and the organisation responsible for its management.

[23] JSP418 MOD Corporate Environmental Protection Manual.
[24] See Acquisition System Guidance (ASG).

Part 6 – Disposal and Emergency Arrangements

17. Disposal and Emergency Arrangements:

a. Identify the arrangements for OME Disposal.

b. Identify the arrangements for dealing with OME related incidents and accidents.

Part 7 – Operational Information

18. Operational Information:-

a. It is crucial that the outputs from the Safety and Environmental Case that are relevant to the management of the OME System throughout its lifecycle, are communicated to the relevant Stakeholders, e.g. operators, maintainers, Front Line Command (FLC), Estates Management (EM), Joint Support Chain (JSC Services).

b. DSA03.OME (JSP 520) provides guidance on the set up of agreements with the stakeholders, at the interfaces of the OME Safety and Environmental Case. These agreements should articulate what information should be passed across the interface.

c. This section should demonstrate what publications (e.g. procedures, handbooks, manuals, maintenance schedules etc) have been, or will be, developed to communicate the safety operational information to all Users, across the OME's MTDS; and that the level of information is appropriate to the User it is intended for, with referable evidence to support the claims. Types of information to be conveyed include:

1) A description of the operational envelopes.

2) List of any limitations and specific operating envelope necessary to manage system safety risks, during its MTDS.

3) Limitation placed by the OSRP.

4) Main areas of risk.

5) Relevant information that can assist the operator in balancing the operational imperative against safety risks.

d. The level of information required within the SECR, is dependent on upon the project's stage on the Acquisition Cycle.

e. Domain specific documents, Land (DSA03 DLSR Movement and Transport Safety Regulations, Dangerous Goods Manual (DGM), Sea (DSA03.DMR) and Air (MRP[25]), will have specific requirements on how operational information is published and communicated to all stakeholders.

[25] MAA01 Military Aviation Authority Regulatory Policy.

Part 8 - Conclusions

19. State conclusions of Report, including OME Safety Advisor, Independent Safety Auditor (ISA) conclusions where appropriate. Where an ISA is engaged, a formal ISA report should be prepared for inclusion in the SECR.

20. Provide a summary of identified limitations and provisos; identify any voids in the safety argument and what processes are in place to remove / control.

21. Provide a summary of the forward action plan.

References

22. A list of key reference documents the PT should have readily available and maintained including:

a. Explosive Hazard Data Sheet (or equivalent).

b. Environmental Hazard Analysis or Environmental Impact Screening and Statement.

c. PT OME Safety and Environmental Management System.

d. Appropriate operating environment statements, e.g. Naval Environment Assessment Statement (NEAS) (for OME to be used or carried in the Maritime environment).

e. Explosives compatibility matrices.

f. In-Service Surveillance Plan.

g. Disposal Plan.

h. Relevant Clearance and Certificates, including (where relevant to its Service Environment).

1) DOSR DOME Hazard Classification.

2) Explosive qualification.

3) Range safety measures.

4) Laser safety certification.

5) IM assessment.

6) Dangerous Goods by Air Committee (DGAC) clearance.

7) Aircraft certification:

a) Aircraft Weapons Air Carriage and Release

b) Aircraft Self Damage (ASD).

c) Thermal Effects on Airborne Conventional Armament Stores and Equipment (TEACASE).

d) Aircraft Weapons Ballistic Committee (AWBC).

8) Logistic Parachute Delivery Clearance, commonly known as Air Drop Code.

i. OME Safety Advice.

Appendices

23. These may include:

a. Hazard Log Report.

b. Diagrams of the Safety and Environmental Case Claim and Argument structure, e.g. Goal Structured Notation.

c. Calculations and Analyses.

d. Certificate and Clearances.

Annex C: Guidance Evidence Required for OSRP throughout the Acquisition Cycle

OME SECR Section	Evidence required at:			
	Concept Stage (Pre Initial Gate)	**Assessment Stage (Pre Main Gate)**	**Demonstration Stage (Pre Systems Acceptance)**	**Manufacture, In Service and Disposal (Post Systems Acceptance)**
PART 1 – SYSTEM DESCRIPTION				
Section 1 Capability	• Statement of the required capability or reference to appropriate documentation. • Inclusion of OME safety as either a capability or a constraint in the URD.	• Review for changes.	• Review for changes.	• Review for changes.
Section 2 Predicted Service Environment	• Outline of predicted service environment may be available.	• Development of predicted service environment and life cycle. DefStan 00-05[26] and AOP15[27].	• Details of predicted service life confirmed.	• Review for changes.
Section 3 Life Cycle Sequence	• Outline life cycle details may be available.	• Identification of major events expected to occur in the planned life cycle of the OME System from development to operational use or disposal.	• Confirmation of planned life cycle details.	• Review for changes.

[26] DefStan 00-35 Environmental Handbook for Defence Materiel, Part 4 Natural Environments.
[27] AOP15 Guidance On The Assessment Of The Safety And Suitability For Service Of Non-Nuclear Munitions For NATO Armed Forces.

Section 4 System Definition	• Unlikely to have data at this stage. • For MOTS buys where several solutions have been identified a system definition should be available.	• Outline System description available. • Outline System boundaries and interfaces specified (may be delayed if a number of options under consideration). • Method of operation, especially safety related software and safety critical components, specified (may be delayed if a number of options under consideration). • Details of energetic materials specified (may be delayed if a number of options under consideration).	• System boundaries and interfaces specified (if not specified earlier). • Method of operation, especially safety related software and safety critical components, specified (if not specified earlier). • Details of energetic materials specified, if not specified earlier.	• Review for changes.
PART 2 – SAFETY AND ENVIRONMENTAL REQUIREMENTS				
Safety Requirements	• Safety User Requirements - Safety targets specified in capability terms and included in URD. • Any specific environmental considerations or performance requirements that the PT are aware of, or that the equipment or service must meet; and included in the URD. • Safety System Requirements - Unlikely to have data at this stage.	• Review URD for changes. • Safety System Requirements - Safety targets and criteria specified as non-functional requirements (also called constraints). These requirements should form part of the SRD. • Safety System Requirements - Requirements should include criteria against which the system will be assessed and accepted (standards etc.). • Any specific environmental considerations or performance requirements that the PT are aware of, or that the equipment or service must meet. These requirements should form part of the SRD.	• Review for changes. • Changes at this stage to be the exception and must be fully justified. • Check SRD requirements included in contracts.	• Review for changes. • Changes at this stage to be the exception and must be fully justified.
PART 3 – OME REVIEW CATEGORY				

OME Review Category.	• General qualitative risk assessment based on system design concept in its predicted service environment leading to the assignment of a high, medium or low OME Review Category.	• Functional risk assessment. Def-Stan 00-56[28] and AOP15[29]. • Initial Review of OME Review Category.	• Review of OME Review Category.	• Review of OME Review Category.
PART 4 – SAFETY AND ENVIRONMENTAL MANAGEMENT PLAN				
Section 1 Risk Management	• Outline list of safety management activities needed to ensure that OME risks remain either Broadly Acceptable or Tolerable and ALARP throughout the Acquisition Cycle. • Outline the environmental management activities to ensure that the OME the will meet the requirements of JSP418[30] throughout the Acquistion Cycle.	• Confirmed list of safety management activities needed to ensure that OME risks remain either Broadly Acceptable or Tolerable and ALARP throughout the Acquisition Cycle. • Confimed list of environmental management actities needed to ensure that the will meet the requirements of JSP418 throughout the Acquistion Cycle.	• Review for changes.	• Review for changes.
Section 2 Safety and Environmental Programme	• Outline programme of work that identifies and schedules the safety / environmental management activities.	• Confirmed programme of work that identifies and schedules the safety and environmental management activities. • Appropriate consideration given to through life OME safety and its	• Review for changes.	• Review for changes.

[28] DefStan 00-56 Safety Management Requirements for Defence Systems.
[29] AOP15 Guidance On The Assessment Of The Safety And Suitability For Service Of Non-Nuclear Munitions For NATO Armed Forces.
[30] JSP418 MOD Corporate Environmental Protection Manual.

	• Appropriate consideration given to through life OME safety and its environmental impacts. • Endorsement review timings should be identified.	environmental impacts.		
Section 3 Review and Audit	• Outline arrangements for the review and audit of OME system for safety and the environment.	• Confirmed arrangements for the review and audit of OME system for safety and environment.	• Review for changes. • Results of early review and audit regime available. • Confirmation that Caveats, Provisos and Limitations included in earlier Certificates of Safety OME (including an overview of the Operational Information developed so far[31]have been put into practice.	• Review for changes. • Results of earlier review and audit regime available. • Confirmation that Caveats, Provisos and Limitations included in earlier Certificates of Safety OME have been addressed.
Section 4 Roles and Responsibilities	• Outline details of Organisations involved in OME safety and environmental management activities including roles, responsibilities and competences.	• Confirmed details of organisations involved in OME safety and environmental management activities including roles, responsibilities and competences.	• Review for changes. • Test accreditation and competencies of any Independent Safety and Environmental Advisors appointed.	• Review for changes.
PART 5 – SAFETY ASSESSMENT				

[31] refer to Annex B Part 7

Section 1 Design Assessment (Explosive Classification)	• Check on DOME Database to see if the item has already been classified. If not, plan and cost for.	• Produce evidence to DOSR of successful completion of classification and packaged article tests for development model. Obtain an DOSR Temporary Classification Number.	• Use the DOSR Temporary Classification Number.	• Produce evidence to DOSR of successful completion of classification and packaged article tests for production model. Obtain an DOSR Permanent Classification Number.
Section 1 Design Assessment (Explosive Qualification)	• Identify all Energetic Materials (EM) (giving details of material type and proposed use) and provide as much detail as possible, including any existing Material Qualification to STANAG 4170[32] and to Def-Stan 13-129[33]if available.	• Full details of all EMs, specifications and manufacturers. Material Qualification to STANAG4170 / AOP7[34]and any specific UK requirements agreed with DOSG-ST1. • Provide evidence of material / EM compatibility, with a proposed compatibility matrix as a minimum.	• Full Material Qualification data to STANAG4170 / AOP7 plus results of 'Type Qualification' from sequential environmental trials. • In Service Survalence (ISS) plan to be agreed	• Notification to DOSG-ST1 of any changes in manufacturer, spec, ingredients etc. (see STANAG4170 Para. 4c) and subsequent re-qualification results as agreed with DOSG-ST1. New EHDS if appropriate. • ISS results on EMs.
Section 1 Design Assessment (Electrical Environmental Assessment)	• No system data likely to be available except where an off-shelf solution is mandated. Identify all EM environments (for each MTDS phase) and associated tests / assessments to be met. Identify design standards required to be met for intrinsic safety. Safety case to state these levels /	• Initial hazard analyses for each option to level relevant to design maturity but at least to sub-system level. Identification of safety related sub-systems and how safety for each and for AUR will be demonstrated. Confirmation of environmental levels for qualification, precautions being taken to ensure levels will be met and details of how qualification will be achieved (tests and assessments to be done). Where system is off the shelf existing test results to be supplied.	• Full hazard analyses for all firing and safety related circuits. Justification that hazard targets have been met and risks are ALARP. Environmental test results and / or assessments to show system is safe throughout MTDS. Actual clearance levels and any operational restrictions	• For any design / obsolescence changes all analyses / assessments / tests to be reviewed and where necessary repeated. • Change of use / environment to be justified.

[32] STANAG 4170 Principles and Methodology for the Qualification of Explosive Materials for Military Use.
[33] DefStan 13-129 Requirements for Explosives Hazard Data Sheets for MOD Use.
[34] AOP7 Manual of Data Requirements and Tests for the Qualification of Explosives Materials for Military Use.

	requirements are feasible. Safety standards / environments for all electrical test equipment for each phase of MTDS to be identified. Need for storage and processing through life and identification of electrical safety standards to be applied.	Definition of test equipments required, environmental and safety standards to be applied. Definition of processing required, where to be done and standards applicable to both facility and OME.	resulting to be identified. • Safety justification for use of test equipments and facilities required for storage / processing throughout MTDS.	
Section 1 Design Assessment (Mechanical / Climatic assessment)	• No system data likely to be available. The User Requirement Document (URD) may include platform and environmental aspirations that will need to be expanded and detailed. • Work should start on an Environmental Requirements Document (ERD), including the AOP15[35]Environmental Questionnaire, in support of the System Requirements Document (SRD). • Material Qualification Data should be assessed to understand the	• A completed ERD is required including the Life Cycle Environmental Profile (LCEP). • As an absolute minimum this could be a completed AOP15 Environmental Questionnaire. Upper and lower temperature and humidity extremes for function and storage; the vibration and shock from transport and tactical platforms; must be identified. A Hazard Analysis to determine those environments most likely to degrade or damage the design. Need to ensure that specific Design or Test Limitations are not confused with the actual Environmental Requirements. Identify primary modes for physical and chemical degradation. Identify any need for mitigation (shock mounts, thermal protection, packaging). Component level stress analysis and	• Full hazard analysis and assessment of the resistance of the design to environmental stressing. The effects of cumulative (sequential) and combined (simultaneous) stresses should be analysed to give an All Up Round (AUR) level Safety and Suitability for Service assessment. In Service Surveillance Plan showing when (after what level of environmental exposure) key parameters need to be measured during the planned service life.	• Safety and Suitability for Service Report. In service surveillance reports will be compared to safety and suitability and “as new” data to give rate of degradation estimates. • Life Extension: Where the requirement changes, new platforms are added or the degradation rates are unexpected additional Safety and Suitability assessment data may be required as per AECTP600[36].

[35] AOP15 Guidance On The Assessment Of The Safety And Suitability For Service Of Non-Nuclear Munitions For NATO Armed Forces.
[36] AECTP-600: The Ten Step Method for Evaluating the Ability of Materiel to Meet Extended Life Requirements.

	temperature limitations and mechanical properties.	thermal degradation analysis.		
Section 1 Design (Assessment Software assessment)	• No system data likely to be available except where an off-shelf solution is mandated. Spec to identify requirements for Safety Related Software (SRS) and programmable hardware and confirmation to be given these will / can be met. Initial identification of where SRS will / may exist.	• Hazard analyses to determine safety integrity requirement for software and programmable hardware. Full identification of how such integrity will be achieved and demonstrated. Draft software / hardware safety & quality plans for each separate software development. Where previously developed software is to be used what evidence is available and how safety is to be justified.	• Safety case report, which incorporates software to be produced to include, Updated hazard analyses. Evidence for each software package that required integrity has been achieved through design controls, validation and verification and where necessary formal assessments.	• All changes to safety related software or associated hardware to be justified and implemented using same methods used during initial design.
Section 2 Safety Trials	• No system data likely to be available except where an off the shelf solution is being pursued. The User Requirement Document (URD) should identify the requirement for an Integrated Test & Evaluation Assessment Plan (ITEAP). The ITEAP ought to have placeholders for the typical range of OME Safety Trials carried out (eg IM, DOSR, S3, Energetic Qualification,	• Development of Systems Requirement Document, AOP15[37]and Manufacture to Target & Disposal Sequence, Initial Design Safety Assessment and ITEAP / Sequential and Non-sequential trials plans. Trials results from other users or from manufacturer may be available.	• Read across evidence (from other users / manufacturer, trials on similar OME) analysed. Trial Plans agreed and trials conducted. Results analysed and incorporated into the Safety Case to justify risk assessments and contribute to the ALARP argument. In Service Surveillance Program developed as necessary.	• In Service Surveillance Plan implemented and results analysed and incorporated into Safety Case. All configurations changes to be assessed and justified - retrials as appropriate.

[37] AOP15 Guidance On The Assessment Of The Safety And Suitability For Service Of Non-Nuclear Munitions For NATO Armed Forces.

	Laser Safety, Range Safety) depending on the OME being considered.			
Section 3 Range and Laser Safety	• Check with MLSC to confirm if system has already been cleared. If not, parameter data will be required, but often limited at this time.	• Produce evidence to the MLSC on hazard classification and hazard assessment along with appropriate safety procedures. Obtain an Interim Laser Safety Clearance Certificate.	• Use Interim Laser Safety Clearance Certificate	• Produce evidence of successful demonstration. Obtain MLSC Full Laser Safety Clearance Certificate
Section 4 Environmental Management and Assessment	• Identify environmental aspects and impacts. • Preliminary environmental case report. • Record relevant stakeholders. • Record relevant legislation and other standards.	• Revised environmental case report for each design option that prioritises the options in terms of environmental aspects and impacts. • Preliminary Environmental Impact Assessment. • Draft environmental objectives and targets. • Draft environmental management plan. • Outline of any further assessments or information needs.	• Revised environmental case report for chosen design option. • Revised environmental management plan. • Draft operational control procedures.	• Revised environmental case report. • Revised environmental management plan including disposal. • Revised operational control procedures. • Finalised disposal plan.
Section 5 Risk Management	• No data likely to be available other than that supporting the OME Review Category. • Risk management integrated into acquisition plans. • Risk management and control introduced into the design / selection procedures.	• Development of a Hazard Log. • Preliminary Hazard Analysis (PHA) leading to a risk assessment. Can be a development of the process initiated under "OME Review Categories" described above. Def-Stan 00-56[38] and AOP15[39] provides guidance. • User requirements can be met without causing unacceptable risks to capability, people, property and environment. • Management of hazards through	• Review development of Hazard Analysis. • Review Hazard log. • Review risk management activities.	• Review maintenance of hazard log. • Review Hazard log. • Review risk management activities. • Details the evidence, risk assessments, review by advisors to ensure that there is sufficient confidence in the OME system design that the

[38] DefStan 00-56 Safety Management Requirements for Defence Systems.
[39] AOP15 Guidance On The Assessment Of The Safety And Suitability For Service Of Non-Nuclear Munitions For NATO Armed Forces.

		elimination or control. • Identification of residual hazards.		OME system is safe and suitable for service.
PART 6 – EMERGENCY ARRANGEMENTS				
Emergency Arrangements	• No data available at this stage.	• Initial development of OME emergency arrangements. This should include: emergency and escape arrangements, procedures for dealing with misfires, hang-fires, casualty weapons, aborted discharges or any other unscheduled event.	• Review development of OME emergency arrangements.	• Review development and use of OME emergency arrangements.
PART 7 – OPERATIONAL INFORMATION				
Operational Information	• No data available at this stage.	• Initial development of operational safety information to support future trial programmes. • Unlikely to have no data available at this stage. However, if there are trials required to support the assessment then the evidence required will be similar to the "Demonstration" phase.	• Operational Safety Information for trials and assessments. • Initial development of operational safety information to support manufacture, In-service and Disposal	• Operational safety information to support manufacture, In-service and Disposal.
PART 8 – CONCLUSIONS				
Conclusion	• To provide a summary of the PTs conclusions along with those of the OME Safety Advisors conclusions and of the ISA if one appointed.	• Review and update.	Review and update.	Review and update.

Annex D: Evidence to Support Risk Assessments and ALARP Statements

1. The availability of evidence to support risk assessments and ALARP statements is an essential part of both safety implementation and safety assurance. In terms of an assessed risk, evidence is required to support both the assessed probability of the accident and contributory hazards occurring, and the assessed consequence of that accident. In terms of an ALARP statement, evidence is required that a mitigating mechanism reduces the risk as claimed or, conversely, that discounting a mitigating mechanism on the grounds of ineffectiveness is justified. The rationale for engineering judgements made, in support of a risk assessment and its ALARP statement must be recorded.

2. Evidence can take a number of forms:

a. Assessment by competent person or body. This might be an academic or professional body, an acknowledged SME, or even the Safety Management Committee or Panel. The competence of the authority or person must, however, be quoted.

b. Read across from evidence obtained for a similar system. Care must be taken that such evidence is applicable to the build standard and intended use of the system.

c. In-service history from UK or overseas forces use. Again, when overseas history is considered, care must be taken that such evidence is applicable to the UK build standard and intended use of the system.

d. Output from modelling of the accident scenario or hazards leading to accidents. Again care must be taken that such evidence is totally appropriate and that any assumptions made within it are true for the scenario modelled.

e. Results from trials or tests.

3. When deciding the form of evidence required, the following considerations apply:

a. The evidence to support a particular risk assessment or ALARP statement can come from more than one source.

b. Evidence from an assessment by a competent person or body on its own would normally only be sufficient to support low (class D) risks.

c. For medium (Class C) risks, read across, in-service history or modelling evidence should be sought first. Only if insufficient evidence is available from these sources should tests and trials be considered.

d. High risks (Classes A and B) invariably require supporting evidence from tests and trials.

e. Where the consequence of an accident might be high, such as that resulting from an IM hazard, test or trial evidence of that consequence may still be needed even if the assessed risk is low.

4. When tests or trials are conducted to provide safety evidence, the following factors should be considered:

a. Any OME subjected to test or trial must be fully representative of the in-service build standard. Any changes to the build standard may result in the need for tests or trials to be repeated.

b. Individual tests should be conducted to an accepted standard and trials conducting authorities should be accredited to known standards.

c. The trials must closely simulate the extremes of the hazardous environment which the OME is likely to encounter during its service life, such as:

1) Mechanical environments such as shock and vibration (Def-Stan 00-35 [40] Part 5 or AECTP 240[41]).

2) Climatic environments such as temperature, humidity, rain and ice. (Def-Stan 00-35 Part 4 or AECTP 230[42]).

3) Contaminating environments such as water, other fluids and dust / dirt (See Def-Stan 00-35 Part 4).

4) Electrical environments such as EMC, RADHAZ and Lightning. (STANAG 4297 [43] or for specific environments STANAGs 4242[44], 4370[45] or 4439[46]).

5) Accidental environments such as drop and fire.

6) Enemy action such as bullet attack.

7) Secondary environments such as fragment attack and sympathetic detonation.

d. When seeking evidence of the probability of an accident occurring during exposure to environments in which the OME is required to be stored, transported, maintained or operated:

1) The order of testing should replicate, as far as is practicable, that likely to be encountered in service since hazards can cumulatively lead to an accident.

2) Depending on its design and purpose, evidence may also be required that the OME may be operated safely during or after exposure to the simulated environment.

3) Ideally, a statistically valid sample of the OME should be subjected to test. However, where this is not practicable due to cost, the volume of production or the difficulty of the test technique, the biggest possible sample size should be used.

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[40] DefStan 00-35 Environmental Handbook for Defence Materiel, Part 5)
[41] AECTP 200:Environmental Conditions, Category 240, Mechanical Conditions.
[42] AECTP 200:Environmental Conditions, Category 230, Climatic Conditions.
[43] STANAG4297 Guidance on the Assessment of the Safety and Suitability for Service of Non-Nuclear Munitions for NATO Armed Forces.
[44] STANAG 4242 Vibration Tests Method and Severities for Munitions Carried in Tracked Vehicles - AOP34
[45] STANAG 4370 Environmental Testing.
[46] STANAG 4439 Policy for Introduction and Assessment of Insensitive Munitions (IM).

4) More than one ‘stream’ of tests (e.g. hot and cold) may be necessary to ensure that the extremes of potentially hazardous environments are tested.

5) Following the tests or trials, the OME may need to be functioned and / or subjected to Breakdown, Test and Criticality Analysis (BTCA) to confirm that no hazardous degradation has occurred.

e. When seeking evidence of the consequences of an accident:

1) Consideration should be given to pre-conditioning the OME under test by exposing them to representative environments which are likely to be encountered prior to the accident when in-service.

2) Similarly, consideration should be given to preconditioning the OME under test to the extremes of the in-service environment (e.g. high or low temperature) where it is assessed this may have an effect on the result.

3) Depending on the accident scenario being simulated, the OME may be required to remain safe for use following the trial. In other scenarios the OME may only be required to remain safe for disposal.

4) Such testing will frequently also provide evidence of the Insensitive Munitions (IM) signature of the OME.

f. The required tests and trials should be combined into the most cost-effective programme possible and should form part of the system Integrated Trials, Evaluation and Assessment Programme (ITEAP). Such a programme will frequently include testing of the suitability for service of the OME since many of the same considerations apply.

5. Tests and trials may also be needed in support of other specific requirements:

a. In support of Explosive Classification

b. In support of Energetic Material Qualification as detailed in STANAG 4170 [47]and AOP7.[48]

c. To establish the IM signature as detailed STANAG 4439 [49]

d. All evidence gained should form part of the Safety and Environmental Case and be referenced in the Hazard Log.

[47] STANAG 4170 Principles and Methodology for the Qualification of Explosive Materials for Military Use.

[48] AOP7 Manual of Data Requirements and Tests for the Qualification of Explosives Materials for Military Use.

[49] STANAG 4439 Policy for Introduction and Assessment of Insensitive Munitions (IM).

Annex E: Post Launch Hazards and Dynamic Safety

1. Dynamic Safety is a collective term applicable to ordnance systems that discharge munitions. It covers all events that occur between launch initiation (intentional or otherwise) and termination of motion. This includes the trajectories of the munitions and any associated projectiles, their interaction with terrain or objects (including the platform), together with ricochet, warhead events, and terminal effects. It excludes any consideration of events after termination of motion including post conflict Explosive Ordnance Clearance (EOC) or Explosive Ordnance Disposal (EOD).

2. Dynamic Safety can be affected by factors associated with the platform, systems that interface with launch (including software), flight control systems (including software), the characteristics of the munition, as well as environmental and operational conditions.

Assessing and Communicating OME Dynamic Safety.

3. OME PTLs should ensure that all safety issues and control measures are documented and communicated to relevant authorities and users. These risks and mitigations must be included in the safety case for both normal functioning and malfunctioning of the weapon system. All risks (e.g. self hit, blast damage, etc) and their possible causes (e.g. loss of control, early fuze function, etc) need to be considered.

4. The Duty Holders should train and supply competent users and provide appropriate safety bodies with any information that is needed relating to weapon danger areas, danger zones and Hazard Impact Area Traces (HIAT) including firing tables, aerodynamic models for the munition, etc.

5 In the operational environment the use of peace time risk reduction measures is sometimes impracticable. To assist the operational commander to understand and accept the risks associated with the use of the weapon system when balanced against the operational risk, the platform and OME PTs should ensure that pertinent data, relating to the dynamic performance of the system, is maintained and readily available.

6. The PT is to show evidence that the risk of self hit or re-contact is either Broadly Acceptable or Tolrerable and ALARP. This evidence shall include any trials data and any verified / validated modelling results and may include safety firing arcs.

7. The following documents contain relevant information for Dynamic Safety. This is not an exhaustive list and is intended as a guide.

Document	Title	Relevance
Def-Stan 00-101, Part 5	Explosives Safety in MOD Ships and Submarines. Ship Weapon Dynamic Safety.	Dynamic safety concerns for the naval environment
Def-Stan 07-85	Design Requirements for Weapons and Associated Systems	Safety requirements for fuzes, control systems and launching mechanisms
DSA03.OME (JSP 520)	Handbook of Defence Land Ranges Safety	Range safety for land systems and Air-ground systems
JSP418	MOD Corporate Environmental Protection Manual.	Environmental advice
DSA03.DMR	Management of Ship Safety and Environmental Protection.	Safety and environmental management of MOD shipping activities
JSP454	Land Systems Safety and Environmental Protection	Land System Safety
JSP482	MOD Explosives Regulations	Explosive regulations
MAA 01	Military Aviation Authority Regulatory Policy.	Weapon / Platform Safety (i.e. Aircraft Self Damage), Flight Safety
BR1043	Gunnery and Guided Weapons Practices – User Instructions	Naval Ranges
POSMS	Project Orientated Safety Management System manual	Safety issues
POEMS	Project Orientated Environmental Management System manual	Environmental issues including efflux and fumes

8. Advice and guidance on dynamic safety can be obtained through the OME Safety Advisor.

Annex F: Disposal

1. In AOP38[50] Disposal is defined as: “The end of life tasks and actions for residual materials resulting from demilitarisation operations. Disposal encompasses the process of redistributing, transferring, donating, selling, abandoning or destroying military munitions. Explosive Ordnance Disposal (EOD) activities are not included in this definition.” Munitions may be disposed through training, authorised sale to a third party, passed back to the manufacturer or other contractor for refurbishment or recovery, or ultimately may have to be demilitarised. Munitions may be disposed of through one or a combination of these routes in varying quantities throughout their life cycle.

2. The OME PTL is responsible for the OME system throughout the Acquisition cycle, which includes Disposal, thus making the PTL the Duty Holder during the disposal phase. A disposal contractor is responsible for the process, but MOD holds responsibility for selection of the contractor, provision of accurate and comprehensive technical data to the contractor, and ensuring the contractor is aware of the hazards associated with the munitions.

3. The Duty Holder is responsible for ensuring that Disposal is / was considered from the start of life of the OME system, the duty holder needs to ascertain that this was the case or generate a Disposal Plan for a legacy system. An appropriate and proportionate Disposal Plan should be generated and linked with the Through Life Management Plan (TLMP) so that it is kept up to date throughout the life of the OME system. The Disposal Plan is also a required part of an OME Safety and Environmental Case and thus they should be updated in line with each other.

4. Disposal Plans at introduction to service may be limited to consideration of disposal costs and outline disposal options, a detailed plan for any specific technique would not be of much value given that disposal may occur some 10-20 years later. Baseline data to inform a later disposal option may be included. The depth of technical data required to support the Disposal Plan must be appropriate and proportionate to the potential safety and environmental hazards. There are a number of occasions when this data might be used across the munition’s planned life cycle. In addition, the data might be needed as a result of unplanned activity or a change in legislation or disposal technique.

5. The OME Safety and Environmental Case must consider safety issues associated with disposal but only as appropriate to the specific disposal option. Commercially available disposal techniques and legislation potentially influencing techniques are likely to change over the period of ownership. The PT would only be expected to address the specific compliance issues at the time of planning for actual disposal. It is advised that when updating the disposal plan any major changes in procedure or legislation are noted.

6. Significant risks associated with disposal plans must be identified and controlled through life. These risks must be included in the Safety and Environmental Case, either directly within the main risk register, or as part of the Disposal Plan. Prior to specific disposal options being executed, specific safety and environmental risks for

[50] AOP38: Glossary of Terms and Definitions on Ammunition Safety.

that option are to be identified, controlled and recorded. This may be completed as a separate exercise in conjunction with a disposal contractor.

7. There is a requirement to address the environmental impact of the OME system throughout the lifecycle. An initial environmental impact screening and / or scoping assessment would be required to determine if there is any potential for negative environmental impact during the likely disposal options. The effect of the quantity for disposal should be addressed at this initial stage as this has a major influence on the disposal option chosen. Normally there would be no requirement for a detailed assessment as the demilitarisation would be carried out by a competent contractor within a compliant process in a compliant facility. If this is not the case, or it is accepted that there are materials that could have a negative impact on the environment and no compliant system has been identified, then further work to assess the impacts and their mitigation would be required. Disposal needs to be considered from the very start and designed in, so that the OME System can be easily disassembled at the disposal stage. The cost of managing the disposal of hazardous materials can be significant, and thus the materials chosen should be considered for their ease of disposal as well as their performance. However, the cost of the disposal process is usually driven by the difficulty of the process, manpower and transportation costs set against the revenue generated from commercially valuable recovered materials.

8. The Duty Holder is also responsible for ensuring that whoever is given the task of disposing the OME system is suitably qualified and trained. Duty Holders must also make sure that there is a clear trail proving that the system has been disposed according to regulations and that the item has actually been disposed. This is to avoid situations where the item is believed to have been disposed, but later falls into unauthorised hands where it may present a safety risk and a reputational risk to the UK MOD. In this case the original Duty Holder, (i.e. the person in the position of PTL during the Disposal phase), would be held responsible. As a guide a technical data pack listing the detailed design and packaging of the munitions, a list of energetic and other hazardous or restricted materials, any other stored energy, sensitive or valuable components or materials would provide sufficient initial information. The PT would normally require evidence of the proposed process and how this meets local and (if applicable) UK standards and legislation.

9. The Disposal Plan should include a procedure for disposal of small quantities of OME items at short notice. This includes: items returned unfired but downgraded from operational deployments, damaged items, or any other scenario which would require premature disposal. Consideration must also be given to disposal of any remnants after firing. This need not extend to a detailed analysis of, for example shell splinters on a range, but would, where necessary extend to instructions to range staff for the disposal route for things such as launch containers or fired pyrotechnics. In the first instance existing MOD procedures should be checked to identify if the new OME system falls within existing procedures. Only exceptions to standard procedures will require specific instructions.

10. The Duty Holder is responsible for the accountability of all OME items within an OME system. When items are nearing their end of life, suitable measures can be taken to either extend their life or to put disposal procedures into action. This process must be carried out with sufficient time to get the item out of wherever it may

be before it reaches the end of its life so that it is safe to transport to the location of disposal but must still be in a safe storage area preceding the actual date of disposal. Additional surveillance activities may have to be carried out to demonstrate continued safety of stock pending disposal.

11. Although the definition of Disposal does not include EOD activities, these must be considered, and appropriate emergency procedures put into place to allow authorised render safe procedures to occur following an incident.

12. Documents which give guidance on disposal processes and what a Disposal Plan should include are:

a. STANAG 4518 Safe Disposal of Munitions, Design Principles and Requirements, and Safety Assessment.

b. JSP886 The Defence Logistics Framework (DLF).

c. Through Life management Plan[51] (TLMP) - Disposal Phase.

d. JSP762 Weapons and Munitions Through Life Capability.

e. A&ER Volume 3 Pam 21 Parts 1, 3, 5, 9 and 13.

NOTE

13. The DGM PT is currently responsible for the provision of a service to the wider MOD for a central munitions disposal contract. This contract is currently let to QinetiQ's Shoeburyness facility. In addition, the DGM PT chairs the Defence Munitions Demilitarisation Committee and provides advice to other PTs regarding appropriate contractors. Further advice may be sought from the DGM PT's Munitions Disposals Section.

[51] See Acquisition System Guidance (ASG)

Annex G: Small Arms Ammunition – Short Supply Procurement

Overview

1. The purpose of this process is to provide a stream lined approach to assessing the safety & suitability for service (S3) of short supply ammunition.

Potential Hazards

2. The following are potential hazards associated with Short Supply Ammunition:

a. Ammunition developing lower pressure than the weapon needs, affecting accuracy and from a safety perspective, the possibility of a bullet lodging in the barrel causing an obstruction for subsequent firings.

b. Ammunition developing greater pressure than the weapon is designed to withstand, causing damage to the weapon and possible injury to the firer or other personnel within close proximity.

c. Propellant stabiliser depletion leading to the possibility of auto catalytic ignition whilst in storage or transit.

d. Leaking seals, allowing the ingress of moisture which will affect the performance of the propellant resulting in lower pressures.

Underpinning Considerations

3. The stream-lined process is based on the following underpinning considerations:

a. The design of SAA has not changed for many years. The basic concept and design of SAA has been around for well over 100 years and the ammunition is extensively used world wide.

b. Weapon chamber dimensions, ammunition designs and proofing pressures are standardised by various STANAGs and other international agreements.

c. Ammunition / weapon interface problems are highly unlikely and easily detected with weapon cycling and function tests and Electronic Pressure Velocity Action Time (EPVAT) testing.

d. The cost per item of SAA is small and as a result, most manufacturers conduct extensive proof testing on every lot of ammunition produced. This includes weapon functioning trials.

e. The majority of ammunition trials[52] are concerned with the reliability of the ammunition to function according to design, having been subject to long term storage and environmental or mechanical stressing. These risks are reduced with Short Supply Ammunition by limiting the life to 3 years and if necessary introducing restrictions e.g. for training only or use only in NW Europe.

[52] DefStan 07-85 Design Requirements for Weapons and Associated Systems and DefStan 00-35 Environmental Handbook for Defence Materiel.

Stream Lined Process

4. The stream lined procurement system, uses an initial assessment to allocate a short shelf life based on obtained knowledge and known risk for Short Supply Ammunition prior to testing. The initial assessment is then supplemented by evidence gained from tests (of reduced duration / scope from those applied for full S3 for 'long term contract' SAA.

5. **A 1 Year Assessed Shelf Life**. Based on sufficient information from the Design Authority (DA), manufacturer, supplier, available empirical evidence and read across.

a. **Initial Assessment**. The Project Team (PT) conduct an initial assessment of the Short Supply ammunition, based on a minimum level of information gained from the Design Authority (DA), manufacturer, supplier, empirical evidence (in service history from UK or overseas use) and read across from similar systems with an applicable build standard and intended use. The minimum information required is:

1) Detail of propellant chemical make up.

2) Detail of primer make up.

3) Detail of sealants and sealing techniques for projectile and cap.

4) Detail of mean service pressures the ammunition develops.

b. **Initial Shelf Life**. Based on sufficient information for a successful read across, an assessed shelf life of 1 year is authorised by the PT, with no DOSG input required.

6. **Extension to a 3 Year Shelf Life**. The minimum testing and analysis to provide sufficient evidence for the PT to authorise a 3-year shelf life for Short Supply Ammunition is:

a. **DOSG Assessment.** The PT task DOSG to conduct a design safety assessment using the evidence gained for the Initial Assessment. This would include design safety assessment of the propellant makeup / design that could cause a problem e.g. new stabiliser or inhibitors and if necessary, some weapon functioning, conducted by the supplier and witnessed by DGM and DOSG personnel.

b. **Preliminary Functioning and Safety Tests**. Used to obtain ballistic data and demonstrate that the strength of design of the round is satisfactory, it will not function prematurely, and that the pressures generated are safe in respect of both the gun and projectile. For Short Supply Ammunition the minimum testing would be:

1) A stabiliser depletion test in accordance with Allied Ordnance Publication (AOP) 48[53] is conducted. If the ammunition fails it would be removed from stock and disposed of.

2) Conduct of Weapon Cycling and Function Tests and EPVAT testing[54].

[53] AOP48 Explosives, Nitrocellulose Based Propellants, Stability Test Procedures and Requirements Using Stabilizer Depletion.

c. **Sequential Environmental Tests**. Used to verify that ammunition, packaged and unpackaged, can survive safely and satisfactorily within the expected environment. For Short Supply Ammunition the minimum testing would be conduct of an Immersion Test[55].

d. **3 Year Shelf Life**. Following successful minimum testing as indicated in the Table below, and in agreement with DOSG, the PT authorises a 3-year shelf life.

[54] Multi Calibre Manual of Proof and Inspection Procedures for NATO Ammunition.
[55] DefStan 00-35 Environmental Handbook for Defence Materiel.

7. Hazard and Mitigation. Table G1 below explains the mitigation for hazards:

Table G1: Mitigation for Hazards

Hazard	Tests required to Mitigate	Short Supply Ammunition	NATO Design SAA (Long Term Contract)
1. Ammunition develops lower pressure than the weapon needs. 2. Ammunition develops greater pressure than the weapon is designed for. 3. Propellant stabiliser depletion.	Preliminary Functioning and Safety Tests	Minimum testing: • PT / DOSG Design Assessment (read across) and Propellant Design Safety Assessment. • Stabiliser depletion test IAW AOP48[56] • Weapon Cycling and Function Tests. • EPVAT test in accordance with Multi Calibre Manual of Proof and Inspection procedures[57]	All tests as per DOSG S3 Trial Plan.
1. Leaking seals and ingress of moisture. 2. Risks to personnel from ammunition exposed to expected environments.	Sequential Environmental (Packaged and Unpackaged).	Minimum Testing: DefStan 00-35[58] (Test CL29 Immersion).	Selected tests as per DOSG Trial Plan.
Risks to personnel from ammunition storage.	Service Life Assessment.	Limitations in use, based upon read across and minimum testing.	Selected tests as per DOSG Trial Plan.
Risks to personnel from stressed ammunition.	Final Function & Safety Tests.	Limitations in use, based upon read across and minimum testing.	Selected tests as per DOSG Trial Plan.

8. NATO Design SAA. NATO design SAA procured for long term stock piling should continue to be subjected to full S^3 trials in order to gain firm evidence and sound assurance on which to base advice recommending the longer shelf lives necessary.

[56] AOP48 Explosives, Nitrocellulose Based Propellants, Stability Test Procedures and Requirements Using Stabilizer Depletion.
[57] Multi Calibre Manual of Proof and Inspection Procedures for NATO Ammunition.
[58] DefStan 00-35 Environmental Handbook for Defence Materiel, Part 4 Natural Environments.

Annex H: Non-Service Pattern Light Weapons (NSPLW)

Overview

1. The purpose of this process is to provide a pre-firing assessment procedure for NSPLW prior to the authorisation to fire.

2. Because the maintenance and safe, effective operation of NSPLW is typically not addressed by normal procedures, there is a need for a pre-firing assessment procedure to ensure the risks involved are reduced to either Broadly Acceptable or Tolerable and ALARP. This leaflet lays down the assessment procedure to be followed, before UK service personnel can be authorised to fire NSPLW.

3. Not withstanding the information in this leaflet, the use of NSPLW must be officially funded and authorised. The use of the generic NSPLW in Tables H1 to H4, that have been included in the Capability Directorate Combat (CD Cbt) Safe System of Training, can be formally authorised in writing by the Unit Commanding Officer (OF 4 level). The use of all other NSPLW must be formally authorised at 2 Star level.

Background and Information

4. **Reasons for Firing NSPLW**. NSPLW may need to be fired for the following reasons:

   a. Operational requirements (i.e. to obtain data on the weapons characteristics and performance).

   b. To compare the weapon to the equivalent UK service weapon.

   c. To demonstrate to others the weapon's characteristics and performance.

   d. To use the weapon to test other items (i.e. ammunition and ancillaries).

   e. To train persons in the use of the weapon, because the weapon has become an individual's personal weapon or in order to mentor foreign armies.

   f. To familiarise persons with the weapon (i.e. to recognise and make safe).

5. **Definitions of NSPLW and SA**. The definition of NSPLW are "*All foreign and obsolete British light weapons, whether officially issued or otherwise acquired, which are not 'in service*', i.e. not listed in the Catalogue of Material Authorised for Establishment Purposes. In this context, light weapons are stated to include all small arms, i.e. "*pistols, sub-machine guns, rifles, machine-guns, shotguns, carbines, anti-riot guns, grenade launchers and mortars*". Throughout this leaflet, the terms "SA" and "NSPLW" have been used to refer to those categories of weapons listed in DefStan 07-85[59].

6. **Mounts and Ancillaries**. Some NSPLW are equipped with weapon mounts (e.g. tripods, air defence or vehicle mounts) and ancillaries (e.g. bayonets). Hereafter, reference to SA includes mounts and ancillaries that are specific to that weapon. Guidance on the safety assessment of weapon mounts is in DefStan 07-85.

[59] DefStan 07-85 Design Requirements for Weapons and Associated Systems.

7. **Definition of Manned Firing**. Manned firing is defined as “the firing of any weapon, where personnel are in direct contact with, or in close proximity to a weapon when it is fired.” Close proximity is taken to be in any position where a person could sustain injury, should an incident occur, during firing.

8. **Authority to hold and train with NSPLW**. Authority to hold NSPLW and their associated mounts can only be granted by Sp and CBRN Cap branch, formerly DDOR (Pol & Sp) and later Soldier Systems Programmes-Lethality (SSP-Lethality) maintain a master register of authorised NSPLW being held by individual units, they are to be notified, by individual units, of all acquisitions of NSPLW, and their associated mounts and are also to be notified of changes to the categorisation of a NSPLW or mount (e.g. downgrading to DP or disposal). The following are examples of UK service personnel who routinely have the need to use NSPLW:

a. Special Forces (of all services).

b. Instructors and Students at: Operational Training and Advisory Group (OPTAG), Joint Service Intelligence Organisation (JSIO), Chicksands and RMCS Shrivenham.

c. Members of units training along side or mentoring foreign armies.

d. Officers and soldiers attached or seconded to foreign armies.

e. Soldiers and MOD Civilian Workers at Trials and Experimental Units (e.g. SSP-Lethality, Infantry Trials and Development Unit (ITDU) and QINETIQ).

9. **Rules for Safe Use of NSPLW**. The rules for the safe use of NSPLW must enable those with a legitimate reason to fire them to do so effectively and efficiently and must reflect the various ways NSPLW may be used. They must also be manageable and ensure that any risks, associated with the firings, are reduced to either Broadly Acceptable or tolerable and ALARP. The rules for the use of NSPLW is only applicable to SA weapons:

a. Which have been acquired and retained for service reasons.

b. Which the design assessment parameters, in DefStan 07-85, are applicable to and at the moment of firing, have a locked or sealed chamber.

c. When firing ball, tracer and inert projectiles only.

d. Using iron, passive optical sights, image intensifiers or thermal imaging sights only.

10. **Not Included in the NSPLW Process**. The following NSPLW and ammunition are unsuitable for the NSPLW Assessment process and should continue to be referred to DOSG for safety advice:

a. Weapons with an unlocked or unsealed chamber (e.g. recoilless weapons (RPG 7)).

b. Weapons using an active laser device (e.g. Laser Range Finders).

c. Firing of ammunition natures containing energetic materials other than SAA propellant and tracer compositions (e.g. HE natures, HEI, HEDP).

Assessment Of NSPLW

11. **Systematic Approach.** The assessment for the use of a NSPLW requires a systematic approach, which includes assessment of the whole system rather than the weapon alone. A flow diagram, showing such a systemic assessment, is at Figure H1. Once an assessment has been completed the results must be used to inform the Unit Commanding Officer (OF 4 level), authorising the use of NSPLW and to determine whether a 2 Star level authorisation is required.

12. **Initial Assessment of the requirement.** Although weapons can be fired remotely, there will be occasions when manned firing will be inevitable. However, manned firing is to be considered the exception rather than the rule. Therefore, before authorising manned firing, commanders must ensure that it is necessary to man fire the weapon and that the aim cannot be achieved by other means. If the aim can be achieved by remote firing, then a firing (Trial) instruction should be issued stating the trial details and the strict precautions to be observed. The following categories of NSPLW are not to be used for manned live firing:

a. Weapons that have not passed high-pressure proof, (i.e., no valid proof mark, see Def-Stan 05-101[60].

b. Weapons or mounts that do not conform to the design parameters (e.g. fails gauging) or show a significant change in measurements since the last examination.

c. Weapons previously down graded to instructional or Drill Purpose (DP).

13. **Manned Firing**. Where manned firing of NSPLW is considered necessary the Unit Commanding Officer (OF 4 level) must assess the safety of the complete system of firing and complete an Authorisation for Manned Firing of NSPLW Assessment form at Annex H2, before authorisation to fire is given. This will capture the following:

a. Justification of the need to ‘man fire’ the weapon(s).

b. Assessment of the firing regime and range practice, to ensure they do not exceed the weapon’s design criteria. If no specific design information is available then assessment against the generic design type (preferably UK equivalent) and adherence to any restrictions will help to mitigate risk to either Broadly Acceptable or Tolerable and ALARP. However, the firing regime selected must not place undue stress on the weapon or mount and under no circumstances should NSPLW be used for prolonged periods of sustained firing.

c. Assessment of the generic design of the weapon, to ensure that the design presents no inherent safety problems.

d. Assessment of the condition and maintenance of the weapon(s) to be fired to ensure that each individual weapon is safe to use.

e. Assessment that the ammunition to be used is the correct type for the weapon and that it is in a safe condition to fire.

f. Assessment of the range to be used, to ensure that it meets the safety requirements of the weapon characteristics.

[60] DefStan 05-101 Proof of Ordnance, Munitions, Armour and Explosives.

g. Provision of training for armourers, instructors and safety staff to enable them to undertake their duties effectively.

h. Provision of training for all firers to enable them to handle and fire the weapon safely. The level of training is to be such that the standards achieved are those required by the Army Operational Shooting Policy (AOSP) for the use of the equivalent UK weapon.

14. **Weapon assessment.** DOSG Weapons Section 1 (WS1) can advise on Design Safety Assessment. The safety of the weapon must be considered in 2 stages:

a. Inherent Safety of the Generic Weapon Design. The design of the weapon must not present any unnecessary risk, to any persons in the vicinity of the weapon, when it is fired. A design safety assessment or a comparison, with the design features of known weapon systems that have previously been judged as meeting the UK safety requirements. A list of weapons which are either in wide usage with NATO or other allied nations, or have been manufactured and used in such quantities for any serious defects in their design to have been identified is given at Tables H1 to H4. Though not listed in the tables, weapons manufactured under licence by other nations maybe considered as part of the same generic family. During any assessment or comparison, consideration must be given to the following key safety features of the design:

1) Design Strength. The weapon components must have sufficient material strength to withstand the stresses generated during firing. This is traditionally demonstrated by high-pressure proof firings.

2) Locking or Sealing of the Chamber. The weapon design must ensure that it can only fire once the breech is locked or otherwise effectively sealed.

3) Dwell Time. The mechanism of the weapon is such that the breech cannot unlock, or in the case of weapons operated by blowback or external mechanical mechanisms, does not open, until the pressure of gasses in the chamber have reduced to a safe level.

4) Mechanical Safety. The design of the mechanism must not allow the weapon to fire unintentionally (e.g. if dropped or subjected to vibration or whilst drills are being carried out).

5) Applied Safety. There must be an effective safety mechanism to prevent the weapon firing when not required (i.e. a safety catch).

Table H1: Generic Families of Pistols

Manufacturer	Model Name	Calibre(s)	Country of Origin	Remarks
Glock	Glock 17	9 mm x 19 mm (Parabellum)	Austria	
Browning	FN Browning	9 mm x 19 mm (Parabellum)	Belgium	Also made in Canada
Walther	Models PP and PPK	7.56 mm (.32 ACP)	Germany	Both models manufactured in all 3 calibres
		9 mm Short (.38 ACP)		
		.22 LR		
Walther	Model P5	9 mm x 19 mm (Parabellum)	Germany	
Uzi	9 mm Pistol	9 mm x 19 mm (Parabellum)	Israel	
SIG-Saur	P225 & P226	9 mm x 19 mm (Parabellum)	Switzerland	
Beretta	Model 92F	9 mm x 19 mm (Parabellum)	Italy	Also in service in USA
Springfield Armoury	M1911A1	.45 ACP	USA	Manufactured in both calibres
		9 mm x 19 mm (Parabellum)		
Colt	M1911A1	.45 ACP	USA	

Table H2: Generic Families of Sub Machine Guns and Machine pistols

Manufacturer	Model Name	Calibre(s)	Country of Origin	Remarks
Sterling	L2A3 SMG	9 mm x 19 mm (Parabellum)	UK	Also C1 from Canada
H&K	MP5	9 mm x 19 mm (Parabellum)	Germany	Also MP5 SD
H&K	HK 53	5.56 mm x 45	Germany	
Uzi	9 mm SMG	9 mm x 19 mm (Parabellum)	Israel	Mini-Uzi and Micro-Uzi
Beretta	38 / 49 Model 4	9 mm x 19 mm (Parabellum)	Italy	
Beretta	Model 12	9 mm x 19 mm (Parabellum)	Italy	Also Model 12S
Colt	9 mm SMG	9 mm x 19 mm (Parabellum)	USA	
Ingram	Model 10	.45 ACP		Manufactured in both calibres
		9 mm x 19 mm (Parabellum)		
Ingram	Model 11	9mm Short (.38 ACP)		Manufactured in both calibres
		9 mm x 19 mm (Parabellum)		

Table H3: Generic Families of Rifles

Manufacturer	Model Name	Calibre(s)	Country of	Remarks
FN	FAL	7.62 mm x 51 mm (NATO)	Belgium	Plus all variants of the basic models
	L1A1 SLR		UK	
	L1A1		Australia	
	C1 and C2		Canada	
	SAR-48		USA	
Steyr	AUG	5.56 mm x 45 mm (M193, M196)	Austria	Compromise rifling twist, can fire both types of ammunition
		5.56 mm x 45 mm (SS109)		
FN	FNC	5.56 mm x 45 mm (M193, M196)	Belgium	Ammunition type depending on the type of barrel fitted.
		5.56 mm x 45 mm (SS109)		
Colt / Armalite	AR15	5.56 mm x 45 mm (M193, M196)	USA	Also all variants
	M16A1	5.56 mm x 45 mm (M193, M196)		
	M16A2	5.56 mm x 45 mm (SS109)		
	C7 and C8	5.56 mm x 45 mm (SS109)	Canada	
FA MAS	FAMAS	5.56 mm x 45 mm (SS109)	France	
H&K	G3	7.62 mm x 51 mm (NATO)	Germany	
H&K	G36	5.56 mm x 45 mm (NATO)	Germany	
H&K	HK 33E	5.56 mm x 45 mm (M193, M196)	Germany	
H&K	HK G41	5.56 mm x 45 mm (SS109)	Germany	
H&K	HK G8	7.62 mm x 51 mm (NATO)	Germany	
H&K	417	7.62 mm x 51 mm (NATO)	Germany	
Remington	M24	7.62 mm x 51 mm (NATO)	USA	
Izhmash	Dragunov SVD	7.62 mm x 51mm R (Long)	USSR	
Galil	Assault Rifle	5.56 mm x 45 mm (M193, M196)	Israel	Manufactured in both calibres
		7.62 mm x 51 mm (NATO)		
Beretta	AR70 / 223	5.56 mm x 45 mm (M193, M196)	Italy	
Beretta	AR70 / 90	5.56 mm x 45 mm (SS109)	Italy	
CETME	Model A	7.92 mm x 57 mm (Mauser)	Spain	
	Model B	7.92 mm x 57 mm (Mauser)		
	Model C	7.62 mm x 51 mm (NATO)		
CETME	Models L & LC	5.56 mm x 45 mm (SS109)	Spain	
Kalashnikov	AK-47 & AKM	7.62 mm x 39 mm (Short)	USSR	All variants
Kalashnikov	AK-74	5.54 mm x 39 mm (Soviet)	USSR	All variants
Israeli Weapons Industries (IWI)	TAR 21/X95	5.56x45mm NATO/ 5.45x39mm RPC)	Israel	
Beretta Defence Technologies (BDT)	ARX 160	5.56x45mm NATO/ 7.63x39mm).	Italy	
Smith Enterprise Inc (SEI)	Mk 14 Enhanced Battle Rifle (EBR)	7.62x51mm NATO	USA	
Accuracy International (AI)	Mk 13 Sniper Rifle	.300 Win Mag	USA	

Table H4: Generic Families of Machine Guns

Manufacturer	Model Name	Calibre(s)	Country of Origin	Remarks
SASCO Defence	M60	5.56 mm x 45 mm (M193, M196)	USA	
Steyr	AUG HBAR AUG LMG	5.56 mm x 45 mm (SS109) 5.56 mm x 45 mm (M193, M196)	Austria	Available with various barrels. Ammunition depending on barrel
Browning / FN	M2 HBMG	50 Cal (12.7 mm x 99 mm)	Belgium USA	Also QCB variant
FN	MAG GPMG	7.62 mm x 51 mm (NATO)	Belgium	Also variants
FN	Minimi	5.56 mm x 45 mm (SS109) 5.56 mm x 45 mm (M193, M196)	Belgium	Ammunition depends on barrel
AA 52 / NF-1	NF-1	7.62 mm x 51 mm (NATO)	France	Also in 7.5 mm x 54 mm MAS as AA 52
H&K	HK 21A1	7.62 mm x 51 mm (NATO)	Germany	Belt Fed
H&K	HK 11A1	7.62 mm x 51 mm (NATO)	Germany	Magazine Fed
H&K	HK 21E	7.62 mm x 51 mm (NATO)	Germany	
H&K	HK 23E	5.56 mm x 45 mm (SS109) 5.56 mm x 45 mm (M193, M196)	Germany	Compromise rifling twist, can fire both types of ammunition
H&K	HK 13 LMG	5.56 mm x 45 mm (SS109)	Germany	LMG Version of HK 33 Rifle
H&K	MG4	5.56 mm x 45 mm (NATO)	Germany	Initially known as MG43
Galil	ARM Galil LMG	7.62 mm x 51 mm (NATO)	Israel	LMG version of Galil Rifle
Degtyarev	RPD LMG	7.62 mm x 39 mm (Short)	USSR	
Goryunov	SG43 and SGM	7.62 mm x 54 mm R (Mosin-Nagant)	USSR	7.62 mm Long
Kalashnikov	PK Series	7.62 mm x 54 mm R (Mosin-Nagant)	USSR	7.62 mm Long
Kalashnikov	RPK	7.62 mm x 39 mm (Short)	USSR	
Degtyarev	DShK-38	12.7 mm x 108 mm	USSR	12.7 mm Soviet
Enfield	BREN	7.62 mm x 51 mm (NATO)	UK	
Browning	30 Cal Model 1919A6	.30 Cal M2 US Service	USA	Canadian Version in 7.62 mm x 51 mm
Browning	50 Cal MG HB	12.7 mm x 99 mm M2 (.50 Cal Browning)	USA	

b. Safety of the Individual Weapon(s). Although, the above assessment or comparison may show that the inherent design of a weapon system may be safe, it is not an assessment of the safety of an individual weapon. Therefore, each individual weapon must also be assessed to ensure that it is in a safe condition. The armourer's inspection, in accordance with AESP 1000-A-003-013[61] should consider:

1) General Condition. The general condition of a weapon will give some guide as to the standard of maintenance that has been given to the weapon. During inspections, particular attention should be paid to the condition of such items as locking shoulders, locking detents, sears and bents as these all have a bearing on the safe operation of a weapon. If a

[61] AESP 1000-A-003-013 Policy and Procedures for Armourers Light weapons / Workshops

weapons history is in doubt, Non Destructive Testing (NDT) should be used to detect any fractures or material flaws that may render the weapon unsafe.

2) High Pressure Proof. The weapon must have been subjected to high pressure proof and carry a valid high-pressure proof mark. The validity of foreign proof marks will need to be ascertained. The presence of a proof mark on an obsolete British weapon or on weapons belonging to other nations may not be evidence of valid high-pressure proof. DefStan 05-101[62] contains information regarding the proofing of SA and proof marks.

3) Weapon Examination. A critical examination of the weapon, including accurate measurement of the following parameters will need to be made:

a) Barrel Bore Measurements. Barrel measurement, (use of 'Go' and 'No Go' gauges) should be used to ascertain the condition of the barrel. Measurements must be in accordance with manufacturer's recommended limits. Weapons exhibiting excessive wear may be inaccurate to the point of being unsafe.

b) Cartridge Headspace (CHS). CHS must be measured and be within specifications. A weapon with excessive CHS may be susceptible to a breech explosion as the case may not be fully supported at the moment of firing.

c) Firing Pin Protrusion (FPP). FPP must be measured and be within specifications. Weapons with excessive FPP may be susceptible to a breech explosion, as they may be capable of firing before the breech is locked or sealed and the firing pin could puncture the percussion cap, compromising the chambers seal.

d) Test Firing. Once the weapon has been passed as suitable for manned firing, to confirm its correct functioning, it should be test fired, at 25 m, in the presence of the unit armourer. Clearance to fire the weapon will need to be sought from the Range Administrating Officer. The average size of 4 x 5 round groups fired at the same point of aim should be recorded on the NSPLW record sheet, an example record sheet is at Annex H3. The weapon or mounting is to be rejected, for repair or replacement if: A group cannot be achieved within the acceptable standard. If no standard exists, the group size must not exceed the criteria laid down in the Additional Safety Rules – Overhead Fire in Pam 21[63], a round is noted to have struck the target Broad Side On (BSO) or all rounds do not fall within the shot box being used on a particular range, e.g. 300mm x 300 mm at 30 metres.

[62] DefStan 05-101 Proof of Ordnance, Munitions, Armour and Explosives.
[63] Infantry Training Volume IV Ranges, Pamphlet No 21 Regulations for Training with Armoured Fighting vehicles, Infantry Weapon Systems and Pyrotechnics 2009.

15. **Safety Assessment of the Ammunition.** The ammunition used with a weapon system has a direct bearing on the safety of that system. The following points are applicable:

a. Ammunition Type. The ammunition that is used must be of the correct type. It should be noted that ammunition from different manufacturers and of different types or marks, although of the same calibre, may have different types of propellant or projectiles of a different mass (e.g. 9 mm Parabellum and Luger or 5.56 mm M193 and SS109 / L2A2). Therefore, not all ammunition of a particular calibre will be compatible with the weapon concerned. Advice about the suitability of ammunition for particular weapons may be obtained from the Defence General Munitions (DGM) PT.

b. Ammunition Age and Condition. The chemical characteristic of propellants and primer compositions may be affected by age and by the environmental conditions under which they have been stored. Environmental conditions at the time of firing may also affect the pressure produced by propellants and the sensitivity of primers.

1) Ammunition with Ball, Tracer and Inert Projectiles. Ball, tracer and ammunition with inert projectiles are only likely to be effected by changes to primer sensitivity or pressures produced by the propellant, on firing. Variations in ammunition performance can lead to hazardous situations such as runaway guns or double tapping. These risks can be reduced by using ammunition of recent production, from an established manufacturer, that has been stored in good conditions. However, weapons using the “blowback” mode of functioning are more susceptible to changes in ammunition performance. Therefore, before using any ammunition to conduct training with a “blowback” weapon, a confirmatory functioning test (remotely fired) should be conducted using ammunition from the batch selected for training.

2) Inert Projectiles. Consideration should be given to the composition of the inert filling to ensure it presents no toxic hazard (marker compositions).

3) Ammunition with HE Projectiles. Assessment of such changes is a difficult task and cannot be undertaken without specialist knowledge and extensive trials. Such assessments are beyond the scope of units and all ammunitions with HE projectiles are to be referred to DOSG for advice.

16. **Assessment of the Firing Location**. The firing location will effect the safety requirements for the use of NSPLW.

a. Test / Trials Ranges. Firings on Test / Trials ranges will normally take place under strict safety precautions, with the weapon fired remotely. The firers and range staff are, therefore, separated from the weapon and protected at the moment of firing. Special safety rules, set out in the establishment standing orders, apply to these ranges. A trial safety assessment is required to be carried out and the results included in the specific instructions for the trial.

b. Live Fire Marksmanship Training. Where the firing is to take place on purpose-built ranges (e.g. Barrack Ranges, Gallery Ranges or Intermediate Marksmanship Range), firers will be under normal range supervision from the

range staff. The level of supervision to be provided must conform to that required in Pam 21[64]. In addition, it must be ascertained that the range is both suitable and licensed for the ammunition that is to be fired. This will entail ensuring that the muzzle energy of the ammunition does not exceed the design of the range.

c. Live Fire Tactical Training. Use of NSPLW on Live Firing Tactical Training Areas (LFTTA) will require compliance with the training progression and minimum levels of supervision required in Pam 21. In addition, it must be ascertained that the range danger area can accommodate the weapon / ammunition danger area.

d. Range / Weapon Danger Area / Zone (WDA / Z). When firing it is imperative that the correct WDA / Z template is applied and that the template can be contained within the range danger area. As danger area templates for the ammunition used with many NSPLW are often not available, DOSG-WS2r is to be consulted concerning the template requirements of these weapons.

17. **Training and Assessment of the Firer.** The following points need to be considered:

a. Training Time. Sufficient time must be made available to train all firers. The training syllabi must include all subjects applicable to safe handling and firing (e.g. safe handling, load, make safe, unload and stoppage drills).

b. Weapon Drills. Where possible, access to the weapon training pamphlets will be required to establish the correct drills, the NSPLW User Handbook[65] provides this information for some of the more regularly used NSPLW listed in Tables H1 to H4. For other NSPLW it may be possible, where the weapon has a similar mechanism to a known UK weapon, to employ the UK drills with which the firer is already familiar. However, care must be taken to ensure that the drills used are suitable for the weapon mechanism. In particular, the “unload” drill must be chosen to ensure there is no danger of a round being fired during the drill.

c. Weapon Handling Standards. The standard required is dependent on the way the weapon is to be used and on the level of supervision applied:

1) Operational Use and Normal Training. Where the weapon is to be used for operational purposes or under normal training conditions (i.e. LFTT or with normal levels of range supervision) it will be necessary for the firer to be trained in all drills. The standards of handling that is required are to be at the same level as those set down in AOSP[66] for the use of an equivalent UK weapon.

2) Using the Weapon under Strict Supervision. Where a weapon is to be used under strict supervision (i.e., on a purpose-built range), and where sufficient supervisors are available (i.e., 1:1), it may be possible for all weapon handling to be carried out by trained safety supervisors. In this

[64] Infantry Training Volume IV Ranges, Pamphlet No 21 Regulations for Training with Armoured Fighting vehicles, Infantry Weapon Systems and Pyrotechnics 2009.
[65] Infantry Training Volume 2 SAA (Personal Weapons) Non Service Pattern Light Weapons User Handbook.
[66] Army Operational Shooting Policy (AOSP).

case, it may be sufficient for the firer to receive the minimum training to hold, aim and fire the weapon safely.

18. **Assessment of Instructors**. The following points need to be considered:

a. Instructors. All instructors must be competent with the weapon and with the drills required to operate it safely. If instruction has to be carried out by instructors of a foreign army, it is to be validated by a competent UK instructor. Instructors must have:

1) Reached a standard of efficiency in weapon handling tests on the weapon at least to the equivalent pass level in the basic "safe handling, load, unload and stoppage drills" for the equivalent UK weapon.

2) A thorough knowledge of the weapon mechanism.

3) The knowledge and ability to zero the weapon correctly.

19. **Provision of Training and Support**. The provision of necessary training for all those involved in the assessment and firing of NSPLW is the responsibility of Unit Commanders. The following Units can support and assist with training of firers, armourers and instructors:

b. Royal Military College of Science (RMCS). The Light Weapons Section of the RMCS make extensive use of their NSPLW for live firing and their armourer can conduct the necessary training or updating of unit armourers.

c. HQ INF / SASC. The Weapons Collection holds an extensive collection of NSPLW and associated publications. HQ SASC can also advise on NSPLW training and testing.

20. **Assessment of Range Safety Staff**. All persons employed as Range Safety Staff must hold the necessary range qualification or authorisation as required by Pam 21[67] . In addition, they must be trained in the weapon(s) that they are to supervise and have passed Weapon Handling Tests (WHTs), to enable them to carry out their safety duties effectively. HQ SASC can advise on the regulations for firing and training with NSPLW.

21. **Frequency of Assessments**. The frequency of the assessment of a NSPLW will depend on the way in which it is to be used:

a. Operational and Regular Use. The initial assessment of the weapon design need only be carried out on the first occasion. Continued safety will then depend on routine maintenance and examinations by the armourer, and the standards achieved in training by range staff and firers. However, the remaining parts of the assessment (weapon, training, ammunition and ranges) must be carried out on all occasions.

b. Weapons that are the Property of Other Nations. Where the weapon is the property of another nation, an assessment will need to be conducted on each occasion it is intended to issue an authority for manned firing. Where individuals are leaving a Unit on attachment to a foreign army, it is the

[67] Infantry Training Volume IV Ranges, Pamphlet No 21 Regulations for Training with Armoured Fighting vehicles, Infantry Weapon Systems and Pyrotechnics 2009.

responsibility of that unit to ensure that an assessment is carried out on the weapons to be used. As it may be impracticable for an assessment to be conducted on the individual weapon, the individual concerned is responsible for ensuring that any weapon he is required to fire and any ammunition he is using is in a safe and serviceable condition. Where any doubt exists, individuals are to decline to use the weapon and refer the matter to a higher authority.

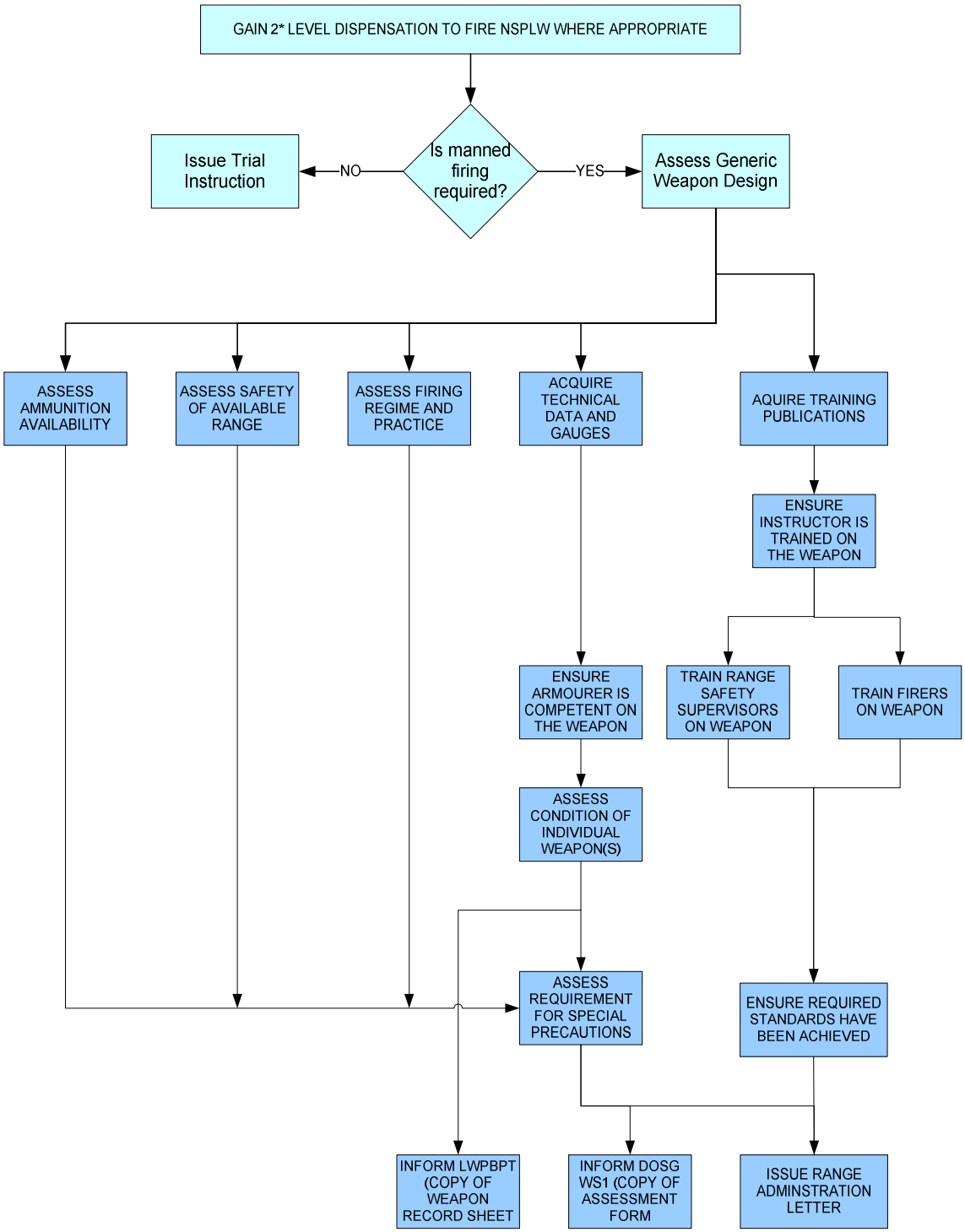

Figure H1: Authorisation for manned firing of NSPLW aide memoir – Flow Diagram

Other Considerations

22. Gauging, Maintenance and Inspections. Mandated requirements for gauging, routine and periodic maintenance, inspections and recording the results of those inspections are critical aspects of managing the risks associated with the use of NSPLW.

23. Weapon Gauging. All NSPLW, and any mounts which are property of the UK, are to be examined and gauged before each live firing session. Where a weapon is in continual use over a short period of time the examination and gauging should be repeated at intervals not exceeding one week. NSPLW, acquired new, should have the necessary gauges and technical publications. These will allow weapon gauging and measurement to be undertaken to the required degree of accuracy. Obsolete weapons and weapons obtained from other sources may not have the necessary gauges and publications. Where possible the necessary gauges are to be acquired from:

a. Other units holding similar weapons. Care must be taken to ensure that the gauges are calibrated and within specification.

b. Equivalent or similar UK weapons.

c. Composite gauges held by trials and experimental units. It will be necessary to ensure correct calibration of the gauges and that the user is competent in their use.

24. Periodic Maintenance, Examination and Inspection. In addition to the initial examination and assessment, NSPLW will require periodic maintenance, examination and inspection. It is considered that the following will be the minimum necessary:

a. Weapons that are UK Property. In addition to their normal regular maintenance programme, must be examined and inspected as follows:

1) Pre-Firing Examination. Before each live firing session, NSPLW must be critically inspected and a full set of measurements taken. If the weapon and mount are to be used for flanking fire with troops under training the weapon must be test fired prior to use and, in addition to functioning correctly, must meet the grouping criteria set out in Pam 21[68]. All test-firing results must be recorded on the weapon record sheet.

2) Annual Inspection. Units are to institute an annual examination of all NSPLW and any associated mounts held by them. Measurements are to be taken and recorded on the weapon record sheet. Unit annual Mandatory Equipment Inspection (MEI) inspections should include all NSPLW held by that unit. MEI Teams are to satisfy themselves that the weapons are being maintained in a serviceable condition, that the required inspections and measurements are being carried out and that the results are recorded on the weapon record sheet.

[68] Infantry Training Volume IV Ranges, Pamphlet No 21 Regulations for Training with Armoured Fighting vehicles, Infantry Weapon Systems and Pyrotechnics 2009.

3) Periodic Non-Destructive Testing. To ensure continued safety and serviceability NDT should be carried out on all safety critical components, of all weapons, at intervals of not greater than 5000 rounds and the test results recorded on the individual weapon record sheet.

4) NSPLW Record Sheet. An example record sheet is at Annex H3. It is to be maintained for each live firing NSPLW or mount, which is the property of the UK. If the measurements taken on any examination are not within design specifications, or there is significant change from the measurements previously recorded, then the weapon must not be used for live firing.

5) Toxicity and Noise. The use of non-service ammunition may subject firers to toxic residues, fumes, and noise levels in excess of those generated when firing service weapons. Firing of such ammunition must not present a hazard to those in the vicinity of the weapon or to the environment. To reduce such risks, firing in confined spaces should be avoided and double hearing protection, as described in Pam 21 (Ref.H5), is to be used at all times. To reduce the risks from toxic residues, personnel should wash thoroughly after firing or cleaning weapons in which non-service ammunition has been used.

6) Laser Safety. Sights containing laser devices (Range Finders) may be fitted to some NSPLW. The assessment of the safety of such devices is a complex subject and assessment of these devices can only be conducted by suitably qualified and experienced persons. Advice can be obtained from the DOSG Military Laser Safety Committee.

7) Personal Protection Equipment. The assessment of a NSPLW may indicate that there is a specific, but minor, risk associated with its use (e.g. unburned propellant fragments or excessive noise and blast). Therefore, it may be necessary for unit commanders to consider the use of PPE by persons engaged in firing the weapon, or in close proximity to it (e.g. the use of protective goggles and body armour).

8) Monitoring Authorisations for Manned Firing of NSPLW. To ensure that NSPLW assessments are being carried out correctly and to provide a record of those generic weapon families that have previously been assessed and fired, a system of monitoring and recording is required. The results of all NSPLW assessments should be recorded on the assessment form at Annex H2 and sent to Soldier Training and Special Projects (STSP) and DOSG WS1e to maintain a record of all assessments and authorisations in order to capture:

a) All initial assessments of NSPLW procured or acquired by the UK.

b) The results of any assessment of weapons belonging to a foreign army.

9) Private Weapons and Non-Public Funded Weapons. Private Weapons and Weapons purchased by units, using non-public funds, are not to be used for service reasons (e.g. operations and training). They are only to be used for the recognised sporting purposes for which they were purchased. The NSPLW process is not applicable to the assessment of either private weapons or weapons bought for sporting purposes, using non-public funds, i.e., Civilian Weapons.

Annex H2: Authorisation for Manned Firing of NSPLW Assessment Form

AUTHORISATION FOR MANNED FIRING OF NSPLW ASSESSMENT FORM
(To be completed for each weapon to be fired) * Delete as appropriate

1. Weapon: …… 2. Serial No.: ……
a. Holding Unit: ……
b. Firing Unit: (If different from holding unit) ……

3. Justification for Manned Firing. Can the aim be achieved by firing non-manned firing? YES / NO *
If "NO" state briefly why it is necessary to manned fire the weapon.
……
……
……

4. Assess Firing Regime and Practice(s) to be fired. (assessment per weapon)
Single Shot / Bursts* : …….. Max No of Rounds to be fired: ……
Rate of Fire …… (rpm) Max Burst Length ……..…..
Max no. of bursts before cooling …….. Cooling between serials: ……
Additional restrictions:
……..……..

5. Weapon Assessment:
Design Safety Assessment. To include weapon family (if known), and types of mechanical safety incorporated into the design.
……..…
……
……

Applied Safety Devices. State: Type, Description, Mechanism, Serviceability
……
……
……

Individual Weapon Assessment. To be completed by a qualified armourer. If any part of the inspection is not carried out a reason is to be given.

Were the following available: Technical Publications: YES / NO* Specifications: YES / NO* Gauges: YES / NO*

General Condition of the Weapon. (Cleanliness, Damage, Wear etc.)
……
……
……

Gauging and Measurement.

	Bore Go.	Bore No Go.	CHS	FPP
Requirement:	……..	……	……	……
Measurement:	……..	……	……	……

(4) Total Rounds fired previously (if known) ……
.
(5) Comments
……
……..

(6) Serviceability Assessment: Is the weapon considered safe for manned firing? YES / NO * Armourer's Name: ……. Class: ……. Signature: ……. Date: …….
6. Ammunition: Manufacturer: …….. Type: …… Lot No / DOW: …… General Condition: ……
7. Training. The following training was given: Armourer: Instructor: Range Staff: Firer(s): Publications Available …… Length of Training …… Location …… Weapon Handling Tests …… Dates of training Event …… Comments: …… ……..... Instructor's Name: …… Signature: …….. Date: ……..
8. Risk Reduction Precautions. Any special precautions to be taken (i.e. use of PPE etc.) …… …… Authorising Manned Firing: …… Signature: …… Date: …… CO(OF4) or 2 Star (as appropriate)

Annex H3: NSPLW Record Sheet

NSPLW RECORD SHEET											
WEAPON / MOUNT:											
SERIAL No:							SHEET No:				
Ser	Date	Results of Examination							Rounds Fired		Signature
		CHS	FPP	Bore		General Condition	Average 25 m Group Size	Sentence	Today	Total	
				GO	NO GO						

Notes:
To be maintained for all NSPLW which are the property of the UK MOD.
To be completed after each examination, inspection or firing of the weapon or mount.