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Audit of Hazardous Materials Management

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Table of Contents

Acronyms and Abbreviations	i
Results in Brief.....	ii
Introduction	1
Background	1
Objective	2
Scope	2
Methodology.....	2
Description of Program.....	3
Statement of Conformance	4
Findings and Recommendations.....	5
Governance.....	5
Internal Controls.....	10
Information Systems.....	14
General Conclusion	18
Annex A—Management Action Plan	A-1
Annex B—Audit Criteria	B-1



Acronyms and Abbreviations

ADM(IE)	Assistant Deputy Minister (Infrastructure and Environment)
ADM(Mat)	Assistant Deputy Minister (Materiel)
CFB	Canadian Forces Base
CFSS	Canadian Forces Supply System
CGCS	Canadian Government Cataloguing System
CRS	Chief Review Services
D Safe G	Director of General Safety
DAOD	Defence Administrative Orders and Directives
DGENS	Director General Environment and Nuclear Safety
DLEPS	Director Land Equipment Program Staff
DND/CF	Department of National Defence and the Canadian Forces
DSCO	Director Supply Chain Operations
HAZMAT	Hazardous Material
HMMP	Hazardous Materials Management Plan
HMRA	Hazardous Materials Reference Application
HRMS	Human Resource Management System
LCMM	Life Cycle Materiel Manager
MA&S	Materiel Acquisition and Support
MSDS	Material Safety Data Sheet
OAG	Office of the Auditor General
OCI	Office of Collateral Interest
OPI	Office of Primary Interest
POL	Petroleum, Oils, and Lubricants
VCDS	Vice Chief of the Defence Staff
WHMIS	Workplace Hazardous Materials Information System



Results in Brief

The use of hazardous materials (HAZMAT) is inherent in much of the work performed by the Department of National Defence and the Canadian Forces (DND/CF), and a wide range of products are employed at work locations across the Department. HAZMAT may have adverse effects on health and safety, the environment, and equipment. To mitigate the risks associated with these products, a HAZMAT management program is in place to provide advice to users, manage compliance, and investigate and pursue projects and initiatives.

Chief Review Services (CRS) conducted an audit of the HAZMAT management program in order to assess the effectiveness of governance structures, controls over life-cycle management, and information management processes.

Findings and Recommendations

Governance. Because of its multidisciplinary nature, a single functional authority for the HAZMAT program does not exist. Instead, aspects of HAZMAT management are divided amongst the primary functional areas of health and safety, materiel management, and environmental management.

Despite individual efforts within the functional areas, weaknesses in coordination between these functional areas for the HAZMAT program have limited departmental efforts to develop and implement national policy. This has resulted in unclear roles and responsibilities and an ineffective policy framework. At local operational levels, a similar conflict in functional authorities has led to inefficiencies, while a lack of national direction has contributed to inconsistent application of departmental initiatives.

It is recommended that the Assistant Deputy Minister (Materiel) (ADM(Mat)), with support from the Assistant Deputy Minister (Infrastructure and Environment) (ADM(IE)) and the Vice Chief of the Defence Staff (VCDS), assume the lead role for the development of the governance framework for the life-cycle management of HAZMAT by revising departmental policy instruments for HAZMAT to clearly define the roles and responsibilities of functional authorities and operational levels, standardizing training to HAZMAT functional specialists and users, and monitoring compliance through a multidisciplinary inspection program.

Overall Assessment

The HAZMAT program lacks the structure, policy and guidance to ensure the following:

- clearly understood roles and responsibilities;
- clear and consistent direction on the introduction of products to the supply chain, and the identification of risks in the workplace; and
- record-keeping processes and information systems functionality to support data collection and analysis.



Internal Controls. Procurement of HAZMAT has become increasingly decentralized in DND/CF, reducing the need to stockpile and distribute materiel. However, this has also led to decreased controls over initial product selection and procurement, which are key stages of life-cycle management where high-risk substances can be prevented from entering the supply chain.

While initiatives are in place to reduce the use of these products at the national level, less consideration has been given to the majority of products, which are procured locally. Low awareness of these initiatives in local organizations has led to limited and inconsistent controls over procurement.

It is recommended that ADM(Mat) formalize consistent criteria for the assessment of HAZMAT products, and ensure that they are communicated to personnel across the Department with responsibility for selection and procurement.

Within workplaces, controls related to storage, use, and handling of HAZMAT tend to be ad hoc. The lack of inventory management systems renders it impossible to track characteristics such as usage patterns and product shelf life. Proper storage, labelling, training, and protective measures are dependent largely on the diligence of local supervisors. Workplace assessments of hazardous substances are not performed in accordance with legislative requirements.

It is recommended that VCDS establish requirements and guidelines for the conduct of workplace assessments, which can form the basis of risk management practices for HAZMAT in the workplace.

Information Systems. The HAZMAT program is supported by a number of information systems, providing functionalities related to materiel management, health and safety, and incident management. Further benefits from these systems could be realized through improvements to system design and data analysis, as well as more complete and consistent implementation and utilization.

Inconsistent adoption of materiel management systems at the operational level has compromised the integrity of HAZMAT holdings data. These systems provide important linkages between national materiel managers and local HAZMAT users, and the unreliability of data has weakened the effectiveness of national initiatives and compliance with health and safety requirements.

It is recommended that ADM(Mat) improve controls over materiel management for HAZMAT by better aligning information system functionalities with work processes to increase ease of use for data collection and organization, ensuring consistency with related systems, and promoting user adoption.

Information on health and safety incidents related to HAZMAT is not readily available. Without this information, health and safety risks may not be identified and action not taken to prevent future occurrences.

It is recommended that VCDS improve controls over HAZMAT in the workplace by improving the use of incident management systems to better capture HAZMAT incidents and allow for statistical analysis.

Note: For a more detailed list of CRS recommendations and management response, please refer to [Annex A](#)—Management Action Plan.



Introduction

Background

DND/CF personnel perform a wide range of activities involving the use of HAZMAT. Whether in the course of military training activities, servicing military equipment, maintaining infrastructure, supporting personnel, or providing administrative services, personnel make use of HAZMAT in the regular performance of their duties.

HAZMAT takes many forms within DND/CF workplaces. Products including common office supplies and cleaning products; petroleum, oils, and lubricants (POL); paint and coating systems; and compressed gases are essential to the work carried out in maintenance workshops, hangars, aboard ships, and other DND/CF facilities.

The use of HAZMAT carries with it inherent risks, which are compounded by the proliferation of HAZMAT across the Department. In some cases, risks relating to certain products may not yet be fully understood, and adverse latent effects may not be known.

Generally, HAZMAT risks related to health and safety arise from their use and handling. Short-term effects from workplace injuries have an impact on the well-being of personnel, leading also to lost productive time, healthcare and workers' compensation costs. In the long term, claims may be made by retired personnel for illness related to prior exposure.

Spills and releases of HAZMAT can have immediate and direct effects on the environment, as well as financial costs related to clean-up. Over time, contaminated sites may develop, requiring costly remediation. Environmental contamination may also impact on local communities and on public health.

Improper selection of HAZMAT can also present risks of damage to incompatible equipment. HAZMAT products are often required to conform to manufacturer specifications in respect of warranty conditions, or military specifications to ensure technical performance.

Related to these areas are risks associated with compliance management and departmental reputation. HAZMAT activities are carried out in conformance with a variety of legislation, including the *Canada Labour Code Part II, Hazardous Products Act, Canadian Environmental Protection Act, Transportation of Dangerous Goods Act*, and related regulations. Regulatory noncompliance may result in work stoppages, fines and prosecution against the Department, senior management, and individuals in positions of command. HAZMAT incidents may also impact community relations, and public confidence in the Department's performance in materiel management, health and safety, and environmental stewardship.

To mitigate these risks, it is important that the Department have in place an effective HAZMAT management program to provide appropriate governance and controls over the life cycle of this materiel. The objective of the program is to address the protection of human health, the environment, and equipment, and compliance with legal requirements, in a manner that demonstrates due diligence.

The DND/CF HAZMAT management program was previously audited by CRS in 1996.¹ The Office of the Auditor General (OAG) also completed an audit on this topic in 1999,² with a follow-up in 2001.³ The implementation of management actions resulting from the previous audits (where they fell within the scope of this current audit) was assessed. These included recommendations involving responsibilities and accountabilities, product selection, inventory management, information management, compliance and monitoring.

This audit was identified in the CRS Risk-based Internal Audit Plan for fiscal year 2012/13 to 2014/15. HAZMAT management has been consistently identified as a priority area in DND/CF sustainable development strategies since 1997, and is a key operational category within the Defence Environmental Strategy.

Objective

The objective of the audit was to assess the governance and controls relating to the life-cycle management of HAZMAT. [Annex B](#) outlines the audit criteria assessed in this audit.

Scope

The scope of this audit included chemical products of a consumable nature, and those contained in equipment.

This audit did not include consideration of chemical and biological agents, radiological and nuclear materials, or ammunition and explosives. The audit focussed on materials used in garrison, and excluded materials used in operations, or outside of Canada. It also excluded HAZMAT related to real property such as asbestos, dust, lead, polychlorinated biphenyls, and halocarbons.

In this audit, “HAZMAT” refers to materials included within the audit scope.

Methodology

The audit results are based on the following:

- Interviews with functional authorities for health and safety, materiel management, and environmental management within the ADM(Mat), ADM(IE), and VCDS organizations, and corresponding functional advisors to operational commands.

¹ CRS, Life Cycle Management of Hazardous Materials, March 1996.

² OAG, National Defence – Hazardous Materials: Managing Risks to Employees and the Environment, September 1999.

³ OAG, Follow-up of Recommendations in Previous Reports, December 2001.

- Reviews of legislation, policies and directives, manuals, instructions, and guidance documents.
- Site visits to four major DND/CF installations: Canadian Forces Base (CFB) Montreal, CFB Gagetown, Maritime Forces Atlantic, and 8 Wing Trenton.
- Interviews with functional personnel within base/wing support organizations.
- Interviews with functional and HAZMAT user personnel within operational organizations.
- Walk-throughs of work processes and observation of workplaces, storage areas and disposal facilities.
- Data analysis of relevant information systems, including the Hazardous Materials Reference Application (HMRA), the Canadian Government Cataloguing System (CGCS), the Canadian Forces Supply System (CFSS), the Human Resources Management System – Health and Safety Module (HRMS), SpillNet and the National Movement and Distribution System.

Description of Program

The DND/CF HAZMAT management program aims to address the protection of human health, the environment, and equipment, and compliance with legal requirements, in a manner that demonstrates due diligence. Other objectives include reduction in the usage of HAZMAT, decentralization of procurement, limitation of quantities stored, and minimization of waste generated.

HAZMAT management follows a life-cycle approach, which addresses risks within the stages of initial selection, procurement, transportation, handling, storage, use, and disposal. Initial selection and procurement refer to the identification and sourcing of materiel to be used in the work of the Department, including consideration of technical requirements and the use of less hazardous alternatives. Transportation of HAZMAT considers compliance with regulations related to the shipment of dangerous goods. Storage, use, and handling issues involve ensuring that personnel are provided the necessary training, product information, and protective measures when interacting with HAZMAT products. Disposal of hazardous waste considers identification, collection, storage, and processing of waste for removal, as well as strategies to reduce the amount of waste generated.

Functional authority for HAZMAT management is shared primarily between three organizations at the national level: ADM(Mat), ADM(IE) and VCDS.

Groups within the ADM(Mat) organization are responsible for materiel management. The Director Supply Chain Operations (DSCO) provides Department-wide functional direction to the materiel acquisition and support community, as well as tools such as materiel cataloguing and information systems. Life cycle materiel managers (LCMM) act as technical authorities for equipment systems and components, as well as commodity groups, and are responsible for developing specifications of materiel to be used in the servicing of military equipment.

The Director General Environment and Nuclear Safety (DGENS) within the ADM(IE) organization is responsible for coordinating HAZMAT policy, training, and monitoring activities, and liaising with other government agencies on regulatory issues affecting the Department. ADM(IE) is responsible for the primary policy on HAZMAT management: Defence Administrative Order and Directive (DAOD) 4003-1: Hazardous Materials Management.

The Director of General Safety (D Safe G) within the VCDS organization is responsible for HAZMAT management as one element of a broader program for health and safety, including compliance with requirements for HAZMAT in the workplace.

At the operational level, HAZMAT management within DND/CF installations is primarily the responsibility of a base, wing, or formation HAZMAT officer. Organizations that use HAZMAT in their work assign unit HAZMAT officers and section HAZMAT representatives as secondary duties to form a network of functional specialists. A similar structure exists for the health and safety function, with personnel assigned as unit general safety officers as a secondary duty, coordinated by a base, wing, or formation general safety officer. Other base and unit supporting functions provide common services to HAZMAT users, in areas such as supply and disposal.

Statement of Conformance

The audit findings and conclusions contained in this report are based on sufficient and appropriate audit evidence gathered in accordance with procedures that meet the Institute of Internal Auditors' *International Standards for the Professional Practice of Internal Auditing*. The audit thus conforms with the Internal Auditing Standards for the Government of Canada, as supported by the results of the quality assurance and improvement program. The opinions expressed in this report are based on conditions as they existed at the time of the audit, and apply only to the entity examined.

Findings and Recommendations

Governance

The governance framework and overlapping functional authorities do not support an efficient and effective HAZMAT management program.

Roles and Responsibilities

HAZMAT management within DND/CF is divided primarily between the functional areas of health and safety, materiel management, and environmental management. At the national level, these areas are the respective responsibilities of D Safe G, various organizations within ADM(Mat), and DGENS.

The roles and responsibilities of departmental functional authorities have not been well defined in policy instruments, and each organization has tended to focus on its own aspect of HAZMAT management. ADM(IE), through DGENS, is responsible for the management of the national environmental protection and stewardship portfolio on behalf of the Department. ADM(IE) has led the functional coordination for the HAZMAT program with its issuance of DAOD 4003-1 in 1998, which may reflect the prevailing focus on HAZMAT management from a perspective of environmental protection. In practice, the role of DGENS has focused on policy development, regulatory affairs and spill response, while ADM(Mat) and VCDS are charged with operational responsibilities for life-cycle materiel management and health and safety.

The various functional authorities have worked within their respective areas, with some collaboration on cross-functional initiatives. Despite these efforts, and due to the absence of a clearly defined lead, the program as a whole has lacked an effective accountability framework. This has prevented the development of a coordinated HAZMAT management program with clear and consistent objectives and departmental positions to support HAZMAT users. Delays have been experienced in the issuance of authoritative policy and guidance to operational organizations, and the development and implementation of program initiatives has been limited. Conflicting areas of responsibility have also resulted in duplication of activities in some areas, while gaps exist in others.

Similar findings had been reported in the 1999 audit conducted by the OAG. Despite the publication of a HAZMAT Safety and Management Manual which addresses this area, functional responsibilities remain uncoordinated and unclear.

Ambiguities in roles and responsibilities at the departmental functional level have persisted at the operational command, base and unit levels. Within bases, wings, and formations, a HAZMAT officer and an associated network of unit HAZMAT representatives are the primary sources of functional advice to HAZMAT users. At most locations, this position is situated within the local environmental management function, while some regions place the function on its own or within a combined safety and environment organization, in recognition of its multidisciplinary role.

Because of overlapping areas of responsibility, HAZMAT officers are also required to work closely with other functional specialists in areas such as supply and disposal, health and safety, fire protection, and preventive medicine to coordinate the delivery of the HAZMAT program. Duplication was noted in areas such as inspection of workplaces and storage areas, while gaps were seen in areas such as product selection and procurement.

HAZMAT officers were often limited in their ability to influence operational processes in their role as functional advisors. The lack of direct authority over HAZMAT users, as well as the lack of a clear strategy for the HAZMAT management program, restricted their ability to promote enduring improvements to life-cycle activities. Instead, HAZMAT officers were often required to detect and react to issues of noncompliance, and without clear national objectives, local HAZMAT management programs are operated largely independently, based on local initiatives driven by the HAZMAT officer.

Without clear roles and responsibilities, the HAZMAT management program has lacked coordination and accountability. Functional direction has been stalled, and gaps and duplications exist in management activities. A clear program lead is required to provide strategic outlook and exert authority over this area.

Policy Framework

Departmental Policy. The departmental HAZMAT program is based in an order issued by ADM(IE), DAOD 4003-1: Hazardous Materials Management.⁴ ADM(IE), through DGENS, has also issued a series of directives establishing a departmental HAZMAT Advisory Committee, setting out standards for HAZMAT Management Plans (HMMP), and addressing specific topics and commodities. In addition, a comprehensive HAZMAT Safety and Management Manual⁵ has been produced jointly by D Safe G for VCDS, and DSCO for ADM(Mat).

Departmental policy instruments are out of date and have lost some of their relevance. ADM(IE) has functional ownership of DAOD 4003-1, despite the relatively limited role of the organization in HAZMAT management. The DAOD, issued in 1998, has not been revised to reflect fundamental changes such as the definition of hazardous materials, legislative changes, departmental objectives, nor the results of the prior audit completed by the OAG in 1999. The DAOD also lacks identification of roles and responsibilities, and is weak in providing authoritative policy direction to communicate a clear national direction for the HAZMAT management program.

⁴ DAOD 4003-1 – Hazardous Materials Management.

⁵ A-GG-040-004/AG-001 – General Safety Program – Hazardous Materials Safety and Management Manual.

Similarly, the HAZMAT Safety and Management Manual, intended as a key reference resource, has been ineffective in communicating practical guidance to functional specialists and HAZMAT users. Efforts to maintain the currency of the manual have been restricted by the need to consult the multiple functional authorities with responsibilities for subject areas. The guidance provided does not present program objectives, accountabilities, targets, or reporting requirements, resulting in limited adoption by operational organizations nor monitoring by functional authorities.

Personnel interviewed within departmental functional authorities agreed with the findings related to the departmental policy framework, but explained that policy development and approval of draft documents has been hindered by the conflicting roles and responsibilities and lack of accountability of functional organizations.

Local Procedure. Within operational organizations, bases, wings and formations are required to establish HMMPs, which are sometimes incorporated with environmental management systems. Units have developed standard operating procedures specific to their work with HAZMAT throughout life-cycle stages, as well as in areas such as spill response and record keeping.

The requirement for the establishment of HMMPs, and standards for their development, were established by DGENS. HMMPs are intended to set out a plan to establish local HAZMAT management programs, including identification of program aspects, legal requirements, objectives and targets, and specific management programs, while setting out processes for program implementation, operation, monitoring and reporting.

While these requirements were met at the locations visited, HMMPs have not been leveraged as a practical governance instrument in the management of the HAZMAT program. HMMP standards were reported to be outdated, and do not result in operational guidance for users. HAZMAT officers at some locations reported that HMMPs were developed to fulfill a requirement, but have not been implemented, and procedures described do not reflect actual operational processes. The lack of approval, monitoring or review requirements for HMMPs by command or functional organizations have limited accountability and commitment to the plans.

An opportunity exists to implement HMMPs as intended as a means to communicate consistent program objectives, set out policies and procedures, and develop performance measures and reporting requirements as the basis for local HAZMAT management programs.

Job Task/Hazard Analysis. Canada Occupational Health and Safety Regulations require the completion of “hazard investigations” of the potential health and safety impacts of all hazardous substances used in the workplace. Such analyses are intended to examine the types and quantities of HAZMAT products to which workers may be exposed in a workplace, possible health effects, and procedures for storage, use, handling and disposal, in order to identify controls to be implemented.

While guidance has been issued as part of the HAZMAT Safety and Management Manual, this requirement has not been met, and implementation at the local level has been inconsistent. At one of the locations visited, the general safety organization had taken leadership for completing these assessments based on types of occupations or work environments. At another location, general instructions and templates were provided to unit supervisors, with no further monitoring to ensure that assessments were completed.

Departmental guidance has not been adequate to clarify the requirement for such assessments, responsibility for their completion, instructions and guidance for their preparation, and monitoring to ensure compliance. The opportunity exists to complete these assessments as the basis for HAZMAT management within the workplace by identifying HAZMAT products in use, assessing related risks, and developing controls such as training and protective measures.

Training

Basic training programs are in place for HAZMAT users and functional specialists. Departmental training programs are provided to personnel with specialist responsibilities for the control, disposal, packaging, and shipment of HAZMAT, and for response to emergency incidents. HAZMAT officers may complete this training, as well as position-specific training developed by each operational command. Training for unit HAZMAT representatives is provided by local HAZMAT officers.

For HAZMAT users, training is provided as part of initial occupational military training for trades in which HAZMAT products are used. Upon employment within a workplace, a general orientation is provided on the Workplace Hazardous Materials Information System (WHMIS), a legislative requirement. Supervisors are responsible for providing product-specific training to new employees or upon introduction of new products to the workplace. Standard training for line officers, supervisors, and workplace health and safety committee members is available through D Safe G as part of the Safety Management Course.

WHMIS training within the Department tends to be locally developed, and its consistency varies from formal classroom-based learning and computer-based training, to informal self-study of presentation materials. Policy for periodic refreshment of training also varies by location, from no requirement to annual review of learning materials. One organization examined took greater initiative to foster employee engagement by producing an annual professional development day to review WHMIS requirements and address special topics relevant to the work of the unit.

While WHMIS training requirements are being met, a standardized national training program may reduce inconsistency and duplication of efforts in the development of materials.



Monitoring and Review

At the operational level, inspections are performed on storage areas and workspaces where activities involving HAZMAT take place. Within units, inspections are conducted by a number of base, wing or formation organizations with functional responsibilities for HAZMAT management, health and safety, environmental management, preventive medicine, and fire protection. A lack of guidance on inspection protocols and overlapping responsibilities has led to inconsistent and duplicated efforts, with multiple inspections of the same work area for different aspects of HAZMAT management. Formal reporting, analysis and follow-up of inspection results are also lacking.

At the functional level, review of the HAZMAT management program is limited. Local programs at the base, wing, or formation level are generally not reviewed by functional authorities or command advisors. This lack of oversight, and the absence of performance measures or reporting requirements have limited the availability of information to all levels of functional management on the performance of the HAZMAT program.

The need for standard inspection protocols and program performance indicators at the operational level and at the program level were previously identified by the OAG.

Conclusion

Unclear definition of roles and responsibilities has contributed to a lack of direction over the HAZMAT program for the Department, which has hindered the efforts of the various functional authorities. This has impacted the development of policies and procedures and standard training and inspection protocols, leading also to weaknesses in the structure and operations of the HAZMAT management program at local levels.

Recommendations

1. ADM(Mat), with the support of VCDS and ADM(IE), should assume the lead role in developing the governance framework for the life-cycle management of HAZMAT by developing the following:

- departmental policy for HAZMAT to clearly define the roles and responsibilities of functional authorities and operational levels;
- standard training programs for functional specialists and HAZMAT users on life-cycle activities and information systems; and
- a multidisciplinary inspection program to include assessments of prohibited products held, holdings records, protective measures, training and storage requirements, along with reporting processes and analysis.

OPI: ADM(Mat)

OCI: VCDS and ADM(IE)

2. VCDS should improve controls over HAZMAT usage in the workplace by establishing a process to conduct preventative “hazard investigations” that identify and mitigate risks associated with HAZMAT usage in the workplace.

OPI: VCDS



Internal Controls

There are inadequate controls over the local level selection and procurement of HAZMAT to prevent the usage of high-risk substances that can threaten the health and safety of HAZMAT users and pose risks to the environment.

Initial Selection and Procurement

Initial selection is a key stage of the HAZMAT life cycle, where decisions are made as to the products to be used in the work of the Department, and where high-risk substances can be prevented from entering the supply chain. Such a preventive approach to life-cycle management had been previously suggested in the OAG audit. The procurement stage also represents an important control point for the authorization of HAZMAT for introduction to the supply system. These stages occur at both the departmental and operational levels.

LCMMs working in the Equipment Program Management areas of ADM(Mat) detail procedures for the operations and maintenance of military equipment through the publication of technical documentation, which may include prescribed HAZMAT products to be used. In selecting HAZMAT products, LCMMs may consider factors such as original equipment manufacturer specifications, warranty conditions, performance requirements, as well as health and safety and environmental management. HAZMAT requirements may be described specifically or generally. Operators and maintainers of equipment must use the exact brand, type and/or grade of product when it is specified in technical documentation, but have more flexibility where multiple products may meet a prescribed military specification, or where no specific product is prescribed.

HAZMAT products may be procured centrally by supply managers in Equipment Program Management areas for distribution through Canadian Forces Supply Depots, or may be purchased locally by operational supply organizations through standing offers, purchase orders, or from local retail suppliers. In keeping with the Department's stated objective to decentralize the procurement of HAZMAT, a shift towards increasing local procurement has been reported, with locally procured products representing a majority of new products catalogued upon introduction to the supply system.

At the departmental level, positive initiatives have been observed within Equipment Program Management organizations, where explicit evaluation criteria are included in procurement instruments to provide preferred consideration to suppliers of less hazardous substances. Initial steps are being taken to incorporate HAZMAT considerations into equipment life-cycle planning, and these initiatives should be pursued further.

Departmental initiatives are also in place to reduce the procurement and use of harmful products through their replacement with less hazardous alternatives. The Department has committed to participation in the Chemical Management Plan Challenge by its inclusion in sustainable development strategies. An initiative of the Government of Canada, this program aims to consult industrial users on chemical substances under review for potential federal regulation. The Director Land Equipment Program Staff (DLEPS) leads the Department's efforts to proactively assess products containing these substances for removal from the supply system. This involves analysis to identify HAZMAT products



containing targeted substances, determining areas of the Department where products are in use, and working with LCMMs and HAZMAT users to identify and test alternative products. Products may be flagged in supply databases as prohibited from procurement or restricted to specific applications based on the results of this analysis.

Despite these efforts, improvements are needed to internal controls over initial selection and procurement at the local level. Where the use of specific products is not otherwise prescribed, HAZMAT users may select products meeting the required fit, form, and function necessary to carry out a task. Products are normally requisitioned by a HAZMAT user or section head, and procured by a unit's local procurement function.

Although the majority of HAZMAT users reported efforts to select and procure "green" products, formal selection criteria that consider health, safety and the environment were not observed within units, and selection was based primarily on product performance, cost and product availability. Local procurement personnel reported that they lacked the technical knowledge that would be needed to assess products requisitioned and to suggest less hazardous alternatives. Users and procurement personnel are also unfamiliar with information systems that identify procurement restrictions, product ranking tools, or product listings of approved and prohibited items.

HAZMAT officers and unit HAZMAT representatives are intended to provide functional advice to users when new products are introduced, and consideration of less hazardous alternatives. Without direct authority over HAZMAT users, and with limited involvement in the procurement process, such advice may not be sought or may be disregarded, and HAZMAT officers may not become aware of products in use until otherwise detected.

HAZMAT officers and unit HAZMAT representatives have made attempts to control the purchase of HAZMAT products by users within units. However, inconsistent assessment criteria for products, limitations in enforcing compliance, and lack of awareness of departmental initiatives have weakened the effectiveness of these measures.

- At a unit examined, a HAZMAT representative required that all requisitions for HAZMAT include confirmation that products had been approved. Products were incorrectly considered to be approved if they were catalogued in HMRA, a departmental database. In fact, HMRA serves as a product catalogue in which any product will be accepted for cataloguing, and inclusion in HMRA is not intended to imply assessment or approval of a product.
- At another unit, a HAZMAT representative reported a local initiative to replace a certain product in use with a less hazardous alternative. However, a review of HMRA indicated that the product in use had been assessed at the departmental level as being subject to procurement restrictions, but that the product being substituted had been prohibited from procurement outright. The unit HAZMAT representative was unaware that departmental procurement restriction information was available in HMRA.

- At a DND installation, local policy required that all HAZMAT procurement be routed through a central procurement authority. HAZMAT products were assessed based on the judgment of experienced personnel, but formal assessment criteria were not identified. A number of major units had also been granted exemptions based on large quantities of recurring requirements. However, the exemptions did not consider new products, or products that were similar but of different chemical compositions.

Storage, Use and Handling

The use of HAZMAT in the workplace is subject to the WHMIS, a legislative requirement aimed at preventing work-related injuries and diseases by communicating information about HAZMAT. The primary requirements of this system are for HAZMAT users to have access to Material Safety Data Sheets (MSDS) for each product, for WHMIS labels to be applied to all products, and for personnel to have access to worker education programs. The availability of MSDS information had also been considered in the prior OAG audit.

A current MSDS is required to be available for each product maintained in a workplace. MSDSs provide HAZMAT users with product information such as the chemical composition and characteristics, toxicology information, personal protective equipment recommendations, storage requirements, first aid instructions, etc. MSDSs should be reviewed when new products are introduced to a workplace as a basis for product-specific worker training, and to ensure that protective measures are in place. MSDS are required to be updated whenever new hazard information becomes available, or at least every three years. In the workplaces examined, MSDSs were not available for 53 percent of products sampled, while 50 percent of those that were available were out of date. Furthermore, HAZMAT users did not appear familiar with MSDSs, apart from the requirement to maintain them, and MSDS binders were disorganized and unused. This suggested a lack of discipline in adherence to MSDS maintenance and worker education processes. Good practices were observed in some units where MSDSs were presented to personnel at weekly safety meetings. One unit also required personnel to write their initials on the MSDSs to confirm that they had been reviewed.

The audit also found several cases where WHMIS labels were not applied to HAZMAT being used in the workplace, especially for decanted products. The lack of proper labels, particularly with unidentified spray bottles containing decanted material, can lead to improper handling or incompatible storage conditions. These conditions are consequences of inadequate maintenance and monitoring from carelessness and disregard for operating procedures, and result in non-compliance with federal regulations and pose risks to the health and safety of personnel.

Storage and handling of HAZMAT are specifically exempt from WHMIS regulations and are instead governed by legislation aimed at containing HAZMAT, spill containment and fire prevention. At workplaces examined, storage compatibility issues were observed and HAZMAT was found outside designated storage areas at the end of the workday. Expired products were also found, as were aged products with no indicated expiry date, and which personnel reported were no longer in use.

In general, controls related to HAZMAT in the workplace tend to be ad hoc and depend largely on the diligence of HAZMAT users and section supervisors. The majority of the issues observed during these life cycle stages were a result of difficulties by HAZMAT users in establishing formal and practical procedures from the various requirements imposed on them, and to consistently incorporate these procedures into routine work processes. Job task analyses or “hazard investigations,” as required by the Canada Occupational Health and Safety Regulations, involve the investigation of all HAZMAT products in a workplace that may pose a risk to workers. The completion of such analyses could form the basis for the development of local procedures by systematically reviewing and assessing the risk of all HAZMAT products in a workplace, and determining workplace safety measures and product-specific training requirements.

Transportation and Disposal

Transportation and disposal of HAZMAT are strictly regulated stages of the HAZMAT life cycle, with requirements aiming to control the release of substances into the environment. Personnel with responsibilities for packaging and shipment of HAZMAT and waste undergo a departmental certification and renewal process. With the focus on decentralization of HAZMAT procurement, transportation of HAZMAT between DND installations has decreased.

Hazardous waste generated by operational units is accumulated at work locations, before being collected at a central hazardous waste facility for processing and disposal through contractors. Several good initiatives were noted to reduce, reuse, and recycle hazardous waste. At one installation, waste oil or fuel was collected for use in a central heating plant. Others generated income from the sorting and sale of used batteries and other hazardous waste. Waste reduction initiatives included changes to the parts cleaning process using less hazardous materials, and changing to bulk orders to reduce waste from small containers. The Department could benefit from the sharing of best practices to reduce HAZMAT disposal costs.

Conclusion

Controls over initial selection and procurement of HAZMAT require attention in order to ensure that clear criteria are communicated and consistently applied to prevent the introduction of high-risk substances to the supply chain. Controls over HAZMAT in use could be made more rigorous by applying a framework that systematically considers product risks.

Recommendation

3. ADM(Mat) should improve HAZMAT management processes as follows:
 - ensure that prohibitions and restrictions are communicated to operational supply organizations for local HAZMAT procurement; and
 - develop guidance and tools for assessing and selecting alternative and less hazardous products at local levels.

OPI: ADM(Mat)

OCI: VCDS and ADM(IE)



Information Systems

Incomplete and unreliable HAZMAT information along with systems that are not configured for analysis of incidents and accidents, may lead to inappropriate life-cycle management decisions that could compromise the health and safety of individuals and compliance with regulations.

HMRA

HMRA is the Department's primary HAZMAT information system. Its three primary functions provide HAZMAT users with access to a centrally managed MSDS library, a holdings module to record HAZMAT in use in order to comply with legislative and emergency response requirements, and a product ranking tool to help users to select less hazardous substances. The use of HMRA across the Department is mandated by ADM(Mat).

ADM(Mat) supports HMRA through DSCO, including system development, materiel cataloguing, maintenance of MSDS updates, and user training. DLEPS is responsible for product ranking and assessment, including the determination of procurement restrictions or prohibitions. At bases, wings, and formations, a HAZMAT officer usually provides training to unit HAZMAT representatives, and administers user accounts, unit structures, and storage locations within HMRA. Unit HAZMAT representatives are responsible for updating HMRA holdings records for their assigned storage areas, which at many locations is required at least annually.

The development of HMRA addresses prior CRS and OAG audit recommendations for the implementation of HAZMAT inventory systems containing standard information. However, HMRA acts as a holdings management system only, to record the types of products that may be used within a workplace, and the maximum quantities that may be held at any time. The system does not provide inventory management functionality to record inventory counts, procurement or usage.

HMRA has not been fully implemented throughout the Department. While most organizations have adopted the system to manage HAZMAT holdings and obtain MSDS, some continue to use alternative processes.

- One departmental functional authority was unaware of HMRA and its function as an MSDS library, and had subscribed to a commercial reference database to provide a duplicated capability to the Department. Some installations or units also hold independent subscriptions, resulting in further duplication.
- Another unit was not established in HMRA to record its HAZMAT holdings.

Key features of HMRA are not well understood, or are not being used as intended due to inadequate training and misalignment of systems processes with work processes.

- A unit examined had properly recorded their HAZMAT holdings in HMRA, but was unaware of the report generating functionality, and had created duplicate manual inventory listings instead.



- DSCO explained that maximum holdings information was captured in HMRA to support emergency responders by indicating the types and quantities of HAZMAT that may be present in an incident location. Fire crews interviewed reported that they did not rely on this information, and instead conducted physical observation during building familiarization inspections.
- DLEPS conducts analyses of HAZMAT products, and controls the procurement status of each product. Products may be catalogued in HMRA as prohibited or restricted if they contain targeted chemical ingredients. Most HAZMAT users and procurement personnel were unaware of this field, and did not consider it in making initial selection and procurement decisions. The distinction between the prohibited and restricted statuses is also unclear.

Units are not updating their HAZMAT holdings records at least annually, as required at most installations. In a sample of 31 storage areas at 14 units, including flammable lockers, acid lockers, paint stores and POL stores, 54 percent of products tested were not identified as held in HMRA. Lapses in record keeping were attributed to insufficient unit personnel assigned to perform updates, inadequate monitoring to ensure compliance, and difficulties with the proper use of HMRA due to training and system design deficiencies. Instances of missing, extra or incorrectly named storage lockers were also observed.

Units did not record certain types of commodities, such as bulk HAZMAT stored outside of storage lockers. These products included parts washers, paint strippers, heating plant materials, and POL products.

It is important for holdings data to be complete and accurate to provide local users with the basis for HAZMAT management activities, as well as providing departmental visibility of HAZMAT stored and used across the country and on ships. Headquarters and local organizations may rely on this information for decision making, reporting and emergency response.

CFSS/CGCS

CFSS is the departmental information system for supply operations. It is used for supply activities including procurement, warehousing and inventory management, distribution and issuance, and disposal of commodities and equipment. HAZMAT in warehouse facilities and supply depots are not recorded in HMRA if they are kept as inventory for distribution. These inventories are recorded in the CFSS along with information such as product names, locations, quantities and shelf lives.

The audit tested a sample of 52 shelves (bins) containing HAZMAT in two warehousing facilities. Of the bins tested, 21 percent did not contain the products or were not empty as identified in the CFSS. Inaccurate inventory records prevent supply personnel from locating and issuing products. Inventory management functions may also be affected in providing inaccurate information for procurement decisions and the culling of expired products.

HAZMAT indicators in CFSS were found to be inconsistent with those in CGCS. CGCS is the departmental catalogue for materiel, and classifies materials as HAZMAT based on automatic updates from HMRA. HAZMAT indicators in CFSS are manually assigned by LCMs. Products classified as HAZMAT in CGCS were not always identified as such in CFSS.

HAZMAT indicators in CFSS and CGCS are also used when considering methods of disposal for products and equipment. Clear direction was not available to personnel working in repair and disposal organizations on specific procedures required for identification, extraction and disposal of equipment containing HAZMAT components.

SpillNet/HRMS

Incidents relating to HAZMAT are reported in SpillNet and HRMS. SpillNet keeps a record of spills, leaks or releases to the environment, while the HRMS Health and Safety module is used to record accidents, injuries or exposures involving DND/CF personnel.

It was not possible to verify the accuracy or completeness of data in these two systems; however, inconsistent reporting practices at the local level were noted. These include inconsistent SpillNet reporting thresholds at bases and units, the non-reporting of near-misses or the recording of an incident affecting multiple personnel as one incident report. In 82 percent of SpillNet reports, the cost of product lost or the cost of clean-up were not identified. Inconsistent reporting practices impact the comparability of information across the Department.

Information on health and safety incidents specifically related to HAZMAT is not readily available in HRMS. While the system allows for the coding of incidents to identify HAZMAT as a contributing factor, this coding was not consistently applied. Without this information, it is difficult to assess incident reports in order to perform further analysis.

DGENS, as the custodian for SpillNet, and D Safe G, the custodian for HRMS, do not currently perform any analysis or trending of HAZMAT incident reports. These two systems have the potential to provide management with pertinent information that can be used to identify areas of increased risk to assist in the development of measures for the prevention or reduction of incidents.

Conclusion

HAZMAT holdings, incident and accident data is not accurate or complete. Users are not in a position to make full use of the features and functionality of HMRA, resulting in control weaknesses and incomplete information to support HAZMAT management. Information systems are not configured to allow analysis or trending of HAZMAT data in support of risk management.

Recommendations

4. ADM(Mat) should improve HAZMAT management processes by identifying data collection and reporting requirements for information systems, and ensuring that users have the requisite training to make full use of system functionalities.

OPI: ADM(Mat)

OCI: VCDS and ADM(IE)

5. VCDS should improve controls over HAZMAT usage in the workplace by identifying incident reporting requirements to better capture HAZMAT incidents to allow for trend analysis and identification of risk areas.

OPI: VCDS



General Conclusion

The DND/CF HAZMAT management program has evolved progressively to control the risks of HAZMAT products to health and safety, the environment, and equipment. However, there remain opportunities for improvement, and the recommendations of prior audits have not been fully addressed.

Most notably, the shared functional authority governance structure for the program has been ineffective. The identification of a clear lead and improvements in program coordination are needed to develop objectives and strategies, establish a policy framework, and provide practical advice to users.

The increasingly decentralized nature of HAZMAT activities has led to gaps in internal controls over life-cycle management. Clear and consistent criteria for product selection and procurement need to be communicated to operational personnel to control the introduction of HAZMAT products to the supply system. A formal framework for assessing and managing risks in the workplace should be implemented to improve controls over storage, handling and use of HAZMAT.

HAZMAT management is supported by information systems that have not been fully implemented to communicate information between functional authorities and operational users. User training and system improvements are needed to ensure visibility of HAZMAT products in use throughout the Department, and to provide for analysis of incidents.



Annex A—Management Action Plan

Governance

CRS Recommendation (High Significance)

1. ADM(Mat), with the support of VCDS and ADM(IE), should assume the lead role in developing the governance framework for the life-cycle management of HAZMAT by developing the following:
 - departmental policy for HAZMAT to clearly define the roles and responsibilities of functional authorities and operational levels;
 - standard training programs for functional specialists and HAZMAT users on life-cycle activities and information systems; and
 - a multidisciplinary inspection program to include assessments of prohibited products held, holdings records, protective measures, training and storage requirements, along with reporting processes and analysis.

Management Action

ADM(Mat) has prepared a comprehensive action plan, the Hazardous Materials Management Program Review. As part of this plan, the following actions will be taken to address the audit recommendation.

ADM(Mat) will establish and lead a HAZMAT Management Program Review Tiger Team in consultation and collaboration with VCDS and ADM(IE). The Tiger Team will conduct a review that will address the Recommendations and Management Action Plan of the CRS Audit of Hazardous Materials Management, October 2012. More specifically, the Action Plan will provide DND/CF senior management with an understanding of the risks, an assessment of the gaps and the business context to which HAZMAT must be aligned during a time of reorganization and restructuring within the Department. This review will also serve to ensure legislative compliance, protection of the environment, our equipment and the health and safety of DND/CF members and employees is maintained.

While the action plan focuses on longer term issues, the Tiger Team will also actively ensure that any initiative currently under way, with a HAZMAT connection or dependency, will be dealt with from a business improvement point of view.

HAZMAT Management Framework

The Management Framework is essentially the business architecture defining the elements of the program. As an initial step, the HAZMAT Management Program Review Tiger Team will develop the Management Framework to guide the assessment of priorities and options for implementation and assist in the development of a long-term strategy of where and how the HAZMAT program is situated within the DND/CF.



HAZMAT Management Framework Timeline

- April 2013 – Initial analysis of HAZMAT business process outcomes, within the overall Management Framework, are identified and incorporated into broader program review elements:
 - program and policy,
 - planning and reporting,
 - decision support and knowledge,
 - corporate oversight,
 - program and service delivery, and
 - corporate management (including resources requirements).
- July 2013 – L1 consultation on business process outcomes.
- December 2013 – DG-level Review Committee for endorsement of Management Framework.
- April 2014 – L1 endorsement of Management Framework – initiate work on program elements.

Governance Framework

The Governance Framework will address functional authorities, operational responsibilities and corporate accountabilities among the various L1 stakeholders to ensure that their roles are also captured effectively and efficiently at both the corporate and installation levels and a clear definition of a central authority with the duties of DND Manager, Commanding Officers and Personnel engaged in HAZMAT management will be communicated and understood.

Governance Framework Timeline

- December 2014 – Initial Analysis and Governance Framework developed for consultation.
- March 2015 – Endorsement by DG-level Review Committee to commence consultation.
- June 2015 – L1 stakeholder consultations completed with endorsement of Governance Framework.
- September 2015 – Governance Framework finalized and submitted for approval to the DG-level Review Committee.
- April 2016 – Governance Framework endorsed among L1 stakeholders with additional briefings as required to ensure the success of program review.

Policy and Direction

The HAZMAT program and policy must remain current with legislative requirements and balance the interests of stakeholders in ways that protect the health of persons and the environment. Federal legislation includes, but is not limited to the *Canadian Environmental Protection Act, 1999*, the *Hazardous Products Act*, the *Transportation of Dangerous Goods Act*, and Canada Labour Code, Part II, Occupational Health and Safety.

Policy and Direction Timeline

- December 2014 – Draft policy and direction on HAZMAT Management developed—specifically, communications procedures are addressed that effectively prohibit or restrict the use of HAZMAT to operational supply organizations, specifically relating to local HAZMAT procurement.
- March 2015 – Endorsement by DG-level Review Committee to commence consultation.
- June 2015 – L1 stakeholder consultations completed with endorsement of Policy and Direction instrument.
- September 2015 – HAZMAT Policy/DAOD finalized and submitted for review and approval to the DG-level Review Committee.
- April 2016 – HAZMAT Policy/DAOD implemented among L1 stakeholders.
- April 2016 and beyond – Development of additional guidance, operational direction, and standard operating procedures to provide flexibility and clarity to L1 stakeholders.

Compliance and Conformance

Establishing a multidisciplinary HAZMAT inspection program and a standard training program will ensure compliance and conformance that the program is monitored and reported on and incidents of non-compliance are identified for action, correction or investigation. As well, functional specialists and HAZMAT users as well as managers and commanders are trained on these HAZMAT lifecycle management requirements as required to fulfill the job responsibilities.

Compliance and Conformance Timeline

- December 2015 – Initiate assessment of priorities, risks and scope.
- April 2016 – Endorsement by established governance of the priorities and scope.
- June 2016 – Begin development of training programs:
 - L1s to be consulted to ensure most appropriate method of delivery,
 - Needs analysis to be completed to ensure proper level of training development, to be completed with a Training and Development Officer, and
 - Examine integration into DND/CF program codes.
- June 2016 – Begin development of compliance/inspection programs:
 - L1s to be consulted to ensure compliance and inspection program will address immediate concerns of commanders and personnel, and
 - Minimum resources to be identified to ensure inspection effectiveness.
- December 2016 – L1 stakeholder consultations on requirements completed.
- March 2017 – Provide program and resource requirements to L1s.
- April 2017 and beyond – Implement training and inspection programs.

OPI: ADM(Mat)

OCI: VCDS and ADM(IE)

Target Date: April 2017

CRS Recommendation (High Significance)

2. VCDS should improve controls over HAZMAT usage in the workplace by establishing a process to conduct preventative “hazard investigations” that identify and mitigate risks associated with HAZMAT usage in the workplace.

Management Action

The current publication entitled the “Hazardous Materials Safety and Management Manual” (A-GG-040-004/AG001) requires revisions in order to reflect VCDS requirements and intended guidance to the functional specialists and users. VCDS will ensure that this guidance documentation is reviewed appropriately and adopted by the operational organizations and monitored by the applicable functional authorities.

A memorandum will also be provided to the Chain of Command in order to communicate the requirements and ensure that there is compliance with hazard investigations related to Hazardous Materials.

OPI: VCDS

Target Date: December 2014

Internal Controls**CRS Recommendation (High Significance)**

3. ADM(Mat) should improve HAZMAT management processes as follows:
- ensure that prohibitions and restrictions are communicated to operational supply organizations for local HAZMAT procurement; and
 - develop guidance and tools for assessing and selecting alternative and less hazardous products at local levels.

Management Action

ADM(Mat) has prepared a comprehensive action plan, the Hazardous Materials Management Program Review. As part of this plan, the following actions will be taken to address the audit recommendation. See also the Management Action at CRS Recommendation #1.

Draft policy and direction on HAZMAT Management will be developed—specifically, communications procedures will be addressed that effectively prohibit or restrict the use of HAZMAT to operational supply organizations, specifically relating to local HAZMAT procurement.

OPI: ADM(Mat)

OCI: VCDS and ADM(IE)

Target Date: December 2014



Information Systems

CRS Recommendation (Moderate Significance)

4. ADM(Mat) should improve HAZMAT management processes by identifying data collection and reporting requirements for information systems, and ensuring that users have the requisite training to make full use of system functionalities.

Management Action

ADM(Mat) has prepared a comprehensive action plan, the Hazardous Materials Management Program Review. As part of this plan, the following actions will be taken to address the audit recommendation.

While HMRA is the Department tool for HAZMAT inventory and cataloguing, specifically as it relates to Material Data Safety Sheets and the Product Selection Tool, additional work will be required to ensure that HAZMAT is appropriately mapped into Supply Chain Integration and is part of the Materiel Acquisition and Support (MA&S) Integrated Defence Environment Strategy.

HAZMAT Information Management Systems Timeline

- December 2014 – Review where and how HAZMAT can be integrated into the MA&S Transformation Campaign Plan, specifically within Systems Engineering and Supply Chain Integration in DRMIS.
- March 2015 – Review complete of the HMRA, DRMIS or other solution for HAZMAT information management.
- April 2015 and beyond – Integration of HAZMAT data into the DND/CF solution.

OPI: ADM(Mat)

OCI: VCDS and ADM(IE)

Target Date: April 2015

CRS Recommendation (Moderate Significance)

5. VCDS should improve controls over HAZMAT usage in the workplace by identifying incident reporting requirements to better capture HAZMAT incidents to allow for trend analysis and identification of risk areas.

Management Action

HRMS migration from version 7.5 to version 8.9 will allow for the identification and coding of HAZMAT incidents to provide for proper analysis of data. The migration of the Health and Safety Module is currently planned for summer 2013.

OPI: VCDS

Target Date: September 2013



Annex B—Audit Criteria

Objective

To assess the governance and controls relating to the life-cycle management of hazardous materials.

Criteria

1. Appropriate policies, guidance and management structure for the life-cycle management of HAZMAT at DND/CF exist and comply with external regulations.
2. Adequate controls are in place to govern the life-cycle management of HAZMAT in order to protect human health, the environment and equipment and meet legal requirements.
3. HAZMAT information is recorded and shared in reliable information systems and is monitored periodically to ensure accuracy and completeness.

Sources of Criteria

- DAOD 4003-1: Hazardous Materials Management
- Audit Criteria related to the Management Accountability Framework: A Tool for Internal Auditors
- Institute of Internal Auditors – Global Technology Audit Guide 1: Information Technology Risks and Controls

