Director Ammunition and Explosives Regulation Annual Report

Sixth Report to the Deputy Minister and the Chief of the Defence Staff

A Review from 1 January to 31 December 2013

National Defence
Défense nationale

Canada

Cover Photo:
Corporal Yves Labranche, a supply technician from Montreal, Québec, fires an M203 grenade launcher at the Kabul Military Training Centre range on November 4, 2013, during Operation ATTENTION in Kabul, Afghanistan.

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NDID: A-JS-040-000/JP-001

Print — Bilingual Tumble
Government of Canada Catalogue Number: D3-27/2013
ISSN: 1929-4719

Electronic English
Government of Canada Catalogue Number: D3-27/2013E-PDF
ISSN: 1929-4727

Electronic French
Government of Canada Catalogue Number: D3-27/2013F-PDF
ISSN: 1929-4735

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INTRODUCTION

This is the sixth annual report to the DM and CDS from the Director Ammunition and Explosives Regulation (DAER). As required under our mandate it provides an independent assessment of the current status of ammunition and explosives (A&E) safety programs and practices within the Department and the CAF, the management of risk of activities involving A&E and compliance with regulatory requirements.

The mission of DAER, through the A&E regulatory program, is to support the following DND and the CAF corporate priorities:

- Operational Priority – Ensuring Sustainable Operational Excellence Both at Home and Abroad. Through appropriate publications and advice, it provides the orders and directives governing the care, storage and handling of all A&E during operations in order to minimize the inherent hazards while maintaining the ability to efficiently and effectively meet operational requirements; and
- Management Priority – Maintaining Defence Affordability. Through the introduction of a risk-based approach to ammunition safety management and regulation, DAER contributes to the integration of risk and performance management into defence planning and management. The objective is to integrate

this approach at all stages of the planning process and subsequent operations in order to minimize casualties and loss or damage to materiel.

The disciplined use of an overarching risk management framework that can be tailored across the life cycle of A&E activities, from acquisition through storage, handling, transportation and use to final disposal, enables commanders at all levels to take informed decisions in support of their operations. The DAER annual report provides an opportunity to identify and address issues affecting this framework by informing the strategic leadership of DND and the CAF.

2013 KEY ISSUES

As with previous reports, the 2013 annual report reviews the state of the safety and risk management of A&E related activities conducted over the past year. It includes the principal activities of the regulators' office over that period as well as a forecast of the planned activities over the next two years (2014-2015).

Specific issues are identified in this report including the lack of a dedicated DND/CAF disposal and demilitarization capability which continues to be a capability gap within A&E program execution. Failure to address this longstanding requirement has forced the A&E community to maintain a dedicated safety regime for stockpiling, storing, executing a surveillance program on and actively managing (with resultant costs) increasing quantities of surplus and deteriorating materiel. In addition the continued paucity of A&E accident and incident reporting by units within some commands makes meaningful statistical analysis and commentary very difficult.

An A&E infrastructure renewal and recapitalization plan rooted in outcomes of Defence Renewal is considered to be essential. If a plan is not developed and acted upon, the risk that our aging infrastructure will become unviable for A&E storage in the future can only increase.

2013 ASSESSMENT

The use of selected and modified key elements of the Treasury Board Management Accountability Framework (MAF) is again being used to provide senior management with an overview of the state of explosives safety compliance and A&E risk management within the DND and CAF. The assessment is included in the last section of the report as a top level synopsis of the strengths and weaknesses of the ammunition program as observed by the regulator in 2013.

The overall rating remains unchanged from 2012 as "Opportunity for Improvement". The comprehensive study of the strategic management and governance of the ammunition program reported in the 2012 annual report was completed in 2013. With the creation of the Materiel Group J4 Ammunition (Mat J4 Ammo) organization the basis for coherent strategic leadership of program delivery has now been established. This, along with the near completion of the suite of regulatory publications and progress in resolving other long standing issues, paves the way for more improvements in the coming years.

Successful implementation of the Mat J4 Ammo organization and mandate is a key enabler to A&E program execution going forward. The clarification of organizational roles, responsibilities and accountabilities between Mat J4 Ammo under COS (Mat), DAEME under DGLEPM and DAER will be a watch item for 2014. In addition, ensuring that DAER's mandated regulatory and safety independence from the program delivery and execution directorates will remain fundamental. Finally, replacement of the legacy Ammunition Board and its three working groups with the Ammunition Program Oversight Committee (APOC) in 2014 and ensuring that no former action items or lines of accountability are missed or dropped will be a future compliance watch item.

CONCLUSION

During 2014 DAER will continue to actively work with the responsible authorities and key stakeholders on the identification and implementation of international best practices in support of Defence Renewal. We will also continue to inform senior management on the state of compliance with A&E regulatory requirements, effectiveness of risk management, and state of A&E safety programs and practices across the Department and CAF.

Corporal Sark Daniel from The Prince Edward Island Regiment (RCAC) replenishes 7.62mm ammunition for a C-6 general purpose machine gun crew during Exercise SOUTHBOUND TROOPER XIII (Ex SBT XIII) at Fort Pickett, VA, USA on 19 February 2013.

Warrant Officer Danny Compton, Canadian Contribution to the Training Mission in Afghanistan, takes aim with a para-flare during a joint coalition weapons training session with the Armée de Terre (French Army) at KMTC in Kabul, Afghanistan during Operation ATTENTION on August 5, 2013.

Section 1 Introduction

BACKGROUND

Director Ammunition and Explosives Regulation (DAER) was established by CANFORGEN 168/06 DTG 101044Z Nov 06. The accompanying DAOD 3002-0 Ammunition and Explosives further detailed the scope of this foundation across DND and assigned the following authorities to the DAER:

- Regulate the procurement, storage, transportation, inspection, maintenance, authorized modification, issue, use and disposal of all ammunition and explosives (A&E) within the DND and CAF, including A&E used for research and development (R&D); and
- Manage the DND Explosives Safety Program.

In order to effectively execute the mandate and function as the A&E regulatory and safety agency spanning DND, the following principles have been established and must be maintained, understood and adhered to:

- Delegation of Authority. The authority of the Director stems from the Department's exemption from the Explosives Act and his appointment to act on behalf of the Minister;

- Independence. DAER as a regulator is independent from the A&E program execution and delivery elements within the DND/CAF. The principle of regulatory independence (organizational and geographical) effectively ensures that there cannot be confusion as to the respective authorities and accountability of the A&E program regulator (DAER) and the A&E program implementers (Materiel Group J4 Ammunition (Mat J4 Ammo), DAEME and L1s), or real or perceived conflict of interest within any of these organizations;

- Reporting Lines. These must be separate from the chain of command and/or administrative reporting lines. Effective regulation can only occur when the regulator has a direct report to the highest levels of DND and the CAF. For DAER, the direct line of report is established from DAER to the CDS/DM; and

- Communication, Transparency, Responsiveness and Accountability. An effective regulatory environment can only function when the regulated (the A&E program execution and delivery) element understands the nature of their relationship with the regulator (DAER) and as such operates in a proactive way and promotes self-accountability, provides transparency of information and operations and executes with agility in responsiveness.

Each of these principles can be established as a performance indicator and used as a regulatory health measure. These principles will be analyzed in each DAER annual report and given a health performance score within the report.

AMMUNITION PROGRAM RESTRUCTURE

The 2012 annual report stated that a comprehensive study of the strategic management and governance of the ammunition program was being undertaken by the Department; this was completed in 2013. Based on the recommendations of the report senior leadership initiated a significant restructuring of the program. Resources were reallocated and execution of the approved Master Implementation Plan began in September 2013. The program design being implemented is based on an in-depth analysis of the requirement and is purpose-built to achieve three strategic outcomes:

- Effective Management of A&E as a Commodity. Ensure that A&E is delivered to the right place at the right time in the right quantity and of the right design and quality to support CAF operations and training;

- Effective Management of A&E Support Capability. Ensure that A&E support capabilities meet CAF requirements now and in the future; and

- Accountability. Ensure that program resources, in particular A&E inventories and associated capital assets, are accurately accounted for across the system.

These outcomes will be achieved by building the program and its processes around the delivery of the following specific outputs:

- Safe and Suitable A&E. A&E designs and quality of manufacture that meet CAF requirements for safe operation, functionality and effect under operational service conditions;

- Effective Life Cycle Management. A&E that is well managed throughout its entire life cycle from pre-acquisition through disposal;

- Effective Procurement and Supply Management. Inventories of ammunition, explosives and associated items that are properly managed to effectively and efficiently meet CAF requirements;

- Effective A&E Support Capabilities. Static and deployable A&E support capabilities that meet CAF A&E support requirements;

- Well-Managed Ammunition Human Resources (HR). That the CAF and DND have adequate numbers of experienced, technically proficient specialist practitioners to deliver the required A&E support now and in the future; and

- Effective Operational Support Planning. That planning and management of A&E support to CAF training and operations are well supported by timely and accurate information and sound advice.

The organizational model selected comprises three "pillars":

- A new J4 Materiel directorate (name to be confirmed), which includes a Mat J4 Ammo team responsible for: non-regulatory policy and doctrine; overall integration of the program including design, planning, management and delivery; and support capability management, including business leadership for specialist HR development. Upon completion of the build of the Mat J4 Ammo team, other logistics functions are intended to be grouped into the directorate;

- An equipment program management (EPM) organization responsible for procurement, inventory management, design management of the A&E commodity; and

- The existing DAER regulatory organization.

The new program structure clarifies accountabilities for program management and execution. As illustrated in Figure 1, ADM(Mat) is the designated Program Authority. L2 oversight is jointly exercised by DCOS Mat and DGLEPM under a structured co-management framework, and program delivery is co-managed by J4 Materiel and Director Ammunition and Explosives Management and Engineering (DAEME) in collaboration with Director Land Procurement (DLP). DAER provides regulatory

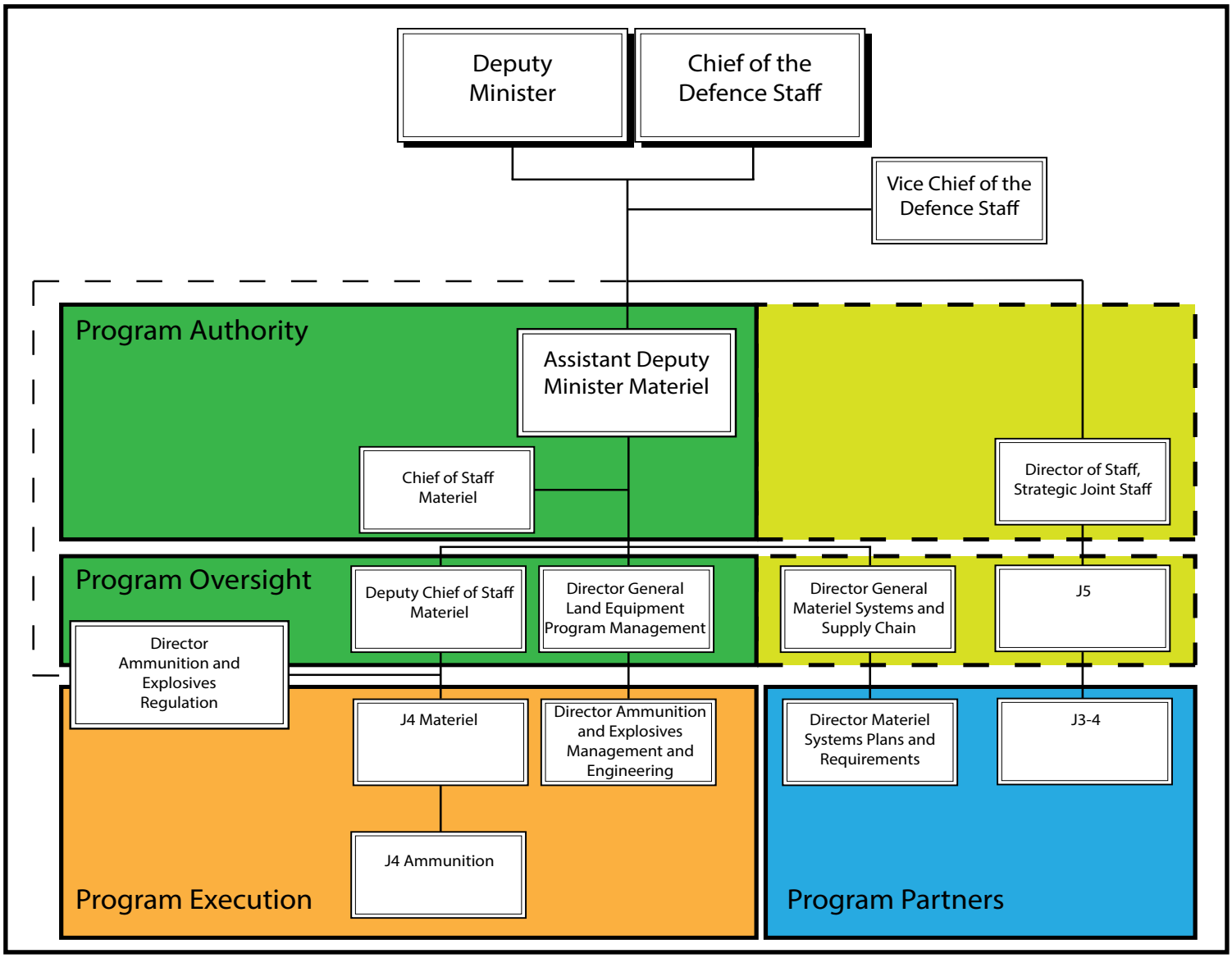


Figure 1 Ammunition Program Organization

support and advice. The program design includes frameworks for collaboration with DGMSSC/DMSPR for A&E support capability management and SJS J3-4 for A&E requirements.

This organizational model was selected for the flexibility it offers to address a number of wider issues in the management of key support functions. A more centralized program design, also considered, would have further simplified management and governance, however trade-offs were made by senior leadership to optimize management of the totality of the defence materiel business. In order to address the limitations inherent in the design, conscious measures are being taken to ensure disciplined co-management at L2 and L3, and to support ongoing over watch by the L1 Program Authority.

MAT J4 AMMO ORGANIZATION

The creation of the new Mat J4 Ammo within ADM(Mat) is aligned with the Defence Renewal effort in that it will improve business processes and activities related to A&E, resulting in maximized operational capability and readiness.

The Ammunition Program Restructure (APR) team has been established under the leadership of a Colonel, Director J4 Materiel, and of a Lieutenant Colonel, Mat J4 Ammo Branch Head. The Mat J4 Ammo's mission is to oversee strategic-level management of the A&E program, with the view to providing a comprehensive mechanism for non-regulatory aspects of A&E policy, support capability management and enabling strategic surveillance, collaborative readiness planning and Joint, Interagency, Multinational and Public (JIMP) information exchange.

The Mat J4 Ammo is organized into three sections as follows:

- Policy/Doctrine Section. The role of the APRT Policy/ Doctrine section is to identify, consolidate, amend and produce those aspects of Ammunition Program (AP) policy that are not the mandate of DAER, which are relevant, easily understood, accessible, and implementable at the operational and tactical levels, while maintaining strategic relevance. Section tasks are related to identification of all relevant non-regulatory

AP policy and doctrine documents with an objective of identifying the AP OPI for identified policy and doctrine within the newly identified program pillars: Program Management (Mat J4 Ammo) and A&E EPM (DAEME). The policy section will also ensure that future external policy to which the AP must adhere, such as MA&S policy, is produced in a way that adheres to the regulatory and explosives safety aspects of ammunition management governed by DAER, while ensuring the AP compliance with overarching Departmental policies;

- Program Management Section. The role of the Program Management Section is to ensure all functions in the Ammunition Program Framework are developed and maintained by the appropriate team to support leadership at all levels in ensuring that established program-related policies, standards, processes and norms are being met and that the program is operating as designed and intended. It should be noted that these tasks are complementary to, but do not replace, the tasks mandated to DAER. The objectives are largely internal to the program in the sense that they determine and shape how the program will deliver its strategic outputs and achieve the required outcomes. The section's primary tasks include:

  - Developing an effective performance management framework including key performance indicators (KPI), target performance standards, continuing performance measurement, analysis and reporting;

  - Providing effective non-regulatory oversight and compliance verification across the program and sound management of program risks;

  - Developing AP business requirement documents for action by relevant authorities and reports containing analysis and advice for leadership; and

  - Developing effective governance support including communications with the stakeholders and effective and timely operational support planning.

- Support Capability Management Section. The role of the Support Capability Management Section is to provide Departmental decision makers A&E program business intelligence (BI) and business leadership (BL) on capability development requirements, such as with the Ammunition Information and Maintenance Systems (AIMS) The section provides department-wide BI concerning DND A&E infrastructure investment and A&E subject matter expert (SME) requirements. The section ensures AP capabilities align with pan DND strategic requirements and initiatives.

Finally, the former Ammunition Board, which had been structured to coordinate and manage the many cross-boundary program delivery issues under the old model, has been replaced by a more strategic oversight committee designed to ensure effective executive-level stakeholder engagement in, and appropriate influence on, the management of the A&E program.

While implementation of the new program model is still incomplete, improvement in strategic management and governance is already visible.

A Canadian Armed Forces soldier driving a fork lift, loads a pallet of unused ammunition into a sea container for its return to Canada, at Camp Phoenix, Kabul, Afghanistan during Operation ATTENTION on October 26, 2013.

Crewmembers from Her Majesty's Canadian Ship TORONTO fire an infrared decoy off the SHIELD II system, a requirement in order to maintain the ship's readiness, on December 20, 2013 during Operation ARTEMIS.

Section 2

Ammunition and Explosives Compliance Framework

DAER 4 COMPLIANCE AND VERIFICATION

DAER 4 is mandated to monitor, track, recommend corrective action and report when issues are identified within the health of the DND/CAF A&E program delivery and execution elements. This span includes procurement through testing, storage, transportation, maintenance, modification, handling, use and disposal. The program delivery and execution organizations include the ADM (Mat) units DAEME and Mat J4 Ammo for technical, procurement and programmatic matters as well as any L1 organizations including any unit that stores, warehouses, transport, use and/or dispose of A&E.

A&E SAFETY INSPECTIONS AND SURVEYS

Description

The A&E safety inspections (AESI) and A&E safety surveys (AESS) are the cornerstones of the regulatory compliance program from DAER through the L1 ammunition technical authorities (ATA) to the individual base and unit explosives safety officer (UESO) and end users. In accordance with DAER policy there is a standard, frequency, process and reporting requirements through which the tactical, operational and strategic levels are all involved. The overall indicative health of the A&E safety program is most easily captured by the summary results of the AESI/AESS process.

Previous Annual Report Results and Trends. The AESI/AESS process has been in place as currently defined since 2010, and this is the third year that a chart rolling up the results has been developed. The inspection process is divided into seven separately assessed areas: Safety Program, Storage, Maintenance Operations, Transport, Disposal, Emergency Preparedness and Administration. Each of these elements is scored against a standard, with a GREEN score equating to >80%, a YELLOW score between 60-80% and a RED score being <60%. These base-level scores are then aggregated at the L1 level for each area, with average stoplight scores being applied.

2013 Results and Trends. The 2013 L1 aggregate scores are contained in Table 1. It is important to note that, as compared last year, the bar has been raised in terms of reporting from 60% representing a GREEN score to 80% representing a GREEN score. Notwithstanding, there was no appreciable degradation of the stoplight chart which shows a mature process that is well understood and executed. The trend is similar to previous years, with approximately 90% scoring green and the same issues scoring yellow and red. At the lower base level (chart not shown but available from DAER) the scores are improving annually with more green and fewer red scores. The 2013 cycle has also exposed issues and weaknesses which present a continuous improvement opportunity for the AESI methodology.

Summary. The overall execution and reporting of the AESI/AESS remains excellent and results are steadily improving across the L1s over the three years that this program has been actively run and reported upon. From a risk management perspective, the Safety Program element is indicative of a culture of A&E safety and this element is scoring very well with four exceptions under active L1 ATA management oversight. The AESI/AESS methodology is now due for a continuous improvement review in consultation with the L1 ATAs to address the observations detailed above, and this will be a key focus area for 2014 to ensure that the methodology and process execution and outcomes are aligned with the program purpose.

A&E COMPLIANCE AND VERIFICATION ISSUES

General

There are many longstanding issues spanning the A&E community of practice which have various owners and stakeholders and which by virtue of their multi-year span require ongoing monitoring and annual reporting. This section presents a status update on each issue. For each there is a summary of the issue and owner, a description of past direction and actions taken, a description of what has changed on the issue during 2013, and a summary of what needs to occur going forward to retire the issue.

Disposal and Demilitarization

General. In this section, disposal broadly refers to the many ways that DND can divest itself of surplus materiel in accordance with established policies (eg DDSAL) and defined requirements (eg environmental) while demilitarization refers to the Controlled Goods requirements. DND/CAF continues to unnecessarily stockpile vast quantities of A&E and munitions scrap that are obsolete, surplus to requirements or time expired. These stores require warehousing in A&E facilities and put an increased workload to the A&E community in the form of increased surveillance, materiel management and technical management activities. Although sale is a valid method of disposal in some cases, it is not often practicable due to the fact that most A&E is already obsolete by the time DND is ready to dispose of it. In addition to the redundant A&E stores awaiting disposal, the munitions scrap resulting from the UXO program and range clearance activities continues to accumulate and also requires warehousing and management. A fundamental life-cycle EPM function for DAEME as the technical authority is the ability to dispose of and demilitarize A&E. DND has a long-acknowledged capability gap as we lack the capability to properly demilitarize our A&E at the end of its useful life. Setting aside disposal of

L1	Safety Program	Storage	Operations	Transport	Disposal	Emergency Preparedness	Administration
ADM (S&T)							
CA							
CJOC							
CANSOFCOM							
RCAF							
RCN							
VCDS							

Legend:	
	Aggregate L1 average score is over 80% for the element
	Aggregate L1 average score is between 60% and 80% for the element
	Aggregate L1 average score is below 60% for the element

Table 1 Aggregate AESP Health Scores for L1 Organizations

A&E by sale as a specific and well defined way to remove A&E (or any other surplus commodity) from the inventory, there are three overarching requirements that a dedicated DND/CAF disposal and demilitarization capability (other than sale) must satisfy:

- Safety. The output of the disposal and demilitarization process, whether of A&E or munitions scrap, must be guaranteed to be safe and free from hazardous materiel prior to being provided for further processes (e.g. materials recycling);

- Environmental. The by-products from and outputs of the disposal and demilitarization process must meet all applicable environmental protocols for the location that the activity is being undertaken; and

- Controlled Goods. The output of the disposal and demilitarization process must be compliant with Canadian CTAT, US ITAR and end user certificate (EUC) requirement.

The requirement for a dedicated DND/CAF disposal and demilitarization capability that meets the three overarching requirements above has been acknowledged and understood for decades. Unfortunately DND has lacked the focussed attention, sustained direction and persistent resource allocation required for execution to secure this capability

Previous Annual Report Results. The 2012 DAER Annual Report cited the total inventory of A&E plus munitions scrap awaiting demilitarization at 5,381 tonnes. This represents a volume of approximately 20 medium- to large-sized magazines dedicated to warehousing materiel that, solely for lack of capability, otherwise could be removed from the DND/CAF inventory with resultant avoidance of future safety issues and unnecessary costs. In 1998, environmental concerns regarding the by-products of static furnace incineration without abatement systems led to the closing down of 13 furnace operations. In 2001, in response to environmental concerns, logistical destruction of A&E by open burning and open detonation (OB/OD) was forbidden. Later in 2011, the ban on OB/OD was lifted, but only for specific types of A&E and subject to strict volume limits at most locations (CFAD Dundurn having the greatest permitted capacity). In spite of OB/OD restrictions and the lack of a dedicated CAF/DND demilitarization capability, DAEME (with execution by supporting ammunition facilities across Canada) still manages to dispose of significant quantities of surplus A&E, most notably through its successful annual Op Dusty Thunder held each summer at CFAD Dundurn.

2013 Results. Total holdings of A&E plus munitions scrap awaiting demilitarization have increased by almost 2,000 tonnes (30%) in-year to 7,300 tonnes. Against this, DAEME destroyed 720 tonnes of surplus A&E and sold a further 190 tonnes of processed scrap material. The longstanding attempt to procure a dedicated capability as a Capital Program (CF Ammunition Demilitarization Capability Project CID# 00001101) has been closed out and removed from the CID as it has failed to move forward as a capital program. The requirements for disposal and demilitarization have been moved wholly under the A&E NP budget managed by DAEME. A successful industry engagement activity was held in June 2013 to understand what interest and capabilities in demilitarization Canadian industry currently possesses. Going forward the required capability will be pursued as a services contract with a DRAFT RFP forecast in 2014, and a full operational capability (FOC) sought for 2017. These timelines are considered extremely optimistic given significant NP budget pressures in FY14/15 and beyond. The addition of the new requirement for disposal and demilitarization, which will inject further significant funding pressures into an already reduced and constrained A&E procurement budget, will prove difficult. One area of success has been the letting of a contract for the destruction of cluster munitions (DPICM) to meet Canada's international treaty obligations. Removal of these weapons from the CAF inventory should occur in 2014.

Summary. The lack of a dedicated DND/CAF disposal and demilitarization capability that meets the three overarching requirements above continues to be a capability gap within A&E program execution. Under the ongoing program for Defence Renewal, the successful execution and outcomes associated with initiative 2.1 (Inventory Management), 2.2 (Warehousing and Distribution) and 4.2 (Rationalize Real Property Portfolio) are directly tied to the ongoing lack of A&E demilitarization capability. Failure to address the longstanding requirement for A&E demilitarization capability will have a direct and negative impact on success across these initiatives as the A&E community is forced to continue to stockpile, store, execute a surveillance program on and actively manage (with resultant costs) continually increasing quantities of surplus and deteriorating materiel.

A&E Risk Management

General. The A&E program has historically been managed and operated with a culture of "consequence management," or decision making based on analysis of negative outcomes. As mandated by Treasury Board across government and by VCDS directives within DND/CAF, the A&E program must implement a program of decision making based on sound risk management practice. A&E risk management policy, implementation management, and performance reporting is owned by DAER while A&E risk management implementation is the responsibility of L1 ATAs across the department.

Previous Annual Report Results. A&E Risk Management has previously been reported as an area requiring development and work.

2013 Results. C-09-005-001/TS-000 Volume 1 - Program Management and Life Cycle Safety contains the overarching policy for the A&E risk assessment safety case (AERASC). The AERASC provides the structured methodology for identification, analysis, control, approval and tracking in compliance with higher TB and VCDS directives. In addition, draft DAOD 3002-7 Ammunition and Explosives Risk Management for DND/CAF directs implementation of the AERASC and defines the roles and responsibility for risk management across DND/CAF. As DAOD 3002-7 is still being staffed for signature, no compliance

or verification activity has yet occurred although the A&E community is being encouraged to use this tool.

Summary. Once DAOD 3002-7 is released, each L1 ATA will be mandated to comply with the AERASC process and manage and report. Implementing a successful culture of risk management decision making and communication across the A&E community of practice will be a multi-year process that will be monitored closely for compliance.

A&E Program Restructure and Governance

General. The A&E program is currently implementing a third pillar of program strategic execution and delivery under the Ammunition Program Restructure team within ADM (Mat) under the Mat J4 Ammo. This organization is being created in addition to the already established DAER (regulatory and safety management) and DAEME (technical authority and procurement) in response to recommendations made in the 2013 DND Ammunition Program Study.

Previous Annual Report Results. Previously identified as an "Opportunity for Improvement", foundational study work and options analysis was developed and put forward to senior leadership for decision.

2013 Results. Ammunition and Explosives Program Restructure and Governance is now post-decisional with the stand-up of Mat J4 Ammo under COS (Mat). Mat J4 Ammo, under the Ammunition Program Restructure team Leader, is presently implementing the DCP endorsed Master Implementation Plan. One of the first tangible outcomes was the retiring of the legacy Ammunition Board and its three subordinate working groups: the Strategic Enablers WG, the Ammunition Program Execution WG and the Ammunition Requirements and Planning WG.

Summary. Successful implementation of the Mat J4 Ammo organization and mandate is a key enabler to A&E program execution going forward. Delineation of organizational roles, responsibilities and accountabilities between DAER, the new Mat J4 Ammo under DCOS (Mat) and DAEME under DGLEPM will be a future watch item for DAER. In addition, ensuring that DAER's required regulatory and safety independence from the program delivery and execution directorates will remain fundamental. Finally, replacement of the legacy Ammunition Board and its three working groups with the Ammunition Program Oversight Committee (APOC) in 2014 and ensuring that no former action items or lines of accountability are missed or dropped will be a future compliance watch item.

Infrastructure

General. Now owned by ADM(IE), the 2nd and 3rd line A&E infrastructure portfolio has historically been an area for concern. Spanning DND/CAF across virtually all L1 organizations and thereby having varied chains of accountability and command, the infrastructure holdings dedicated to A&E comprise a significant asset that have undergone multiple studies without a comprehensive plan for rationalization or recapitalization.

Previous Annual Report Results. Previous DAER reports have identified the need for establishment of approved stock holding levels by A&E nature, adjustment of the National Inventory Control Point (NICP) to reflect re-distribution of approved holdings, rationalization of holdings, and development of an A&E realty asset development plan. The A&E 2nd and 3rd line infrastructure requirement is further complicated by the lack of a dedicated DND/CAF disposal and demilitarization capability as previously described, the end result of which is that approximately 25 medium to large ammunition magazines across Canada are currently utilized to warehouse A&E natures or munitions scrap awaiting demilitarization.

2013 Results. Several key milestones occurred in the infrastructure issue in 2013. First, in conjunction with ADM(IE)/DRPP, DAER conducted a study of all 2nd and 3rd line facilities to get an understanding of what is held, its condition and its status. Key outputs from that study are:

- Canadian Army is tenant in majority of A&E infrastructure (approx 50% of total);
- The overall condition of infrastructure is poor to fair (66%) with a minority being identified as Good (33%);
- CFADs have a range of conditions. However, generally Bedford and Rocky Point scored good, Angus scored fair and Dundurn scored poor; and
- A&E infrastructure is old, with the median construction date being 1965 (49 years old).

In addition to the information above, ADM(IE) has adopted a real property management plan across DND/CAF. This means that while individual Construction Engineering organizations will be responsive to their chain of command and L1 for infrastructure issues, they will be accountable to ADM(IE) who will centrally own and manage all DND/CAF infrastructure. Finally and most significantly, the Defence Renewal Program has several initiatives that will impact future A&E Infrastructure postures – namely 2.1 Inventory Management, 2.2 Warehousing and Distribution and 4.2 Rationalize Real Property Portfolio.

Summary. Going forward, it will be vital that A&E infrastructure requirements and analysis be directly interrelated with the Defence Renewal initiatives that necessarily need to impact and reduce the holdings in future. Mat J4 Ammo has already engaged within the Defence Renewal initiatives to ensure that A&E requirements will be identified and considered within the broader initiatives. A future A&E renewal and recapitalization plan rooted in outcomes from Defence Renewal is an absolute requirement, the absence of which increases the risk that our rapidly aging infrastructure will not remain viable for A&E storage in the future.

Inventory Management and Accountability

General. The A&E inventory represents a very large capital investment with a value of over $3 billion. As an inherently dangerous and sensitive commodity, the strictest possible inventory management and accountability in terms of supply discipline is required from both a safety and a controlled goods perspective. This issue is owned by a number of stakeholders, including the SJS logistics staff and the Mat J4 Ammo. Execution ownership is through the environment logistics staff (e.g. 1 CAD A4 Log, C Army G4).

Previous Annual Report Results. This issue has been raised consistently in previous annual reports. Observations included poor supply discipline IAW the Canadian Forces Supply Manual (CFSM), particularly delayed execution of adjustment transactions and stocktaking deficiencies and improper paperwork supporting write-off. Consequences of these poor practices include uncertain inventory data reliability, which affects inventory management as well as procurement, operational and financial planning.

2013 Results. Inventory control and management issues continue to be observed as part of the 2013 compliance program. Overall, there has been marked improvement in all inventory control and management areas observed upon in previous reports. 2013 saw the roll-over of all A&E inventory holdings into the Defence Resource Management Information System (DRMIS). While the implementation resulted in expected discrepancies to holding accounts, much work has been done to ensure that discrepancies have been corrected to ensure that DRMIS-reported holdings are correct. It is expected that once DRMIS capability is applied to A&E inventory management, such as stocktaking procedures being produced by DSCO, combined with a re-organization of the second and third line A&E facility DRMIS account structures, there will be much more robust and standardized oversight of the A&E inventories. Finally and with a view to the future, DAER, Mat J4 Ammo and DAEME are participating in the DND Automatic Identification Technology initiative.

Summary. Mat J4 Ammo is now leading the integration of A&E inventory management processes. Positive results have already been achieved in policy production and integration affecting the Supply Administration Manual as well as the relationship between the A&E program and the user community. The SJS has already consulted directly with the Mat J4 Ammo concerning the development of A&E program input into operational planning guidance to L1s. Mat J4 Ammo will be consulted to assist with the production of A&E stockpile plans and operational A&E Replenishment Points scales, the recommended inventory accounting and management procedures to be used in operations and TO&E guidelines to ensure explosives safety capabilities are embedded in the theatre of operations. These consultations represent a significant improvement to A&E due diligence with respect to explosives safety, resource management and materiel accountability. Mat J4 Ammo oversight will facilitate proper forecasting of additional A&E requirements and the replacement of consumed stocks from the appropriate funding lines approved for operations, ensuring visibility of potential "stock outs". It is imperative that vigilance be maintained over the next two to three years to ensure that the new processes and departmental information technology (IT) systems are tested and modified as necessary to ensure a pan-DND/CAF system is in place. By doing so, the Department will be able to improve the accuracy and timeliness of A&E inventory information, which will inform strategic level program decisions.

DND UXO and Legacy Sites Program

General. This program has a vast mandate spanning both environmental concerns and unexploded explosive ordnance (UXO). Owned by ADM(IE), the organizations involved are undergoing reorganization with clarity of roles and responsibilities still pending. This program manages over 800 identified potential sites across Canada. Of these, approximately 150 have been assessed or are under active management.

Previous Annual Report Results. DAER has accompanied the UXO program on several occasions to multiple sites. The UXO program ensures that the MND's accountability for self-regulation extends to UXO contractors. These requirements flow directly from the Operational Training Part 3 – Range and Unexploded Explosive Ordnance (UXO) Clearance Handbook.

2013 Results. The ADM(IE) restructure has led to changes in this program. Firstly the program has been re-branded as the UXO and Environmental program. As at 31 December 2013 redistribution of responsibilities between program management (under Directorate of Real Property Program Management) and program execution (under the soon to be renamed Director Contaminated and Legacy Sites Project Delivery) had not yet been normalized with fully defined roles and responsibilities between the organizations. Site prioritization and program management activities under DRPPM are handed off for execution to DCLSPD, who appoints a project manager for the sites that are being activated. The UXO Centre of Expertise supports the project manager in all aspects of A&E safety including execution of the risk management process which is compliant to the DAER AERASC process. Prioritization for action between sites is through application of sound risk management principles by accounting for factors such as the potential hazard. (e.g. was it a range or a supply depot) and usage of the site (e.g. is it remote access or in a developed area).

Summary. The active site remediation and site management program is very well managed with sound application of risk management practices to ensure low risk to the public. However, with reorganization, the roles and responsibilities between organizations remained to be clarified. This issue has since been resolved through the L4 descriptions. In addition, this program has endured budget cuts of over 50% which severely limits its ability to provide active site remediation (versus site management). Furthermore, the number of specialist A&E personnel assigned to this activity has been reduced significantly. Given the very large number of sites that remain for assessment and action, the reduction of budget and personnel, if continued through the medium and long terms, increases the risk posed by the UXO problem to Canadians.

Surveillance

General. A rigorous program of A&E surveillance run by DAEME as the technical authority is a key enabler for the A&E safety program to ensure we remain within an acceptable level of safety for A&E between its acquisition and its disposal. This fact bears further emphasis given the ongoing disposal and demilitarization issue described above in that we continue to stockpile increasing quantities of ever aging A&E.

Previous Annual Report Results. DAEME has significantly matured the surveillance program over the past several years. The standard for surveillance, which is based on the NATO standard, has only been available since 2011. An engineering study by DAEME on the A&E that was issued for use in Afghanistan, stored in extreme temperature conditions in austere locations and returned to Canada concluded that these stores showed no appreciable degradation as compared to stores that remained back in Canada. This is a significant lesson learned for future operations.

2013 Results. The surveillance standard mandates that LCMMs manage the Item Implementation Plan (IIP) for their commodities. The IIP's focus is on non-regular surveillance activities such as life extension testing or performance testing. Execution of these activities is the responsibility of and managed by LCMMs. Inspection of commodities is the responsibility of and executed by L1s that have custody of the natures, with feedback provided to LCMMs through CF410 when defects are found. DAEME manages the surveillance activities on the highest risk commodity (propellant stability) via an annual call letter which identifies which stores will undergo high performance liquid chromatography (HPLC) testing in the given year. Control, management, execution and reporting of the HPLC surveillance program between DAEME, 3rd line depots and DRDC, Valcartier Research Centre is excellent.

Summary. Overall, the surveillance program is well defined and understood at DAEME. However, DAEME needs to ensure proper coordination between the surveillance program and the disposal and demilitarization program exists to ensure positive control over natures awaiting disposal from a surveillance and safety perspective. Finally and from a safety perspective, the engineering study on A&E from Afghanistan and a post-graduate thesis done at RMC entitled "Considerations for Predicting Gun Ammunition Shelf Life" commissioned by DAEME indicate that we continue to manage stocks at an acceptable level of safety; both these studies confirmed our predictions of degradation over time have been very conservative.

Avalanche Control

General. OP PALACI is the operation wherein artillery fire is used to pre-emptively trigger and thereby control unwanted large avalanches at Rogers Pass in Glacier National Park. The operation is owned by CJOC, and the roles and responsibilities between DND, Parks Canada and Natural Resources Canada (NRCan) are defined by the MOU that was last updated and signed on 26 Oct 2012.

Previous Annual Report Results. DAER and CJOC have visited this operation with Parks Canada and NRCan in previous years. There have been changes as a result, including a revision to the MOU in 2012 to better codify the roles and responsibilities and decrease in the A&E holdings and thereby net explosives quantity (NEQ) at the site, as well as recommendations on a new storage facility.

2013 Results. The CJOC L1 ATA conducted the oversight visit in early 2014. The current MOU remains valid with no changes necessary. Parks Canada has constructed another magazine site which allows the required steady state ammunition inventory to be stored. In addition, the NRCan Senior Inspector has revised all magazine licences to reflect the reduced NEQ of 3000 kg in holdings (vice 5000 kg previously) as recommended by DAER. Accountability for the current holdings has been strengthened, with both Parks Canada and DND maintaining individual registers, and in addition both organizations hold NEQ registers to ensure licence compliance.

Summary. This issue has stabilized to the point that there are no extant safety or compliance concerns that require highlighting in the DAER Annual Report at this time. All activities to monitor OP PALACI will fall under the compliance program between the CJOC L1 ATA and DAER within the realm of the annual safety inspection process. As such, OP PALACI will be removed from the DAER Annual Report as a compliance issue.

L1 ATA Responsibilities

General. As per DAER policy each L1 must have a dedicated ATA who is accountable for all A&E issues to the L1 commander, but responsive to DAER for safety and regulatory issues and to DAEME and Mat J4 Ammo for programmatic matters. The roles and responsibilities of the L1 ATA are detailed in Section 2 of C-09-005-001/TS-000 A&E Safety Manual, Volume 1 - Program Management and Life Cycle Safety.

Previous Annual Report Results. Continuing shortages of ammunition technical officers (ATOs) and ammunition engineers have made it difficult to provide appropriately qualified personnel to every L1. In addition, whilst some L1s have a large area of responsibility with respect to A&E (e.g. Army, Navy, RCAF, CJOC and ADM(Mat)), other L1s have a much smaller footprint in A&E. Shortfalls have typically been managed by the CJOC L1 ATA.

2013 Results. Every L1 currently has an L1 ATA named and assigned which is a first for this key safety role and the names for each L1 ATA are available on the DAER website. Ensuring the required L1 ATA cross-organizational boundary responsiveness continues to be a challenge. As one example, L1 ATA review of A&E accident and incident reports with any required and appropriate follow-on action with the source unit are not being "pushed" to DAER from the L1 ATA and as a result have to be "pulled" by DAER.

Summary. DAER will continue to work the L1 ATA responsiveness and communication by re-branding the quarterly

information session L1 ATA meeting that DAER 4 chairs into the semi-annual L1 ATA Working Group. Within that forum each L1 ATA will have a mandate that includes provision of their review and comments on accidents, incidents, licences, waivers and their L1 ATA risk management register. In addition, DAER 4 will develop an annual L1 ATA report to be submitted to DAER in support of the Annual Report process. Finally, DAER will consider the requirement for reporting to each L1 on the ATA performance during the annual PER process as a way to formalize the required responsiveness of the L1 ATAs.

S3 Process

General. The Safety and Suitability for Service (S3) process is the A&E specific equivalent of a systems engineering critical design review (CDR). As such, it is the formal process by which A&E is formally assessed and recommended (or not) for service use under any restrictions or conditions deemed appropriate. The responsible L1 then formally accepts or rejects the A&E and the recommended limitations.

Previous Annual Report Results. DAER conducted a compliance audit of the S3 process in 2009, out of which 32 observations were made. Prior to 2013, 21 of those 32 observations had been addressed and closed.

2013 Results. DAEME continues to mature this systems engineering process. One of the major challenges faced is that there is no standardized release to service process for new equipment across the Major Project Divisions, and therefore A&E service release is a component that must be tailored for each environment and capital project. As such, there are liaison officers at DAEME that work closely with the capital projects' qualified ammunition technical authorities (QATAs) to ensure S3 requirements are met.

Summary. The S3 process is a mature process with well defined boundaries and interfaces. The majority of the 2009 audit observations have been addressed, with only 3 observations remaining open as work in progress. Accordingly, DAER will work towards issuance of a compliance letter to DAEME to close out the audit stating that the remaining 3 observations are to be tracked to completion by DAEME as part of their program of record, and reported to DAER formally upon completion. After that has occurred, S3 will be removed as an issue from the DAER compliance report.

A&E COMPLIANCE AND VERIFICATION FOCUS AREAS FOR 2014

Technical Authority

DAEME as the technical authority for A&E effectively functions as an EPM team. One of the critical safety functions that an EPM exercises in a commodity life cycle is in positive control of technical authority. Having already examined the technical authority aspects during procurement and release to service as contained within the S3 process, the focus will now be on the execution of technical authority during the remainder of the life cycle.

AESI/AESP Renewal

As described in the issue section, the AESI/AESS methodology is now due for a continuous improvement review in consultation with the L1 ATAs to address the observations as detailed. This review will seek to ensure that the process execution and outcomes are aligned with the purpose of the AESI – namely improving the safety and self-reporting cultures across the CAF and DND.

ATO Training

The ATO is a specialist qualification that draws officers from different branches within the CA, RCN and RCAF. An ATO often serves intermittently in A&E specific positions at captain/lieutenant(N), major/lieutenant-commander and lieutenant-colonel/commander rank levels, rotating back to his or her primary classification in order to gain the variety of experience needed for promotion. ATOs also serve as the officer corps for the ammunition technician occupation. The decision was made to repatriate this training to Canada from the UK where Canadian officers had previously been trained for over 40 years. The Individual Training and Education (IT&E) for the ATO Qualification AEXN has been developed for delivery in Canada on behalf of ADM(MAT). The instructional strategy is a combined education and training program offered at the Royal Military College of Canada (RMCC) and the Canadian Forces Logistics Training Centre (CFLTC). To enable this new delivery model, the baseline transfer from ADM(MAT) of $204K to Borden and $500K to RMCC was completed in FY 13/14. Combining the educational resources required by ATO with the current Ammunition Engineering (AE) program provided at RMCC has created increased effectiveness, economies and efficiencies for CAF IT&E compared to the previous model of running two separate programs.

With the repatriation of the ATO training to Canada, the decision was also made to remove significant sections of the syllabus from the course (e.g. certain academic and practical technical content, project work, EOD, and IEDD). The resultant course syllabus is now being used for the second serial of Canadian ATO training. Mat J4 Ammo, as the CAF ATO specialty advisor, intends to lead a validation of the repatriated ATO course. DAER will, in conjunction with the Mat J4 Ammo led initiative, execute a regulatory review of the training qualification standard against the job specifications of ATOs and the functions matrix contained in policy documentation in order to validate the quality of the output against the requirements.

Effectiveness of A&E Regulatory Authority

The foundational 2006 CANFORGEN gave DAER the mandate to "regulate the procurement, storage, transportation, inspection, maintenance, authorized modification, issue, use and disposal of all A&E within the DND and the CAF, including A&E used

for R&D." With over seven years of experience, DAER will now undertake an examination of how it exercises regulatory authority over each of these elements of A&E to fulfill its mandate. This examination will review the policy guidance associated, the insight/oversight that DAER has into each element, the effectiveness of the execution of the element, how that regulatory authority enables operations and whether that authority is being exercised to the same degree over all L1s. Finally the examination of A&E regulatory authority over each element will also review communications as a component of the overall requirement to regulate.

A&E Deviation Process

As a fundamental element of a regulatory program, there must be a formal process to assess and authorize deviations as well as to track and report on them. In this context, a deviation is an intentional departure from policy for a specific purpose and time period (not to be confused with a waiver which is specific to licensing in the A&E context). DAER must implement a decision methodology, supported by the AERASC process and assigned decision authorities, a tracking and reporting capability associated with deviations to A&E policy.

L1 Ammunition Technical Authority (ATA) Reporting Requirements

As detailed by policy, the L1 ATA function is pivotal as the operational level oversight of the A&E program delivery. Within this function there are several key deliverables and areas where communication upwards to DAER is critical in order to have effective and robust regulatory oversight and compliance. As an example, the L1 ATA plays a central role in the development and life-cycle management of the AERASC and inherent in that is the requirement to manage and report annually on their L1 risk register. As another example, the L1 ATA is required to review and provide assessment on all CF410 Ammunition Accident, Incident, Defect and Malfunction reports. A focus area over the coming year will be to entrench these requirements with the L1 ATAs and formalize reporting requirements.

COMPLIANCE AND VERIFICATION SUMMARY

From the perspective of hazards and risk, the current operating environment spanning the A&E community of practice is considered to be at an acceptable level of safety risk. The safety culture is generally good for A&E spanning DND and the CAF. The safety culture is supported by the underlying reporting culture which is assessed as good to poor depending on the L1. While the RCAF and RCN have a good reporting culture, the CA and CANSOFCOM are encouraged to continue to develop their safety reporting culture to a similar degree. Future improvements in this area will be enabled in the inspection and reporting process and the accident and incident reporting tools with future implementation of electronic tools that are currently in definition and development.

From the perspective of A&E program community of practice efficiency and effectiveness, much room for improvement remains. A large number of longstanding and significant A&E community issues continue to languish and require senior DND and CAF leadership direction and the application of resources to resolve, most notably disposal and demilitarization, infrastructure and inventory management and accountability.

Two enablers currently under development within the efficiency and effectiveness area are the A&E program restructure and governance and Defence Renewal. The Mat J4 Ammo organization will give real strategic level advocacy for these important A&E community issues, and integration of the A&E community of practice at that within the Defence Renewal Initiatives as mentioned through this section will enable future decisions and improvements to the multitude of outstanding issues.

Pictures taken during the construction of new magazines at Canadian Forces Ammunition Depot Bedford in June 2013..

A technician from 409 Squadron based in 4 Wing Cold Lake, Alberta loads a CF-18 Hornet with 20 mm canon training rounds at Solenzara Air Force Base in Corsica, France on November 24, 2013 during SERPENTEX 2013.

Section 3

Ammunition and Explosives Policy Framework

BACKGROUND

The work undertaken by DAER in developing and updating A&E orders and directives serves to provide DND and CAF with the policies, procedures and regulatory processes necessary for safe conduct of both domestic and deployed operations.

Through compliance with these orders and directives non-battle casualties, losses and damage in deployed operations are minimized, and on domestic operations casualties, damage and other losses to valuable human and materiel resources are avoided. Continued success in these objectives serves to maintain public confidence in National Defence's stewardship of these resources.

The publications and instructions issued are comprehensive source documents on all aspects of the A&E life cycle, from cradle to grave designed for use by L1 organizations in their day to day operations. A&E regulatory policy is the result of a collaborative process involving stakeholders and where appropriate, drawing on international best practices and initiatives that foster interoperability and encourage compliance with accepted standards.

During 2013 the work on the suite of A&E policy documents continued to close policy gaps and ensure the currency of safety regulatory publications. Following on from 2012, the main thrust

has been to complete the drafting, consultation and publication of the key volumes and, where necessary, to provide interim policy in support of operations.

A&E POLICY ACTIVITIES FOR 2013

C-09-005 Series

C-09-005-001/TS-000 Ammunition and Explosives Safety Manual (Volume 1) Program Management and Life Cycle Safety. The manual was published 1 August 2013. Replacing portions of the previous Explosives Safety Manual C-09-153-001/TS-000, this manual includes new risk management principles, descriptions and terms of reference for key ammunition participants, a matrix summarizing key ammunition qualifications, detailed guidance on A&E safety surveys and inspections, and expanded guidance on Hazards of Electromagnetic Radiation to Ordnance. DAER 2-6 OPI is presently collecting errata and proposed amendments for the next revision.

C-09-005-003/TS-000 Ammunition and Explosives Safety Manual (Volume 3) Transportation. A revised edition of C-09-005-003/TS-000, Transportation, was published in 2013. This edition incorporates content on Service Representative Officers (SRO) that was formerly held in a separate publication, as well as new direction on the transportation of A&E in Armoured Fighting Vehicles (AFV), transportation of munitions scrap and surplus propellant, and transportation for Explosive Ordnance Disposal (EOD) purposes.

C-09-005-005/TS-000 Ammunition and Explosives Safety Manual (Volume 5) - Deployed Operations. This volume was published late in 2013. It supersedes A&EI 23, Explosive Clearance Inspection of Battle Damaged Vehicles and C-09-153-001/TS-000, Part 4, Sect 15, Field Storage of Ammunition and Explosives. It encompasses all aspects of deployed operations and particularly storage considerations for all types of Ammunition Storage Areas (ASA). It also includes a risk assessment process specific to deployed operations but based on the process detailed in C-09-005-001/TS-000. This volume has been closely coordinated with the 2012 publication of Allied Ammunition Storage and Transportation Publication (AASTP) -5, NATO guidelines for Storage Maintenance and transport of ammunition on Deployed Missions or Operations and therefore provides consistent standards for Canada's participation on NATO operations.

C-09-008 Series

The rewrite of C-09-008-002/FP-000 - Ammunition and Explosives Procedural Manual - Destruction of Dud and Misfired Ammunition on CF Ranges and Training Areas was completed, and the revised publication has been translated and posted online.

A&EIs

A&EI 11, Disposal of Ammunition and Explosives at the end of Life Cycle, was updated this year adding clarity to the principle that, apart from CFAD Dundurn, all second and third line facilities are limited to burning a maximum of 5000 kg of surplus propellant per year. As an exception, CFB Gagetown has been granted a waiver increasing their limit to 25,000 kg per year due to the quantity of rounds fired by the artillery school per year.

DAODs

Although it was anticipated that several new and revised DAODs would be issued in 2013, delays have been experienced due in part to a requirement to staff definitions used in DAODs through the Defence Terminology Standardization Board (DTSB). In the future, such terminology staffing will be initiated earlier and will not result in additional delays during the review stages. The Ammunition and Explosive Terminology Panel (AETP) is well placed to ensure that new and amended definitions are processed in step with the DAODs themselves.

DAOD 3002-7 has become inextricably linked with DAOD 3002-0, Ammunition and Explosives, due to the requirement to establish authorities in a -0 DAOD. This meant that the risk acceptance authorities originally drafted into 3002-7 were moved to 3002-0 by DSCS staff, necessitating an additional round of subject matter legal advisor review. As a result, additional questions from stakeholders were raised in December 2013, and publication of DAOD 3002-7 is now anticipated in mid-2014. The revised DAOD 3002-0 may also be delayed due to the significant restructuring of the DAOD 1000-series that is currently underway.

Significant changes were made to the draft of DAOD 3002-5, Use of Firearms, Ammunitions and Explosives, based on stakeholder feedback. Portions relating solely to firearms have been removed, as not being within the DAER mandate, and other portions re-worded to place the emphasis on the use of ammunition rather than of the firearm. It is anticipated that the revised draft will be circulated for stakeholder and legal advisor review in early 2014.

DAODs 3002-3, Ammunition and Explosives Safety Program, and 3002-4, Ammunition or Explosives Accident, Incident, Defect or Malfunction Reporting, are currently under review. No major changes are planned in either of these DAODs.

Non-DAER Controlled Publications

DAER 2 participated in the Director of Army Training (DAT) lead effort to rewrite the B-GL-381 series on Ranges and Training Safety which should be promulgated in 2014.

Electrical Standards

DAER 2-6 continues to work towards an update of policy regarding electrical standards for A&E infrastructure. This thrust builds on findings in the Mang Report (CFB Petawawa, September 2007) and the SNC Lavalin Report (CFAD Bedford, April 2013). Existing safety and construction guidance have served the A&E community well in the past, but are now suspected to be over-conservative and potentially over-designed for the more limited explosives environmental risks typical

of managing today's A&E inventory. For example, with the evolution of modern ammunition, loose black powder and other explosive dusts have become exceptionally rare in storage situations, and are no longer common even in active A&E workshop environments. Specialised workshops and R&D facilities must maintain a capability to work intimately with the explosives in inventory, but conventional depot storage sites may not require the same electrical code rigour as those found in commercial explosives manufacture. Initial changes being considered include the controlled use of previously restricted electronic computer devices to modernise paper-based methods in the lower-risk explosives environments of storage magazines (stocktaking aids) and transit facilities (technical data). Next steps will further refine construction standards, and will be included in Volume 8 of the C-09-005 series.

Risk Management

The required keystone policy for managing risk throughout the entire A&E life cycle has been published, and is contained in C-09-005-001/TS-000 Volume 1 - Life Cycle Safety with the specific application for deployed operations being contained in C-09-005/TS-000 Volume 5 - Deployed Operations. The related DAOD 3002-7, which will provide authorities for A&E risk management, is being staffed. A&EI 45 Risk-based Storage Licensing and Waivers provides interim direction to allow application of the provisions relating to risk-based waivers included in C-09-005-002/TS-000 Volume 2 – Storage and Facility Operations.

International Policy

General. DAER continued with strong participation at regular meetings of the NATO Conference of National Armaments Directors (CNAD) Ammunition Safety Group (CASG - AC/326) and through that a close working relationship with the US Department of Defense Explosives Safety Board (DDESB), the UK Defence Ordnance Munitions and Explosives Safety Regulator (DOSR), and the Australian Directorate of Ordnance Safety (DOS). This activity ensures Canada's A&E safety regulations are well coordinated with this international group of experts and promotes the ability to work seamlessly with our Allies on operations.

AASTP-4 (Explosives Safety Risk Analysis). Realigning the responsibilities for participation with NATO A&E working groups has permitted DAER 2-6 to become more involved in explosives safety risk analysis, complementing the risk management policy recently introduced in Volumes 1 and 5.

As an adjunct, international partnerships continue to be enhanced through membership and strong participation in the thirteen-Nation, NATO-based, Munitions Safety Information Analysis Centre (MSIAC).

NATO Explosives Safety Munitions Risk Management (ESMRM) Policy. The aim of this policy work is to establish a NATO munitions risk assessment and risk decision making framework, that recognizes national sovereignty and responsibility for risk decisions within each nation, to be applied during training and contingency operations involving munitions and which recognizes NATO's responsibilities in the risk assessment and decision making process for planning, training and contingency operations. An Allied Logistic Publication Development Panel (including DAER membership) has drafted STANAG 2617 and ALP-16 – ESMRM in NATO Planning, Training and Operations. The aim of this publication is to establish requirements for the NATO ESMRM Process as well as roles and responsibilities applicable to the NATO Operational Planning Process, Operational Stages, and Consumer Logistics Process across the Full Range of NATO Military Operations, to include munitions-related contracted support. This will be submitted for ratification in early 2014. This, in conjunction with the ESMRM policy, will be used as a basis for Canadian operational A&E safety policy and doctrine.

United Nations' International Ammunition Technical Guidelines (IATG). The IATG were developed by the UN Office of Disarmament Affairs to improve safety, security and efficiency in international conventional ammunitions stockpile management. They recommend an integrated risk and quality management system, along the lines of the UN's Transportation of Dangerous Goods guidelines, and are considered of growing importance. UN General Assembly Resolution 66/42 welcomed the completion of the IATG and establishment of the SaferGuard Program to assist in the implementation of the guidelines in those member nations requiring assistance. DAER, through participation with NATO Ammunition Safety Group, the UNODA, and close cooperation with US/DDESB representation in the IATG Technical Review Panel, provides review and input to the IATG. This is of importance in that NATO (Canada's) and UN guidelines must be complementary.

Terminology

In 2013, the AETP was very active. A total of 27 AETP-originated proposals were accepted by the DTSB during this period. Of these, some were new definitions or translation records required in support of existing and future policy, and some were corrections to inaccurate terminology records. Future AETP efforts will involve work on terms used in A&E DAODs and terms relating to demilitarization and disposal, in addition to the continuing clean-up of incorrect and duplicate records.

A&E POLICY PROGRAM OF WORK FOR 2014-2015

DAODs

Due to limited staff resources, DAOD staffing is being prioritized. Effort will be concentrated on the new DAOD 3002-7, Ammunition and Explosives Risk Management, rather than on revisions of existing DAODs. Revisions therefore will continue at a slower pace.

C-09-005 Series

C-09-005-004/TS-000 Ammunition and Explosives Safety Manual (Volume 4) Demilitarization and Disposal. The current program of work builds upon the work initiated in 2012 and 2013 with effort being concentrated on the promulgation of the new C-09-005-004/TS-000, Volume 4, Demilitarization and Disposal manual which will include the content currently promulgated in the following documents:

- C-09-008-002-001/FP-000 Destruction of Surplus Obsolete and Deteriorated Ammunition with added guidance in demilitarization processes and disposal;
- C-09-008-003/FP-000 Explosive Ordnance Disposal - Disposal of Stray Ammunition;
- A&EI 08 Plastic Coated Tape Explosives Safety Hazard Electrostatic Discharge;
- A&EI 09 Crimping of Non Electric Blasting Caps Procedures and Protective Equipment;
- A&EI 11 Disposal of Ammunition and Explosives at the End of Life Cycle;
- A&EI 14 Mitigation of Blast and Fragmentation Effects Utilizing Sandbags;
- A&EI 31 Chg 2 Destruction by Open Burning of Surplus Gun Propellant;
- A&EI 34 Approved Misfire Procedure for Electrically Initiated Disposal Operations;
- A&EI 36 Labels Applicable to Certification of Ammunition and Explosives; and
- Table of Departmental Stack Emissions and related guidance on its application.

The publication should be promulgated in late 2014. There will be an ongoing initiative after release to convert the current illustrations into photographs so that readers will have a better concept of colour, shape and depth perception. The new photos will be included in the first revision of the document.

C-09-005-008/TS-000 Ammunition and Explosives Safety Manual (Volume 8) Construction Standards. This manual is now under way with DCAE lead. This volume will bring standardization and economy to new construction and retrofit of ammunition infrastructure. DCAE has hired a consultant to assist with writing the publication, with completion of a draft planned for end June 2014. Force protection building design will be incorporated in the new publication along with the more typical A&E facilities design.

C-09-005-009/TS-000 Ammunition and Explosives Safety Manual (Volume 9) Hazards of Electromagnetic Radiation to Ordnance (HERO). This manual is also under development. QETE as lead has hired a consultant to research information and draft the volume. The intent is to incorporate the latest information and safety guidance, including international best practice, and the new publication. A framework for HERO Safety and Program Management has been presented as the basis for the new volume.

A&EIs

A&EI 44 on pre-fabricated magazines will be re-written using wall specifications found in the NRCan and US Alcohol Tobacco and Firearms (ATF) magazine guides rather than identifying two types of pre-fabricated magazine that are acceptable. This A&EI will eventually be incorporated into Volume 8 Construction and Design Standards.

A&EI 48 on barricade geometry will be published in early 2014. This A&EI introduces the use of a fixed height between two A&E storage locations rather than the current 2 degree rule. This A&EI will be incorporated into Volume 8 Construction and Design Standards.

Non-DAER Controlled Publications

DAER 2 continues to provide input to the development and updating of other publications such as the B-GL-381-001/TS-000 Training Safety manual, B-GL-381-003/TS-000 UXO and Range Clearance Handbook and the CFSM.

Trials

DAER will continue to work with Mat J4 Ammo and DRDC on R&D projects such as one dealing with contamination of the ranges by 1,3,5-trinitro-1,3,5-triazinane (RDX). Studies indicate that the excessive use of C4 plastic explosive on DND ranges has started to take a toll with high contamination rates of RDX being found on some ranges across Canada. DRDC scientists have proposed the use of small shaped charges (1/30 the RDX content) to dispose of munitions, thereby minimizing the amount of RDX used during the disposal process. In addition to supporting DRDC with valuable experience and technical competence, military ammunition practitioner participation in the trials allows them to develop their skills in the venting and burning, or low order detonation, of ammunition when required.

Phase two of the trial includes using an environmentally friendly flare in conducting burn procedures. Testing will take place in 2014 to determine the way ahead for this product. There will also be extensive testing of various methods and techniques that can be employed to mitigate the challenges that Insensitive Munitions (IM) present to EOD Operators. Research in this area will be especially important in the coming years in order to prepare for the introduction of IM natures, such as the 120mm tank round, into CAF service.

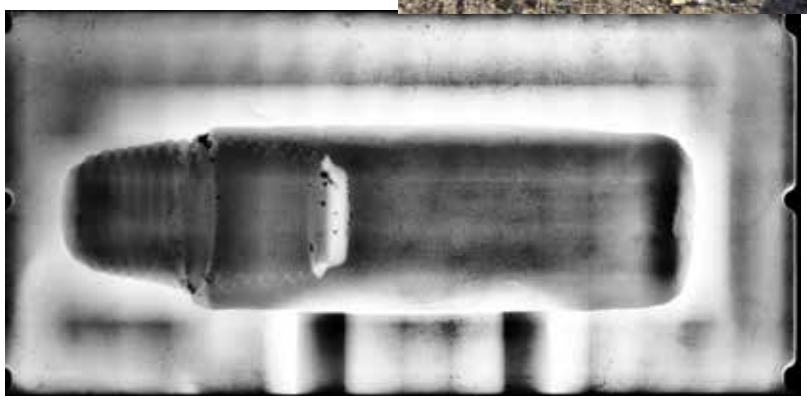
Other trials that DAER will support include research into the mitigation of blast and fragmentation utilizing water and the use of lasers to destroy conventional and IM.

SUMMARY

In general the work of the policy section has steadily improved the status and standard of the regulatory framework documents for the regulation of the procurement, storage, transportation, inspection, maintenance, authorized modification, issue, use and disposal of all A&E within the DND and CAF.

It is expected that the development of publications and policy documents should start to slow in 2014, as we enter into a new period where maintaining publications, managing policy documents and increased Compliance focus becomes the new direction. It may be necessary to make some internal resource allocation changes to achieve this.

It was not possible to progress as quickly as anticipated with some key documents, particularly DAODs, due to resource limitations and external policy changes. This has an impact on the ability of the compliance section to initiate activities to ensure that all units and organisations within DND/CAF are managing A&E in accordance with established safe practices.



This is an item Ammunition Technicians from Farnham had to investigate.

Competitors participate in the Pistol Falling Plate match, the final event with the service pistol during the Canadian Armed Forces Small Arms Concentration.
The Canadian Armed Forces Small Arms Concentration (CAFSAC) is held annually at the Connaught Ranges in Ottawa. Teams from CAF, RCMP, UK, USA and the Netherlands are taking part this year. The competition focuses on core marksmanship competency for all service members.

Section 4

Ammunition and Explosives Safety Advocacy and Analysis

INTRODUCTION

Strengthening of DND/CAF A&E safety advocacy and analysis capabilities continued in 2013. Principal activities included: analysis of accident and incident reports, incorporating statistical analysis; completion of the final draft and translation of a new Ammunition and Explosives Safety Program (AESP) policy manual; continuation of the development of a new e-solution for safety management; and final development of distributed learning versions of the Unit Ammunition Representative and Unit Explosives Safety Officer courses with the Canadian Forces Logistics Training Centre (CFLTC). Assistance was also provided to a number of compliance activities.

SAFETY ADVOCACY AND ANALYSIS PROGRAM ACTIVITIES FOR 2013

Policy

A-GG-040-006/AG-001 DND/CAF Ammunition and Explosives Safety Program. This is the main policy manual for the AESP. It was last updated in 1994 and is now going thorough modernization. The new policy will incorporate the Canadian Standards Association CSA Z1000-06 Occupational Health and Safety Management System standard, which was published in 2006. Among other things, this standard will ensure that the "Duties of Employers" in the Canada Labour Code are properly

reflected in the policy. The rewrite was therefore substantial and involved extensive consultation with stakeholders. Translation of the manual has been received and the final formatting and publication will occur in 2014.

Following promulgation of the new policy, L1 organizations will be required to revise their respective AESPs, and reasonable time will be allowed to accomplish this. The end result is intended to be that the programs in DND and the CAF will fully meet all legal requirements and be comparable to any modern Health and Safety Management System in industry or government.

Development of Courses

4. Unit Ammunition Representative (UAR) Course. In 2013 there were 16 serials, two of which were conducted in French at Valcartier as a means of trialing the French language curriculum. A total of 302 candidates were trained, the highest total so far, yet still far below the numbers needed to satisfy the requirements. The development of the Distributed Learning (DL) version of the course continued during the whole year, with the new curriculum being increasingly phased into the course.

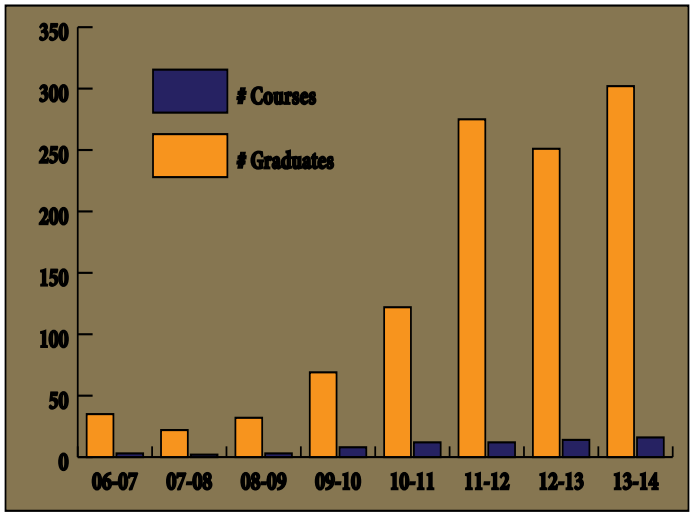


Figure 1 Number of Graduates from UAR Courses

The last serial of 2013 was conducted using the English language package in DNDLearn. Cessation of face-to-face training was announced in 2013, with the final serial to be conducted in January 2014, and with commencement of training delivery in April 2014 via DNDLearn, in both official languages. Figure 1 shows the number of UAR courses and graduates since 2006.

Unit Explosives Safety Officer (UESO) Course. A trial serial of this course was conducted to test the English language curriculum. This course is expected to be available on DNDLearn in both official languages from October 2014. In the meantime, CFLTC will deliver the course face-to-face in English commencing March 2014. This will be a major step forward. For the first time we will be providing training at the unit level, training designed to improve management of the inventory and management of safety.

Educational and Promotional Products

Posters. Two posters were released in 2013, see Figure 2. These posters were designed to highlight two facts gleaned from accident and incident analyses: personnel-related causes account for approximately 80% of all AESP occurrences and 15% of all occurrences are due to personnel deliberately deviating from established standards and procedures.

DVD. The development of DVDs was not pursued in 2013.

Awareness Promotion Items. Due to the fiscal environment within the department, no promotional items were authorized for 2013. It has now been three years in a row that no promotional or educational items were authorized. It is hoped that in 2014 the procurement of a few items will be authorized, in order to emphasize events such as the 40th anniversary of the 1974 accident at the Cadet Camp in Valcartier, which resulted in the deaths of six cadets and led to the AESP being modified to the program we know today.

Communications

General. Theme 7 of the CRS 2005 evaluation of the DND/CF Ammunition Safety Program[1] was Communications. One of the recommendations related to this theme was to "Establish mechanisms to promote dialogue and information sharing across DND/CF ammunition safety community and with key external organizations". The following paragraphs summarize the latest efforts to continue enhancing communications for the ammunition program at large, as well as the issues faced by the community.

DAER DIN Page. The DAER DIN page has become a reference for many members of the ammunition community. In 2013, the range of training vignettes was further expanded and the extant vignettes were updated. In order to provide some links to the past of the ammunition community, an historical interest page was added.

DAER Shared Workspace. The Shared Workspace of DAER saw increased usage. It was very useful for the transfer of large files. It provides the ability to create virtual working groups and this has proven extremely valuable in the revision of existing manuals as well as the development of new policy.

One excellent example of the many potential uses of the Shared Workspace is its use for the development of the Unit Ammunition Representative Course. CFLTC placed the various modules on the Shared Workspace for review. All involved then had easy access to the material and they could follow the development as it happened, instead of having to wait for days until DVDs would be delivered in the mail.

Ammunition and Explosives Safety Conference (AESC). An AESC was planned for 2013; however, due to new government restrictions it was not conducted. This annual meeting had

1 1258-101-2 (CRS) Evaluation of DND/CF Ammunition Safety Program, February 2005

Figure 2 New Posters Issued in 2013

become an excellent venue to exchange ideas and distribute safety related information at all levels and it is hoped that this forum will be reinstituted in 2014.

Impact of Controlled Goods Regulations (CGR) on Dissemination of Information. The application of the CGR still impedes ready access to A&E publications and may eventually result in safety being compromised due to the unavailability of safety critical information to A&E practitioners. Specific areas which require close monitoring include:

- Availability of Publications. The removal of A&E publications from the Canadian Forces Publications Depot (CFPD) electronic library affects the ability to access the required safety publications in a timely fashion. While the LCMMs cooperate fully with the users, they are not always available. This issue is ongoing and there does not seem to be any resolution in sight; and

- Requirement for Level II Security Clearance to Receive Training. When training involves access to publications with CG information, a level II security clearance is required. Two examples of the impacts are:

  – Ammunition Technician Training. Students must wait until they obtain the required clearance before they can undertake the training. As civilians can now be recruited to become ammunition technicians, the request for the Level II clearance must be initiated very early in the training. With respect to those who transfer from other trades, this may result in undue delays before they can join a course; and

  – Unit Ammunition Representative (UAR) Training. The requirement for a Level II clearance was going to have an impact on course loadings for UAR courses, as many potential candidates do not have the appropriate clearance. It would also have created issues for the development of distributed learning packages. As a result, the course was reviewed and the contents modified so that access to controlled goods was no longer necessary. Those UARs wishing to further their knowledge now have the responsibility to obtain the required clearance.

Electronic Tools

Safety Information Management System. In 2011 the first five requirements of the Ammunition and Explosives Safety Information Management System (AESIMS) were selected for development by IM Group. It will develop these requirements

along with those of the Flight Safety Program for an upgraded Flight Safety Occurrence Management System, with a view to providing a common corporate solution called the Safety Information Management System (SIMS). The intent is for relevant functionality in this solution, once implemented for the two lead sponsors, to then be extended to the other DND/CAF safety programs.

The Business Process Mapping and Business Requirements Document have been completed and development started in the summer of 2012. The five requirements being developed for the explosives safety program are:

- Hazardous Occurrences Reporting;
- Defects and Malfunctions Reporting;
- A&E Safety Inspections and Surveys;
- A&E Licensing and Storage, including waivers; and
- Risk Management.

While the original expectation was that the initial capability would be delivered in 2014, this date has now been revised to read 2015, and only for the first two modules on Hazardous Occurrences Reporting and Defects and Malfunctions Reporting. The other modules will be delivered starting in 2016 at the earliest. While this delay is unfortunate, it was to be expected, as SIMS is the first software to be developed by the Director Application Development and Support (DADS) using "sprints" (30-day development periods). The goals and related timelines are therefore adjusted as a result of experience gained.

In addition to the delay, two new issues related to SIMS developed in 2013:

- Technical Writer. The first issue is a lack of funds required to hire the technical writer needed to prepare the user manuals related to the various modules. The staff from DADS in ADM(IM) have stated they would require the specialist some time in 2014, and that DAER would have to do the hiring. The technical writer would need to work over two fiscal years: FY 14/15 for the module on Hazardous Occurrences Reporting, and FY 15/16 for the other modules. Funding for the FY 14/15 part has been approved, however approval for the FY 15/16 period is pending; and

- Communications Plan and Training Package. The second issue is related to the lack of funds needed for the development of a communications plan, a training plan and a training package. In a similar fashion to the user manual, these need be developed in order to train the users who will be working with the first module. The original intent was to develop one or a series of courses that would be offered by DL, through DNDLearn. The use of contractors through standing offers would have been the preferred option, however no funds are currently available. As a result, DAER will request training of an individual on the various SABA software used in DNDLearn in order to develop the basic courses in-house. If this proves unworkable, it will be necessary to re-evaluate whether the first module should be released in 2015.

Defence Resource Management Information System. The Department has completed the migration of ammunition inventory accounting into DRMIS as part of the Supply Chain Integration initiative under the MASIS Project. Unfortunately, the solution being delivered lacks some functionality needed for effective corporate management of ammunition (similar deficiencies exist in the legacy CFSS platform) and therefore a follow-on effort is being pursued through the MA&S Stream II initiative, led by DGMSSC, to fill in the gaps. The MA&S Stream II Initiative is now being delayed, and as a result the legacy systems such as AIMS may have to be retained much longer than initially anticipated.

SUMMARY OF 2013 ACCIDENT AND INCIDENT ANALYSIS

Statistics

A detailed analysis for 2013 is attached as Annex C. Along with the analysis is a summary of accidents and incidents, which is intended to promote dialogue down to the unit level and to illustrate the potential seriousness of any incident or accident involving A&E.

Figure 3 and Figure 4 provide a trend analysis for reported occurrences (accidents and incidents) and deaths and injuries during the past ten years. The dotted line indicates the creation of DAER, which constituted a major process change for the reporting of A&E occurrences.

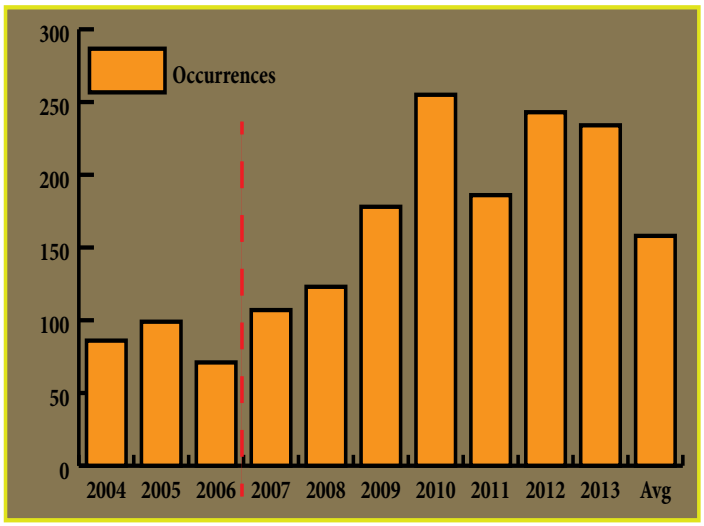


Figure 3 Number of Reported Occurrences 2004-2013

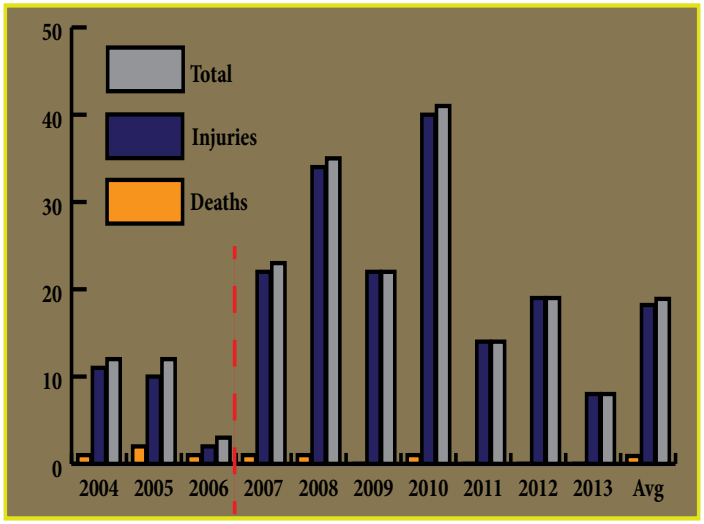


Figure 4 Deaths and Injuries

Analysis

Based on the historical averages and the detailed analysis at Annex B, the following points are worthy of note:

- There is continuing concern with what appears to be a lower frequency of reporting from some Army, CMP and CANSOFCOM bases and units. This concern is based on the high usage of ammunition versus the low incidence of reporting and a comparison of incidents/accidents ratios. The CAF cannot draw effective lessons learned from accidents and incidents that go unreported. Commands must continue to work with their L1 ATAs on improving the rigor of reporting in order to facilitate the ability of the Department and the CAF to learn from experience and take corrective action where necessary;

- In the vast majority of reported cases, the ammunition or explosives worked as designed. There were no injuries due to ammunition faults;

- Common User natures plus the natures most commonly used by the RCN and the RCAF – hence those most frequently used and most familiar to CAF personnel – continue to be involved in a high percentage of accidents and reported incidents. Nine of the 14 injuries resulted from this category, including three auditory injuries incurred while firing small arms;

- Most events are the result of human error: 77%, comparable to previous years; and

- Deliberate deviations from procedures caused 9 % of occurrences (down from 15%), including three accidents – two with injuries. Of the 20 deliberate deviations, two occurred in the RCN, one in ADM(IE) and the remaining 17 were a CA responsibility. Of these 17, seven involved visiting forces and six resulted from poor unit control. The relatively large number of accidents and incidents categorized as deliberate deviations (approximately one in every three occurrences), and the nature thereof, tend to suggest that there may be a lack of respect for established drills and procedures within some CA units.

Observation to Lessons Learned

Unit control of ammunition and ammunition processes, particularly in CA units, where ammunition is more readily available and more widely distributed, needs to be strengthened. Greater diligence on the part of range safety officers and supervisors in strengthening post exercise clean-up and declaration procedures would reduce risk to personnel conducting post-firing range sweeps, those transporting ammunition and ammunition salvage from ranges, and technicians taking and processing these returns. It would also help reduce finds of stray ammunition. An active Amnesty Box Program could limit inappropriate disposals. Approximately 40% of reported CA occurrences related to some aspect of poor unit control. This is a reduction from 60% in 2013 and it may seem a notable improvement; however, with the very small base of reports received, it is difficult to draw detailed lessons.

Reporting of accidents and incidents, more specifically the lack thereof, continues to be a major concern; specifically that many occurrences continue to go unreported within CA, CMP and CANSOFCOM units. In general, this concern is based on the high usage of ammunition versus the low incidence of reporting and a comparison of accident/incident frequency. The high incidence of deliberate deviations within CA indicates a lack of respect for established drills and procedures. Work to improve the rigour with which accidents and incidents are reported must continue to ensure that all occurrences are captured, analysed and corrective action taken where necessary.

In 2012 there were two incidents and one accident involving display ammunition, and there had been similar incidents over the previous three years. In 2013 DAER's compliance program specifically addressed this issue. No further museum incidents were reported in 2013, but there were two occurrences involving energetic components which were discovered installed in aircraft dedicated to maintenance training. Continued diligence is required.

Recommendations

Within the RCN and RCAF, a culture of reporting appears to be institutionalised. However, there is a continuing concern with lack of reporting from CA and CANSOFCOM units, as well as CFB Borden (CMP). A change in reporting ethos is required. Robust outreach/education programs should be pursued within these organizations in order to increase individual and unit awareness of A&E safety.

SUMMARY OF 2013 ACCIDENTAL DISCHARGES

Statistics

This is the third year accidental discharges are reported separately from other incidents following the promulgation of new direction in 2010. The decision to report accidental discharges separately was made in order to avoid skewing the data when comparing incidents from year to year.

In 2013, DAER received a total of 44 Accidental Small Arm Weapon Discharge Reports. They were broken down as follows:

- Pistols: 5 occurrences, or 11 %;
- Rifles/Carbines: 32 occurrences, or 73%; and
- Machine Guns: 7 occurrences, or 16%.

Analysis

As can be noted in Figure 5, the numbers for this year are comparable to those of the first two years, and from those it is evident the message about the obligation to report these events has still not made its way to the individuals in charge. If accidental discharges only involved blank ammunition, with a limited potential for injury or death, we could partially understand why people would not want to report. But of the 44 reported occurrences for this past year, 17 (39%) involved ball ammunition. If the discharges only occurred during training and there were no issues during deployments, we could again understand why people are reluctant to report. However, 11 out of the 44 reported, or 25%, occurred in Afghanistan. So we know there are issues, but we also know we are not getting the full picture.

Observation

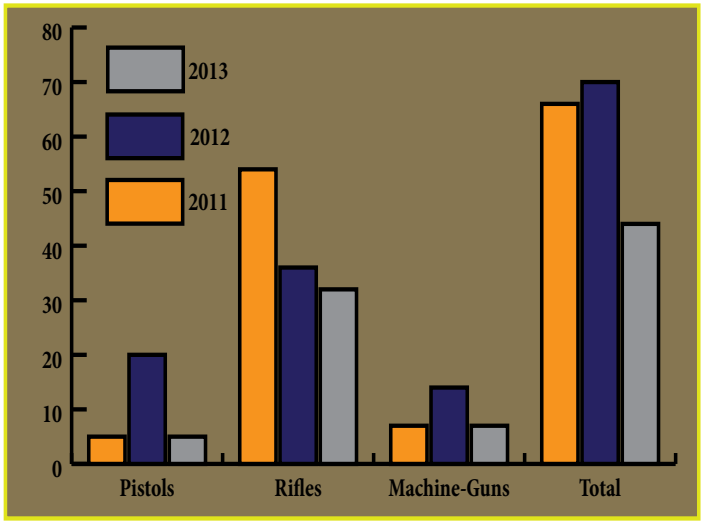


Figure 5 Accidental Discharges 2011-2013

The major observation resulting from reviewing the various reports is the same as last year, which is that in the majority of cases weapon handling drills were not properly followed. Approximately the same amount of small arms ammunition was fired in Canada in 2013 as there was in 2012: 35 344 880 rounds versus 34 449 125[2]. This covers all types of small arms ammunition fired by tens of thousands of CAF members, visiting forces, cadets, police officers and civilians on Canadian ranges and training areas. Even if we were to add the number of rounds fired in theatres of operations and on foreign ranges, the very small numbers of reported cases and service tribunal convictions suggest that weapons handling training is probably generally effective. The increasing use of electronic simulators probably also plays a role in reducing the number of accidental discharges. But as was the case in previous years, the absence of better quality data makes it impossible to confirm this or to identify any localized areas of weakness.

Recommendations

Efforts should be made to strengthen reporting of accidental discharges to support improved analysis and trend identification. Trend data are valuable for, among other things, identifying areas of weakness in weapons training delivery, indicating the impact of changes in training practices, and analyzing the introduction of new training technologies. Such data would also be used when introducing new weapons to be able to accurately compare the incidence of accidental discharges through the introductory period, and between the new weapon and the old one. Trend data can also provide an early indicator of a need to consider design modifications.

SAFETY ADVOCACY AND ANALYSIS PROGRAM OF WORK FOR 2014-2015

Policy

A-GG-040-006/AG-001 DND/CF Ammunition and Explosives Safety Program. Consultations with Level 1 ammunition technical authorities (ATAs) on the content and structure of the update to this major manual resulted in more comments than originally anticipated and delayed the final draft. It was completed in the fall and submitted for translation. The French text was received in December 2013. After the technical review of the translation, the document will be sent to Director Supply Chain Operations for formatting and publication.

A-GG-040-006/AG-002 DND/CF Ammunition and Explosives Accident / Incident / Defect / Malfunction Reporting. As a result of the AESP policy manual rewrite, a revision of the reporting manual will be initiated to maintain alignment between the two and improve data quality, with a view to strengthening the ability of commanders and staffs to observe trends and identify root causes.

2 Numbers were extracted from the Canadian Forces Range Information System on 8 March 2013 for the year 2012, and on 18 January 2014 for the year 2013

DAODs 3002-3 and 3002-4. The cyclical review of both DAODs was initiated late in 2013. However, before the draft documents could be circulated for comments, minor revisions to the definitions were needed in line with the Defence Terminology Programme. Once the revised definitions have been accepted, the draft DAODs will be circulated.

Development of Courses

DAER 3 will continue to work with CFLTC to implement the DL UAR and UESO courses with a view to improving the ability of CAF units to meet their requirements for this training and reducing training delivery costs. The objective is to implement these solutions in 2014.

Educational and Promotional Products

Posters. DAER has established a limited, low-cost, in-house capability to design and distribute safety posters. It is a secondary function for one person and pursued only as primary duties permit. Poster development will continue as a limited effort in 2014.

Awareness Promotion Items. DAER will very selectively pursue the procurement and distribution of awareness promotion items where they are shown to be effective.

Communication

Controlled Goods. DAER will continue to work with the various responsible authorities to find appropriate means to ensure that adequate access to technical data is provided to practitioners when required, while respecting the Controlled Goods Regulations.

E-Business Environment. Evolutionary introduction of the use of e-business tools will continue in 2014. The DAER DIN site is now mature and the focus will be on managing content and encouraging its wider use. The shared workspace is also well established and receiving increased usage by the practitioner communities. Expansion into secure internal systems and the non-secure external (i.e. internet) environment will be explored based on the assessed need.

Annual Conference. The intent is to continue organizing one major conference per year for ammunition practitioner communities, although this is dependent on securing funding and event approval.

Electronic Solutions

DAER will be active in supporting development of two corporate systems in 2014 and 2015:

- SIMS. The bulk of the work in 2014 and 2015 will concentrate on the development of the various modules of SIMS. The first module, the one on occurrence reporting (including defects and malfunctions), is now scheduled for delivery in the spring of 2015, following trials in the fall of 2014. Other modules will follow, but delivery dates have not been identified yet; and

- DRMIS. Further development of the six remaining requirements identified in the AESIMS business requirement document will be taken forward to ADM(Mat) DMSPR, for consideration into developing a solution in conjunction with ADM(IM). That solution could be permanent, or it could be temporary until the work to include all ammunition functionality into DRMIS resumes, as part of MA&S Stream II or as part of another initiative.

SUMMARY

Sustained efforts made over the past several years to put in place key enablers in order to strengthen explosives safety programs and practices are now bearing fruit. These include:

- Modernized safety policies and program guidance, firmly based on national and international standards and best practices, that provide the chain of command with more effective safety and risk management tools;

- A consistent and sustained effort to collect and analyze data concerning A&E occurrences is starting to indicate which areas need to be worked on in order to improve safety and strengthen risk management practices;

- Delivery of two new DL training courses that will eliminate training bottlenecks, enable commanders down to unit and sub-unit level to establish stronger local safety programs and risk management practices, and provide major time and cost savings in training delivery; and

- Delivery of SIMS will soon provide more sophisticated and powerful management and analytical tools.

Our near-term major focus remains getting the new enablers delivered and improving the way we inform and support the institution in delivering AESPs, and in managing related risks. However, at the same time we are continuing to work with the relevant communities of practice and the chain of command to identify requirements for, and plan the delivery of, future policy, program and system improvements.

Sergeant Eric Dinn of 442 Transport and Rescue Squadron, Comox prepares a smoke marker on the back of a CC-115 Buffalo aircraft on September 16, 2013 during the 2013 National Search and Rescue Exercise held in Gimli, Manitoba.

Section 5 Conclusion

GENERAL

In order to provide senior management with an overall assessment of the state of explosives safety compliance and risk management in DND and the CAF, a summary view was introduced in the 2010 annual report, modified from selected key elements of the Treasury Board Management Accountability Framework (MAF). This view has been found to have been useful and is now a permanent feature of these reports. It provides a high-level perspective of the current strengths and weaknesses of the DND/CAF ammunition program from a regulatory and safety perspective.

The following 5 MAF assessment areas were originally selected for reporting on A&E safety management. The MAF has since evolved, and the areas have been tailored to fit within the context of reporting on the performance of the ammunition program. They therefore don't necessarily closely align with the current MAF areas, however we have retained the same areas in order to maintain consistency year over year:

ASSESMENT AREA	DESCRIPTION
Governance and Strategic Direction	Internal coherence, corporate discipline, and alignment of processes and activities to outcomes are in place and enable the provision of sound strategic direction and support to ammunition users and the ammunition program
Policy and Programs	Development of policy and program tools are sustained in order to provide appropriate advice and guidance to L1s
People	DND/CAF has the required A&E specialists, work environment and focus on building capacity and leadership for the future
Risk Management	Risk Management activities in the A&E life cycle are governed by an overarching policy, risk decisions are taken at the appropriate level and mitigation measures are tracked
Stewardship	Departmental Control Regime (assets, money, people, and services) is integrated and effective. Underlying principles are clear and contribute to the accomplishment of an effective A&E regulatory regime

Each area was then rated against a MAF-derived assessment scale, predominantly based on qualitative measures based on observations in the annual reports as described below:

ASSESSMENT SCALE	COLOUR CODE	DESCRIPTION
Attention Required		Significant deficiencies – inadequate attention being paid
Opportunity for Improvement		Moderate deficiencies – evidence of attention to the deficiencies and progress
Acceptable		No significant deficiencies – meets the requirements of the DND/CAF A&E regulatory framework
Strong		No deficiencies in any of the measures – exceeds the minimum requirements of the DND/CAF A&E regulatory framework.

ASSESSMENT ELEMENT #1 - GOVERNANCE AND STRATEGIC DIRECTION

Overall Rating:	"Opportunity for Improvement"

This element considers how well the ammunition program and associated activities are managed. Sound governance and strategic planning enables leadership to effectively allocate resources to priorities, align activities to outcomes and manage program risks. Indicators of sound governance and strategic direction include:

- Governance. Program responsibilities and accountabilities are well defined and program leadership makes informed, proactive and timely decisions to achieve desired results;
- Planning and Plans. Program planning is comprehensive and aligned with corporate priorities, business plans and resource allocation;
- Program Coordination. There is good policy coherence and effective coordination of program activities to support efficient and effective delivery of required outcomes.

With the acceptance of the recommendations of the study on the strategic management and governance of the ammunition program, and the stand-up of the new Mat J4 Ammo organisation under ADM(Mat), substantive progress was made in 2013 in clarifying and strengthening the governance and strategic direction of the ammunition program. Once the new organisation reaches FOC a review of it's specific authorities and responsibilities will be conducted. The current status of action in response to recommendations related to this assessment element from this and previous annual reports is noted in the table below.

Required Action	Annual Report	Status	Comments
Establish effective strategic-level executive leadership of the ammunition program.	2013 2012 2011 2010		A DCOS(Mat)-led comprehensive study of the strategic management and governance of the ammunition program was undertaken by the Department and completed in 2013. Full execution of the approved Master Implementation Plan began in September.
Review of DAOD 3002-0 Functional Authorities	2013 2012 2011 2010		A critical policy update has been held up by delays in approving the revision of DAOD 1000 series and in seeking DM approval for A&E risk management policy changes. DM policy approval is anticipated in 2014 but the timeline for issuing the new DAOD 1000 series is unknown.
Accountabilities of the Ammunition Board	2013 2012 2011 2010		The former Ammunition Board will be replaced in 2014 by a more strategic oversight committee designed to ensure effective executive-level stakeholder engagement in, and appropriate influence on, the management of the ammunition program.

ASSESSMENT ELEMENT #2 – POLICY AND PROGRAMS

Overall Rating:	"Opportunity for Improvement"

The rewrite of the A&E policy suite is nearly complete with many publications now in a standard review cycle. However, delays in the staffing of critical DAODs continue to affect implementation of key policy changes. The lack of reporting of accidents and incidents by units within some commands means that it is difficult to conduct significant analysis and draw valid conclusions from the very small base of reports received. The current status of action in response to recommendations related to this assessment element from previous annual reports is noted in the table below.

Required Action	Annual Report	Status	Comments
Restructure of policy framework into new series of A&E manuals	2013 2012 2011 2010 2009 2008		DAER policy update program of work is on track for completion by 2015. Delay in departmental approvals of key DAODs is introducing new schedule risk.
Implementation of new program tools:	2013 2012 2011 2010		The AESI/AESS methodology is now due for a continuous improvement review in consultation with the L1 ATAs to address issues and weaknesses observed during the 2013 cycle.
Implementation of improvements for safety & suitability for service assessments	2013 2012 2011 2010 2009		The S3 process is a mature process with well-defined boundaries and interfaces. The majority of the 2009 audit observations have been addressed, with only 3 observations remaining open as work in progress.
Implementation of new in-service surveillance program (ISSP)	2013 2012 2011		Overall, the surveillance program is well defined and understood. Proper coordination between the surveillance program and the disposal and demilitarization program is required to ensure positive control over natures awaiting disposal from a surveillance and safety perspective.
Development of Unit Ammo Rep and Unit Explosives Safety Officer DL courses	2013 2012 2011 2010 2009 2008		The development of the Distributed Learning (DL) version of the UAR course was completed in 2013. The course will be delivered via DNDLearn in both official languages starting in April 2014. The UESO course is expected to be available on DNDLearn in both official languages from October 2014.
Further development of Ammunition & Explosives Safety Information Management System (AESIMS)	2013 2012 2011 2010 2009 2008		A corporate SIMS development is in progress to meet consolidated needs of multiple safety programs. Although previously reported that initial capability would be delivered in 2014, this date has now been revised to 2015, and only for the first two modules on Hazardous Occurrences Reporting and Defects and Malfunctions Reporting. The other modules will be delivered starting in 2016 at the earliest.
Improve reporting of A&E occurrences	2013 2012 2011		Reporting of accidents and incidents continues to be a major concern; specifically many occurrences continue to go unreported within certain units. Weakness in reporting is a long-standing and complex problem that defies simple solutions. DAER will continue to engage relevant L1 organizations through 2014 to improve the situation.

ASSESSMENT ELEMENT #3 – PEOPLE

Overall Rating:	"Opportunity for Improvement"

This element considers the state of the small but highly specialized workforce required to deliver the ammunition program. Effective management of this workforce requires a long-term strategy and sustained effort. Indicators of sound workforce management include:

- Selection and Training. There is sustained planning for ensuring that adequate numbers of specialist military and civilian practitioners are recruited, trained and retained to meet program needs. Training is delivered as efficiently as possible; and
- Leadership Development. There is a coherent approach to the development of leadership competencies for specialist practitioners, including future institutional leaders.

This element remains an "Opportunity for Improvement" because of the number of issues still to be addressed.

The current status of action in response to recommendations related to this assessment element from the current and previous annual reports is noted in the table below.

Required Action	Annual Report	Status	Comments
Stabilize the Ammunition Technician Trade	2013 2012 2011 2010		The trade is considered Green by CMP because overall numbers are good. However, there remain significant issues of rank distribution, with shortages at key senior levels. The recently completed Occupational Analysis has resulted in a 5 year plan to normalise the situation.
Development of civilian ammunition practitioners under the civilian ammunition technician program	2013 2012 2011 2010 2009		The recently completed CAT 4 Lesson Plans, coupled with the management training courses available through the Canadian School of Public Service, now provide the capability to train a civilian from apprentice to CAT 5 Explosive Safety Officer (Capt equivalent).
Provision of L1 Ammunition Technical Authority (ATA) Support	2013 2012 2011		Every L1 currently has an L1 ATA named and assigned for this key safety role. Ensuring the required L1 ATA cross-organizational boundary responsiveness continues to be a challenge.
Implementation of ATO training in Canada	2013 2012 2011 2010		The first serial of the Canadian ATO course graduated in spring 2013. Serial 002 with 13 officers started in fall 2013. Mat J4 Ammo as the Log Branch ATO advisor, in conjunction with DAER, will validate the ATO training starting by comparing the syllabus against the job specifications of ATOs and the functions matrix in policy documentation in order to validate the output of the course. There does however remain a concern over the near-term availability of senior ATOs to fill command appointments.

ASSESSMENT ELEMENT #4 – RISK MANAGEMENT

Overall Rating:	"Opportunity for Improvement"

This element considers the effectiveness of integrated risk management in program delivery and more widely in activities involving A&E. A proactive, rather than reactive, approach to managing risk provides for better decision-making and timelier responses to emerging risks that threaten the operational capabilities of the DND/CAF and safety of personnel. Indicators of sound risk management include:

- Program Risk Management. Within the program delivery framework there is sound risk management methodology, effective governance and clear leadership accountability for integrated risk management; and

- Corporate Risk Management. More widely in DND and the CAF, there is clear and coherent strategic direction concerning the safe custody, handling and use of A&E. Commanders and managers at all levels have ready access to technical advice relevant to the activities they conduct involving A&E. There is ongoing corporate monitoring and reporting on compliance with relevant policies, procedures and norms at all levels, with effective mechanisms for managing risk and quickly identifying and correcting problems.

The overall rating of this element remains "Opportunity for Improvement" however there is no change to the corporate risk management component which is assessed as being "Acceptable". Adequate corporate direction is in place concerning the safe custody, handling and use of A&E, and it is being progressively updated and improved. Major L1 users are collaborating well with DAER in the conduct of active compliance activities. The reporting of accidents and incidents by some units within commands continues to cause concern and DAER will be working with the relevant organizations to determine causes and find appropriate solutions.

The current status of action in response to recommendations related to this assessment element from the current and previous annual reports is noted in the table below.

Required Action	Annual Report	Status	Comments
Devolution of approval authorities for higher risk activities to the appropriate level	2013 2012 2011 2010		Legal endorsement obtained. CDS approval received. DM approval being sought for the new policy.
MOU on avalanche control with Parks Canada – safety and regulatory requirements.	2013 2012 2011 2010		This issue has stabilized to the point that there are no extant safety or compliance concerns that require highlighting in the DAER Annual Report at this time.
Continued progress in addressing legacy sites	2013 2012 2011		The legacy program is very well managed with sound application of risk management practices to ensure low risk to the public. However, budget cuts of over 50% and the significant reduction in the number of specialist A&E personnel assigned to this activity severely limit its ability to provide active site remediation. The reduction of budget and personnel, if continued through the medium and long terms, increases the risk posed by the UXO problem to Canadians.
Improve control over higher risk A&E support activities in deployed operations	2013 2012		Positive results were achieved in policy production and integration affecting the Supply Administration Manual. For future operations, the SJS, Force Generators and Force Employers will consult with Mat J4 Ammo to assist with the production of A&E stockpile plans and operational A&E Replenishment Points scales, the recommended inventory accounting and management procedures to be used in operations and TO&E guidelines to ensure explosives safety capabilities are embedded in the theatre of operations.

ASSESSMENT ELEMENT #5 – STEWARDSHIP OF ASSETS

Overall Rating:	"Opportunity for Improvement"

This element considers how well ammunition and explosives-related assets, including infrastructure, lands, inventories and equipment, are managed. Indicators of sound stewardship of assets include:

- Real Property. A real property management framework ensures that investments are planned and real property is managed in a sustainable and financially responsible manner, throughout its life cycle, and support cost-effective and efficient delivery of the ammunition program;

- Ranges and Training Areas. Effective plans and programs are in place to ensure the long-term environmental protection and sustainability of ranges and training areas where A&E are used. Legacy sites with known or suspected contamination are properly managed and progressively cleaned up. New technologies that reduce the environmental impact of using A&E are introduced where feasible and affordable; and

- Materiel. A materiel management framework ensures that A&E are managed throughout their life cycles in a manner that is sustainable and financially responsible. A&E are safely stored and protected in a manner that preserves public safety and that of CAF personnel and DND civilians. Materiel is accurately accounted for in accordance with government standards.

Despite progress in many areas, concern remains as to the state of the A&E infrastructure and the accuracy of inventory accounting. In addition, the long standing challenges posed by the lack of a demilitarisation capability present a growing safety risk. It is anticipated that the changes being implemented in management of the program at the strategic level will go a long way to resolving these issues.

The current status of action in response to recommendations related to this assessment element from the current and previous annual reports is noted in the table below.

Required Action	Annual Report	Status	Comments
Progressing the demilitarization initiative	2013 2012 2011 2010 2009		A successful industry engagement activity was held in June 2013 to understand what interest and capabilities in demilitarization Canadian industry currently possesses. Going forward the required capability will be pursued as a services contract with a draft RFP forecast in 2014, and a full operational capability (FOC) sought for 2017. These timelines are considered extremely optimistic given significant NP budget pressures in FY14/15 and beyond.
Strengthen environmental stewardship within the A&E regulatory framework	2013 2012 2011 2010		The Air Emission Standard to support demilitarization developed by DAER in collaboration with ADM(IE), and in consultation with the various national and provincial authorities is in final stages of preparation. It is expected that it will be published in 2014.
Strengthen ammunition inventory control and accounting	2013 2012 2011 2010		No change from 2012. DAER will continue to observe on this issue from an explosive safety viewpoint. Problems continue with supply discipline, including improper write-off procedures, failure to report expenditures and failure to report stocktaking deficiencies of items involving controlled technologies.
Access to Technical Data	2013 2012		No change from 2012. Access to technical data for CTAT/ITAR controlled technologies remains difficult with the associated risk that needed data for some A&E activities to be safely executed may not be available when required. DAER will continue to monitor development of improved solutions.
A&E Infrastructure Real Property Development planning	2013 2012 2011 2010		DAER, in conjunction with ADM(IE)/DRPP, conducted a study of all 2nd and 3rd line facilities to get an understanding of what is held, its condition and its status. The results show that A&E infrastructure is old, with the median construction date being 1965 (49 years old) and that the overall condition is poor to fair (66%) with a minority being identified as Good (33%). An A&E infrastructure renewal and recapitalization plan, rooted in outcomes from Defence Renewal, would decrease the risk posed by aging buildings.

SUMMARY

Although the overall rating remains unchanged from 2012 at "Opportunity for Improvement" the creation of the Mat J4 Ammo organization provides the basis for coherent strategic leadership of program delivery. This, along with the near completion of the suite of regulatory publications and progress in resolving other long standing issues, paves the way for more improvements in the coming years.

CONCLUSION

The issues and concerns in the conduct of defence activities involving A&E identified in this report impact in varying degrees on the ability of DND and the CAF to safely conduct operations. It should be noted however that overall oversight, control and risk management of these activities continues to be done adequately in most cases. There remains the potential for those exceptions detailed in the report, if not addressed, to worsen over time and culminate in a major event.

To mitigate the risk, these issues need to be addressed at the strategic level, in some instances with the assistance of senior management. The areas we believe merit the greatest focus are:

- Strengthening ammunition inventory control and accounting, from both a systems perspective and correcting improper practices;
- Strengthening management of the specialist Communities of Practice essential to successful program delivery; and
- Rationalising and recapitalising aging A&E infrastructure.

During 2014 DAER will continue to actively work with the responsible authorities and key stakeholders on the identification and implementation of international best practices in support of Defence Renewal. We will also continue to inform senior management on the state of compliance with A&E regulatory requirements, effectiveness of risk management, and state of A&E safety programs and practices across the Department and CAF.

The Ammunition and Explosives Safety Program was represented at the North American Occupational Safety and Health Week event held at 15 Wing Moose Jaw, on the 8th of May 2013. Over 25 agencies participated and the event was attended by more than 375 people.

A soldier from 36 Canadian Brigade Group (36 CBG) provides cover for his platoon, after throwing a smoke grenade, while they prepare to secure a building during the final assault scenario as part of Exercise SOUTHBOUND TROOPER XIII (Ex SBT XIII) at Fort Pickett, VA, USA on 22 February 2013.

Annex A

Summary of DND/CAF Ammunition and Explosives Totals by Group for Demilitarization

The following caveats are applicable to all tables in this summary:

- The information is based on CTAT's "Certificate of Demilitarization" Form DND 2586 received from CAF units by DAEME;
- DAER is using an average capacity of 400 pallets based on the standard storage holdings within the 17x20 m magazines used in many locations across Canada;
- Not all units are writing off (striking off) the inventory once destruction/disposal has occurred in accordance with Supply Management Policy. In some cases there is a 3-6 months lag time to complete the write-off transaction. As such, the numbers contained in this annex should be considered accurate but not precise; and
- The data contained in the tables is current as of end December 2013.

TABLE 1 - AMMUNITION AND EXPLOSIVES PENDING DEMILITARIZATION/DESTRUCTION

Table 1 summarizes the totals of A&E awaiting demilitarization or destruction.

Group	Munitions Types	Current Qty	Total Wt Kg	Total Wt Tonnes	Total Pallets	Total Magazines	Remarks
A	SAA up to and including 50 Cal	5,821,418	166,311	166.3	161.8	0.404	
B	20mm through 24mm	285,107	93,675	93.7	102.9	0.257	
C	25mm Through 40mm	494	430	0.4	10.9	0.027	
D	40mm Naval Through 104mm	15,563	120,902	120.9	135.4	0.338	76mm (cougar) & 2.75inch warheads
E	105mm Through 155mm	14,374	628,108	628.1	534.7	1.337	DPICM Awaiting for EX Number
F	AC Bombs	92	5645	5.6	20.6	0.052	
G	Propellant	41,061	1,993,220	1,993.2	0.0	0.000	Recovery from ranges and 155mm M119 red Bag (Red bag is pending ADM(Mat) approval)
H	CADS & PADS	424,332	23,444	23.4	73.6	0.184	
I	Demolition Material	81,319	11,968	12.0	9.5	0.024	M700 Time Fuze and Blasting Fuse
J	Fuzes, Primers and Tracers	81,355	14,278	14.3	22.3	0.056	
K	Grenades	0	0	0.0	0.0	0.000	
L	Rocket Motors	85,945	320,770	320.8	1,006.7	2.517	CRV7 Pending EIA Approval
M	Missiles and Rockets	4,741	103,562	103.6	1,176.8	2.942	Eryx
N	All Pyro	241,622	147,013	147.0	209.9	0.525	
O	Decoy Devices	13,957	8,931	8.9	4.8	0.012	
P	Naval	3,128	6,020	6.0	4.8	0.012	
Q	Chemical - WP, RP and CS Irritant	59,576	176,291	176.3	153.2	0.383	WP & RP Pending Contract
R	Mines	0	0	0.0	0.0	0.000	
S	Munitions Scrap (Range and Dis-assemble) Kg	n/a	3,441,169	3,441.2	2,592.6	6.481	
T	Inert Trg (Dummy and Display)	16,190	18270.53748	18.3	33.6	0.084	pending mutilation
U	Aids to Production - Repack material	12,929	5,025	5.0	228.6	0.572	pending mutilation
V	Spent Brass and Steel Cartridges	9,979	13,492.50	13.5	133.2	0.333	pending mutilation
W	Salvage (links, launch Tubes)	n/a	n/a	n/a	n/a	n/a	n/a

TABLE 2 - AMMUNITION AND EXPLOSIVES AWAITING DISPOSAL BY SALE

Table 2 summarizes the totals of A&E awaiting disposal by sale.

Group	Munitions Types	Current Qty	Total Wt Kg	Total Wt Tonnes	Total Pallets	Total Magazines	Remarks
A	SAA up to and including 50 Cal	0	0	0.0	0	0.00	
B	20mm through 24mm	0	0	0.0	0	0.00	
C	25mm Through 40mm	0	0	0.0	0	0.00	
D	40mm Naval Through 104mm	0	0	0.0	0	0.00	
E	105mm Through 155mm	3,166	146,835	146.8	226	0.56	105mm TK Model C76 Potential Buyer Mar 2014
F	AC Bombs	0	0	0.0	0	0.00	
G	Propellant	57,000	1,202,700	1,207.7	2,850	7.13	155mm Red bag
H	CADS & PADS	0	0	0.0	0.0	0.00	
I	Demolition Material	0	0	0.0	0.0	0.00	
J	Fuzes, Primers and Tracers	0	0	0.0	0.0	0.00	
K	Grenades	0	0	0.0	0.0	0.00	
L	Rocket Motors	0	0	0.0	0.0	0.00	
M	Missiles and Rockets	0	0	0.0	0.0	0.00	
N	All Pyro	0	0	0.0	0.0	0.00	
O	Decoy Devices	0	0	0.0	0.0	0.00	
P	Naval	0	0	0.0	0.0	0.00	
Q	Chemical - WP, RP and CS Irritant	0	0	0.0	0.0	0.00	
R	Mines	0	0	0.0	0.0	0.00	
S	Munitions Scrap (Range and Dis-assemble) Kg	n/a	n/a	n/a	n/a	n/a	n/a
T	Inert Trg (Dummy and Display)	0	0	0	0	0	
U	Aids to Production - Repack material	0	0	0	0	0	
V	Spent Brass and Steel Cartridges	0	0	0	0	0	
W	Salvage (Processed scrap, metal, brass, plastic)	n/a	119,919	99.9	100	0.25	Processed Material waiting CADC Sales

TABLE 3 - DISPOSAL BY DESTRUCTION

Table 3 is a summary of the disposal by demilitarization, destruction and mutilation.

Energetic A&E Items Destroyed					
Live	Number Items	NEQ	Wt Kg	Pallets	Magazines
Energetics Dundurn	1,150.00	4,368.89	18,524.30	197.71	0.494
Dusty Thunder 2013	96,397	31,563.95	349,843.15	371.23	0.928
Energetics Angus	1,162	10.93	72.58	0.27	0.001
Energetics Rocky Point	4,538	1,888.95	4,403.79	14.61	0.004
Energetics METC	41	799.50	789.25	1.71	0.004
Energetics Wainwright	0	0.00	0.00	0.00	0.000
Energetics Valcartier	595	26.99	180.20	1.57	0.004
Energetics Cold Lake	8,826	1,822.28	7,013.09	10.85	0.027
Energetics Bagotville	2,202	12.59	461.04	1.49	0.004
Energetics Petawawa	11,331	8,790.39	8,227.43	7.52	0.038
Energetics Gagetown	17,401	11,339.60	12,633.86	15.15	0.038
Subtotals	143,643	60,624.07	402,148.69	622.11	1.54
Items Mutilated and Processed as Scrap Metal					
Non-Explosive	Number Items	NEQ	Wt Kg	Pallets	Magazines
Inert Munitions	17,908	n/a	49,789.51	50.87	0.127
Tools and Equipment	16	n/a	204.01	2.01	0.005
Aids to Production	11,564	n/a	35,155.40	274.99	0.687
Salvage	228,086	n/a	233,210.30	424.00	1.062
Subtotals	257,574	n/a	318,359.22	751.87	1.88
	Number Items	NEQ	Wt Kg	Pallets	Magazines
Combined Totals	401,217	60,624.07	720,507.91	1,373.98	3.42

In the first picture, Colonel Michael Rafter, Commander of the Canadian Materiel Support Group, and Major Martin Duchesneau, Commandant of the Canadian Forces Ammunition Depot Dundurn, observe Ms. Reaschelle Higginbotham and Private Kyte Fleming as they disassemble an Eryx missile on August 7, 2013. In the second picture, we see the warheads from the missiles used to demilitarize 5inch 54 projectiles on the demolition range in Dundurn, Saskatchewan during Exercise Dusty Thunder 2013.

TABLE 4 - DISPOSAL BY SALE

Table 4 is a summary of the disposal by sale.

Group	Munitions Types	Current Qty	Total Wt Kg	Total Wt Tonnes	Total Pallets	Total Magazines	Remarks
A	SAA up to and including 50 Cal						
B	20mm through 24mm						
C	25mm Through 40mm						
D	40mm Naval Through 104mm						
E	105mm Through 155mm						
F	AC Bombs						
G	Propellant						
H	CADS & PADS						
I	Demolition Material						
J	Fuzes, Primers and Tracers						
K	Grenades						
L	Rocket Motors						
M	Missiles and Rockets						
N	All Pyro						
O	Decoy Devices						
P	Naval						
Q	Chemical - WP, RP and CS Irritant						
R	Mines						
S	Munitions Scrap (Range and Dis-assemble) Kg						
T	Inert Trg (Dummy and Display)						
U	Aids to Production - Repack material						
V	Spent Brass and Steel Cartridges						
W	Salvage (Processed scrap, metal, brass, plastic)		189,349	189.3	325	0.81	Sold - Processed Material Scrap

Canadian Armed Forces Flight Engineer, Corporal Moe Woodworth mans the C-6 general-purpose machine gun as his CH-146 Griffon helicopter provides security for ground troops during Exercise MAPLE RESOLVE 13 (JOINTEX) in Wainwright, Alberta on June 2, 2013.

Annex B

Status of Main Policy Manuals

The following is a record of the DND/CAF A&E policy documents. It has been updated by the OPIs to show the latest versions to provide practitioners a guide to the most up-to-date information available

Publication of volumes in the new Ammunition and Explosives Safety Manual continues, although some delays have been encountered in the publication process. Full implementation of some of these volumes is also dependent on the staffing of DAODs, notably 3002-7 on Risk Management, which has now reached step 5 of the DAOD development process (out of 12).

During 2012, a new DAOD staffing/approval process was announced, based on procedures used elsewhere in government. Additional process changes were made in 2013, in addition to a significant planned restructure of DAOD 1000-0. A return to DAOD approval by functional authorities, rather than by the CDS and DM, is now anticipated. DSCS 3 staff have advised DAER that the staffing of DAODs will continue while 1000-0 is restructured, rather than being put on hold, and affected DAODs will be administratively amended once the functional authorities are published. All definitions used in DAODs must now be staffed through the proper terminology channels. As the result of the standing-up of the AETP, this is not expected to cause additional delays for DAODs managed by DAER. Furthermore, all extant DAODs will be reviewed within the next three years for compliance with the revised formats, including the

requirement for a dedicated Consequences paragraph to detail the consequences of non-compliance. Notwithstanding the return to approval by functional authorities, the timelines indicated in the DAOD Development Process documentation appear to be optimistic. In particular, review by the subject matter legal advisor (SMLA) typically takes longer than the allocated time and the timeline does not allow for additional consultation with the SMLA after the DSCS 3 analyst reviews the DAOD.

Although C-09-005-002/TS-000, Ammunition and Explosives Safety Manual Volume 2, Storage and Facility Operations has been published, the over-arching risk management policy has not yet been promulgated. Therefore, although Volume 2 as published includes provisions relating to risk-based waivers, these provisions are not yet in effect. A&EI 45 provided updated direction on waivers and risk-based explosives storage licences.

A&E DAODs			
Document/Subject/ Theme	**Brief Description**	**Date Current Document Published**	**Comment**
3002-0	Ammunition and Explosives	Nov 2006	Publication of revised version in mid-2014; will include risk acceptance authorities
3002-1	Certification of Ammunition and Explosives	Aug 2012	No Consequences paragraph.
3002-2	Insensitive Munitions	Aug 2012	No Consequences paragraph.
3002-3	Ammunition and Explosives Safety Program	Dec 2007	Review in progress
3002-4	Ammunition or Explosives Accident, Incident, Defect or Malfunction Reporting	Dec 2007	Review in progress
3002-5	Use of Firearms, Ammunitions and Explosives	Dec 2007	Under review; publication target late 2014
3002-6	Display Fireworks	Dec 2010	Under review
3002-7	Ammunition and Explosives Risk Management	N/A	Publication in mid-2014; risk acceptance authorities to be detailed in 30020
Ammunition and Explosives Safety Manuals			
Document/Subject/ Theme	**Brief Description**	**Date Current Document Published**	**Comment**
C-09-153-001/TS-000	Ammunition and Explosives Safety Manual Volume 1 – Storage and Transportation	Version dated Aug 2013; published Nov 2013	All material now published in C-09-005 volumes 1, 2, 3 and 5 has been deleted. Most of the remainder to go in Volume 8.
C-09-153-003/TS-000	Explosives Safety Manual Volume 3 – Naval Vessels	Mar 2008	To be replaced by C-09-005 Volume 6.
C-09-005-001/TS-000	Volume 1 – Ammunition and Explosives Program Management and Life Cycle Safety	Version dated 1 Apr 2012 but published on ePubs 1 Aug 2013 (metadata basic date)	Replaces A&EIs 13, 19 (Draft), 15, 17 and portions of C-09-153-001/TS-000.
C-09-005-002/TS-000	Volume 2 – Storage and Facility Operations (including storage related operations)	Feb 2013	A&EI 45 remains in effect for waivers and risk-based licences.
C-09-005-003/TS-000	Volume 3 – Transportation	Jun 2013	First revision.
C-09-005-004/TS-000	Volume 4 – Demilitarization and Disposal	To be published in 2014; translation accuracy check in progress	Replaces C-09-008-001/TS-000 dated Oct 1993 and C-09-008-002/FP-000 dated Sep 2011
C-09-005-005/TS-000	Volume 5 - Deployed Operations (encompasses FOB, Field, BLAHA and deployed ops Risk Assessment & Clearance of BDV)	Version dated Mar 2013; published Dec 2013.	Replaced A&EI 23 and C-09-153-001/TS-000 Part 4 Sect 15
C-09-005-006/TS-000	Volume 6 – Naval Vessels	To be published in 2015	Will replace C-09-153-003/TS-000
C-09-005-007/TS-000	Volume 7 – Certification of Ammunition, Explosives and Accessories for Service Use	Oct 2011	Partially replaced D-09-002-010/SG-000 Published Mar 2007. To be reviewed in 2014.

C-09-005-008/TS-000	Volume 8 – Construction Standards	To be published in 2015	Will replace A&EI 26(Draft), 28(Draft), 39, 44(draft), and 48 and portions of C-09-153-001/TS-000
C-09-005-009/TS-000	Volume 9 – Hazards of Electromagnetic Radiation to Ordnance (HERO)	To be published in 2015	Will replace and expand upon Part 10 of C-09-005-001/TS-000
Ammunition and Explosives Instructions			
Document/Subject/ Theme	**Brief Description**	**Date Current Document Published**	**Comment**
01/07	Ammunition and Explosives Instructions	Cancelled	Included in Volume 1 of the C-09-005 series.
02/07	Review of Ammunition and Explosives Regulations and Instructions	Cancelled	Replaced by A&EI 50
03/07	Ammunition and Explosives Storage Licensing	Cancelled	Replaced by Volume 2 of the C-09-005 series and by A&EI 45
04	Transportation of Ammunition and Explosives Recovered during Domestic Explosive Ordnance Disposal Operations	Cancelled	Included in Volume 3 of the C-09-005 series.
05	Transportation of Munitions Scrap	Cancelled	Included in new Volume 3 of the C-09-005 series.
06	Removal of Hard Targets from CF Ranges and Training Areas	Dec 2008	Change 1
07	Ammunition Accident/Incident Investigation and Reporting	Aug 2013	Change 1
08	Plastic Coated Tape, Explosives Safety Hazard – Electrostatic Discharge	Cancelled	Superseded by C-09-008-002/FP-000.
09	Crimping of Non-Electric Blasting Caps – Procedures and Protective Equipment	Cancelled	Superseded by C-09-008-002/FP-000.
10	Cartridge Signal 16mm No 1 Mk3	Cancelled	Superseded by C-74-370-CA0/TA-000
11	Disposal of Ammunition and Explosives at the End of Life Cycle	Sep 2011	Change 1 (Change 2 to be published in 2014; labels replaced by A&EI 36; some material to go into Volume 4 of the C-09-005 series)
12	Ammunition Salvage Processing Buildings	Cancelled	Included in new Volume 2 of the C-09-005 series.
13	Ammunition Amnesty Box Program	Cancelled	Included in Volume 1 of the C-09-005 series.
14	Mitigation of Blast and Fragmentation Effects Utilizing Sandbags	Dec 2008	
15	Recognized Civilian Qualifications Applicable to Ammunition and Explosives Employment	Aug 2010	Change 2
16	Small Quantity Distance Tables	Cancelled	Included in new Volume 2 of the C-09-005 series.
17	Civilian Qualification Expiry Criteria	Jan 2009	To be included in new Volume 1 of the C-09-005 series.
18	Civilian Ammunition Technician Specification	Nov 2009	
19	Personnel Qualifications matrix	Never issued	Included in Volume 1 of the C-09-005 series.
20	Gauging for Serviceability – Cartridge 20mm Dummy C145A1	Cancelled	
21	Containment Vessels Siting and Storage Instructions	Cancelled	Included in new Volume 2 of the C-09-005 series.
22	Public Traffic Routes and Densities	Cancelled	Included in new Volume 2 of the C-09-005 series.
23	Explosive Clearance Inspection of Battle Damaged Vehicles	Cancelled	Included in Volume 5 of the C-09-005 series.

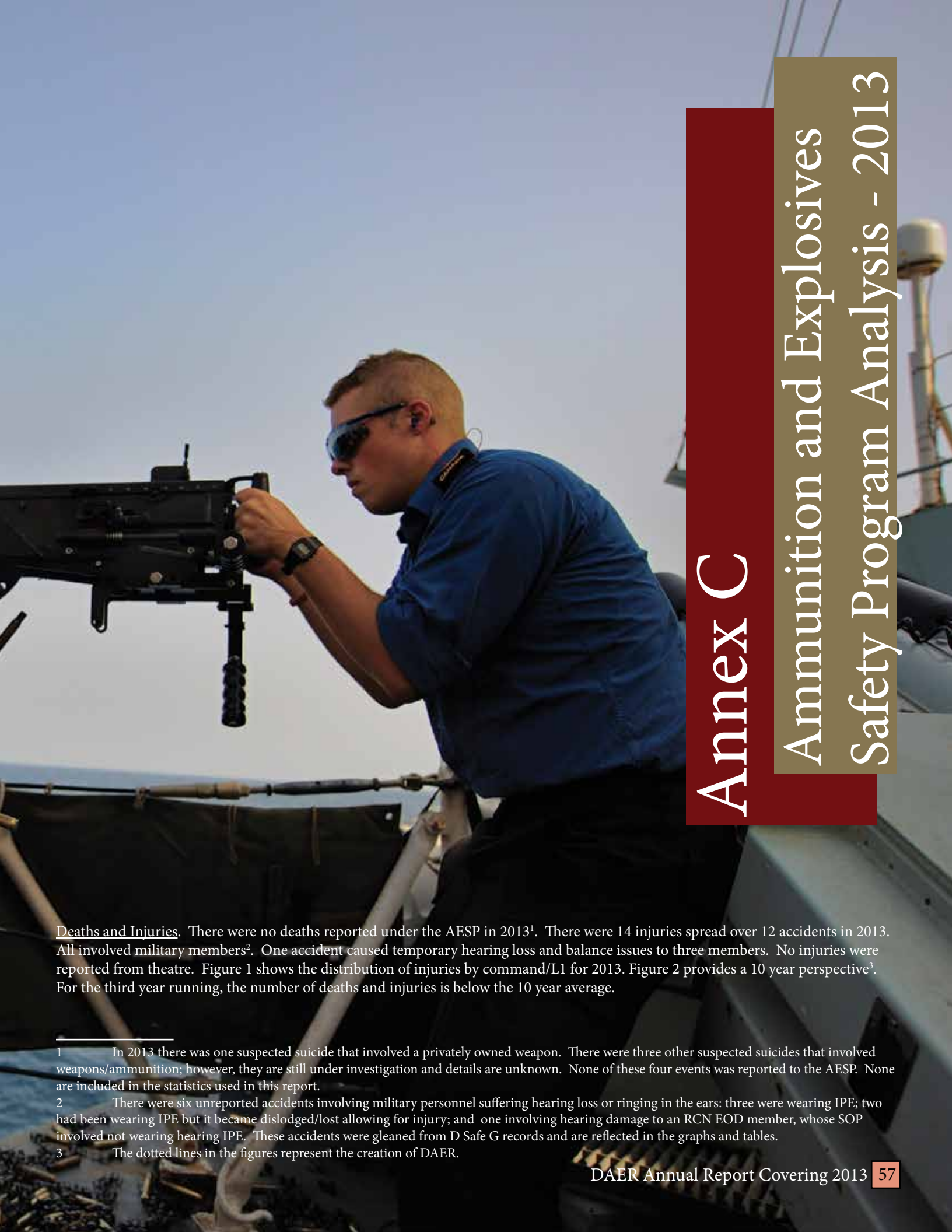
24	Transfer of Small Quantities of Ammunition and Explosives Within HMC Dockyards	Mar 2010	Change 1
25	Stowage of Expendable Targets on Board HMC Ships	Feb 2010	
26	Construction Guidance for Facility Electrical Systems	Never issued	To be included in Volume 8 of the C-09-005 series.
27	Ammunition Safety and Suitability for Service Assessments – Class Decisions	May 2010	Partially included in Volume 7 of the C-09-005 series. Remainder to go in revised D-09-002-010/SG-000.
28	Construction Guidance for Facility Heating Appliances	Never issued	To be included in Volume 8 of the C-09-005 series.
29	Packaging and Return of Surplus Gun Propellant and Increments	Cancelled	Included in C-09-005-003/TS-000
30	Accidental Small Arms Discharge Reporting	Dec 2010	Change 1
31	**Destruction by Open Burning of Surplus Propellant on Approved Burning Trays**	Aug 2012	Change 2. To be included in Vol 4 of the C-09-005 series.
32	Ammunition and Explosives Safety Survey and Inspection	Cancelled	Included in Volume 1 of the C-09-005 series.
33	Flare Aircraft Parachute LUU-2D/B		contact LCMM for document
34	Approved Misfire Procedure for Electrically Initiated Disposal Operations	Oct 2011	
35	A&E Risk Management Process for Deployed Operations	Never issued	Included in Volume 5 of the C-09-005 series.
36	Labels Applicable to Certification of Ammunition and Explosives	Nov 2012	
37	Safe Handling, Use and Employment of the Cap Blasting Electric M4 Assembly for use with the Defensive Command Detonated Weapon C19	In development	DAEME lead
38	Only Authorized Fresh Water Launch Procedure for Marker Location Marine C2A2	Apr 2012	
39	Miniature Magazine Concrete Earth-covered Three-Bay	Jul 2012	
40	Management Procedures for CRV 7 Rocket Motors Munition Scrap (MS) Potentially Containing Asbestos	Sep 2012	
41	Assessment and Confirmation of Level 1 Ammunition Technical Authorities	Oct 2013	
42	Approved Storage Procedures for FIXOR™ explosives	Never issued	No longer required.
43	Canadian Forces Maritime Experimental and Test Ranges Ammunition and Explosives Embarkation / Disembarkation Area	Nov 2012	
44	Pre-Engineered Magazines	In Development	
45	Risk-based Storage Licensing and Waivers	Jul 2013	

46	Storage and Disposal of Fireworks and non-DND Ammunition and Explosives	in development	
47	RCAF A&E Maximum Credible Event Guidance	in development	to be published in 2014
48	Barricade Geometry	Jan 2014	
49	Emissions Standard for Demilitarization	in development	to be published in 2014
50	Review of Ammunition and Explosives Orders and Instructions	Oct 2013	accompanied by Policy Publication Currency and Supersession Matrix
51	Storage of Articles or Assemblies of Hazard Class 9	In development	
Unexploded Ordnance (UXO) – Policy			
Document/Subject/ Theme	**Brief Description**	**Date Current Document Published**	**Comment**
Standard 1606-4000.1-S02-020	Technical Instruction for Unexploded Explosive Ordnance (UXO) Activities	2010	Draft Supersedes ADM(IE) Standard 01/2008 dated 12 May 2008 OPI - ADM(IE)
ADM(IE) Standard 1606-4000.1-S10-020	Assignment of Responsibility for Managing Legacy Site Responsibilities		Draft OPI - ADM(IE)
ADM(IE) Standard 1606-4000.1-S01- 024	Sustainable Range and Training Area Management		Draft OPI - ADM(IE)
CANFORGEN 181/06 ADM(IE) 002 282157Z NOV 06,	DND UXO and Legacy Sites Program		Current OPI - ADM(IE)
B-GL-381-003/TS-000	Range Clearance and Unexploded Explosive Ordnance (UXO) Activities Manual	interim draft, 12 Apr 2011	Affected by ADM(IE) re-org
EOD			
Document/Subject/ Theme	**Brief Description**	**Date Current Document Published**	**Comment**
CFJP 3.16	Explosive Ordnance Disposal	Dec 2012	Replaced B-GL-005-316/TS-XXX OPI - CFEOD
C-09-008-001/FP-000	Destruction of Surplus, Obsolete and Deteriorated Ammunition	Oct 1993	To be replaced by Volume 4 of the C-09-005 series.
C-09-008-002/FP-000	Destruction of Dud and Misfired Ammunition on CF Ranges and Training Areas	Sep 2011	
C-09-008-003/FP-000	Explosive Ordnance Disposal – Disposal of Stray Ammunition	May 2003	To be incorporated into new Volume 4 of the C-09-005 series.
Defence Administrative Order and Directive (DAOD) 8000-0	Explosive Ordnance Disposal	Dec 2013 (revised)	OPI - CF EOD
DAOD 8000-1	Conduct of Explosive Ordnance Disposal	Dec 2013 (revised)	OPI - CF EOD
DAOD 8000-2	Reporting and Investigation of Explosive Ordnance Disposal Incidents and Accidents	Dec 2013 (new)	OPI - CF EOD
DAOD 8000-3	Explosive Ordnance Disposal Radiation Safety	Dec 2013 (new)	OPI - CF EOD

Ammunition and Explosives Safety Policy Manuals			
Document/Subject/ Theme	**Brief Description**	**Date Current Document Published**	**Comment**
A-GG-040-006/AG-001	DND Explosives Safety Program (To be renamed "DND/CF Ammunition and Explosives Safety Program")	Change 3 – Published on 24 September 1994	Technical check of translation to be completed, followed by formatting
A-GG-040-006/AG-002	DND/CF Ammunition or Explosives Accident, Incident, Defect or Malfunction Reporting	Latest Original Edition – Published on 05 May 2008	
International Policy Development			
Document/Subject/ Theme	**Brief Description**	**Date Current Document Published**	**Comment**
NATO Explosives Safety Munitions Risk Management (ESMRM) Policy	The aim is to establish an ammunition risk assessment and risk decision making framework that recognizes national sovereignty and responsibility for risk decisions within each nation where training and contingency operations involving ammunition are conducted, as well as recognize NATO's responsibilities in the risk assessment and decision making process for planning, training and contingency operations.	26 April 2013	The Policy Ad Hoc Working Group was chaired by Canada/DAER 2. Other ESMRM work is based on this policy and it will be used for development of Canadian policy.
STANAG 2617 and Allied Logistics Publication (ALP) -1.6 – ESMRM in NATO Planning, Training and Operations	Establishes requirements for the NATO ESMRM Process as well as roles and responsibilities applicable to the NATO operational planning process, operational stages, and consumer logistics process across the full range of NATO military operations, to include ammunition-related contracted support.	To be submitted for ratification and implementation in early 2014.	The ALP Development Panel was chaired by the US/DDESB with Canada represented by DAER 2 and DAER 2-4. ALP-4.16 will be used as a source document for revising Canadian policy.
United Nations' International Ammunition Technical Guidelines (IATG)	Developed to improve safety, security and efficiency in conventional ammunitions stockpile management. They recommend an integrated risk and quality management system. Of growing importance, along the lines of the UN's Transportation of Dangerous Goods guidelines.	UN General Assembly Resolution 66/42 welcomed the completion of the IATG and establishment of the SaferGuard Program to implement.	DAER, through participation with NATO Ammunition Safety Group, the UNODA, and close cooperation with US/DDESB representation in the IATG Technical Review Panel provides review and input to the IATG.
External Liaison			
Document/Subject/ Theme	**Brief Description**	**Date Current Document Published**	**Comment**
Avalanche Control	MOU between DND and Parks Canada Agency concerning the control of avalanches by artillery fire at Glacier National Park/Rogers Pass, British Columbia.	Oct 2012 (next revision due in 2017)	CJOC manages the annual military tasks (OP PALACI) and DND input into the five-year MOU review cycle.
National Resources Canada/Explosives Regulatory Division	NR Can/ERD responsible for *Explosives Act*, which provides DND exemption for explosives under MND direction and control.	Amendments to *Explosives Regulations* due to be promulgated February 2014.	DAER maintains close liaison with NR Can through participation at quarterly Quantity Distance and Risk Management meetings plus semi-annual bilateral meetings. This is critical in DND's management of its exemption for all safety policy.

US Department of Defence Explosives Safety Board (DDESB)	The DDESB is the prime proponent of NATO's ammunition life cycle management safety policy.	Conference of National Armament Directors (CNAD) Ammunition Safety Group (ASG) AC/326 guidelines (on-going). ESMRM initiatives (2013-2014).	DAER maintains close liaison with the US DDESB through on-going work but also a scheduled annual bilateral meeting.
C Navy A&E Policy			
Document/Subject/ Theme	**Brief Description**	**Date Current Document Published**	**Comment**
MARCORD 46-8	Defines the organizational structure and the requirements of the Maritime AESP.	Nov 08	OPI – C Navy
MARCORD CS-06	Transportation of Explosives and Ammunition by Motor Transport, Ammunition Lighter, and Military Aircraft Within Maritime Command	Not Known	OPI – C Navy Contains outdated reference to C-09-153-001/TS-000 for road transport.
C Army A&E Policy			
Document/Subject/ Theme	**Brief Description**	Date Current Document Published	Comment
LFCO 22-12	Operational EOD	Dec 1995	To be replaced by CAO 24-7 in 2014
LFCO 22-11	LFC Range Clearance	Sep 1995	To be revised as CAO 22-11 in 2014
C Air Force A&E Policy			
Document/Subject/ Theme	**Brief Description**	**Date Current Document Published**	**Comment**
B-GA-297-001/TS-000	Safety Orders For Canadian Forces Air Weapons Systems	June 2010	Several message amendments in 2013, including changes to waiver expiry dates and to parking and loading of forward firing weapons. OPI – 1 Cdn Air Div / A4 Maint

A boatswain of Her Majesty's Canadian Ship TORONTO maintains his proficiency on the .50 calibre machine gun during skills firing practice during Operation ARTEMIS on August 26, 2013.



Annex C

Ammunition and Explosives Safety Program Analysis - 2013

Deaths and Injuries. There were no deaths reported under the AESP in 2013[1]. There were 14 injuries spread over 12 accidents in 2013. All involved military members[2]. One accident caused temporary hearing loss and balance issues to three members. No injuries were reported from theatre. Figure 1 shows the distribution of injuries by command/L1 for 2013. Figure 2 provides a 10 year perspective[3]. For the third year running, the number of deaths and injuries is below the 10 year average.

1 In 2013 there was one suspected suicide that involved a privately owned weapon. There were three other suspected suicides that involved weapons/ammunition; however, they are still under investigation and details are unknown. None of these four events was reported to the AESP. None are included in the statistics used in this report.

2 There were six unreported accidents involving military personnel suffering hearing loss or ringing in the ears: three were wearing IPE; two had been wearing IPE but it became dislodged/lost allowing for injury; and one involving hearing damage to an RCN EOD member, whose SOP involved not wearing hearing IPE. These accidents were gleaned from D Safe G records and are reflected in the graphs and tables.

3 The dotted lines in the figures represent the creation of DAER.

Number of Occurrences. A total of 234 Ammunition Accidents and Incidents, inclusive of ammunition related Flight Safety Occurrences[4], were recorded in 2013: 52 accidents and 182 incidents. This total is much higher than the 10 year average, shown in Figure 3; however, due to changes in recording procedures (most notably FSOMS data was only incorporated starting in 2008), a five year comparison, as shown in Figure 4, is more appropriate. The 2013 total of 234 is 7% higher than the five year average for 2009 through 2013 of 219 occurrences.

Figure 5 provides a breakout of accidents and incidents by Command/L1 for 2013. In order to better understand trends, Figure 6 shows a 5 year perspective, again by Command/L1. The occurrences reported for CJOC relate directly to CFAD operations. The Other category includes CMP and ADM(IE) occurrences.

In 2010 the large increase in reporting was attributed to increased RCAF reporting and more specifically two factors: increased

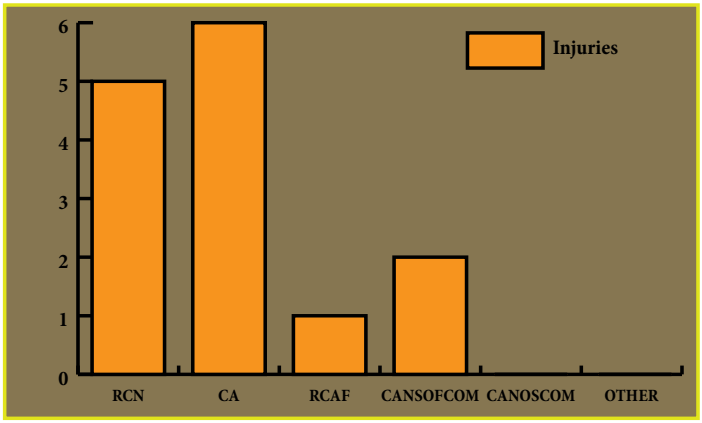


Figure 1 Deaths and Injuries 2013

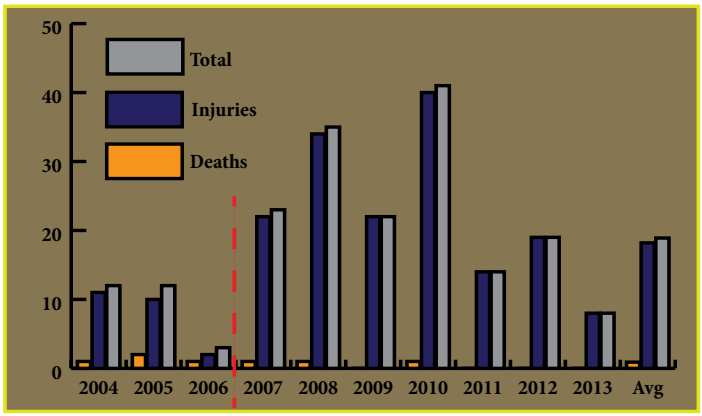


Figure 2 Deaths and Injuries 2004-2013

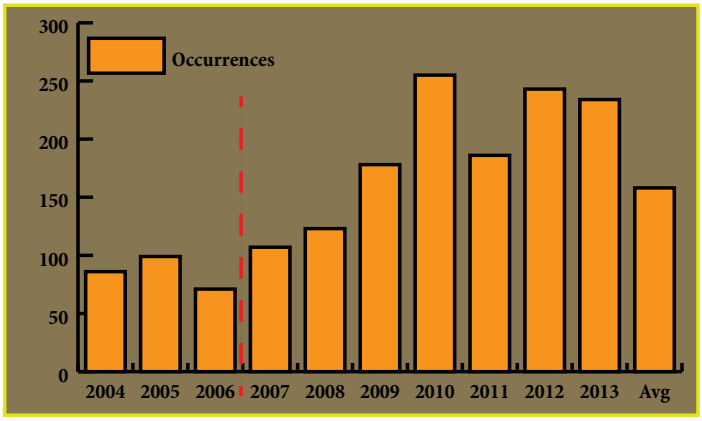


Figure 3 Reported Occurrences 2004-2013

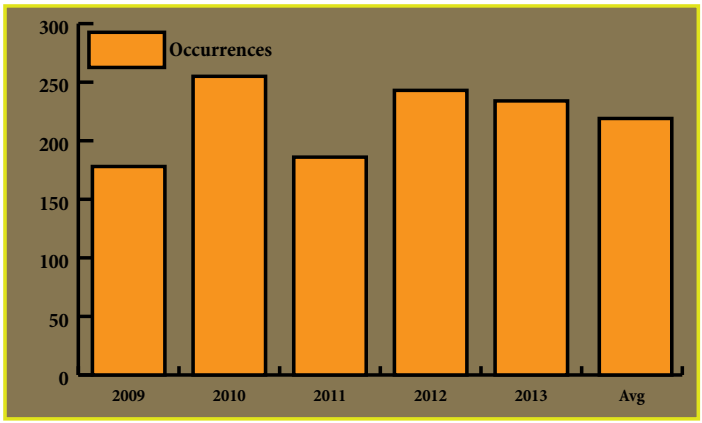


Figure 4 Figure on Five-Year Average 2009-2013

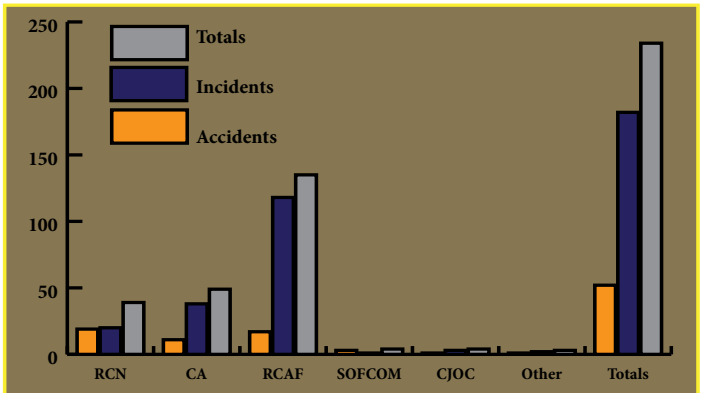


Figure 5 Occurrences by L1 2013

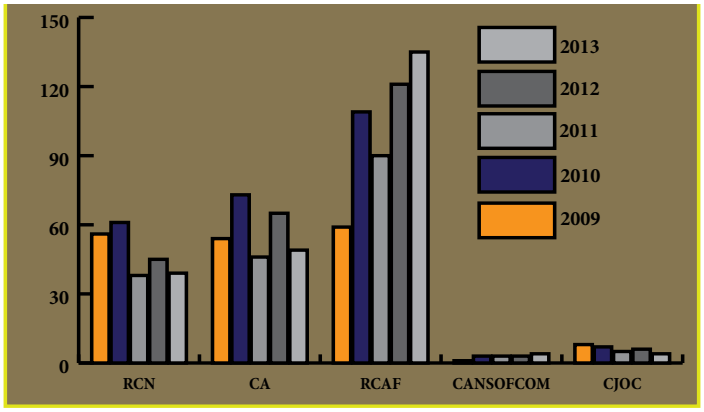


Figure 6 Occurrences by L1 2009-2013

4 AESP definitions for accident and incident do not correspond to those used within the Flight Safety Program. The AESP has a DND/CAF wide mandate. The reporting procedures have been modified to accept FSOMS reports in order to eliminate the requirement for duplicate reporting.

force generation activities in support of theatre operations and the decline in trade knowledge being addressed through the Air Operation Enhancement Program (AOEP). In 2012 there was another significant increase in RCAF reporting. It was assessed that the AOEP had yet to resolve skill issues and the push to adjust training might even have contributed to a short term upturn in occurrences. In 2013 there was another increase in RCAF occurrences. Technical issues with the ALE-47 system (chaff/flare dispense) and case-neck separation of 20mm ammunition caused an upturn in reporting, but there were a large number of occurrences due to human error. Inaccurate record keeping, accidental discharge of fire bottles and incorrect safety pin procedures[5] are all of note. It would appear that the training effect continues. The culture of reporting in the RCAF is assessed as very good; however, there appears to be confusion as to when to report under Flight Safety and when to report under the AESP.

There was a 13% decrease in RCN reporting which is assessed as within normal variance. The RCN is assessed as having a good culture of reporting.

The relative decrease in CA reporting in 2011 was explained in terms of reduced level of effort as the CAF withdrew from theatre. The 41% upsurge (from 46 to 65) in reporting in 2012 was explained by the upsurge in reporting emanating from CFB Suffield[6]: 26 reports, most dealing with unit control issues such as unit returns/salvage, range clearance and post-firing range sweeps, and items inappropriately disposed[7]. In 2013 there was a 25%[8] downturn in CA reporting, approximately half of which can be traced to a decrease in reporting from CFB Suffield, from 26 to 18 occurrences. The other half is attributed to a decrease in usage/reduced level of training.

For the CA overall, 25 events or 50% (down from 63% in 2012) of all occurrences related to poor unit control and lack of supervision. The ratio of accidents to incidents – approximately 1 to 3 - would seem to indicate that many incidents are still going unreported.

There were only four known occurrences related to CANSOFCOM: three accidents and one incident. Of these, one was not reported using the AESP reporting system[9]. Concern continues as to the CANSOFCOM reporting ethos.

CMP/MilPersCom is responsible for CFB Borden, a major training centre, and much of southern Ontario. Despite the high volume of on-base training and the large number of Reserve units supported by this base, no occurrences were reported in 2013. Annex C records one accident gleaned from D Safe G records, but unreported to the AESP. In 2013, the three occurrences at LFCA TC Meaford were rolled to the CA, not MilPersCom. The installation at Meaford is a dependency of CFB Borden and occurrences there should roll to CMP, however, in 2013 accident and incident reports were submitted directly to CA without reference to CFB Borden. As stated in last year's report, formal clarification of AESP responsibilities with respect to Meaford is required.

In 2013, there were two incidents belonging to ADM(IE)'s DND Unexploded Explosive Ordnance and Legacy Sites Program. One related to removal of ammunition salvage; the other to removal of a tank turret before it had been searched and cleared.

Over the past few years, AESP data has been compared with data held in the General Safety Program. Comparison for 2013 revealed seven accidents that were reported through General Safety that went unreported to the AESP – mainly related to temporary hearing damage[10]. The comparison also revealed six[11] accidents, all relating to injuries, reported to the AESP that had not been reported to the General Safety Program. Current policies requiring reporting under multiple safety systems is clearly a problem that should be addressed corporately.

A total of 42 (down from 78 in 2012) occurrences involved Common User (SAA, smoke grenades, pyrotechnics) ammunition. Adding the most commonly used RCN and RCAF pyrotechnics, 141 of the 234 occurrences (60%, down slightly from 67% in 2012) involved the most commonly used items of A&E. Of 52 accidents, 24, including 10 of the 14 injuries, involved such items.

Cause Categories. All 234 occurrences from 2013 were attributed a cause. They are summarized at Figure 7.

CAUSE CATEGORY	NUMBER	PERSONNEL RELATED
Human Error (Error in Drill, Mistake, Poor Judgement)	157	177
Deliberate Deviation	20	
System or Weapon-related	23	
Other Causes	10	
Unassigned (investigation on-going)	11	
Ammunition-related (defect, malfunction, design error)	13	
TOTAL	234	

Figure 7 Cause Categories

5 Incorrect pin procedures: seven occurrences in 2011, 15 in 2012, and 20 in 2013

6 CFB Suffield reports mainly reflect occurrences related to foreign units, which roll to the CA as the host.

7 E.g. discarded, abandoned, or placed in garbage.

8 The actual decrease was 27% if the unreported accidents are not included.

9 Information was provided only in summary form and only well after the occurrence.

10 The accidents recorded at Footnotes 1 and 2 were sourced from Director General Safety records.

11 Two from CANSOFCOM, three from CA and one from RCN.

Approximately 4% were categorized as Other. Use of DM211 during a damage control exercise damaged a weak leak-off line, which in turn caused the failure of an uninterrupted power supply. Wire deterioration caused a minor fire within a CFAD. A Sea King crash damaged a MLM. A container of ammunition fell from a vehicle during transit as a result of a worn door latch. A dud 105mm HE projectile was dug up during a pipeline excavation. There were two cook-off situations: one involved an APU fire bottle and the other a 7.62mm machine gun. There were two investigations completed for which a cause could not be attributed. A further 5% have not been assigned to a cause category as investigations were still underway.

There was a sharp increase in occurrences attributed to a fault in the ammunition – up to 13 from one in 2012. There were no injuries, but four resulted in minor equipment damage. A manufacturing defect of a 40mm TP-T round, the functioning of a gyro during demilitarization and deteriorating expelling charges in 155mm Illuminating projectiles were all single occurrences. The other ten involved case-neck separation of 20mm ammunition[12]. This last issue is under consideration with the manufacturer.

System or Weapon-related occurrences were down from 12% in 2012 to 10% in 2013. There were 11 accidents, 5 without injury. The other 6 related to auditory damage: three were wearing IPE; two had been wearing IPE but it became dislodged/lost allowing for injury; and one involving hearing damage to an RCAF EOD member whose SOP involved not wearing hearing IPE. In addition, there were three RCN occurrences: two accidents involving damage to 57mm rounds and one incident from a damaged Very Pistol. There was a single CA accident caused by a weak extractor in a C6 machinegun. This was the only other CA occurrence in this category. The remaining occurrences involved two RCAF accidents and eleven incidents. As a result of a faulty pin, a guidance unit was rendered inoperable and personnel were potentially exposed to carcinogenic gases. Most other RCAF occurrences involved munitions items falling from aircraft or the uncommanded release of chaff/flares[13].

Personnel were responsible for 76% of all accidents and incidents. Carelessness, poor judgement, errors in drill, sometimes compounded by lack of supervision, were typical causes.

Occurrences were recorded as Deliberate Deviations when it was deemed that procedures had been deliberately contravened. There were 29 Deliberate Deviations reported in both 2011 and 2012. There were only 20 in 2013[14]. They caused three accidents – two with injuries. In one case, a member was injured when he tried to find a misfired artillery simulator without waiting the statutory waiting period. In another, a member was injured when he attempted to extinguish a Thunderflash that became ignited in his pocket as a result of his having removed the sealing tape. Of the 20 Deliberate Deviations, two occurred in RCN, one in ADM(IE) and the remaining 17 were a CA responsibility. Of these 17, seven involved visiting forces and six resulted from poor unit control (theft, improper disposal).

Observations to Lessons Learned. Unit control of ammunition and ammunition processes, particularly in CA units, where ammunition is more readily available and more widely distributed, needs to be strengthened. Greater diligence on the part of Range Safety Officers and supervisors in strengthening post exercise clean-up and declaration procedures would reduce risk to personnel conducting post-firing range sweeps, those transporting ammunition and ammunition salvage from ranges, and technicians taking and processing these returns. It would also help reduce finds of stray ammunition. An active Amnesty Box Program could limit inappropriate disposals. Approximately 40% of reported CA occurrences related to some aspect of poor unit control. This is a reduction from 60% in 2013 and it may seem a notable improvement; however, with the very small base of reports received, it is difficult to draw detailed lessons. Lack of CA reporting continues to be a concern.

Another CA concern is the percentage of accidents and incidents categorized as deliberate deviations (approximately one in every three occurrences). This indicates a lack of respect for established drills and procedures. The situation involving improper disposal by visiting forces at CFB Suffield appears to be well managed reactively; however, there appears to be much scope for proactive measures.

In 2012 there were two incidents and one accident involving Display ammunition, and there had been similar incidents over the previous three years. In 2013 DAER's compliance program specifically addressed this issue. No further museum incidents were reported in 2013, but there were two occurrences wherein energetic components were discovered installed in aircraft dedicated to maintenance training. Continued diligence is required.

On the 13th of May 2013, one of the AIM9 missile coffins being moved at 3 Wing Bagotville fell on the floor, damaging the three missiles inside, which were eventually disposed of.

12 There was another incident as a result of quarantined ammunition being used, but this was classified as Human Error.

13 In 2013 occurrences related to inaccurate chaff/flare counts by armament systems or failure to fire were not counted. Uncommanded or inappropriately commanded releases were counted.

14 Accidents and incidents related to Deliberate Deviations are indicated in the 2013 Accident and Incident Summaries with a grey background. These summaries follow as Appendix 1 and Appendix 2 to Annex C.

Appendix 1 to Annex C

Summary of Accidents for the Year 2013

Accident Summary. The following table summarizes accidents that occurred in 2013. Greyed out cells indicate a deliberate deviation.

L1 or Command Responsible for Reporting	2013 Accident Summary	Date
RCN	A Grenade Hand Smoke Screening functioned when it passed through a waste processing shredder. Grenade had been discarded into a roll-off garbage container.	9 Jan 13
RCN	A Thunderflash was used in one compartment without appropriately warning personnel in adjacent compartment, resulting in temporary hearing loss and balance issues.	30 Jan 13
RCN	C2A2 Marker Location Marine functioned inside bridge wing ready-use locker, damaging locker.	6 Feb 13
RCN	While rigging jump ladder, ship staff caused Marker Man Overboard to partially dislodge from its bracket and in trying to reset it, inadvertently caused the marker to function	23 Feb 13
RCN	Torpedo was rendered inoperable when it was rammed before the exploder key was removed	12 Mar 13
RCN	Use of DM211 during a damage control exercise damaged a weak leak-off line, which in turn caused the failure of an uninterrupted power supply.	3 Apr 13
RCN	While traversing a Mk 48 torpedo, it came into contact with an A frame that had not been removed.	9 Apr 13
RCN	While sheeting in the gennaker, the sheet whipped the Pains Wessex from its bracket into the water.	10 Apr 13
RCN	Subsequent to firing small arms, a member who had been wearing hearing protection, experienced ringing in his ears and diminished hearing. NOTE 2	15 Apr 13
RCN	Subsequent to firing small arms, a member who had been wearing hearing protection but who lost one during the practice, experienced loud ringing in his ears and diminished hearing. NOTE 2	20 Apr 13
RCN	57mm gun jammed, damaging one BLP round, which was quarantined.	27 May 13
RCN	Part of the breech assembly of a 40mm came loose and some parts fell out during firing. Attributed to operator error	23 Jul 13
RCN	During docking a fender caught and deployed a Marker Man Overboard	29 Jul 13
RCN	Machine gun jammed with the bolt partially forward and a round jammed between the chamber and bolt.	3 Sep 13
RCN	During line handling, the Marker Man Overboard was knocked overboard by the hurricane hawser and was activated	30 Sep 13
RCN	During debanding of a HOTTORP the release lanyard securing loop slipped from a multitool and became deeply embedded in the technician's hand.	15 Oct 13
RCN	During SURFIREX, two 57mm rounds jammed. Further damage caused during extraction resulted in rounds being jettisoned.	8 Nov 13
RCN	During a small arms shoot at sea, one projectile punctured the guardrail on the focsle.	18 Nov 13
RCN	While preparing 57mm ammunition for upload, one round struck the storage rack, shearing the tip	6 Dec 13
CA	Two .50 cal machine guns experienced cartridge case separation while firing AP-T ammunition	11 Jan 13
CA	While participating in a firefight, member shot the vehicle he was using as cover. Single round from C8 penetrated RG-31.	26 Apr 13
CA	In attempting to avoid a grader, vehicle veered too far to right, caught soft shoulder and rolled. Vehicle was carrying mixed load of artillery natures.	10 May 13
CA	Member experienced constant ringing in one ear after being adjacent to a firing 25mm chain gun. He was wearing electronic ear protection. NOTE 2	13 May 13
CA	Subsequent to firing the 84mm Carl Gustav while wearing hearing protection, a member reported ringing in his ears and diminished hearing. NOTE 2	30 May 13

L1 or Command Responsible for Reporting	2013 Accident Summary	Date
CA	A bridge sustained $2000 in damages when a Flare, Trip, Surface that had been affixed to it was ignited.	12 Jun 13
CA	C6 Coax had stoppage when a cartridge case failed to eject. A second cartridge was partly chambered, then functioned and fragmented, taking the base from first cartridge case. A third cartridge was then pushed into the first cartridge case. The accident resulted from a weak extractor.	26 Jun 13
CA	Member was injured when he attempted to find a misfired Artillery Simulator without waiting the required period.	11 Jul 13
CA	Trainee received light burns to his hand and knee when it exploded as he attempted to extinguish a Thunderflash. He had stored it in his pocket after removing the tape securing the striker cap.	16 Jul 13
CA	During a paraflare demonstration, the instructor had difficulty launching the flare. It launched at a low angle and it landed on a private balcony where the flare burned out.	28 Aug 13
CA	During screening and processing of ammunition salvage a 2.75 inch rocket motor with the fuze portion of a warhead was discovered. It was destroyed in-situ, with minor infrastructure damage	7 Jan 13
RCAF	During gun loading, the gun jammed after 6 rounds. When unloaded it was discovered that 5 rounds had damaged casings and the 6th round had a punctured casing. NOTE 1	22 Mar 13
RCAF	While carrying a chaff pod to an armament trailer, technician dropped the pod. NOTE 1	4 Apr 13
RCAF	Technician knocked a loaded chaff/flare magazine to the ground. NOTE 1	17 Apr 13
RCAF	SMDC line damage caused by inattention while climbing in/out of cockpit NOTE 1	24 Apr 13
RCAF	During loading of an AIM-7 missile, the pins on the umbilical were damaged. NOTE 1	2 Mar 13
RCAF	A sonobuoy fitted with a CAD was dropped on the tarmac, causing the CAD to become locked into the sonobuoy. NOTE 1	11 May 13
RCAF	During movement of a missile coffin, the coffin slipped off the crane forks and fell 7 feet to the floor, landing upside down.	13 May 13
RCAF	As a result of a faulty pin, the solid fuel in a missile guidance control system was ignited, exposing personnel to carcinogenic gases and rendering the guidance unit inoperable.	30 May 13
RCAF	During loading of a LGTR, it fell from the wing, sustaining serious damage NOTE 1	18 Jun 13
RCAF	Technician error resulted in APU firebottle discharging. NOTE 1	22 Jun 13
RCAF	Case neck separation caused gun jam and damage to weapon. NOTE 1	9 Jul 13
RCAF	Gun jam caused by using ammunition without case hardened neck. NOTE 1	12 Jul 13
RCAF	Subsequent to carrying out an EOD task by detonation, EOD team member experienced headaches and ringing in the ears. He was not wearing hearing protection as it was the unit SOP not to do so in order monitor the explosion. NOTE 2	24 Sep 13
RCAF	A LUU2B flare was damaged when it was dropped during downloading from an aircraft. NOTE 1	5 Oct 13
RCAF	Case neck separation caused gun jam, with damage to chute. NOTE 1	29 Oct 13
RCAF	LGTR dropped from rack during mounting. NOTE 1	29 Oct 13
RCAF	LUU2 Flare was dropped and damaged during replenishment of aircraft search stores. NOTE 1	10 Dec 13
CANSOFCOM	A member sustained a non-life threatening injury to his hand when attempting to throw a distraction device. Attributed to human error in that member did not confirm condition of all safety features and apply SOP in the removal of the device from the custom back pouch of the member in front.	4 Feb 13
CANSOFCOM	9mm round was fired from pistol fitted with a simunition barrel. Ball round was mixed in with simunition rounds	7 Mar 13
CANSOFCOM	During training, instructor threw Thunderflash 12 to 15 feet from trainee, causing hearing damage.	19 Sep 13
CJOC	During demilitarization of ERYX missiles a spring loaded gyro functioned. Attributed to poor quality of gyro.	26 Apr 13
CMP	Subsequent to firing small arms, a member who had been wearing hearing protection but who lost one during the practice, experienced loud ringing in his ears and diminished hearing. NOTE 2	14 Sep 13
NOTE 1	Originally reported in FSOMS	
NOTE 2	Originally reported through the General Safety Program, and not reported to the AESP	

Appendix 2 to Annex C

Summary of Incidents for the Year 2013

Incident Summary. The following table summarizes incidents that occurred in 2013. Greyed out cells indicate a deliberate deviation.

L1 o Command Responsible for Reporting	2013 Incident Summary	Date
RCN	Improper storage of small arms ammunition. Three rounds 5.56mm ball found in ship's mail room by civilian worker.	2 Jan 13
RCN	Unit Ammunition Representative exceeded the maximum NEQ for jetty due to misinterpretation of internal guidance	22 Jan 13
RCN	Torpedoes discovered on unsecured dollies in torpedo magazine	27 Jan 13
RCN	SOLAS stores in pelican packs found to have expired (some installed expired) due to transfers between several vessels	07 Feb 13
RCN	SOLAS stores discovered to be time expired	14 Feb 13
RCN	During ammunitioning of ship, FP QRT were observed to use smart phones and to have active PRCs, contrary to procedures	15 Feb 13
RCN	Ammunition box containing 251 rounds of 5.56mm Blank was discovered among empty containers stored in a locked sea container.	21 Feb 13
RCN	As a result of damage to the chamber of Very Pistol, Green Star Cartridge became lodged in pistol, creating a hazard	26 Feb 13
RCN	Flood valve on demolition locker was replaced and left in open position, resulting in flooding of locker when system was pressurized.	15 Mar 13
RCN	Ammunition was stored in quarterdeck locker after waiver expiry.	04 Apr 13
RCN	Upper deck locker was removed from ship for refurbishment without being certified free from explosives.	04 Apr 13
RCN	Hot work was carried out within two metres of a magazine	12 Apr 13
RCN	Combination of human error and loose fit of MMOB bracket caused one MMOB to be removed from service	14 Apr 13
RCN	Live 9mm round discovered in returned brass	29 May 13
RCN	Unauthorized storage of blank SAA in force protection ready-use locker.	10 Jun 13
RCN	SAA was discovered stored in the torpedo ready-use locker while the ship was in harbour. SAA had been left on board by departing land unit.	20 Jun 13
RCN	Accounting error caused a double order of pyrotechnics to be delivered to the ship, resulting in the jetty limit being exceeded.	05 Jul 13
RCN	Sea Training utilized DM 211 in an unauthorized manner.	02 Sep 13
RCN	Magazine Custodian handover revealed weakness in ship's ammunition accounting	05 Sep 13
RCN	Subsequent to deammunitioning of ship, 220 rounds 7.62mm were discovered in the small arms magazine.	9 Sep 13
CA	Civilian vehicle contractor discovered small arms ammunition in vehicle sent for maintenance	15 Jan 13
CA	Range Control changed status of training area from dry to live without informing Petawawa advisory for update, resulting in flight through live range	15 Jan 13
CA	Unit returned misfired parachute flare instead of placing it in misfire pit for disposal	25 Jan 13
CA	MPs conducting search at gate discovered a Thunderflash and a Smoke Grenade in the trunk of a private vehicle.	14 Feb 13

L1 o Command Responsible for Reporting	2013 Incident Summary	Date
CA	Small quantity of igniters and match fuse discovered missing from exercise lock-up. Lock-up had been shared with visiting (foreign) troops and items were likely confused with their stores.	16 Feb 13
CA	Manufacturing defect in 40mm TP-T caused hard extraction and misfire to occur.	27 Feb 13
CA	CFEOD responded to police request related to a cache of A&E in the possession of a former RCMP member. Several items of CAF inventory recovered, all pyrotechnic in nature.	07 Mar 13
CA	Misfired Grenade Hand Smoke was discovered in a bag of expended grenades turned in as ammunition salvage. The actuator was still attached to the striker assembly.	19 Apr 13
CA	During periodic inspection of a 155mm Illuminating Projectile, black powder from the expelling charge was ejected. Further inspection revealed more bulged expelling charges.	29 Apr 13
CA	During excavation for a pipeline through the training area, an excavator dug up a dud 105mm HE projectile.	29 Apr 13
CA	Incorrect issue of ammunition (one wrong item, some additional items) resulted in review of user and ammunition platoon SOPs.	08 May 13
CA	Unit salvage return included live pyrotechnics and blank SAA repackaged in ball inner packs. Trained UAR involved.	15 May 13
CA	Incorrect misfire drill resulted in a misfired Parachute Flare being transported to the ammunition section while in Firing mode. During attempt to set it to safe, it fired.	31 May 13
CA	Munitions scrap and ammunition salvage were improperly accumulated in an unlicensed and insecure area instead of being returned to the ammunition section in a timely manner.	07 Jun 13
CA	Improper disposal of ammunition, munitions scrap and ammunition salvage, in that items were found inside and next to a waste bin designated for general waste.	07 Jun 13
CA	5.56mm Ball round discovered in a clip of blank rounds.	11 Jun 13
CA	Trainee discovered an inner pack of Ball cartridges in a box of Blank cartridges. Attributed to unit error in repacking	11 Jun 13
CA	During a routine inspection of waste collection points, a variety of ammunition salvage was found in a BFI bin. Improper disposal.	08 Jul 13
CA	During a return inspection, live ammunition was found under the front passenger seat.	10 Jul 13
CA	A block of C4 was recovered from an amnesty box near the single quarters	10 Jul 13
CA	Improper ammunition salvage return. Unit did not affix certification labels, and return included general garbage and live ammunition.	13 Jul 13
CA	Improper disposal of munitions scrap. Part of a rocket motor from a Python system was discovered in a scrap steel bin.	14 Jul 13
CA	Post-firing range sweep recovered the tail section of a 60mm WP Mortar Bomb that was dirt encrusted. During screening the dirt was dislodged and the WP began to burn.	04 Aug 13
CA	During a post-firing range sweep two misfired paraflares were recovered. Member recovering items thought they were serviceable.	05 Aug 13
CA	Military ammunition recovered from private residence of military member. 5.56mm, .50 cal, 12.7mm and 25mm involved.	09 Aug 13
CA	During GPMG firing a belt of blank cartridges was found in a sealed can of 4B/1T cartridges. Attributed to unit mixing during previous range date and failure of technician to note and correct the mixing during the receipt inspection.	22 Aug 13
CA	5 Ground Burst Simulators recovered from a private residence.	28 Aug 13
CA	Improper disposal of ammunition salvage - recovered from BFI bins in training area	24 Sep 13
CA	Two Fuze Electric No F123 in original packaging were recovered from a unit ammunition salvage return	03 Oct 13
CA	During range clearance operations a live 155mm flare and parachute assembly were incorrectly identified as safe and were transported. Correct identification of the hazard occurred during third level screening.	10 Oct 13
CA	Ammunition salvage was recovered during inspection of waste disposal bins	14 Oct 13
CA	Ammunition boxes returned to salvage with FFE chits were discovered to contain remains of PE-7	14 Oct 13
CA	Ammunition container with FFE chit discovered to contain PE-7	15 Oct 13
CA	Visiting Cdn unit stored 9mm ammunition in armoury without authorization	24 Oct 13
CA	During cleaning of chemical toilets, 7.62mm and 5.56mm ammunition was recovered	28 Oct 13
CA	Cartridge Flash Bang Smoke Simulator L1A1 was abandoned next to a BFI waste bin, along with several pieces of ammunition salvage	02 Nov13
CA	Round cooked-off as member had the cover open during immediate actions	21 Nov 13

L1 o Command Responsible for Reporting	2013 Incident Summary	Date
RCAF	Live cartridges found in gun's ammunition handling system undergoing safety clearance at second line maintenance. NOTE 1	07 Jan 13
RCAF	Improper passage of information and failure to check contents of suspect ammunition container resulted in unauthorized air transportation of dangerous goods (flares) NOTE 1	09 Jan 13
RCAF	Student pilot removed MDC firing handle pin instead of MDC unit pin during pre-flight check. NOTE 1	14 Jan 13
RCAF	While taxiing, a C2A2 Smoke Marker fell from an aircraft armament chute. Attributed to undetected progressive breakdown of a safety pin NOTE 1	15 Jan 13
RCAF	SAR team brought additional Markers Location Marine on board aircraft without informing aircraft crew NOTE 1	16 Jan 13
RCAF	During fire suppression system checks, the APU fire bottle discharged. Attributed to residual heat in the APU compartment NOTE 1	16 Jan 13
RCAF	Pilot delivered bomb attack rather than gun attack. Attributed to pilot error, exacerbated by poor quality of communications link. NOTE 1	18 Jan 13
RCAF	As aircraft started forward, a C2A2 Smoke Marker fell from an armament chute NOTE 1	22 Jan 13
RCAF	Gun attack without clearance NOTE 1	27 Jan 13
RCAF	NACES seats were transported unsecured and without proper placards NOTE 1	31 Jan 13
RCAF	Rear ejection seat found in unsafe condition (pin partially withdrawn). NOTE 1	31 Jan 13
RCAF	During start up, one MJU-27 flare was fired uncommanded according to the original report; however, investigation suggests that release probably took place in the air. NOTE 1	01 Feb 13
RCAF	During pre-flight inspection, technician noted the armament state record did not match stores on-board. Previous usage of Marker Location Marine had not been reported and servicing crew failed to confirm load. NOTE 1	08 Feb 13
RCAF	During removal, SMDC line tip was discovered to be severely bent NOTE 1	13 Feb 13
RCAF	C2A2 Smoke Marker discovered on deck under aircraft NOTE 1	13 Feb 13
RCAF	Helicopter returned to ship with one smoke store unaccounted. Attributed to worn set screw for securing manual release handle NOTE 1	13 Feb 13
RCAF	Ejection seat pin not properly installed in rear seat NOTE 1	14 Feb 13
RCAF	SMDC line tip found to be bent beyond limit NOTE 1	19 Feb13
RCAF	During post maintenance aircraft documentation review the fire extinguisher squib serial number was found to differ from the CF 353 (Explosives and Cartridge Record) NOTE 1	21 Feb 13
RCAF	During post maintenance aircraft documentation review, the fire extinguisher squib serial number was found to differ from the CF 353 NOTE 1	21 Feb 13
RCAF	Technician error caused fire bottle to discharge NOTE 1	22 Feb 13
RCAF	ALE-47 system performed uncommanded release of chaff/flare NOTE 1	22 Feb 13
RCAF	Student pilot failed to install front ejection seat safety pin NOTE 1	25 Feb 13
RCAF	C2A2 Marker Location Marine were loaded into chutes using improper arming procedure, resulting in two markers failing to light NOTE 1	27 Feb 13
RCAF	On short final, a MAWS indication caused four flares to be released, causing a small grass fire. No damage. Crew failed to set MAWS to safe on approach. NOTE 1	01 Mar 13
RCAF	Civilian aircraft undergoing a major inspection was found to be missing the O seals from both ejection gun primary cartridges NOTE 1	05 Mar 13
RCAF	While operating an Ammunition Loading System (ALS), a technician noticed a single round that appeared to have been fired - indicating a possible head-case separation or misfire. Investigation attributed casing to firing sequence starting when only one round remaining. Report cited errors in labelling of ALS and UALS NOTE 1	06 Mar 13
RCAF	Pilot moved from aborted aircraft to back-up aircraft without safety pinning the ejection seat NOTE 1	07 Mar 13
RCAF	During Search Stores replenishment it was discovered that the MRS did not accurately reflect the aircraft load and that an installed JAU 22 cartridge was time expired. NOTE 1	11 Mar 13
RCAF	JAU 22 cartridges were improperly shipped from theatre back to Canada NOTE 1	12 Mar 13
RCAF	Ejection seat safety pin not inserted prior to commencing shutdown checks NOTE 1	18 Mar 13
RCAF	Ejection cartridges were installed on a bomb rack not designed to be ejected. NOTE 1	18 Mar 13
RCAF	Aircraft arrived at arming point already armed for flight. NOTE 1	19 Mar 13

L1 o Command Responsible for Reporting	2013 Incident Summary	Date
RCAF	While conducting a BIT check, a technician inadvertently discharged the engine fire extinguisher bottles. NOTE 1	21 Mar 13
RCAF	While carrying out a functional check, a technician inadvertently caused a fire bottle to discharge. NOTE 1	21 Mar 13
RCAF	Aircraft flew with expired Day/Night flares NOTE 1	22 Mar 13
RCAF	During a building security check a technician noticed that missiles had been incorrectly secured to a trailer NOTE 1	25 Mar 13
RCAF	Aircraft had not been safetied. 'During an "A" check, technician noted that two safety pins were not installed and that the SLT safety door was in the closed (armed) position. NOTE 1	25 Mar 13
RCAF	Pilot dropped Mk-82 bomb without receiving clearance. NOTE 1	26 Mar 13
RCAF	Serial numbers recorded for the explosive cartridges in the SONAR reeling machine were found not to match the installed cartridges. NOTE 1	05 Apr 13
RCAF	Incoming Ammunition Technician conducted a 100% verification of self-contained weapons and attractive items. Accounting irregularities were reported.	23 Apr 13
RCAF	Seat catapult cartridges were discovered to not match maintenance records. Error tracked to 2011. NOTE 1	24 Apr 13
RCAF	Both pilot and supervisor of last chance check missed the fact that the canopy ejection pin was still installed. NOTE 1	26 Apr 13
RCAF	During routine change of time expired component, technician discovered canopy jettison rockets had been improperly installed. NOTE 1	27 Apr 13
RCAF	During removal of the SMDC line, it was discovered to be bent over the tolerance limit. NOTE 1	02 May 13
RCAF	Technicians failed to install jettison cartridges for external fuel tank. NOTE 1	07 May 13
RCAF	A time expired C2A2 MLM was discovered on-board during a pre-flight inspection. NOTE 1	08 May 13
RCAF	AIM-7 missile discovered damaged NOTE 1	08 May 13
RCAF	During transfer of stores to another aircraft, a shortage of five MLMs was discovered - attributed to a persistent failure to physically confirm the armament state. NOTE 1	13 May 13
RCAF	Aircraft returning from a weapons mission was mistakenly parked aimed towards a building NOTE 1	15 May 13
RCAF	During the build-up of a GBU 24, a technician inadvertently pulled the arming pin. EOD rendered safe.	16 May 13
RCAF	Aircraft returning from Maple Flag mission failed to go through the arm/de-arm point NOTE 1	25 May 13
RCAF	During pre-load inspection, the Load Crew Chief discovered that the fuzing wire was damaged. NOTE 1	25 May 13
RCAF	During an after-flight check, an armed C2A2 MLM was discovered on-board. NOTE 1	22 May 13
RCAF	During build-up of ALE-47 magazines, the back plates of two magazines were inadvertently switched. NOTE 1	27 May 13
RCAF	Variety of ammunition items were left behind in an unlicensed location subsequent to a training exercise. During exercise, ammunition was stored without licence.	05 Jun 13
RCAF	During a pre-flight check, the crew discovered one MLM on-board was time expired. NOTE 1	05 Jun 13
RCAF	During a search for a lost tool, technicians opened an old tool board and discovered 19 rounds of live ammunition NOTE 1	11 Jun 13
RCAF	Pilot discovered ejection seat in unsafe condition (pin not fully inserted) during pre-flight inspection. NOTE 1	11 Jun 13
RCAF	Upon landing it was noticed that the MDC Firing Unit safety pin had not been removed and stowed during flight. Attributed to poor documentation NOTE 1	16 Jun 13
RCAF	In attempting to resolve an electrical continuity issue, an armourer reloaded a Sonobuoy without clearance and using improper technique NOTE 1	26 Jun 13
RCAF	Unauthorized dangerous cargo. Technician placed a discharged firebottle, with an unfired squib, on an aircraft for return. He did so without authority. NOTE 1	26 Jun 13
RCAF	Aircraft fire extinguishers were improperly tagged and serviceability of cartridges could not be confirmed NOTE 1	04 Jul 13
RCAF	Gun jam, attributed to case neck separation NOTE 1	04 Jul 13
RCAF	Cockpit was found in unsafe condition - ejection seat and canopy safety pins missing. NOTE 1	11 Jul 13
RCAF	During safety procedures for a jammed gun, the gun was discovered to be cracked. NOTE 1	11 Jul 13

L1 o Command Responsible for Reporting	2013 Incident Summary	Date
RCAF	Day/Night Flares were not replaced in Global Survival Kit prior to time expiry NOTE 1	15 Jul 13
RCAF	While enroute for DOB training the pilot inadvertently dispensed two flares NOTE 1	15 Jul 13
RCAF	Sea King helicopter crashed while parking. One smoke tube actuator failed and released a MLM which stayed lodged in the badly damaged launch tube. MLMs and CADs recovered by EOD.	16 Jul 13
RCAF	Uncommanded release of Modular Practice Bomb (one commanded, one uncommanded) NOTE 1	18 Jul 13
RCAF	Improper storage of flares on aircraft NOTE 1	18 Jul 13
RCAF	Aircraft failed to go through arming point prior to mission NOTE 1	24 Jul 13
RCAF	During pre-flight checks student pilot removed the MDC Firing Handle safety pin. Noticed during pre-takeoff inspection NOTE 1	25 Jul 13
RCAF	The forward firing safety area was not secured and vehicles passed through it just prior to the start sequence NOTE 1	28 Jul 13
RCAF	Uncommanded launch of sonobuoy. Undetermined cause - attributed as an isolated incident. NOTE 1	28 Jul 13
RCAF	Gun wreck caused by case-neck separation NOTE 1	29 Jul 13
RCAF	During a review of records it was discovered that fire bottle squibs were time expired NOTE 1	30 Jul 13
RCAF	Multiple aircraft flew with unauthorized weapons load of Mk82 and MPBs NOTE 1	08 Aug 13
RCAF	APU fire bottle discharged. Attributed to a system fault, not technician error NOTE 1	10 Aug 13
RCAF	Case neck separation caused gun jam NOTE 1	12 Aug 13
RCAF	On preflight checks, the ejection seat safety pin was found to not be properly installed NOTE 1	12 Aug 13
RCAF	Case-neck separation caused gun jam NOTE 1	13 Aug 13
RCAF	Two flares were launched without command from pilot. Attributed to program error. NOTE 1	14 Aug 13
RCAF	Live canopy SMDC Line found installed on a training aircraft. Investigation revealed a second live component on another training aircraft. NOTE 1	21 Aug 13
RCAF	During a periodic inspection a fire extinguisher cartridge was found to be improperly installed NOTE 1	30 Aug 13
RCAF	Cartridge retainer departed aircraft in flight NOTE 1	09 Sep 13
RCAF	Pilot neglected to insert the ejection seat safety pin into the seat handle before egressing the aircraft NOTE 1	13 Sep 13
RCAF	During APU maintenance the fire bottle was discharged NOTE 1	14 Sep 13
RCAF	During take-off, a sonobuoy departed the aircraft, uncommanded NOTE 1	16 Sep 13
RCAF	During post-start check, the left seat passenger discovered the ejection seat pin had not been inserted into the seat NOTE 1	21 Sep 13
RCAF	While installing the rescue hoist cartridge, the technician inadvertently actuated the main probe messenger cartridge, cutting the cable NOTE 1	25 Sep 13
RCAF	CATM 9 discovered to be loose on launcher - cause undetermined	25 Sep 13
RCAF	During installation of FDR Beacon Foil, the Foil deployed and the cartridge actuated device fired NOTE 1	25 Sep 13
RCAF	While cocking the aircraft following an armament load, the pilot discovered the seat arming handle in the armed position NOTE 1	27 Sep 13
RCAF	Container of 5.56mm Ball fell from tailgate of vehicle during transit. Attributed to worn catch on tailgate doors	03 Oct 13
RCAF	Pilot failed to safety his ejection seat at appropriate time NOTE 1	04 Oct 13
RCAF	Aircraft was towed into hangar prior to removal of SAR armament Paul Bunyan. NOTE 1	05 Oct 13
RCAF	EOD training explosion occurred outside scheduled range time, placing three scheduled training aircraft at risk NOTE 1	07 Oct 13
RCAF	Ground crew failed to remove maintenance pins from ejection seats prior to returning aircraft to serviceable mode. NOTE 1	15 Oct 13

L1 o Command Responsible for Reporting	2013 Incident Summary	Date
RCAF	Pilot failed to fully insert seat pin, which fact was not noted during maintenance and not discovered until next pilot conducted pre-flight check. NOTE 1	15 Oct 13
RCAF	Quarantined ammunition was used in gun, leading to a gun jam caused by case-neck separation. NOTE 1	17 Oct 13
RCAF	Case neck separation caused gun jam NOTE 1	17 Oct 13
RCAF	During pre-flight check, aft CFS pin was found still stowed. Pilot failed to stow it and maintenance crew failed to notice this discrepancy. NOTE 1	18 Oct 13
RCAF	During pre-flight walk around, pilot noticed the rear ejection seat pin was not properly secured NOTE 1	23 Oct 13
RCAF	Uncommanded flare dispense NOTE 1	23 Oct 13
RCAF	C2 MLM landed within 15 feet of SAR boat during training NOTE 1	23 Oct 13
RCAF	Aircraft did not pass through de-arming point. It was carrying flares. NOTE 1	23 Oct 13
RCAF	Tail probe inadvertently guillotined prior to take-off. NOTE 1	24 Oct 13
RCAF	C2A2 MLM were launched using outdated procedures NOTE 1	28 Oct 13
RCAF	Gun jam caused by partial case-neck separation NOTE 1	29 Oct 13
RCAF	During post-landing checklist, aircrew discovered the back seat seat pin was not properly inserted NOTE 1	29 Oct 13
RCAF	During removal of fire extinguisher cartridges, it was noted that one of the serial numbers was not listed and two others were recorded in the wrong location. NOTE 1	01 Nov 13
RCAF	Uncommanded flare release approximately 30 minutes after unsuccessful flare release. NOTE 1	01 Nov 13
RCAF	Case neck separation caused gun jam NOTE 1	05 Nov 13
RCAF	Aircraft flew into restricted airspace (live EOD range). NOTE 1	05 Nov 13
RCAF	C8 Smoke Marker landed near civilian work area during live parachute drop. NOTE 1	27 Nov 13
RCAF	Aircraft failed to pass through de-arm point on return. NOTE 1	28 Nov 13
RCAF	20mm ammunition from a previously restricted lot was discovered in shipment returned from exercise NOTE 1	10 Dec 13
RCAF	Pilot accidently turned jettison switch while troubleshooting CMDS system, causing inadvertent jettison of flares NOTE 1	12 Dec 13
CANSOFCOM	9mm Ball round found mixed in with 9mm frangible rounds. Box had been locally sealed.	06 Jun 13
CJOC	Fire by an electrical pole was extinguished without damage. Wire deterioration caused fire.	08 Apr 13
CJOC	During construction of a new sidewalk inside the CFAD, a buried propane gas line was pierced.	19 Jun 13
CJOC	Transducer fell to the workshop floor.	17 Sep 13
ADM(IE)	During close-out of disposal operations, one projectile was discovered missing. It was eventually recovered from a security guard who had wanted a souvenir.	05 Mar 13
ADM(IE)	A tank turret awaiting clearance was removed from the area and cut up for scrap without being certified FFE.	18 Apr 13
NOTE 1	Originally reported in FSOMS	

Pictures showing the equipment used during the sampling of air above CRV7 or Mk 58 rocket motors while in their combustion stage, in order to evaluate the pollution levels. The tests were conducted in October 2013, at the Canadian Forces Ammunition Depot Dundurn, in Saskatchewan.

Picture showing the set-up of CRV7 rocket motors during the sampling of air above CRV7 or Mk 58 rocket motors while in their combustion stage, in order to evaluate the pollution levels. The tests were conducted in October 2013, at the Canadian Forces Ammunition Depot Dundurn, in Saskatchewan.

Annex D

Status of Main UXO Program and Legacy Sites - 2013

The full extent of UXO risk management activities including site reconnaissance, UXO avoidance, site characterization, clearance and public information sessions, were conducted at legacy sites across Canada in 2013. The table below describes these sites, including the legacy issues and risk management activities.

The site assessment methodology builds upon existing Program tools and ensures a consistent and defendable approach for the Department in how sites are identified for potential future risk management. Integral to the assessment methodology, are the Initial Risk Assessment Report (IRAR), the Record of Legacy Sites Risk Management (RLSRM), and the Legacy Site Risk Assessment (LSRA) process.

SITE NAME	LEGACY ISSUE	ACTIVITIES CONDUCTED IN 2013	RISK ASSESSMENT STATUS
Programmatic Projects			
Historical Records Research	Proactive research of suspected UXO legacy sites. Research initiatives to support UXO Program projects	• Completed research on 68 suspected UXO legacy sites • Completed file review and document collection for Calgary Third Party Audit	• N/A
Western Region			
Tofino, BC	Tofino, BC was the site of a Royal Canadian Air Force (RCAF) Station from 1942-1957. The RCAF used Wickaninnish Beach and Florencia Bay as target ranges. The Army used Wickaninnish Beach as a coastal defence training area.	• Public information sessions delivered in 2013. • UXO Avoidance services provided to Parks Canada in 2013. • Completed site characterization activities and in-depth historical research in 2013. • On-going communications activities. • Planned re-opening of dune area in Spring 2014	• Initial Risk Assessment Report (IRAR) rating of LOW for Florencia Bay • Legacy Site Risk Assessment (LSRA) rating of LOW for Wickaninnish Bay
Tsuu T'ina First Nations, AB	A total of 5300 Ha of potentially UXO-affected land from approximately 70 years of live-fire practice by the military from 1908 to 1980. A major clearance occurred in the area during period 1985–2005. Residual UXO risk is unknown.	• Site characterization activities • On-going communication activities (e.g. School Program)	• LSRA for South West Calgary Ring Road drafted
Vernon, BC	Total of 20,000 Ha of potentially UXO-affected land resulting from long term military manoeuvre training. There have been 9 confirmed UXO-related deaths since 1944.	• Additional site characterization completed at Kalamalaka Lake Provincial Park in 2013, including Climbers Parking Lot, cycling trails and open areas.	• Risk assessments underway
Central/Northern Region			
Churchill, MB	The Churchill area was historically used for live-fire training at multiple ranges.	• On-going communications activities • On-going risk management activities • Shoreline sweeps • Site characterization	• IRAR rating of HIGH • LSRA for 40-Mile Range in draft form • RLSRM for Waste Disposal Site rated as HIGH
Prince Edward County, ON	Multiple legacy sites with confirmed UXO affected land resulting from BCATP, RCAF, and Army training.	• On-going shoreline sweeps • On-going site characterization • On-going communications activities	• RLSRM for Wellers Bay w/ unmitigated risk of MEDIUM and mitigated risk of LOW • RLSRM for Ostrander Pt. in draft form
Shilo, MB	The site of military activity in the region since 1910.	• Communications activities • UXO project requirements development	• IRAR for Spruce Woods with a rating of HIGH • IRAR for Camp Hughes with a rating of HIGH • LSRA currently being drafted
Winisk, ON	RCAF Station Winisk was operational during the 1950s and 1960s. Remnant explosives were identified at the site.	• CAF conducted risk mitigation activities to reduce the hazard from the remnant explosives as part of OP WINISK. • Consultation with the Winisk First Nation and the Ontario Ministry of Natural Resources • Utilizing the local Ranger Patrol to provide logistical support.	• IRAR rating of Medium • LSRA drafted with a rating of Low
Quebec Region			
Lac Saint-Pierre, QC	Former munitions testing facility located on the St. Lawrence. One confirmed UXO related death in 1982.	• On-going shoreline sweeps • On-going communications activities • UXO avoidance • Planned UXO clearance operation	• RLSRM w/ unmitigated risk of LOW and mitigated risk of LOW

SITE NAME	LEGACY ISSUE	ACTIVITIES CONDUCTED IN 2013	RISK ASSESSMENT STATUS
Atlantic Region/Underwater			
Debert, NS	Former Camp Debert housed over 300,000 troops during WWII, and included multiple ranges and training areas.	• Conducted UXO avoidance support • On-going UXO risk management activities • Planned UXO site characterization and clearance.	• IRAR for Belmont Range with a rating of MEDIUM • IRAR for Cobequid Bay with a rating of LOW • IRAR for Colquhoun Range with a rating of HIGH • IRAR for Horse Point with a rating of LOW • IRAR for Main Base with a rating of LOW • IRAR for Spencers Point with a rating of MEDIUM • IRAR for Staples Brook with a rating of MEDIUM • IRAR for Training and Demolition area with a rating of MEDIUM • LSRA for Training and Demolition area with a rating of MEDIUM
Former Tracadie Range, NB	Former military range undergoing review, as previously cleared lands have residual UXO risk.	• On-going risk management	• RLSRM w/ unmitigated risk of HIGH and mitigated risk of LOW
HMCS Thiepval, BC	Battle class converted trawler shipwreck off the coast of British Columbia, with confirmed presence of UXO.	• Planned UXO clearance	• RLSRM w/ unmitigated risk of MEDIUM and mitigated risk of LOW
HMS Raleigh, NL	Cruiser shipwreck off the coast of Newfoundland	• Planned UXO site characterization	• LSRA with integrated risk of HIGH and mitigated risk of LOW
PLM 27, NL	Carrier shipwreck off the coast of Newfoundland.	• Completed UXO site characterization (non-presence of UXO confirmed)	• LSRA currently being drafted
SS City of Vienna, NS	Carrier shipwreck off the coast of Nova Scotia.	• Conducted UXO site characterization (presence of munitions confirmed)	• RLSRM w/ unmitigated risk of MEDIUM and mitigated risk of LOW
SS Claire Lilley, NS	Munitions transport shipwreck off the coast of Nova Scotia, with confirmed presence of UXO.	• Conducted partial implementation of UXO clearance (shell casings and fuzes), bombs and projectiles remain.	• RLSRM w/ unmitigated risk of MEDIUM and mitigated risk of LOW
SS Saganaga, NL	Carrier shipwreck off the coast of Newfoundland.	• Completed UXO site characterization (presence of UXO confirmed) • Planning for UXO clearance	• LSRA rating of MEDIUM
USAT BGen Zalinski, BC	Cargo transport shipwreck in the Grenville Channel, British Columbia, with confirmed presence of UXO	• On-going risk management, support to Canadian Coast Guard operation	• LSRA rating of LOW

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Pages 10-11: Leading Seaman Dan Bard, Formation Imaging Services, Halifax

Page 19: Mr. Paul Perrin, Explosives Safety Officer, Canadian Forces Ammunition Depot Bedford

Pages 20-21: Master-Seaman Steeve Picard

Page 25: Sergeant Julien Boudreau, 5 Area Support Group Saint-Jean

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Page 41: Mrs. Carla Forester, 15 Wing General Safety officer

Pages 42-43: Corporal Mathieu Gaudreault, 14 Air Maintenance Squadron

Page 46: Mr. Steve Whitwell, from the Director Ammunition and Explosive Management and Engineering

Pages 48-49: Sergeant Matthew McGregor, Canadian Forces Combat Camera

Pages 56-57: Master Corporal David Singleton-Browne, Canadian Forces Combat Camera

Page 60: Submitted by Captain Jean-Michel Racine, 3 Air Maintenance Squadron Armaments Officer

Page 69: Submitted by Mr. Dave Garrison, from the Director Ammunition and Explosives Regulation

Pages 70-71: Submitted by Mr. Dave Garrison, from the Director Ammunition and Explosives Regulation

Page 74: Warrant Officer Mark Irvine, Army Public Affairs Directorate

In celebration of the arrival of an Heir to the throne born on July 22 2013 to the Duke and Duchess of Cambridge, the Canadian Armed Forces fired a 21 gun salute on Parliament Hill in Ottawa, Ontario on July 23.