



Chemical and Material Risk Management Directorate

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Environment, Safety, and Occupational Health (ESOH) Risk and Technology Requirements Status Reporting Procedures for all Program Reviews

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**Ms. Lucy Rodriguez
Booz Allen Hamilton**

**Mr. David Asiello
Office of the Deputy Under Secretary of Defense
(Installations & Environment)**

Outline

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Purpose

- ❖ **This briefing provides the recommended format for reporting **High** and **Serious** category ESOH risks and the status of compliance with ESOH technology requirements for programs, regardless of Acquisition Category (ACAT)**
 - ◆ These procedures are specified in the Defense Acquisition Guidebook Chapter 4.4.7.6
 - ◆ Guidance on ESOH risk management and the most current reporting requirements are located on the Acquisition Community Connection, ESOH Special Interest Area <http://acc.dau.mil/ESOH>

Background

- ❖ **As part of sustaining its mission DoD is committed to avoiding**
 - ◆ loss of life or serious injury to personnel
 - ◆ damage to facilities or equipment
 - ◆ harm to the environment and the surrounding community
 - ◆ failure with adverse impact on mission capability, mission operability, or public opinion

- ❖ **To accomplish this in systems acquisition we must use the System Safety methodology across ESOH disciplines to identify hazards and mitigate risks through the systems engineering process**
 - ◆ ESOH refers to all individual, but interrelated, disciplines that encompass environment, safety, and occupational health

Background, Con't

- ❖ **MIL-STD-882D, *DOD Standard Practice for System Safety***
 - ◆ DoDI 5000.02 requires all programs, regardless of ACAT, to use MIL-STD-882D as the Systems Engineering methodology for managing ESOH risks
 - ◆ Programs must apply MIL-STD-882D throughout the life cycle for all developmental or sustaining engineering activities
 - ◆ When properly applied, this methodology should ensure the identification and understanding of ESOH hazards and their associated risks and options available to eliminate or mitigate the risks

- ❖ **Program Managers (PMs) are required to eliminate ESOH hazards where possible and manage ESOH risks where hazards cannot be eliminated**
 - ◆ Consistent with overall program cost, schedule, and performance requirements
 - ◆ Utilization of applicable ESOH technology requirements

Background, Con't

- ❖ **The three types of ESOH risks that a Program Manager should address are:**
 - ◆ Impacts and adverse effects from routine system development, testing, training, operation, sustainment, maintenance, and demilitarization and disposal
 - ◆ Mission readiness impacts from system failures or mishaps, including critical software failures
 - ◆ System life cycle cost, schedule, and performance impacts from ESOH compliance requirements.

The Reporting Requirement (DoDI 5000.02, E12.6)

- ❖ For acquisition program reviews and fielding decisions, the program manager must report the status of all **High** and **Serious** ESOH risks and applicable ESOH Technology Requirements
- ❖ ESOH Risk assessments must be completed in accordance with MIL-STD-882D, the DoD Standard Practice for System Safety

This reporting policy is not being effectively implemented and we may be unknowingly exposing people, equipment, or the environment to system-related ESOH hazards

Advantages of Reporting

- ❖ **Understanding the life cycle ESOH risks associated with the system and status of mitigation measures implementation over time**
 - ◆ Providing appropriate management level review and allocation of resources when problems arise

- ❖ **Conducting trend analysis to identify recurring hazards, focus resources, provide technology solutions, and reduce risks across platforms and DoD**

Ensures Senior Leadership Awareness of Risk Management Decisions Being Made in Program Development and Sustainment

Definitions

- ❖ **Hazard.** A condition that if triggered by one or more causal factor(s) can contribute to or result in a mishap.
- ❖ **Risk.** A measure of the potential loss from a given hazard. Risk is a combined expression of the severity of the mishap and the probability of the causal factor(s).
- ❖ **Initial Risk.** The first assessment of the potential risk of an identified hazard. Initial risk establishes a fixed baseline for the hazard
- ❖ **Current Risk.** A measure of the risk from an identified hazard at a snapshot in time, taking into account the implemented mitigation measures and verification and validation of mitigation measures designed to reduce the likelihood of a mishap occurring or to reduce the potential consequences of a mishap if it occurs

Definitions, Con't.

- ❖ **Target Risk.** The projected residual risk level that the program manager plans to achieve by implementing mitigation measures consistent with the design order of precedence.
- ❖ **ESOH Technology Requirement.** Hazard mitigation technology designed to eliminate or reduce the risk of systems or equipment failure and associated personnel and environmental hazards which may occur with or without failure of the system. These technologies are not inherent parts of the design of the system, but rather are additions that have the primary purpose of mitigating a specific safety, personnel, or environmental hazard. For example, aircraft landing gear would not be an ESOH technology because it is an essential part of the basic design of an aircraft.

Definitions, Con't.

- ❖ **Risk Assessment Code (RAC)**. A combination of one probability level and one severity category that correlates to a specific cell (and risk assessment value).

RISK ASSESSMENT MATRIX				
FREQUENCY OF OCCURRENCE	I. CATASTROPHIC	II. CRITICAL	III. MARGINAL	IV. NEGLIGIBLE
A – FREQUENT	IA	IIA	IIIA	IIVA
B – PROBABLE	IB	IIB	IIIB	IIVB
C – OCCASIONAL	IC	IIC	IIIC	IIVC
D – REMOTE	ID	IID	IIID	IIVD
E – IMPROBABLE	IE	IIE	IIIE	IIIE
HAZARD Risk Index	Risk Level & Acceptance Authority			
IA, IB, IC, IIA, IIB:	HIGH			
ID, IIC, IIIA, IIIB:	SERIOUS			
IE, IID, IIE, IIIC, IIID, IIIE, IVA, IVB:	MEDIUM			
IVC, IVD, IVE:	LOW			

Reporting Procedures

- ❖ **The PM will summarize ESOH risk and technology requirements, in the recommended format at program reviews**
 - ◆ Risk data will include all ESOH risks for which the current or target risk categories are High or Serious
 - ◆ ESOH Technology Requirements on the system and their implementation status
 - ◆ Supporting Information should be maintained in the Programmatic Environment, Safety, and Occupational Health Evaluation (PESHE) document

ESOH Risk Reporting Requirements

- ❖ **For all hazards whose current or target risk categories are **High** and **Serious**, as derived using MIL-STD-882D methodology, include:**
 - ◆ Hazard ID and Title
 - ◆ Description of Hazard
 - ◆ Current RAC and risk category
 - ◆ Mitigation(s) and mitigation status, including implementation date(s)
 - ◆ Target RAC and risk category

ESOH Risk Reporting Format EXAMPLE

Current or Target Risk Categories are High & Serious
- 5 Current High & Serious ESOH Risks
(Two are also Target Serious ESOH Risks)

	I	II	III	IV
A	Red	Red	Orange	Yellow
B	Red	Red	Orange	Yellow
C	2	Orange	Yellow	Green
D	3	Yellow	Yellow	Green
E	Yellow	Yellow	Yellow	Green

Hazard ID	Hazard Title	Description	Current RAC & Category	Mitigation	Mitigation Status / Date	Target RAC & Category
1	Inadvertent Launch	Inadvertent launch or release of ordnance could result in personnel death or system loss.	ID Serious	1. Incorporate redundant interlocks to preclude inadvertent launch. <u>2. Incorporate warnings / cautions in TM</u> 3. Validate design features via testing.	1. Complete – Aug 2005 <u>2. Open – Oct 2008</u> 3. Open - Jan 2009	IE Medium
2	Fire	Uncontrolled fire causes personnel death, loss of system or environmental damage.	IC High	1. <u>Incorporate automatic fire protection.</u> 2. <u>Change material to be more fire resistant and environmentally friendly.</u>	1. Open – Dec 2008 2. Open – Dec 2008	IE Medium
5	Toxic Materials Released into Environment	In the event of a fire, toxic material is released into the environmental, leading to irreversible environmental damage.	IC High	1. <u>Incorporate automatic fire protection.</u> 2. <u>Change material to be more fire resistant and environmentally friendly.</u>	1. Open – Dec 2008 2. Open – Dec 2008	IE Medium
6	Toxic Fumes During Operation	During weapon firing operations, excessive toxic fumes (CO, NO, NO2) are present and could result in personnel death.	ID Serious	1. <u>Change explosive composition to minimize toxic fumes.</u> 2. Improve toxic fumes evacuation system. 2a. Improve seals around system. 2b. Increase fan capacity. 3. <u>Obtain test data to verify design changes.</u>	1. Open – Aug 2010 2. Complete – July 2007 2a. Complete – July 2007 2b. Complete – July 2007 3. Open – Jan 2009	ID Serious
7	Software Failure Leads to Ballistic Error	Inaccurate targeting of ordnance fired leads to friendly firing.	ID Serious	1. <u>Perform software V&V to verify safety critical software meets requirements.</u>	1. Open – TBD (Need Funding)	ID Serious

Note: Underlined Mitigation / Mitigation Status is Open (Not Complete)

ESOH Technology Reporting Format EXAMPLE

- ❖ **Requirement Description: Voice and Flight data recorders**
 - ◆ Requirement Source: External – 9 Apr 96 DEPSECDEF memo
 - ◆ Status: Incorporated into System Specification
 - ◆ Funding Status: Incorporated into System Baseline
 - ◆ ECD for Implementation: Done
 - ◆ Issues (if any): None
- ❖ **Requirement Description: Military Flight Operations Quality Assurance (MFOQA) Capability**
 - ◆ Requirement Source: 11 Oct 05 USD(AT&L) memo
 - ◆ Status: Seeking waiver IAW USD(AT&L) memo
 - ◆ Funding Status: None
 - ◆ ECD for Implementation: None
 - ◆ Issues (if any): Memo issued after CDR; design change would require more time and funding than available within established cost and schedule requirements; User decided to not include requirement in update to CPD

**ODUSD(I&E), Chemical &
Material Risk Management
Directorate**

Mr. David Asiello

ESOH in Acquisition Lead
(703) 604-1874

David.Asiello@osd.mil



Ms. Lucy Rodriguez, (703) 412-7685, lucy.rodriquez.ctr@osd.mil

Mr. William Thacker, (703) 412-7757, thacker_william@bah.com