

PREPARATION GUIDE
FOR THE
JOINT SERVICES WEAPON SAFETY REVIEW
SAFETY DATA PACKAGE

First Edition
(Version 1.1)



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Department of Defense

Deputy Assistant Secretary of Defense for Systems Engineering (DASD(SE)); Department of the Navy, Weapon System Explosives Safety Review Board (WSESRB); Department of the Air Force, Nonnuclear Munitions Safety Board (NNMSB), and Department of the Army, Army Weapon System Safety Review Board (AWSSRB). 2014. *Preparation Guide for the Joint Services Weapon Safety Review Safety Data Package*. Washington, D.C.

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LIST OF ABBREVIATIONS AND ACRONYMS

ACAT	Acquisition Category
AFB	Air Force Base
AFSEO	Air Force SEEK EAGLE Office
AUR	All-Up-Round
AV	All Viewpoint
CONOPS	Concept of Operations
COTS	Commercial Off-the-Shelf
DoDAF	Department of Defense Architectural Framework
DOT	Department of Transportation
E3	Electromagnetic Environmental Effects
EOD	Explosive Ordnance Disposal
ESD	Electrostatic Discharge
ESQD	Explosives Safety Quantity Distance
FMECA	Failure Modes, Effects, and Criticality Analysis
HAR	Hazard Action Record
HERO	Hazards of Electromagnetic Radiation to Ordnance
HMMP	Hazardous Materials Management Plan
HSI	Human Systems Integration
IAW	In Accordance With
IM	Insensitive Munitions
JS-FISSA	Joint Services-Fuze and Ignition System Safety Authorities
JS-SSA	Joint Services-Software Safety Authorities
JSWSR	Joint Services Weapon Safety Review
LSSRC	Lead Service Safety Review Coordinator
MAR	Mishap Assessment Report
MIL-S	Military Specification
MIL-STD	Military Standard
MRA	Mishap Risk Acceptance
NAVEODTECHDIV	Naval Explosive Ordnance Disposal Technical Division
NDI	Non-Developmental Item
NMD	Navy Munitions Document
NRC	Nuclear Regulatory Commission
OHE	Ordnance Handling Equipment
OV	Operational Viewpoint
PESHE	Programmatic Environment, Safety, and Occupational Health Evaluation
PHA	Preliminary Hazard Analysis
PHS&T	Packaging, Handling, Storage, and Transportation
PM	Program Manager
POP	Performance Oriented Packaging
PPE	Personal Protective Equipment
RAC	Risk Assessment Code
SDP	Safety Data Package
SE	Systems Engineering
SHA	System Hazard Analysis
SSMP	System Safety Management Plan

SSPP	System Safety Program Plan
SSRA	System Safety Risk Assessment
SSWG	System Safety Working Group
STANAG	Standardization Agreement
TOC	Table of Contents
UN	United Nations
UNREP	Underway Replenishment
VERTREP	Vertical Replenishment

SECTION 1 - INTRODUCTION

The primary tool used by the Joint Services Weapon Safety Review (JSWSR) Boards to evaluate weapons, weapon systems, ammunition, and any items containing explosives and/or energetic materials (known hereafter as “weapons”) intended to be used by two or more DoD Components is the Safety Data Package (SDP). In accordance with DoDM 5000.69, a SDP should be developed using this guide. The SDP is a detailed safety study of the weapon(s) and is used to obtain a safety decision from the JSWSR Boards. This guide establishes format and content uniformity among SDPs. The SDP should have the Program Manager’s (PM’s) concurrence prior to submission.

The following contacts are provided to the Program Manager’s (PM) office to provide assistance in tailoring the data requirements from this template for a weapon system review. The following contacts are the Service Safety Review Coordinators (SSRC) contacts. More information on the SSRC responsibilities is provided in DOD 5000.59-M, enclosure 3, paragraph 3.c. The SSRC will aid the PM and staff in tailoring the following template.

Army: Army Materiel Command (AMC), Safety Engineering Office

Primary: AMC (AMCPE-SF), phone: (256) 842-3246

Alternate: AMC (AMCPE-SF), phone: (703) 806-8705

Marine Corps: Marine Corps Systems Command (MARCORSYSCOM)

Primary: MARCORSYSCOM, Code 00T1, phone: (703) 432-3145

Alternate: MARCORSYSCOM, Code 00T, phone: (703) 432-4978

Navy: Naval Ordnance Safety and Security Activity (NOSSA)

Primary: NOSSA, Code N3, phone: (301) 744-6039

Alternate: NOSSA, Code N31, phone (301) 744-6018

Air Force: USAF Air Armament Center (AAC)

Primary: USAF Air Armament Center (AAC/SES), phone: (850) 882-7306

Alternate: USAF Air Armament Center, (AAC/SES), phone: (850) 882-7340

Beneficial comments and any pertinent data which may be of use in improving this guide should be addressed to: AWSSRB Executive Secretary, AMSAM-SF, Building 5301, Redstone Arsenal AL 35758-5301; or JWSWG Executive Secretary, Commanding Officer, Naval Ordnance Safety and Security Activity (NOSSA), Code N314, 3817 Strauss Avenue, Indian Head, MD 20640; or HQ AFSEC/SEWC, 9700 G Avenue, SE, Kirtland AFB, NM 87117-5670.

If the comments/data are e-mailed, please reference the appropriate Guide section/paragraph in the subject line to facilitate resolution.

SECTION 2 – GENERAL

The following general guidelines apply to all SDPs presented to the JSWSR Boards for approval.

1. MEDIA. All SDPs should be provided to the Lead Service Safety Review Coordinator (LSSRC) in electronic format for further distribution to JSWSR Board members.
2. MARKING AND SECURITY. Mark all SDPs in accordance with (IAW) the appropriate distribution statement, markings labels, and security requirements and transmit via approved methods specifically when dealing with classified information. If a SDP contains proprietary information, the first and last page must be marked “PROPRIETARY” at the top and bottom.
3. FIGURES AND TABLES. It is generally accepted literary practice to intersperse figures and tables throughout the text, as close as possible to their reference point within the text, rather than to group all figures and tables at the end of the text.
4. GENERAL APPEARANCE. The appearance of the final document reflects the care and professionalism with which it was prepared. As such, the safety studies should be proofread for spelling and grammar prior to submission.

SECTION 3 - SDP ORGANIZATION AND CONTENT

A SDP is divided into three distinct sections according to the needs of the report. These sections are the prefatory pages, the report body, and the appendices. Each of these sections is explained more fully below.

1. PREFATORY PAGES. The prefatory section is a set of standardized formatted pages design to facilitate distribution and accurate conveyance of correspondence. The prefatory section is always included in each SDP and the standard statements and formatted structure provided below should be followed closely.

a. Cover Page. This page should include the following information:

(1) Heading. "SAFETY DATA PACKAGE" - centered at the top of the page.

(2) Title. "SDP FOR [WEAPON NAME HERE]" - centered in the middle of the page.

(3) Date. "MONTH YEAR" - centered below the title and is the date in which the SDP will be published. The month and date are spelled out completely. Ensure the date changes for each version of the SDP.

(4) Distribution Statements. The submitting organization should indicate any distribution restrictions and if any of the SDP information is Proprietary.

(5) Office of Authorship. Below the distribution statements, the originating office must be listed, starting with the specific office address, center (if applicable), command, and ending with the military branch. This will be the address used for review boards correspondence.

(6) Security Classification Information (if applicable). This includes the classification and declassification information.

b. Table of Contents (TOC). The TOC should include, as a minimum, a listing of each independent section. Each appendix should also be listed by designation (e.g., Appendix A) and followed by its title.

c. List of Figures and Tables. If illustrations and tables are included in the main body of the text, this page(s) should be included. It should list items by title and page number.

d. Abbreviations/Acronyms. SDPs written with many acronyms or abbreviations should contain a "LIST OF ABBREVIATIONS/ACRONYMS" page.

2. REPORT BODY. This is the primary technical content of the SDP. It is strongly encouraged for the preparing organization to contact the LSSRC for guidance regarding interpretation of these requirements. The report body will always contain certain mandatory sections; additionally, secondary sections may be included to fully present the technical detail supporting their safety request for the review. Details are provided for both instances below for each SDP section.

a. Abstract.

(1) The Abstract is a brief (usually one-page) overview summarizing the purpose of the JSWSR, the life-cycle phase and program milestone, deltas from the previously reviewed version(s), safety testing, analyses and results, and the overall safety assessment.

(2) Include the lead system safety engineer's conclusions, recommendations and any notable findings or areas of concern.

b. Purpose and Scope.

(1) Purpose. State the reason for requesting this JSWSR, such as introduction of a new program, seeking concurrence to support a major milestone decision, or seeking concurrence for a developmental test event.

(2) Scope. Describe the overall scope of the SDP at the time of document submittal. This should identify any limits to the safety assessment and any system variants or components that are being assessed.

c. Background.

(1) Mandatory.

(a) Hardware Nomenclature (Service Designators and Name).

(b) If appropriate, state if the item is intended as a replacement, substitute, or modification to an existing system.

(c) Previous Safety Reviews. Include a summary of previous Boards' / Panel reviews held. Do not list OPEN findings and statuses in this section. Only reference the reader to the safety analysis section for the summary of OPEN findings and statuses, to include Fuze Safety Panel and Software Safety Panel (e.g., Joint Services-Fuze and Ignition System Safety Authorities (JS-FISSA) and Joint Services-Software Safety Authorities (JS-SSA)) findings.

(d) Program Organization. Include a brief description of the Program's organizational structure and include an organizational chart with names. Lead System Safety Engineer's location in the Program's organization is only needed for an introductory review. The Program's organizational structure and chart are not needed for follow on reviews.

(e) System Safety Working Group (SSWG). Provide a chart of the current SSWG members. Include member names, affiliations (e.g., Naval Explosive Ordnance Disposal Technical Division (NAVEODTECHDIV)) and roles (e.g., System Safety Lead, Design Agent, Software Test, User Representative, etc.). This description may only be needed at an initial review.

(f) Program Schedule. Provide a brief description of the Program Schedule,

including a representative depiction (e.g., Gantt chart overview) of the overall development of the weapon showing major acquisition milestones and procurement plans.

(2) Secondary.

(a) Acquisition Category (ACAT) Level. Provide the Acquisition Category ACAT Level of the program if applicable.

(b) System Development Process. Describe Safety's involvement within the Systems Engineering (SE) process at an introductory review. This information is not needed for follow on reviews. Only provide these details during follow on reviews if significant changes have occurred.

(c) Major System Interfaces. Identify aircrafts, ships, major system interfaces, and major system configurations used for or with this weapon.

d. Physical and Functional Description.

(1) Physical Description – Mandatory.

(a) The physical description should be based on actual production representative hardware. It can be broken into any number of distinct sections/subsections as necessary to provide a complete explanation of the components that make up the system under review.

(b) These sections are not limited to but should include the following (as applicable): system and component description, weapon deployment-related items, storage and shipping containers, critical or unique ground support equipment, and unique systems specific tools.

(c) Ensure safety devices, safety features, and energetic components (e.g. explosives, batteries, pressure containers) within the system and/or components are identified and adequately described.

(d) Include a listing of energetic components, composition and percentages/weights. Specific compositions and percentages/weights are not required for approved standard materials. Energetic composition data submissions for this Joint Safety Review process do not substitute the need for traditional energetic material qualification. Energetic material qualification should still be pursued in accordance with established individual Service procedures. Include Qualification/Final (Type) Qualification status if already in process. For non-fuze systems with safety critical electronics or software, include logic diagrams and programmable logic device specification summary.

(2) Physical Description – Secondary.

(a) Concept of Operations (CONOPS). Include a summary of the CONOPS for the weapon. An illustrated flow chart of the operational sequence is desirable. Also, present Department of Defense Architectural Framework (DoDAF) viewpoints adequate for understanding the broad scope of the architecture description. Include a graphical representation of the DoDAF viewpoints (e.g., All Viewpoint (AV)-1 and Operational

Viewpoint (OV)-1 /OV-2).

1. Operators and Operating Procedures. Provide operators' roles and responsibilities. Operators may be considered internal or external interfaces. Provide operation station information summarizing the procedures necessary to operate the weapon.

2. Personnel Requirements. Describe any additions or changes in personnel requirements to include quantities, ratings or ranks, any specialty background, knowledge, aptitude, or skill sets necessary, etc.

3. Personal Protective Equipment (PPE). Describe any PPE that should be used by personnel when handling, transporting, storing, or using the weapon, if any.

4. Storage and Transportation. Describe the storage and transportation plans for the weapon as applicable. Include details of any specialized storage requirements such as temperature limits, humidity limits, hazardous gas monitoring, remote reporting, security, fire suppression systems, ventilation, spill management, etc. Describe the intended modes of transportation for the weapon to include truck, rail, military airlift, sealift, Underway Replenishment (UNREP), Vertical Replenishment (VERTREP), etc. If applicable, include details about any explosives-rated rail heads, combat aircraft loading areas, piers, anchorages, etc. with the required Explosives Safety Quantity Distance (ESQD) arcs that may be necessary to support the storage and handling of the weapon.

(b) Laser Description. If the system contains a laser, briefly summarize the purpose and whether the laser has been reviewed by any of the services' laser safety review authorities. If so, include a copy of the Laser Safety Review authorities' findings letter as an appendix to the SDP. If the laser is not a weapon, this section is used for more of an acknowledgement of its role in the weapon.

(c) Operating Environments. Include a discussion on the known or anticipated operating environments for the weapon (e.g., temperature, humidity, salt fog, rainfall, sand, dust, solar, altitude, underwater depths, pressures, G-loading, etc.). Be considerate of what the environment factors could promote into the system such as fungi, insects, or animals.

(d) Ordnance Handling Equipment (OHE). Describe the OHE to be used for the handling of bare and containerized explosives / energetic components, as well as all-up rounds.

(e) Pertinent Technical Drawings, Models, and / or Animations. Include technical drawings illustrating all safety related features, functional graphics, models, and/or animations, and details of interfaces (e.g., mechanical, electrical, pressure, and software), a historical summary of the development of the program including previous spirals or increments, if any, and a brief description of the overall weapon architecture. It is not necessary to submit an entire technical drawing package, but rather only the page(s) that address safety features and their interface into or onto the weapon or host platform. Drawings, if necessary, may be included in an appendix to the SDP.

(f) Facility Requirements. Provide a description of any special facility

requirements to support the manufacture, handling, storage, transportation, or demilitarization/disposal of the weapon.

(3) Functional Description – Mandatory.

(a) The functional description is the logical description of the weapon's operational cycle from storage to target, pulling together in a logical sequence the various events/operations of subsystems/components described within the physical description (e.g., a missile's functional description may start with pre-programming on the ground and end with target impact).

(b) Ensure all safety critical functions are included in the sequence. A timeline figure may be used to clarify the sequence.

(4) Functional Description – Secondary.

(a) Assembly or Buildup. Describe any unique issues or requirements involved with the assembly or buildup of the weapon, if applicable.

(b) Commercial Off-the-Shelf (COTS) and Non-Developmental Item (NDI). Discuss how COTS and NDI items have been analyzed and integrated into the system with respect to safety.

(c) Human Systems Integration (HSI). Summarize the efforts to integrate human considerations into the design of the weapon along such categories as manpower, training, human factors engineering, personnel safety, personnel survivability, health hazards, and habitability, as appropriate. A copy of the HSI plan may be included as an appendix to the SDP.

(d) Software. Briefly describe the software functionality and specify the version of software.

e. System Safety Program. Describe the system safety methodology for the identification, classification, and mitigation of safety hazards as part of the overall SE process.

(1) Mandatory.

(a) Hazard Tracking. Describe the method planned or employed to track hazards throughout the lifecycle of the weapon.

(b) Risk Acceptance. Identify appropriate risk acceptance authorities for each involved Service/Component. Prior to exposing personnel or equipment to risk, ensure that the risk is adequately documented and accepted IAW DoDI 5000.02. Signed/approved risk acceptance documentation should be provided as appendices (e.g., System Safety Risk Assessment (SSRA), Hazard Action Record (HAR), Mishap Assessment Report (MAR), or Mishap Risk Acceptance (MRA)).

(2) Safety Documentation - Secondary. Provide a summary of appropriate programmatic documentation to include, but not be limited to, Programmatic Environment, Safety, and

Occupational Health Evaluation (PESHE), System Safety Management Plan (SSMP), System Safety Program Plan(s) (SSPP), and Hazardous Materials Management Plan (HMMP). Provide the status of safety documentation approval by the program office and planned updates. If applicable, provide the PESHE, SSMP, SSPP, and HMMP as appendices.

f. Safety Analyses.

(1) Mandatory.

(a) Describe the analytical tools and techniques applied in analyzing the weapon for potential hazards (e.g., energy trace barrier analysis, bent pin analysis, fault tree analysis).

(b) Provide a summary of the completed or on-going hazard analyses (e.g., Preliminary Hazard Analysis (PHA), System Hazard Analysis (SHA), Failure Modes, Effects, and Criticality Analysis (FMECA), etc.) with appropriate detailed discussion. Include a list of those hazard analyses that are planned and their anticipated completion dates.

(c) Provide a summary of the planned and current mitigations for the resolution or closure of hazards to an acceptable level of risk. For Legacy weapons, or weapons that have had previous JSWSRs, if applicable, summarize any new or changed hazard mitigations.

(d) Provide a summary of the compliance matrices to safety requirements (e.g., Military Standard (MIL-STD)-1316, 1901, 1911, etc.). Any non-compliance should be noted in this section. Completed matrices should be provided as appendices. If this documentation is included in the JS-FISSA data package, do not resubmit as part of the SDP.

(e) Include, as artifacts, the appropriate analytical reports as appendices to the SDP.

(f) Include information regarding Explosive Sensitivity data, as required, including methodology for obtaining.

(g) Risk Assessment. State which version of MIL-STD-882 the safety program is using. If your program uses a risk matrix different than Table III provided in MIL-STD-882E, discuss how the mishap severity and probability categories have been defined. This section should include a description of the process used to determine the level of safety risks associated with both hardware and software, and how the risks are conveyed to the risk acceptance authorities and the users for acceptance of any risk. It is noted that, per DoDI 5000.02, user representatives must provide formal concurrence prior to all Serious and High risk acceptance decisions. Document the total number of hazards, the event risk and target risk by Risk Assessment Codes (RACs) within a risk assessment matrix, and their statuses (e.g., open, closed, accepted, etc.).

(2) Secondary.

(a) JS-FISSA - Provide a reference or table that includes all fuze and initiation system-related open findings and status/plans to close findings.

(b) JS-SSA - Provide a reference or table that includes all software safety-related open findings and status/plans to close findings.

(c) The following analyses may be executed by the System Safety Program. A summary should be provided on analyses status (completed/planned). Completed analyses should be provided as appendices.

1. Preliminary Hazard List.
2. Preliminary Hazard Analysis.
3. System Requirements Hazard Analysis.
4. Subsystem Hazard Analysis.
5. System Hazard Analysis.
6. Operating and Support Hazard Analysis.
7. Health Hazard Analysis.
8. Functional Hazard Analysis.
9. System-Of-Systems Hazard Analysis.
10. Environmental Hazard Analysis.
11. Safety Assessment Report.
12. Hazard Management Assessment Report.

g. Testing. This section provides a summary of the Qualification and performance tests that substantiate the level of design safety. Appropriate tests are those that support the safety conclusions relative to hazard mitigation design features which were described in the Physical and Functional Description sections. For each test address the methodology (e.g. MIL-STD 331 Test D2), test asset quantity, test configuration/level of assembly and, whether it is sequential or stand-alone testing. This should include the tests the item underwent, results, any safety-related or other critical anomalies, any conclusion drawn from the test results by testers, etc. The test summaries can be narrative or tabular (**preferred**) format and structured in such a manner as to succinctly support the conclusions of the safety study. The following excerpt provides an example:

Fast Cook-off Test (IAW MIL-STD-2105D/Standardization Agreement (STANAG) 4240). Two production representative All- Up-Rounds (AUR) Advanced Hell Freeze Over Missile System with inert warhead were tested. One Rocket Motor case ruptured and remained within the fire pit. The second went propulsive vertically and landed 1000 feet from the fire pit.

In addition, coordinate with LSSRC to determine if test plans and test reports should be included as appendices. If this documentation is included in the JS-FISSA or JS-SSA data packages, do not resubmit as part of the SDP.

h. External Input to JSWSR Boards.

(1) Many of the following external inputs to include certifications, approvals, concurrences, assessments, and reviews may be required from the program. The LSSRC will coordinate with the Service Safety Review Coordinators to determine the information needed for a specific review. The LSSRC will determine if plans and reports need to be provided as appendices to the SDP. Example plans and reports include:

- (a) Air Worthiness .
- (b) Battery Review .
- (c) Cataloging.
- (d) Demilitarization /Disposal Plan.
- (e) Electromagnetic Environmental Effects (E3) (Hazards of Electromagnetic Radiation to Ordnance (HERO) and Electrostatic Discharge (ESD)).
- (f) Energetic Material Qualification.
- (g) Environmental Assessment.
- (h) Environmental/Hazardous Waste Characterization/Minimization.
- (i) Explosive Ordnance Disposal (EOD) Supportability.
- (j) Explosive atmosphere.
- (k) Final (Type) Qualification.
- (l) Flight clearances.
- (m) Interim (Final) Hazard Classification - Include EX#/Department of Transportation (DOT) terminology/Complete Hazard Classification, e.g., 1.2.1.E.
- (n) Health Hazard Assessment.
- (o) Insensitive Munitions (IM) Status - Include a summary of IM scoring and approval letter.
- (p) Laser Safety Review.
- (q) Legal Review.
- (r) Military Specification (MIL-S)-901D Shipboard Shock Test Results.
- (s) Navy Munitions Document (NMD).

- (t) Nuclear Regulatory Commission (NRC) Licensing.
- (u) Ordnance Assessment/ Surveillance Program.
- (v) Performance Oriented Packaging (POP)/United Nations (UN)/ Packaging, Handling, Storage, and Transportation (PHS&T) (including VERTREP).
- (w) Safety Confirmation/Release.
- (x) Safety Review of Technical Manuals.
- (y) SEEK EAGLE (Air Force SEEK EAGLE Office (AFSEO)) Dispensation.
- (z) Submarine Carry.
- (aa) Surface Danger Zones Approval.

i. Conclusions and Recommendations. Reiterate the purpose of the SDP, the rationale for JSWSR Boards' concurrence, and any recommendations from the Program Office.

3. APPENDICES.

a. Nature. The appendices of a SDP should include material which supports the conclusions of the safety study but which, if included in the SDP body, would disrupt its continuity.

b. Format.

(1) Cover pages for each appendix should be consistent within a study. Pages within an appendix should be numbered.

(2) If the appendix is not a stand-alone document, all figures and tables within the appendix should be listed in the SDP "LIST OF FIGURES AND TABLES." If the appendix is a stand-alone document, the figures/tables within the appendix do NOT have to be included in the SDP "LIST OF FIGURES AND TABLES."