



HAZARDOUS SUBSTANCES

Management in the New Zealand Defence Force

A review of controls

Evaluation Division
May 2016

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EXECUTIVE SUMMARY

This audit reviewed the New Zealand Defence Force's system for the management of hazardous substances, with specific reference to the controls on Class 1 and Class 2-9 hazardous substances. The Ministry of Defence's Evaluation Division has completed the audit in fulfilment of the Secretary of Defence's obligation to conduct this work under section 3(6) of the Hazardous Substances and New Organisms (HSNO) Act 1996.¹ The report presents the outcomes of the systems-level review of the controls, and has been completed in conjunction with a programme of external technical audits. During the period of review the Defence Force was committed under the HSNO Act to maintain a Code of Practice that provided a level of equivalence to the civil code.² This provided an important focus for the audit.

Evaluation has audited the Defence Force's controls since 1999 on generally a triennial basis. During that time the Defence Force has been the first organisation in New Zealand to implement the Global Harmonization System for classifying hazardous substances and has developed an organisation-wide management system. With the passing into force of the Health and Safety at Work Act 2015 in April 2016 and the forthcoming release of the Hazardous Substances Regulations 2016, however, the Defence system is required to change.

At the technical level, the Ministry of Business, Innovation and Employment indicated prior to the introduction of the new Act that safety systems that were sound under the old legislation would be generally fit for purpose under the new legislation. There is a requirement under the new legislation, however, for the Defence Force to institute system-level change to ensure it meets greater due diligence requirements under the Act. The Defence Force is updating its health and safety system to meet requirements and the Defence Logistics Command has also recommended some changes to the hazardous substances management system as part of that change. The findings and recommendations in this report may assist this ongoing effort.

No critical failures were identified in the Defence Force's hazardous substances management system. The review findings were, therefore, consistent with previous audits conducted since 2005, which indicated that the Defence Force has developed a generally effective system. Both systemic and specific issues, however, were found. The Defence Force will need to address these to achieve equivalence under the new Act and to improve management of the health and safety risks associated with hazardous substances handling, use, and storage.

We reviewed the Defence Force's Code of Practice (hereafter "the Code") and found this Code, as laid out in Defence Force Order 53, set an effective control regime for hazardous substances. The mix of policy and operating procedure in the one document, however, make it unwieldy and complex. We have recommended the Code be revised into an easy to access set of documents that is clearly split into policy and procedure. The Defence Force has already been updating the Code proactively to address Health and Safety at Work Act requirements. The uptake of this recommendation and the ongoing requirement to remain in step with civil standards, however, will

¹ The obligation of the Secretary of Defence under the Act is "to audit the controls on hazardous substances under the control of the Minister of Defence in accordance with section 24(2)(e) of the Defence Act 1990, and report the results to the Minister and the Minister of Defence", HSNO Act 1996, Part 1 section 3(6).

² HSNO Act 1996, Part 1, section 5.

require that the Defence Force continues to ensure that the Code remains up-to-date and any changes are provided in a timely manner.

The Defence Code does not address to an adequate level of detail the requirements on contractors or sufficient controls for measuring their level of compliance. With contractors managing some significant hazardous substance storage facilities on behalf of the Defence Force, this represents a potentially significant risk to the Defence Force should Defence personnel not have adequate visibility over contractor operations. The immediate imperative is for the Defence Force to clarify that it is the civil Code that contractors must apply. Both contracts and the Defence Code need to detail specific and effective processes to enable Defence Force personnel to manage work across Codes and hold contractors to account.

Across the organisation we found a lack of clarity of responsibility and resourcing of key roles within the hazardous substances management system. These issues have already led to difficulties in Defence personnel managing certification and compliance issues. If left unchecked, these issues could lead further to loss of operational capability or harm to personnel. We believe the forthcoming release of new Defence Force Orders For Safety (Defence Force order 10) will help address this issue at a systems level.³ This order will define a health and safety system consistent with legislation and establish a framework in which 'directors' of the PCBU are accountable, amongst their other safety responsibilities, for hazardous substances management outcomes. Personnel below the directors should understand their responsibilities and be empowered and resourced to carry these out effectively.

The Defence Force may also wish to consider further, specific changes to hazardous substances management outside of the new Defence Force Orders for Safety. The policy function held by Defence Logistics Command staff could be supplemented by a regulatory function, and a set protocol could be set up around site compliance issues to ensure they are resolved and resourced in a timely manner as required under the new Act. There are roles in the current system that have been identified as single points of failure as they have no redundancy, and these roles should be supplemented. Further, technical experts in the system need to be empowered supported and, wherever possible, retained.

The Defence Code has system-level controls that are 'designed-in', such as risk management, controls on hazardous lifecycles, audit and assessment and emergency response. We found that the quality of these system-level controls is in some cases poor and in other cases the systems are not followed. Should these controls be updated as recommended, a challenge for the Defence Force will be to embed them throughout the organisation and ensure that personnel are both trained and adhere to instructions. A positive outcome from updating these controls, including tracking hazardous substances and modernizing risk management processes, should be a system in which the current status of hazardous substances is clear and the associated risks are well understood. The Defence Force has shown progress in moving to address system-level controls more broadly through a new Safety Management System as outlined in the draft Defence Force Orders for Safety. Implementation of this system in coordination with updates to Defence Force Order 81 on risk management and the hazardous substances management system may address these issues.

³ New Zealand Defence Force, Defence Force Order 10 *Defence Force Orders for Safety*, draft as at 28 April 2016.

While systematic tracking of lifecycles and effective risk management would provide a step change to the hazardous substances management system, audit and assessment also needs to be reviewed. As the Secretary of Defence's obligation under the HSNO Act is not to be renewed this change will be a necessity. It is also an opportunity for the Defence Force to rethink their compliance arrangements and have internal audit provide a much greater role in the system. This internal audit will allow the Defence Force to provide greater assurance to Government that its system is fit for purpose.

Finally, even the most effective systems are not immune from the risk of incident, and there needs to be an effective approach to emergency response. In a field such as hazardous substances management, where incidents can be very unlikely but have severe consequences, emergency response needs to be coordinated across the system, well-planned, and the subject of regular, effective training. This is currently an area of weakness across the Defence Force and we have recommended a pan-Defence approach be adopted. Requirements for Emergency Response Plan and annual training need to be enforced.

RECOMMENDATIONS

Three recommendations are made in relation to systemic issues identified with the overall hazardous substances management framework. These high-level recommendations are presented along with a 'goal' that outlines the desired end-state for the system, and proposed actions that could be taken to achieve those recommendations. The proposed actions are included not to provide a prescriptive path but to indicate areas where the Defence Force will need to focus effort. The Defence Force may wish to investigate other approaches to achieve the top line objectives, but it will be important for the approaches to be consistent with the overall health and safety system.

In relation to chapters on Class 1 and Class 2-9 hazardous substances, some specific and non-systemic recommendations are also made.

Recommendation 1:

Keep the Defence Force Code of Practice up-to-date to ensure equivalence is maintained with the civil Code and that personnel find it an effective operational tool.

Goal: The Defence Force Code of Practice is an easy to access, up-to-date tool that provides Defence personnel clear guidance on policy and operating requirements.

Proposed Actions:

- Facilitate as a business priority the current proposed update to Defence Force Order 53 to bring the current document into line with new legislation and Defence Force Order 10.
- Reconfigure the Code into a concise policy-focussed Defence Force Order with links to separate Class 1 and Class 2-9 publications covering the technical operating requirements.
- Clarify in Defence Force Order 53 whether contractors are to apply the civil or Defence Code of Practice and specify this consistently across other Defence publications.
- Specify detailed management processes for working with contractors across the civil and military codes, including oversight provisions and emergency response coordination requirements.
- Provide guidance and training to Defence Force personnel on working alongside contractors and encourage contractors to support this training.

Recommendation 2:

Redefine the roles and associated responsibilities within the hazardous substances management system to ensure accountability is clear and that these roles are resourced to deliver the required outcomes.

Goal: The hazardous substances management system is led by 'directors' of the Defence PCBU who are accountable and conduct effective due diligence. Personnel understand their responsibilities and are empowered and resourced to carry these out effectively.

Proposed Actions:

- Define leadership roles to ensure the Defence Force is in alignment with due diligence requirements and strengthened liability provisions in the Health and Safety at Work Act 2015.
- Investigate the creation of a regulatory function for hazardous substances management to separate out application of policy from its formulation. This investigation could include review of recent experiences in setting up 'worthiness' bodies across the Services.
- Ensure Service Chiefs review the priority they place on hazardous substances compliance, and to be clear of their due diligence requirements under new legislation.
- Determine a set protocol with Defence Property Group for resourcing site compliance that would satisfy the requirements of the new Act.
- Address each of the single points of failure identified in the hazardous substances management system and either provide additional personnel for redundancy or identify a strategy for ensuring business continuity should a subject matter expert be lost.
- Review job sizing in core hazardous substances management roles and support current personnel with additional resource as required.
- Investigate retention and succession plans for specialist hazardous substance management roles.

Recommendation 3

Strengthen system-level controls within the Defence Force's hazardous substances management system to a level no lower than under the civil Code.

Goal: System-level controls are well embedded so that the current status of hazardous substances in the system and associated levels of risk are well understood. Mechanisms are in place to ensure compliance or respond to incidents effectively as required.

Proposed Actions:

- Update the risk framework outline in Defence Force Order 81 to address deficiencies and provide specific guidance in this Order on prioritising health and safety risk.
- Complete further compliance work and training across units to ensure risk management tools are used effectively.
- Establish a process for identifying and assessing new hazardous substances that is in line with the civil Code and applicable to capability projects.
- Implement a tracking system that covers at least equivalency with the tracking of Class 2-9 major hazardous substances as defined under the civil Code.
- Complete additional compliance checks following the self-assessment process for units identified as poor at providing assessment returns or reaching compliance.
- Develop internal audit to meet new health and safety requirements and bolster the overall internal audit and assessment programme.
- Ensure that external audit is maintained at both the technical and systems levels.
- Adopt a consistent approach across the organisation for emergency response and that requirements for Emergency Response Plans and records of training be enforced.

Recommendations 4-9: Class 1 hazardous substances management

4. Ensure that the New Zealand Defence Force Explosives Safety Committee fulfils its requirement for meeting on at least an annual basis.
5. Institute further controls and compliance checks on holdings of Class 1 hazardous substances at unit level to mitigate the risk of them not being tracked centrally.
6. Ensure intranet and hard copy records of Approved Explosives handlers are kept up to date.
7. Review the level of risk posed by poor roading at storage facilities, in particular at Waiouru, and carry out any remediation that may be required.
8. Address the Change Action Requests provided by the Australian Defence Force as is appropriate within the New Zealand Defence Force context and document any actions taken.
9. It would be advisable for the Defence Force leadership to commit some resource to complete a security audit in due course.

Recommendations 10-14: Class 2-9 hazardous substances management

10. Check that Class 2-9 location test certificates all have correct information and whether the addition of tracking numbers, date of issue, and expiry date would enhance the level of control.
11. Ensure all Facility Managers hold and maintain verification dossiers as required in Defence Force Order 53.
12. Communicate requirements for Hazardous Substances Management Cards and original manufacturer Safety Data Sheets to be held on site to all personnel along with a standardised approach for managing this information.
13. Ensure that disposal is being carried out in compliance with the requirements in Defence Force Order 53.
14. Improve tracking of approved handlers and access to update lists of these handlers online and with Prime Delegates.

1. INTRODUCTION

This audit fulfils requirements in the HSNO Act 1996 under which the Secretary of Defence shall audit the controls on hazardous substances under the control of the Minister of Defence. This obligation of the Secretary of Defence has been performed by the Ministry of Defence's Evaluation Division over the period of March 2015 through March 2016, during which it assessed the extent to which the system met the requirements of the HSNO Act and its associated regulations.

Evaluation audits cover the overarching controls put in place through Defence Force Orders and associated publications on management of hazardous substances under the control of the Minister of Defence. The controls within scope are, as defined in the HSNO Act, "any obligations or restrictions imposed on any hazardous substance or new organism, or on any person in relation to any hazardous substance or new organism".

The audit assessed hazardous substance management within an environment of legislative and regulatory change. On 28 August 2015 the New Zealand Parliament passed the Health and Safety at Work Act 2015. This Act passed into force on 4 April 2016, and its adoption represented a change in health and safety practice in New Zealand. While the Ministry of Business, Innovation and Employment publicly acknowledged that organisations that were generally compliant under previous health and safety legislation would in large measure be compliant with the new legislation from day one, there have been some important changes in the legislative framework that public sector agencies need to address. Given the overlapping timing of the changes and this report, the findings and recommendations should be considered by the Defence Force against the broader requirements for change brought about by the Health and Safety at Work Act.

The scope of the audit has been split across hazardous substances contained in weapon systems (defined as Class 1 hazardous substances, or any ammunition, explosive, or propellant, and includes any platform designed to carry any such combination), and those not contained in weapons systems (Class 2-9 hazardous substances, including gases, flammable liquids, flammable solids, oxidising substances and organic peroxides, and toxic, radioactive, corrosive and miscellaneous dangerous substances).

The method has included document analysis, desktop search, and observation of operational practice. Evaluation arranged and joined a series of technical audits and base visits to collect evidence. Class 2-9 hazardous substance management was audited by Responsible Care NZ at RNZAF Base Ohakea in June 2015 and Devonport Naval Base in October 2015. Evaluation staff then conducted a site visit to Linton Army Base in January 2016. To review Class 1 explosives the Australian Defence Force's Directorate of Explosives Ordnance Safety conducted a technical audit of storage sites managed by the Defence Munitions Management Group at Kauri Point, Glentunnel and Waiouru in January 2016.

2. THE HAZARDOUS SUBSTANCES MANAGEMENT FRAMEWORK

The HSNO Act 1996 underpins the management, handling, transportation and storage of hazardous substances in New Zealand. It prescribes an integrated and performance-based regime for managing hazardous substances that is consistent with New Zealand health and safety legislation. It also provides a further level of control as is required for a technical area such as hazardous substances. The HSNO Act binds the Crown, but Section 3 of the Act makes an exemption for hazardous substances controlled by the Minister of Defence.

While the exemption in the Act excludes the Defence Force from the civilian management regime, the Defence Force is still required under the Act to manage hazardous substances to no less a standard than is required of those bound by it. The Chief of Defence Force, for this purpose, is to develop a Code of Practice (hereafter “Code”) for hazardous substances controlled by the Minister of Defence. The Defence Force Code should meet or conform to the requirements prescribed by the civil Code that is specified in regulations made under health and safety legislation.

The requirement for the Defence Force to maintain equivalence carries through into the new hazardous substances control regime as specified under the Health and Safety at Work Act 2015. The civil Code is being updated through the adoption of new hazardous substance regulations, which are projected to come into effect in late 2016. The Defence Force is reviewing currently the draft regulations and is at an advanced stage of updating the Defence Code to provide equivalence with the new civil Code.

As the updated Codes are finalised, the Defence Force’s leadership will be required to define and establish the relationship and boundaries between hazardous substances management (as outlined in Defence Force Order 53) and the broader Defence Health and Safety system. The forthcoming release of the new Defence Force Orders for Safety (Defence Force Order 10) provides an opportunity to do so. The focus for the Defence Force must be to ensure these overall management systems are consistent at a systems-level to both ensure legislative compliance and effective management of safety within the Defence Force.

2.1. CODE OF PRACTICE

The Defence Force’s Code of Practice for the management of hazardous substances is Defence Force Order 53. The Order prescribes a system of both policy-based and procedural controls on the management of hazardous substances in the Defence Force. Across the hazardous substances management framework, organisational accountability structures and system level controls are in place and these are all specified in the Defence Force Order. These controls are reviewed here.

As the repository of these controls, it is important that Defence Force Order 53 is current and effective. Works on Codes of Practice in recent years have highlighted that successful codes should be clear and transparent, applicable across whole organisations, and contain internal

process under which the Code can be kept current. The Defence Force Order was reviewed in line with these principles.

2.1.1. Clarity of the Code

Defence Force Order 53 contains policy for the management of hazardous substances, as well as associated operating requirements. Structurally, policy has been largely outlined in the first chapter of the Order while operating requirements for Class 1 and Class 2-9 hazardous substances are in Chapters 2 and 3 respectively. The requirements draw on Codes of Practice issued by WorkSafe New Zealand (formerly the Environmental Protection Authority) as well as technical publications from overseas defence establishments, including the North Atlantic Treaty Organisation, the British Armed Forces, and Australian Defence Force.

The combination of policy and operating requirements in a single document has resulted in the document being unwieldy and complex. This is significant because the two forms of instruction could be confused, constituting a risk for operational staff that require direct language to indicate which provisions are mandatory and which are optional. A Code composed of a concise policy-focussed Defence Force Order with links to separate Class 1 and Class 2-9 publications covering the technical operating requirements is in development and we recommend the Defence Force's leadership support the expediting of this work.

2.1.2. Currency of the Code

There are internal Defence Force processes for keeping the Code current. Timely updating and promulgation of the Code is important to ensure Defence maintains equivalency and personnel are using current standards and practices that are safe and recognised nationally. Defence could be seen as not fulfilling its obligations under the Act should updates to the Code not be completed in a timely manner.

Responsibility for changes to the Code is vested in the New Zealand Defence Force Explosives Safety Committee for Class 1 hazardous substances, and the New Zealand Defence Force Hazardous Substances Safety Committee for Class 2-9 hazardous substances. An officer in Defence Logistics Command, Staff Officer Logistics Policy and Doctrine (Hazardous Substances), monitors the civil Code and consults with these Committees on any changes. Should an amendment to the Defence Code be required, the changes are agreed by the relevant Committee, then provided to the Commander Logistics for approval on behalf of the Chief of Defence Force. In the case of an amendment that requires more extensive changes to responsibilities or Defence Force procedure, additional scrutiny may be applied by the Defence Force's Legal Division and the Chief of Defence Force.

The update process works well for minor amendments to the Order, but more extensive updates can take some time. The current update to the Code being proposed by Defence Logistics Command has been termed a 'rewrite' by reviewers, and this change requires further scrutiny. While it is of concern that such large updates take some time, we heard that there is a process whereby Commander Logistics can release a Minute to affect any immediate changes pending release of the formal updated publication. With the Health and Safety and Work Act now in effect we recommend that the Defence Force prioritise completion of the current proposed update to Defence Force Order 53 to bring the current document into line with the new legislation.

It is important that Service and Unit-level Orders and Standard Operating Procedures also contain up-to-date reference to Defence Force Order 53 to ensure compliance. These publications were

found to be generally compliant and to reference the relevant Defence Force Order. The Navy's NZBR 23, however, incorrectly references DFO 52 Defence Force Orders for Materiel Management, rather than Defence Force Order 53.⁴

2.1.3. Coverage of the Code

An effective Code for hazardous substances management would be one that is comprehensive in applying to all those working within an organisation as well as across contractors performing jobs on that organisation's behalf. The civil Code can generally be utilised in this manner. Ability to apply a single code across an organisation or sector is important as it leaves no confusion as to who must comply with the Code, or their responsibilities and accountability under the code. There can be associated risks in not maintaining a single, comprehensive Code in that there can be confusion around responsibilities for those operating between multiple sets of rules, oversight can be limited and accountability difficult to discern in case of incident. With the coming into force of the Health and Safety at Work Act matters of liability will be even more important to consider.

The Defence Code is inclusive within the Defence organisation, binding all military and civilian staff, but is not comprehensive as its applicability across contractors has not been clearly stated by the Defence Force. A comprehensive Code would be hard to achieve in the military context given the difficulties of binding civilian contractors to a Defence Force Order enforced against the Armed Forces Discipline Act. As a result of this enforcement issue, Evaluation was informed through audit that the Defence Force is most likely to define by Defence Force Order that contractors fall under the civil Code. This position needs to be clarified expeditiously and consistently across all Defence Force Orders and publications, across the health and safety domain.

The lack of clarity is impacting management of contractors at Defence Force facilities, as illustrated in technical audits. At Devonport Naval Base, for example, there was less oversight over contractor organisations than on Defence-controlled units. This was despite attempts by Defence Force personnel to establish ad hoc oversight mechanisms with the managers of contractor organisations. Compliance was poorer in non Defence-controlled units. Defence Force units hosting contractors at Ohakea took initiative in agreeing with contractors work boundaries and oversight arrangements, but without any central guidance.

When the Defence Force does clarify the Code to be used by contractors, this clarification will need to specify detailed management processes for working with contractors across Codes. In particular, oversight provisions and emergency response coordination requirements will need to be specified for use in contracts. Mechanisms could include options such as formal induction programmes, scheduled management meetings and observance of contractor compliance checks by Defence Force personnel. This is important for risk mitigation where contractors now deliver core functions in areas containing potentially significant health and safety risk. The contracting out of fuel supply and management to multiple private contractors, for example, results in contractors exercising a level of control over the Defence Force's major fuel facilities. There are risks that emergency response is not coordinated across Defence responders and contractors, potentially worsening the consequences of an incident. There are also risks that oversight is insufficient for uncovering practices that could contribute to an incident in the first place.

⁴ This was an action item that had been highlighted during the 2010 Evaluation report, but that has not yet been addressed; see Evaluation Division, "Controls on Hazardous Substances not contained in Weapons Systems", August 2010, p.v.

As well as specifying requirements, it would be advisable for the Defence Force leadership to provide targeted guidance and training to Defence Force personnel for hazardous substances management. We observed personnel at ground level, including many of junior age and rank, who had relatively little business knowledge or experience relevant to work they were to conduct directly with contractors. Tailored training that covers requirements across the civil and military Codes while also providing requisite contract management skills would be beneficial. Defence Force leaders could also work with contractors to ensure their induction programmes for staff are of a higher standard. One major contractor at Devonport ran an induction that included some material on hazardous substances management, but the material in this induction needed improving. Other contractors had no induction and would benefit from creation of induction material that addresses hazardous substance management specifically in the defence context.

2.2. ROLES AND RESPONSIBILITY

It is important that roles and associated responsibilities in complex management systems are clearly defined to ensure core functions of that system are delivered effectively and efficiently. Accountability needs to be clear. Without clear definition of roles and responsibility there are risks that functions are not delivered appropriately. This can ultimately result in system failure. We assessed the roles and responsibilities defined in Defence Force Order 53 and whether they supported the desired outcomes of the hazardous substance management system. We looked across leadership, regulatory, policy and operational compliance functions.

During the time of review roles and responsibilities were being reviewed by the Defence Force through the drafting of the new Defence Force Orders for Safety (DFO10) and rewrite of Defence Force Order 53. The accountabilities and responsibilities laid out in the draft Defence Force Orders for Safety should address many of the high level issues noted below from the audit, but the Defence Force leadership will need to ensure the implementation of the changes is effective and outcomes evaluated in due course.

2.2.1. Leadership

The introduction of the Health and Safety at Work Act has had an impact on organisational leadership in New Zealand. The Act introduced the concept of a Person Conducting a Business or Undertaking (hereafter “PCBU”), under which the Defence Force is considered a PCBU. Organisational leaders sit functionally outside of PCBUs but are termed ‘directors’ under the Act as they are leaders who exercise significant influence over management of the PCBU. The current Defence Force leadership, including the Chief and Vice Chief of Defence Force, Service Chiefs, Commander Joint Defence Services, Chief Financial Officer, Chief People Officer and Chief of Staff are considered ‘directors’ under the draft Defence Force Orders for Safety, which provides consistency with the Act. Their accountability of these ‘directors’ has been strengthened. Whereas under the previous Act they could only be held liable where they directly participated in, contributed to, or acquiesced in an organisational failure, under the new Act they can be convicted for a breach of ‘due diligence’ regardless of whether a PCBU has been convicted of an offence.

Some of the key functions of the Defence Force hazardous substance management system are managed by commanders operating under delegations from Defence Force ‘directors’. These ‘directors’ will need to ensure these delegations are made with due reflection on their additional responsibilities for conducting due diligence under the Act and their not being able to contract out of their accountability for hazardous substances management outcomes. The Commander

Logistics, for example, is delegated responsibility for the policy function where, for the purposes of the Act, the Commander Joint Defence Services above is the 'director'. Similarly, while Service Chiefs are ultimately accountable as directors for compliance within their Services, they have largely delegated responsibility for hazardous substances management to Deputy Service Chiefs. Audit highlighted weaknesses in Service Chief and Deputy Service Chief oversight of hazardous substances management system compliance, and Service Chiefs will need to consider carefully the requirement for greater oversight under the new Act.

2.2.2. Policy function

There are clear lines of accountability for the policy function, which is carried out by Commander Logistics and staff under him in Defence Logistics Command. Commander Logistics approves variations to policy and guidelines contained in Defence Force Order 53. As noted previously, the Explosives Safety Committee and the Hazardous Substances Safety Committee, chaired by Defence Logistics Command staff agree the policy changes to be provided to Commander Logistics. A Defence Logistics Command staff officer, Staff Officer Logistics Policy and Doctrine (Hazardous Substances), oversees policy on a daily basis and supports the committees. With these clear lines this function is being carried out satisfactorily.

2.2.3. Lack of a true regulatory function

While the policy function is being performed adequately, the system is weakened by the lack of a true regulatory function, which would have dedicated staff and a level of independence. Staff under Commander Logistics, in particular the Staff Officer Logistics Policy and Doctrine (Hazardous Substances), are involved in policy formation but also oversight of hazardous substance handlers and trainers, and both resolution and mediation of compliance issues. This involvement in a range of other duties potentially detracts from the core function of administering the Defence Code and ensuring equivalence with the civil regime.

Building into the hazardous management system a more clearly defined internal regulatory function is necessary to provide greater assurance that the code outlined in the Defence Force Order is equivalent to the civil regime. Personnel working for an internal regulator could oversee the maintenance of the Defence Code and ensure equivalence is constantly reviewed. We saw evidence that Defence Logistics Command staff have considered such an approach and we recommend that the Defence Force leadership further investigate the creation of such a function. Recent examples, such as the setting up of worthiness frameworks within the Services could provide a guide for the creation of such a function.

2.2.4. Operational compliance

Accountability for ensuring operational compliance of units handling hazardous substances is split across the Defence system. Service Chiefs and Heads of Business Units (including Defence Property Group and Defence Munitions Management Group) are responsible for ensuring the compliance of units in their chain of command. Oversight and advice to the Chief of Defence Force on overall compliance is a responsibility of the Commander Logistics. While the compliance function is split, the oversight provided by Commander Logistics does provide a useful additional check on operational units.

Within Services and Business Units, compliance responsibilities are delegated to Unit Officer Commanding and the 'Person in Charge', who is assigned to control a location. These personnel

are responsible for reporting on unit compliance through annual self-assessments. The Services also each have 'Prime Delegates', who are technical experts on health and safety and hazardous substance management attached to the safety organisations within the Services. These Prime Delegates provide assistance to and oversight of units in conducting compliance activities. They also serve as their Services' representatives on the Explosives Safety Committee and the Hazardous Substances Safety Committee. Prime Delegates report the overall outcomes of unit compliance activities through Deputy Service Chiefs to Defence Logistics Command.

Those holding accountability above Officers in Charge do not appear to be attaching appropriate priority to compliance activities. Not all reporting is getting through command. Army did not submit their annual compliance report for 2014 due to failure of senior officers to sign off on this document. As noted in section 2.2.1 it is recommended that Service Chiefs review their level of oversight over the compliance function to ensure consistency with the Act and to address these issues.

The Service Prime Delegates are providing useful expertise, although not all Services are suitably supporting and empowering them. The position of Prime Delegates, alongside units but not within the same command chain, can render their advice and oversight ineffective if not empowered. An additional challenge for Prime Delegates is that many hold civilian positions separate from the chain of command.

For the Commander Logistics' part, his responsibility for overall compliance is also delegated, to Staff Officer Logistics Policy and Doctrine (Hazardous Substances). This staff officer reviews Prime Delegate annual reports, raises any key issues to the attention of the Commander Logistics, and provides an annual report through Commander Logistics for the Chief of Defence Force. These functions appear to be being carried out satisfactorily, although these duties of the staff officer would need to be considered in any move towards implementing a regulatory function for hazardous substances management.

2.2.5. Issues with site compliance

Issues emerge occasionally with regards the compliance of sites used to store hazardous substances, including lapses in storage facilities' certification, facilities not meeting design standards or a lack of preventative maintenance. With the move to a matrix organisation, responsibilities for site compliance have become difficult to define and separated from the units that use these sites. Units do not own the facilities they use, and it can be difficult for them to both discern the details of certification issues with the sites they use or influence resolution of any identified issues. There are risks that units utilising sites, even if they understand good practice, could be hindered in trying to comply with handling requirements or actively endangered through having to use non-compliant sites. The consequences of this could be unsafe practice and/or harm to individuals for which Defence Force leaders would be directly liable.

Defence Force Order 53 lays out responsibilities for aspects relating to certification of sites used in hazardous substance storage. Trained test certifiers hold responsibility for certifying the sites. Ensuring sites are up to a certifiable standard is, however, the responsibility of units that control that piece of the Defence Estate on behalf of the Crown. Should work be required they must request assistance from Defence Property Group. There is no specific approach for hazardous substance-related requests to Defence Property Group. The Group does, however, have standardised Defence-wide mechanisms for requesting repairs or for developing user requirements where development, changes or improvements to sites may be necessary. While the

understanding of these mechanisms appears to have improved amongst personnel encountering site compliance issues, further work is required to raise awareness of correct processes. References to these processes in Defence Force Order 53 could be improved. In practice we found that issues had been raised through a number of means including through Prime Delegates to an appropriate Committee, through the annual self-assessment process, or through a Service chain of command.

Once site compliance issues have been raised, there have been challenges in solving these issues across the matrix organisation. There is a contradiction between the quality-focussed hazardous substances management system, which requires compliance with the law, and the efficiency-based property management system run by Defence Property Group that is focussed on delivering facilities that are 'fit for purpose' with limited resources. The Defence Property Group has a challenging task of balancing hazardous substance requirements against other estate priorities. Improved processes and relationships between units and Defence Property Group are beginning to produce results as evidenced through new facilities at Kauri Point and Waiouru. Unless the contradiction in system models is more formally addressed, however, managing issues that fall between the systems will remain challenging and time-consuming, as will maintaining a sound current understanding of the level of compliance across the Defence system.

The requirements of the Health and Safety at Work Act will further challenge the current approach. The 'standard of performance' for hazardous substances management has changed to one presuming in favour of the highest level of protection being provided by a PCBU to keep workers from harm. Consideration of cost must take place after risk assessment to ensure that cost will only take precedence over safety when "grossly disproportionate" to the risk. This could necessitate a system change on the part of Defence Property Group away from efficiency of delivery to effective delivery against the new standard. We recommend the Defence Force leadership in their role as 'directors' responsible for due diligence determine a set protocol with Defence Property Group for resourcing site compliance that would satisfy the requirements of the new Act.

2.2.6. Resourcing of roles

In complex systems such as the one outlined in Defence Force Order 53 personnel management for those responsible for core functions is critical to ensure outcomes continue to be delivered to a high standard. Conversely, poor resourcing and support of personnel can lead to failures of these core functions and an inability to manage key health and safety risks. Roles need to be resourced to a level that provides for some redundancy should key individuals leave or be otherwise unavailable. This means avoiding single staff providing functions. Key people in the system also need to be provided suitable authority to discharge their responsibilities, and be supported effectively. The technical skills to perform such roles need to be valued.

We identified during the audit some core functions in the Defence Force system that were conducted by single personnel and that represented single points of failure. Should any of these staff leave there would be a risk to business continuity. These roles included:

- Staff Officer Logistics Policy and Doctrine (Hazardous Substances), Defence Logistics Command: this role is the sole subject matter expert role dedicated to delivery of policy and compliance functions for which Commander Logistics is accountable.

- Service Prime Delegates for Class 2-9 hazardous substances: these three roles are, within their Services, the sole health and safety experts in their Services and would be difficult to replace.
- HSNO trainer, New Zealand Defence College: training for Class 2-9 hazardous substances is also provided by this single role and loss of this trainer would be a setback for what is an intensive programme of training courses around the country.

Since completing audit work Defence Force Human Resources has approved an additional staff officer position to assist Staff Officer Logistics Policy and Doctrine (Hazardous Substances). We recommend, however, that the Defence Force leadership address each of these single points of failure by either providing additional personnel for redundancy or identifying a strategy for ensuring business continuity should one of the noted subject matter experts be lost.

Although job sizing was not quantified, interviews with the key subject matter experts revealed these personnel were carrying workloads well in excess of a full time equivalent of work. Personnel performing such roles are operating at both a high tempo and to a high standard but without the requisite support. The Defence Force will need to review job sizing in these positions and support current personnel with additional resource as required.

Staff filling hazardous substance management roles are highly specialised, and their hazardous substance training extends beyond solely health and safety expertise. They hold technical expertise that is highly valued across both public and private sector organisations, particularly at present with the health and safety changes taking place. The right employment incentives need to be put in place to retain these staff, and succession plans also need to be developed to ensure suitable personnel can take up these roles as current staff retire or leave. It is recommended that the Defence Force investigate further retention and succession plans for these specialised roles.

2.3. SYSTEM-LEVEL CONTROLS

There are some controls in use across effective hazardous substance management systems that operate at the system level and that are 'designed in' to such systems. Controls that are designed in at this level are the most effective in supporting outcomes. Such controls include formal risk management, tracking across the hazardous substance lifecycle, audit and assessment of system compliance, and emergency response planning and training in case of system failure. These approaches are all embedded in the civil hazardous substance management regime to varying degrees, and we assessed whether the Defence Code provided a level of equivalence in these areas. Potential system-level risks without these designed-in approaches can include that the system is inefficient in achieving outcomes, or that the control environment across the system is inconsistent or inadequate.

2.3.1. Risk management

Risk management is at the heart of hazardous substances management systems. Such systems need to be designed to identify, analyse and manage risk, reducing it, as defined in the Act, so far as reasonably practicable. Good practice for risk management in these complex systems includes maintaining a framework with system-wide focus, that allows for comparison and prioritisation of various internal system elements such as personnel, infrastructure and materiel, and that can be integrated appropriately with other risk management frameworks.

The Defence Force's overall management approach, currently outlined in Defence Force Order 81, provides an approach for use across the Defence Force but we found it requires updating and to be consistently applied by units. The Order is generally financially focussed and while it does specify risk ratings for various kinds of risk, it does not provide sufficient background on health and safety risk and means to compare the various categories of risk. This makes it difficult to apply across the matrix organisation. Following the audit period we were informed that Defence Force Order 81 is being updated. We recommend that the Defence Force leadership prioritise this update to Defence Force Order 81 to address the deficiencies and provide specific guidance in this Order on prioritising health and safety risk.

It is a positive step that the draft Defence Force Orders for Safety also provide general direction on Health and Safety risk management across the Defence Force. An accompany Safety Manual is to provide further instruction. From review of the draft Order, it will be important that the manual provides greater specificity of the risk management practices to be adopted. We saw evidence that some practical models already exist that could be referenced in the manual. During the audit period, for example, Defence Logistics Command trialled a new risk management model, the Bow Tie method, for the identification of risk in significant hazard facilities controlled by the Defence Force.

There is clear recognition of the need for effective risk management amongst hazardous substances management specialists, but effective use of risk management tools by other personnel is limited. Specialists have been proactive in carrying out risk work in the absence of a pan-Defence Force approach. Defence Logistics Command has adopted the prevuBow Tie method Within Services, some Prime Delegates and key personnel have been proactively recording hazards and risks relating to their areas. This does not flow down to unit level, however, where hazard and risk registers seen were often incomplete or out of date. It is recommended that further compliance work and training is completed across units to address this and that hazard registers and risk mitigation tools be subject to internal audit.

2.3.2. Control and tracking of the hazardous substances lifecycle

An effective systems view of hazardous substances management considers relevant controls on the lifecycle of a hazardous substance from cradle to grave. In the Defence Force context, implementing relevant controls for managing this lifecycle includes introduction of the hazardous substance, safe storage and handling during its lifetime through use, and disposal.

The civil Code outlines controls to be applied when bringing in a new substance or organism into New Zealand through an application process to the Environmental Protection Authority. This is an area where Defence Force Order 53 falls short of providing equivalency. In practice, where identified prior to import, military specification hazardous substances to be used by the Defence Force are processed by the Defence Technology Agency.⁵ The Defence Force Order, however, lacks specific direction on this process. Discussions with Service Prime Delegates highlighted that Services had been left to retrospectively review several substances after they had been imported through Capability projects. The Defence Force should establish a standardised and documented process for import of new hazardous substances and ensure that this is applicable across

⁵ The Defence Technology Agency played a role in the setting up of the Defence Force's hazardous substance management system. The Agency assisted Defence units in assessing hazardous substances already in use and in creating Hazardous Substance Management Cards for Class 2-9 hazardous substances management.

capability projects run by Capability Branch the Ministry of Defence's Acquisition Division, as well as routine purchases made through Defence Logistics Command and Joint Defence Services.

Tracking of hazardous substances across their lifecycle as provided by the Defence Force is currently inconsistent, and provides limited assurance. The Defence Force tracks Class 1 explosives but does not track Class 2-9 hazardous substances. In this area the Defence Force's Code lacks equivalency with the civil Code, which does stipulate that 'major' hazardous substances should be tracked. The Defence Force should implement a tracking system that covers at least equivalency with the tracking of major hazardous substances under the civil system. Longer term there would be benefit in a system-wide solution that tracks lifecycles of all hazardous substances and can be integrated into inventory and risk management systems. This would enhance risk management and business performance across the organisation.

2.3.3. Audit and assessment

Satisfactory audit and assessment regimes for complex systems such as the Defence hazardous substance management system involve both internal and external audit and assessment. Internal audit on an annual basis ensures compliance, while external audit conducted periodically provides assurance and oversight. A risk should a satisfactory programme not be followed is that compliance may be compromised and management will not be able to identify issues in the handling of hazardous substances that could lead to incidents.

The Defence Force holds responsibility for undertaking the internal programme of audit and assessment but this programme has remained relatively limited. The Unit Officer Commanding of units that use, store, transport or dispose of hazardous substances must complete annual self-assessments of their compliance with the Defence Code, with separate returns for Class 1 and Class 2-9 substances. Internal audit, however, has generally been conducted on only an 'as needs' basis by the Directorate of Risk and Assurance where external audits completed by Evaluation have highlighted the need.

During the audit period self-assessments were completed but no internal audits were carried out. The level of compliance reported by units through these self-assessments was acceptable but review of these documents also revealed that compliance with operating procedure and the self-assessment process is inconsistent across the Services and wider organisation. Such a self-assessment process can provide sufficient control and feedback to management if used in a system with an established and strong safety culture at unit level. Where such a culture is not present, however, there is risk of abuse of controls and compliance issues not being raised to management. We recommend additional compliance checks to in addition to the self-assessment process where units are poor at providing returns or do not exhibit a high level of compliance.

Change to the internal programme is recommended to address its limited development and to address changes under the Health and Safety at Work Act. The audit provisions in the HSNO Act are to be superseded by provisions in the Hazardous Substances Regulations 2016. The Secretary of Defence's obligation to audit the Defence Force's controls on hazardous substances will not remain. The Defence Force will, therefore, be required under the provisions of the Health and Safety at Work Act to develop internal audit so that it plays a much greater role in the programme. This move to put in place regular internal audit would normalise audit arrangements, increase

compliance, and deepen internal knowledge of the management framework across the Defence Force.

The Defence Force has engaged effectively with other organisations to provide external audit at both technical and systems levels. The Defence Force should maintain its current arrangements for external technical audit and draw on options to have external systems-level audit and evaluation completed on a periodic basis. On the technical side, arrangements for audit of Class 1 hazardous substances by the Australian Defence Force, and for Class 2-9 hazardous substances by Responsible Care NZ (formerly the New Zealand Chemical Industry Council), have been effective and appropriate. System-level audit and evaluation can be carried out by a range of external organisations. While the HSNO Act obligation on the Secretary of Defence is to be removed, the Chief of Defence can request that the Evaluation Division consider an audit for its work programme in accordance with section 24(2)(e) of the Defence Act.

2.3.4. Emergency Response

A coordinated approach to emergency response, both through planning training, is an important component of health and safety systems. While Emergency Response represents the ‘ambulance at the bottom of the cliff’, a strong systems approach to such response can reduce materially the consequences of an incident. Conversely, the risk of not planning and training for emergency response well is that there is potentially increased harm to personnel and those outside the Defence system as a result of incidents, and potentially greater damage to property.

Core controls for emergency response in Defence Force Order 53 include requirements for units to maintain an Emergency Response Plan for each location with physical hazardous substances present, and to train to this plan on at least an annual basis. Our expectations were that the Emergency Response Plans would cover all relevant incident scenarios, consider coordination of both Defence and civil emergency services, and include procedures for military and civilian personnel and contractors. Training, we expected, would include hazardous substance-specific drills and full records would be maintained including the outcomes of the training recorded. These drills would provide opportunity for Defence Force units to work collaboratively with on-base emergency services but also seek greater coordination with outside emergency services and councils.

We found Emergency Response Plans and records of training to be generally poor, and no consistent approach to planning across the organisation. Emergency Response Plans were often not present, incomplete, or did not follow good practice. Few units documented evidence of annual training outside of basic fire response training. Most importantly, coordination of emergency services and unit procedures across different facilities differed. At facilities where central emergency response was practiced such as Devonport, unit-level procedure was unclear. At other facilities where Plans were developed by units, such as Ohakea, there was a lack of a central coordination point for emergency response. It is recommended that the Defence Force adopt a consistent approach across the organisation for emergency response and that requirements for Emergency Response Plans and records of training be maintained and audited.

2.4. FINDINGS

The Defence Force Code of Practice for hazardous substances management has developed into a useful code under Defence Force Order 53 but the Code now requires updating to

ensure equivalence is maintained with the civil Code and so it remains an effective operational tool.

- The combination of policy and operating requirements in the one document has resulted in the document being unwieldy and complex.
- There are instances where Defence Force Order 53 is out of date and no longer reflects the Defence Force's policy requirements or current technical standards.
- The update mechanism for the Defence Force Order works well for minor amendments and, while complex changes can take some time, the Defence Force appears to be managing this.
- It is unclear whether the Code should apply to contractors, and the Code does not provide sufficient controls to provide the necessary oversight over contractors' activities.
- There is a lack of standardised oversight mechanisms and coordination plans within Defence for working with contractors, which may be leading to poorer compliance with HSNO requirements in areas controlled by contractors.

Roles and associated responsibilities within the hazardous substances management system need to be better defined and supported to ensure there is suitable accountability and resource for incumbents in these roles to deliver the required outcomes.

- Leadership as defined within the current system may not meet more stringent due diligence requirements in new health and safety legislation.
- The policy function delegated to Commander Logistics and Defence Logistics Command staff is clear, but in this area there is a lack of a true regulatory function supporting policy and management of the Code of Practice.
- Within the Services, those holding accountability above Officers in Charge do not appear to be attaching appropriate priority to compliance activities.
- Responsibilities for site compliance have become difficult to define under the matrix organisation, and there are risks that troubles in addressing site compliance could impact unit compliance or could endanger personnel.
- The Defence Property Group model for addressing site compliance issues is unlikely to be compliant with the new standard for health and safety management as laid out in the new Act.
- Lack of redundancy in key hazardous substances management roles means that these roles are potential single points of failure for the system.
- Hazardous substances management specialists are highly specialised but there are no clear plans for retention or succession in specialist roles.

System-level controls within the Defence Force's hazardous substances management system are weaker than those found in the civil regime, and these controls need collective updating to ensure outcomes are achieved efficiently and to an equivalent standard as the civil regime.

- Defence Force Order 81 outlines a risk framework for use across the Defence Force but this framework requires updating and does not provide adequate direction for managing health and safety risk across the matrix or against other measures of risk.
- There is clear recognition of the need for effective risk management amongst hazardous substances management specialists, but effective use of risk management tools by other personnel is limited.
- The treatment of hazardous substances lifecycles in the defence Code is incomplete as the Defence Force Order lacks direction regarding the import of new hazardous substances by the Defence Force.
- The Defence Force does not track Class 2-9 'major' hazardous substances as defined and tracked under the civil regime, and this is a point of non-equivalence with the civil regime.
- The Defence Force's programme of internal audit and assessment is limited, and internal audit is not playing as great a role in this programme as it should.
- The self assessment process for hazardous substances management, where completed to a high standard, provides a useful compliance reporting tool but supplementary tools for ensuring compliance are required where units are poor at providing returns or exhibiting compliance.
- Suitable arrangements have been established by the Defence Force for external audit.
- Emergency Response planning and training is poor across all Services, and there is no consistent approach across the Defence Force.
- Emergency Response Plans are often not present, incomplete, or do not follow good practice, and few units have documented evidence of specific annual training for hazardous substances management.

3. HAZARDOUS SUBSTANCES CONTAINED IN WEAPONS SYSTEMS

In this section we outline and comment on aspects of the arrangements the New Zealand Defence Force maintains for managing the implementation of controls on hazardous substances contained in weapons systems. These hazardous substances are generally related to ammunition and explosives and, therefore, mainly fall within Class 1 of the Global Harmonization System.

The management of hazardous substances contained in weapons systems, while based on frameworks also common to the management of hazardous substances not contained in weapons systems, is a different proposition for the Defence Force. It has managed and controlled military explosives for many years and explosive ordnance management is an implicit function for military organisations. Military management regimes in this area are typically more comprehensive or operate to higher standards than civilian organisations operating under the civil Code.

3.1. CODE OF PRACTICE

The controls for Class 1 hazardous substances are outlined in Chapter 2 of Defence Force Order 53, but the Order does not provide a stand-alone Code for these substances. International Codes are required to be followed for Class 1 hazardous substances, including the North Atlantic Treaty Organisation's AASTP-1 *NATO Guidelines for the Storage of Military Ammunition and Explosives*, as well as the British Joint Service Publication 482 and Australian eDEOP 101 *Department of Defence Explosives Regulations* codes.⁶

The Class 1 Code of Practice would benefit from the previously suggested separation of policy and operating procedure. Personnel expressed concerns at the mixing of policy-focussed language with the procedural language required by operators. It has been positive to see steps to achieve this through a project to produce a New Zealand Defence Force Explosives Manual. The finalisation of this text will centralise and clarify procedure within a single separate text that sits under the Defence Force Order.

During the time of review the approach for production of the manual has shifted. Initially the focus was on writing a separate New Zealand publication based on international sources. A recent decision has been taken, however, to adopt fully one of the international codes and to raise any New Zealand-specific requirements or cross references in a cover document. The

⁶ New Zealand Defence Force, Defence Force Order 53 (AL23), section 2.28, 23 November 2015; North Atlantic Treaty Organization, AASTP-1 *NATO Guidelines for the Storage of Military Ammunition and Explosives*, December 2015, available at: <http://nso.nato.int/nso/zPublic/ap/AASTP-1BV1.pdf/>; United Kingdom Ministry of Defence, *Explosives Regulations for the safe storage and processing of ordnance, munitions and explosives (JSP482)*, November 2015, available at: <https://www.gov.uk/government/publications/jsp-482-mod-explosives-regulations>.

decision is based on sound rationale, that maintenance of a separate text could be both complex and time consuming.

A decision remains on the base text to be adopted, and suitable resource needs to be devoted to completing this work and maintaining publications in this area. While the Australian code of practice is known to many and could provide a useful reference text, an initial review of the various codes highlighted that the text in the British Joint Service Publication 482 code (which is in turn based of the North Atlantic Treaty Organisation code) provided a clearer explanation of procedure and would be more accessible for personnel.

An additional part of the Code that is held separate of Defence Force Order 53 is the requirements for Disposal of Explosive Ordnance. This is covered in the separate Defence Force Order 50. This Defence Order is specific as it outlines a process for not only the disposal of military ordnance, but also that disposed of on behalf of civil agencies. A current review of this document is being undertaken is important to ensure that the responsibilities outlined in the Order are in line with current organisational structures.

3.2. RESPONSIBILITY AND ACCOUNTABILITY

3.2.1. Explosives Safety Committee

The Defence Force's Explosives Safety Committee holds responsibility under Defence Force Order 53 for formulating Defence policy for the management of handling of explosives and for considering changes to the Defence Force Order. This Committee has been in existence since January 2000 and appears to be performing its functions effectively. The Defence Force does, however, need to ensure that the Terms of Reference requirement for at least an annual meeting of this body is fulfilled. The most recent meeting on 11 February 2016 met this requirement, falling six months after the previous meeting. It was noted, however, that the Committee did not meet this requirement in 2012 or in 2014. This was despite it being recorded in Committee minutes that more frequent meetings would be desirable.

3.3. MANAGEMENT CONTROLS

Management controls were assessed by Evaluation through reviewing the bulk storage of munitions. The Defence Munitions Management Group is responsible for this bulk storage on behalf of the Defence Force. The review included technical audit conducted by the Australian Defence Force's Directorate of Explosive Ordnance Services, and additional desktop search and meetings with E Squadron (Explosive Ordnance Disposal) and other personnel. The review did not include smaller unit stores at Defence Force bases or field storage, and these may be an area that internal audit could cover. The Defence Munitions Management Group is recommended to address the separate technical findings of that report, while some systemic findings are provided in this report.

3.3.1. Risk Management

Overall risk management for Class 1's is developing, although further work is required at user level. The new risk assessment model adopted by Defence Logistics Command was first used in relation to Class 1 hazardous substances storage facilities, including initially Waiouru, and now also Kauri Point and Glentunnel. Audit of Defence Munitions Management Group sites highlighted, however, that record keeping of hazard registers was poor, with

some being fairly dated. Defence Munitions Management Group should ensure that all facilities maintain up to date hazard registers that align with the overall risk management approach being used.

3.3.2. Tracking

Class 1 hazardous substances in possession of the Defence Force are tracked and accounted for using both electronic and paper-based systems. Depot-level personnel log all items into the SAP system, and all stocks on hand are attached to physical ledger cards that record all transactions. There is 100 percent physical stocktake on issue and receipt of items.

The approach used provides good general tracking of explosives in main storage facilities, although we did not look at tracking of hazardous substances that had then been non-valuated and sent to units, for which practice is different. Service self-assessments highlighted that unit stores were generally compliant with limits but it would be useful for the Defence Force to carry out further compliance checks in this area.

3.3.3. Emergency Response

Emergency response plans for Defence Munitions Management Group facilities were reviewed in conjunction with records of Emergency Response practices at the various facilities. The overall Group Emergency Response Manual contains scenarios for the three core facilities in Kauri point, Waiouru and Glentunnel. These scenarios contained clearly tabulated procedures for personnel.

There is a lack of documentation around practice and training of Emergency Response Plans, both for basic fire response and for more complex scenarios. While personnel recalled clearly having conducted at least the fire training portions of this response practice, it appears that practice of broader scenarios is limited. Further, the Defence Force is not extracting the full value of these exercises through not recording and debriefing on the outcomes.

3.3.4. Security

Audit of Class 1 facilities addressed primarily health and safety aspects of this hazardous substances management. Technical audit, however, highlighted some possible issues around security, with Australian auditors noting a disparity in the level of security controls compared with Australian Defence Force facilities. Defence Force Order 53 outlines security requirements for key storage sites, with additional controls being adopted for high risk sites.

While the measures outlined in the Order appeared appropriate and storage facilities inherently safe, the level of compliance with security controls is unclear. It is also unclear whether the limited personnel numbers observed at several of the facilities would reduce the ability to enforce these controls on site. It would be advisable for the Defence Force leadership to complete a security audit.

3.3.5. Disposal

Disposal for Class 1 hazardous substances is conducted both routinely by depot personnel in the case of Defence Force materiel and by E Squadron (Explosive Ordnance Disposal) on behalf of civil authorities and for Improvised Explosive Device Disposal. We found no

major concerns with disposal practice, although we heard that a concerted effort was required to manage backlogs of items for disposal at depots. Where the Australian technical audit presents a finding around the lack of a Memorandum of Understanding between the E Squadron (Explosive Ordnance Disposal) and civil authorities, we were satisfied on subsequently visiting the unit that this documentation was held.

Defence Force Orders covering disposal, however, require updating. Defence Force Order 53 covers the lifecycle of Class 1 hazardous substances, but coverage of disposal in the document is very limited and could be improved. Defence Force Order 50, used by the E Squadron (Explosive Ordnance Disposal), is in the process of being updated and this should be completed.

3.4. TRAINING AND CERTIFICATION OF PERSONNEL

3.4.1. Approved Handlers

All personnel handling Class 1 explosives in bulk depots and for transportation must be certified as Approved Explosive Handlers. Explosives handlers must have a working knowledge in basic explosives, a thorough understanding of safety precautions, and proven competency in relevant aspects of Defence Force Order 53 and other publications. Approved handlers are revalidated by the Defence Force every five years.

Handlers are trained through the Explosive Ordnance Training School at Trentham. Staff from this school also teach classes at Burnham on an as-needs basis, with the use of teaching aids from Glentunnel. Some Ammunition Technical Officers also receive initial and advanced training with the UK military and Australian Defence Force. No major issues were found with the training programme and no issues were raised with the number of qualified staff coming through the system.

3.4.2. Test certifiers

The Defence Force approves and appoints its own test certifiers to certify explosive storage areas and certify explosive handlers. Test certifiers must be revalidated every two years. The Defence Force currently has 47 test certifiers as noted on a register on the hazardous substances page of the Defence Force intranet. The online record is dated, and it is recommended that the Defence Force ensure this information is kept up to date.

3.5. EXPLOSIVE FACILITIES AND INFRASTRUCTURE

The Defence Munitions Management Group manages depot-level explosives facilities that provide the principal ammunition and explosives stores for the organisation. The key control on these facilities is independent certification by Defence Force test certifiers. A standardised Defence Force Explosive Facility Test Certificate is completed to approve the use of a permanent or temporary facility for the storage or processing of explosives, in accordance with Defence Force Order 53. Test certificates are valid for three years from the date of authorisation unless invalidated by a change in circumstances such as alterations to the facility or adjustments to the authorised explosive limits.

Certification at these facilities was found to be clearly displayed and up to date, with one exception being an igloo at Waiouru for which the Net Explosive Quantity limit was being reassessed. We were also satisfied that the Defence Force is providing 'independent checking' of the sites by having approval of test certificates by local Defence Force test certificates further reviewed and approved by a test certifier from another Service and a Service prime delegate from the Explosives Safety Committee.

The Defence Munitions Management Group and Defence Property Group are jointly managing a complex programme of facility renewal across Kauri Point and Waiouru. While audit highlighted that certification was up to date at these sites, there were a range of general maintenance and design issues with older buildings on these sites. The commissioning of the new facilities at these sites will allow for these issues with legacy structures to be addressed effectively and many of the most troublesome sites to be decommissioned.

A facilities-related concern that requires attention is the roads at depot facilities. While Defence Force Order 53 only specifies that roads within an explosives storage area should be of "sufficient width and strength", the quality of these roads needs to be improved.⁷ The condition of the gravel roads through the storage depot in Waiouru, in particular, was of concern. Transport across poor roads could lead to undesirable buffeting of explosive ordnance loads on and off site, whereas they are otherwise well handled while in store. We heard that this is, in practice, further exacerbated by bad weather and the need to use manual handling equipment for transporting along these roads.

The Defence Force Order also outlines the process for facilities that are used by Defence Force units to store and handle small quantities of explosives. Outside of the depot operations run by Defence Munitions Management Group, the majority of the Service controlled facilities fall under this category. A review of Prime Delegates reports for 2015 raised no major issues with certification or compliance at these facilities.

3.6. AUDIT AND REVIEW

The primary form of review and assessment for Class 1 hazardous substances is through annual self-assessments. Units in control of Class 1 explosives provide self-assessments to their Prime Delegate, who provides a summary report to the Explosives Safety Committee, as well as to their Deputy Service Chief.

We found that the units completing these self-assessments within the Defence Munitions Management Group had done so generally to a high standard. We also found that the Group had an established system of compliance checks that sat alongside the self-assessments. Quarterly inspections are completed by the Officer in Charge, with an annual inspection then being completed by the Defence Munitions Management Group's senior technical officer. The issues raised in these annual inspections were reviewed and aligned well with those reported through the self-assessment process.

External Audit of the technical aspects of Class 1 hazardous substances management in the Defence Force has been performed by the Australian Defence Force's Directorate of Explosive Ordnance Services. This external audit is of high value to the New Zealand

⁷ New Zealand Defence Force, Defence Force Order 53 (AL23), section 2.99.

Defence Force. It exposes the system to external review by technical experts working within a well-developed Explosive Ordnance handling system.

The Australian auditors provide Change Action Requests as a result of their audits, as they would in the Australian environment. While auctioning of these Change Action Requests is not mandatory for the New Zealand Defence Force as an external organisation, a process of closing off these Change Action Requests would add further rigour to the external audit programme. Should a Change Action Request not be applicable in the New Zealand environment, this could be documented to complete the audit trail.

As noted, other Class 1 ready-use stores are managed separately from the bulk stores. The Defence Force should consider internal audit of these stores.

3.7. FINDINGS

- The Class 1 Code of Practice in Defence Force Order 53 is not a stand-alone code and does not always contain clear distinction between policy and procedure. A current project to create a New Zealand Defence Force Explosives Manual may address this.
- The Explosives Safety Committee appears to be effective but did not meet requirements for at least annual meetings in two of the last five years.
- Risk management practice at the user level appears poor with hazard registers at Class 1 facilities poorly maintained and not up to date.
- There is limited tracking of Class 1 hazardous substances at unit level once they have been issued out from depot storage.
- There is a lack of documentation around practice and training of Emergency Response Plans, both for basic fire response and for more complex scenarios.
- Controls around security are less extensive than maintained by the Australian Defence Force, and the current level of compliance with these controls is unclear.
- The register of Class 1 test certifiers on the Defence intranet site is not up to date.
- Certification at facilities was generally clearly displayed and up to date, and these sites are being independently checked.
- There are compliance issues relating to the maintenance and design of older buildings at Class 1 storage facilities but the current commissioning of new facilities is allowing for these issues with legacy structures to be addressed effectively through decommissioning of many of the old buildings.
- The condition of roads through some storage facilities and in particular through the Waiburu depot was poor and this could exacerbate the risks associated with transporting explosive ordnance loads to and from these sites.
- Self Assessments completed by Defence Munitions Management Group units were finished to a high standard, and there was clear evidence of additional compliance monitoring being undertaken that aligned with the self-assessment process.
- The external technical audit of Class 1 hazardous substances management performed by the Australian Defence Force's Directorate of Explosive Ordnance Services is of high value and provides useful Change Action Requests for the Defence Force.

4. HAZARDOUS SUBSTANCES NOT CONTAINED IN WEAPON SYSTEMS

This section covers the arrangements the New Zealand Defence Force maintains for managing the implementation of controls on hazardous substances not contained in weapons systems. In the Defence Force this category has generally encompassed Class 2-9 hazardous substances. This category includes a range of substances including gases, flammable liquids, flammable solids, oxidising substances and organic peroxides, and toxic, infectious, radioactive, corrosive and miscellaneous dangerous substances.

Unlike the Class 1 category, the Defence Force's management of Class 2-9 hazardous substances is generally more comparable to practice in the civil sector. Hazardous substances usage and storage in the Defence Force often involves fuels and common compounds used for machinery maintenance, much like in the civil sector. Substances are spread across a range of sites, and Defence maintains a range of relationships with contractors over hazardous substances management.

4.1. CODES OF PRACTICE

The Codes of Practice for Class 2-9 hazardous substances are contained in Chapter 3 of Defence Force Order 53. This Code provides a regime for management of Class 2-9 hazardous substances that is in large measure equivalent to the HSNO Regulations implemented under the HSNO Act 1996.

It is in relation to Class 2-9 hazardous substances that the lack of provisions in the Defence Force Order on contractor management is causing the most issues. These issues manifest themselves throughout the audit programme. The level of compliance on sites managed by contractors was lower than on Defence controlled sites. Both Navy and Air Force have been conducting management meetings with their contractors, and Babcocks has a general induction programme for staff at Devonport, but practice needs to be standardised and documented in line with the recommendation in section 4.15.

The Code of Practice for Class 2-9 hazardous substances is also impacted particularly by issues in updating the Defence Force Order. The Class 2-9 Code contains many references to international and national standards against which the Defence Force must maintain compliance. Service Prime Delegates and site visits revealed concerns that required changes were not being captured through updates, most notably in areas such as electrical standards.

Technical auditors for Class 2-9 hazardous substances raised some issues through Ohakea and Devonport audit reports where procedure for Class 2-9 hazardous substances in the Defence Force Order differed from the civil Code. These were in some cases cited in the reports as examples of non-equivalence. Focus should, however, not be on assessing whether Defence Force procedures are exactly equivalent to those in the civil Code but on

whether an equivalent level of assurance to the civil Code is achieved by the Defence Force's control regime. To aid assessment of this, Defence could maintain centrally a baseline database that tracks differences between the civil and Defence Codes, explanations for differences, and impact on the assurance regime.

4.2. MANAGEMENT SYSTEM AND CONTROLS

As noted previously, an effective systems view of hazardous substances management considers relevant controls on the lifecycle of a hazardous substance from cradle to grave. This lifecycle management is most notable with respect to Class 2-9 hazardous substances so management controls were reviewed with reference to the lifecycle.

4.2.1. Control and tracking of Class 2-9 hazardous substances

The Defence Force is not equivalent with the civil Code as it does not have a tracking system for most highly hazardous Class 2-9 substances. Class 2-9 hazardous substances are accounted for through annual assessments of collections and through good practice in units that keep a manifest of substances being stored. Both systems fall short of proper tracking of substances and are not consistently completed by Defence Force units.

Tracking through electronic systems would provide an effective control throughout the lifecycle of hazardous substances, both mitigating risk and impacts of non-compliance with HSNO legislation. Modern systems integrated with inventory systems could further enable effective risk management. It could also alleviate an impact currently experienced by civil operators where they could take possession of a highly hazardous substance from the Defence Force and have no visibility of its use during its time in the Defence Force.

Equivalence with the civil code would entail the Defence Force Order's provision of a tracking system that covers at a minimum the most highly hazardous Class 2-9 substances. Given the resource required to establish this it is recommended that the Defence Force investigate designing and initial system based on a minimum level of equivalence with the civil code. Good practice, however, would be for the Defence Force to, longer term, emplace a more extensive risk-based tracking that fully integrates with inventory systems.

While there is no obligation for Class 2-9 hazardous substances not on the most highly hazardous substances list to be tracked, it will remain important for the Defence Force to maintain controls on those substances, including through assessment of collections and manifests. Aside from direct risk of incident, some Class 2-9 hazardous substances were highlighted by technical auditors as common use items in illicit activity, for which the Defence Force will need to maintain vigilance. Defence Force personnel on the ground demonstrated only limited knowledge of this.

As noted previously, another lifecycle issue is that the Defence Code lacks policy and procedure for new hazardous substances, and is not equivalent to the civil Code in this respect. It was in relation to Class 2-9 hazardous substances where tangible examples were raised by Prime Delegates of the importation of new hazardous substances with new military capabilities, with no formal process surrounding their importation.

4.2.2. Storage, site information and signage

Once Class 2-9 hazardous substances have been taken on stock, the core controls on these substances include controls on location, on-site management information and signage.

Certification of storage locations and management information has been a focus of the Defence framework since inception and past Evaluation reports have highlighted these controls have been enforced but with some issues. Hazardous Substance Locations, as well as site information and signage have been reviewed across the Services, and facilities managed by Defence Property Group, Defence Logistics Command and contractors. As these controls directly affect operational use of hazardous substances, poor compliance with these roles can lead to direct risk of incident.

Compliance with controls in Defence Force Order 53 on test certification for storage locations was found during site visits to be satisfactory. Records, however, could be improved. Certificates viewed contained relatively limited site information and out of date references to the Defence Force Order. We were informed that Defence Property Group and Defence Logistics Command are working to complete a map based system of all certified locations and this may improve visibility and access to test certification information. The Defence Force should, however, also check that certificates all have correct information and whether the addition of tracking numbers, date of issue, and expiry date would enhance the level of control.

Historically, as noted at the systems level, site compliance issues within the matrix have been challenging. For Class 2-9 hazardous substance storage locations there have been both challenges and difficulties in assigning responsibilities for resolving certification issues and in maintaining facilities to the required standard. Relationships between key personnel across support organisations appear to have broken down some of the issues in this area, but this needs to be backed up by process mapping and documentation of procedure.

Defence Force Hazardous Atmosphere Zone certification was also reviewed. Defence Force Order 53 outlines that the local Facilities Manager must maintain a verification dossier for these Hazard Atmosphere Zones and a copy is to be held by the unit. It is important for this documentation to be maintained in line with the Order as the information can be required for site and electrical certification, and sites can often be in the control of contractors rather than Defence units. It was found during site visits that dossiers were often not held in a complete state. Prime Delegates and units reported holding original documentation where Facilities Managers should be fulfilling this responsibility. It is recommended that Defence Property Group ensure all Facility Managers hold and maintain verification dossiers as required.

On site, a key unit-level control is the maintenance of both Hazardous Substance Management Cards and Safety Data Sheets for any Class 2-9 hazardous substances held on site. Hazardous Substance Management Cards provide to Officers in Charge a quick reference for how to respond to an issue with a certain substance on site. Safety Data Sheets, on the other hand, provide detailed technical information on a substance that may assist handlers in managing a response.

Site visits indicated that Defence Force units are generally aware of the requirements to hold information on hazardous substances that they hold on site. There was less clarity amongst personnel, however, that both Hazardous Substance Management Cards and Safety Data Sheets should be maintained. Further, many Safety Data Sheets maintained were either not recently updated or were miniature versions without full emergency details. There was also a lack of standardised practice for displaying the cards.

Continued effort is required across units and by Prime Delegates to improve overall practice. Examples of good practice were observed across the organisation and this good practice

could be highlighted in communicating a standardised approach. This would assist where personnel are often impacted by frequent postings. It is recommended that when renewing the approach to move from use of Chemwatch Safety Data Sheets to sheets from original manufacturers. This would alleviate an identified risk that technical information on these cards differs from the true formulation of a substance.

Signage for hazardous substance management was found to be maintained generally to a high standard. Technical auditors during site visits noted some cases of pictograms requiring attention, but the level of non compliance was not a source of concern. Practice within units was found to need reinforcement around managing signage for empty sites, storage vessels and containers. Failing to mark these as 'empty' as required could hinder emergency response to a potential incident.

4.2.3. Emergency Response

Emergency Response was identified as the core area of weakness for Class 2-9 hazardous substance management. Site visits revealed an absence of complete or effective emergency response plans, and some units lacked plans altogether. In many cases there was a tendency for units to have plans and evacuation schemes for fire but that did not specifically address hazardous substances as required under the Defence Force Order. There was that limited evidence was being documented that emergency response plans were rehearsed. Finally, it was on the Class 2-9 technical audits that we evidenced a lack of common approach across facilities, as mentioned in section 4.51.

4.2.4. Disposal

Defence Force Order 53 outlines effective procedure for managing the end of the lifecycle for hazardous substances held under Defence control. No major issues were found with this code. In practice, however, cases were seen of disposal practice in units that was influenced by business requirements rather than the timely removal of hazardous substances. Service Chiefs should ensure that requirements are followed in this area.

4.3. TRAINING AND CERTIFICATION OF PERSONNEL

The roles and associated training of Defence Force personnel are central to class 2-9 hazardous substance management. Units that use, store, transport, or dispose of these substances require trained handlers to conduct and advise other personnel on this work. Defence Force Test Certifiers certify Hazardous Substance Locations, assess Approved Handlers and certify Hazardous Atmosphere Zones.

Training for the management of Class 2-9 hazardous substances is coordinated and carried out centrally by the New Zealand Defence College. The college maintains and teaches three courses as outlined in Defence Force Order 53, and include a basic Hazardous Substances Awareness course, New Zealand Defence Force Approved Handlers training and Test Certifier training.

Training for handlers is based on generally sound processes and systems. The New Zealand Defence College HSNO training instructor demonstrated a appropriate methods for assessing training needs, conducting outreach, and training on site across Defence Force

bases and facilities. For Army and Air Force this training has enabled requisite numbers of handlers to be maintained, although Navy reported that the number of approved handlers was barely adequate. This is one area where additional personnel resource has been identified as required, with the current single trainer role being identified as a single point of failure.

Technical auditors have noted that the records of the certification from this training require review. Whereas handlers' certificates issued under the civil code include the life cycles for which a handler is qualified, the Defence Force certificate does not. It appears that most Defence Force handlers are qualified for storage, but this could be clarified. There is also nothing to indicate the handler has been signed off by their on-site manager to consider them workplace competent.

The tracking of handlers through electronic systems and certificates also requires addressing. On site documentation on Approved Handlers at Defence sites was frequently found to be incomplete, with lists kept by Prime Delegates not up to date. As there is no rule in Defence Force Order 53 that personnel must hold certificates on person as per the civil code, this tracking of handlers is of further importance. It is recommended that tracking of handlers be improved and lists kept up to date.

In the case of Defence Force test certifiers, qualified personnel are tracked centrally by Defence Logistics Command and a list kept on the Defence Force intranet. This system appears to be working well.

4.4. AUDIT AND REVIEW

As with Class 1 hazardous substances, the Defence Force runs a self-assessment process for units in possession of Class 2-9 hazardous substances. The assessment is completed along with an 'Assessment of Collections', which provides the quantities of Class 2-9 hazardous substances on hand at units. Technical auditors noted that as a high-level tool, the self-assessments were a useful practice. They found some alignment between audit findings and self-assessment returns, including in the area of Emergency Response practice.

The quality of self-assessment returns varied considerably between work areas and Services, as was consistent with practice observed during audit and site visits. There would be benefit in Prime Delegates and Officers in Charge ensuring additional compliance checks at unit and base level where required to address these inconsistencies. The need for this was noted particularly at Linton, where Prime Delegates noted the challenges of managing compliance around the posting structure. Further rationale for this is that it is unclear at many locations what additional compliance assessments, if any, are carried out between annual self-assessments. Site visits did not reveal documented quarterly or annual compliance checking.

Defence Logistics Command has, in addition to external audit by Evaluation, asked Responsible Care NZ to conduct external technical audits on several facilities. This external audit has been conducted to a high standard and, with Responsible Care auditors holding experience in both the Defence framework and civil HSNO system, is providing useful testing of Defence practice.

4.5. FINDINGS

- The lack of provisions in the Defence Force Order on contractor management has caused the most issues in relation to management of Class 2-9 hazardous substances.
- There are cases where the Class 2-9 Code of Practice is not up to date with international and national standards (i.e. electrical) and requires updating.
- The Defence Code is not equivalent with the civil Code in that it does not provide for tracking of most highly hazardous Class 2-9 substances, and current manual methods of accounting for hazardous substances are not consistently completed by Defence Force units.
- There is no formal process surrounding the importation of new Class 2-9 hazardous substances with new military capabilities.
- For hazardous substance storage locations there remain challenges in assigning responsibilities for resolving certification issues and in maintaining facilities to the required standard.
- Verification dossiers for Hazard Atmosphere Zones are often held in an incomplete state, and Facilities Managers are not fulfilling their responsibility of holding the documentation.
- Unit awareness that management information must be held for hazardous substances on site is high but the detailed requirements as laid out in Defence Order are not well understood and applied consistently across units.
- Signage for hazardous substance management was found to be maintained generally to a high standard, although units were poor at marking 'empty' containers.
- There is an absence of complete or effective emergency response plans, and limited evidence documented that emergency response plans are rehearsed.
- The Defence Code outlines effective procedure for managing the end of the lifecycle for hazardous substances but these procedures are not being followed consistently.
- Approved handler training is based on generally sound processes and systems, but records of certification and tracking of certified handlers requires review.
- The quality of self-assessment returns varied considerably between work areas and Services, and it is unclear at many locations what additional compliance assessments, if any, are carried out between annual self-assessments.

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