Managing the security risk associated with chemicals of security concern

Summary audit report

October 2018

Acknowledgments

The Crime and Corruption Commission would like to acknowledge the cooperation and assistance of participating agencies during this audit, including the Workplace Health and Safety Queensland.

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Summary

In 2017–18, the Crime and Corruption Commission (CCC) audited four agencies in the department, university and statutory body sectors regarding their management of risks associated with chemicals of security concern (CSC) in their laboratories and workplaces. These chemicals are precursors to homemade explosives, toxic devices and illicit drugs.

Failure to manage chemical risks involving CSC appropriately impacts on an agency's accountability and governance, and may constitute corrupt conduct. Further, this failure may facilitate the diversion of chemicals for illicit purposes.

The CCC audit undertook a detailed review of the four agencies' chemical management systems to manage such CSC (for example, policies, procedures, processes and information systems). The CCC noted one agency had in place a chemical management system that was comprehensive and reasonable to guide staff in managing chemical risks. Three other agencies had gaps in governance, policies/procedures and inventory management, with existing inventory controls not well suited to detecting chemical stock losses. The CCC assessed this control weakness as high-risk. Overall, the CCC recommended these three agencies needed to improve systems for managing chemical risks involving CSC.

A CCC officer visited the four agencies and their eight individual sites to inspect and assess the chemical security measures in place to prevent the potential diversion of desirable chemicals. Although the CCC was satisfied with how the agencies implemented security measures for the majority of CSC in the workplaces, there were some security weaknesses found in all four agencies. Issues identified included a failure by an agency to install an unbreakable entry door, while the security measures of other agencies suggested that they might not be limiting access to high-risk chemicals to only those people who had a genuine need to access them. The CCC believes the four agencies should regularly scan their workplace security environment to identify new and emerging risks, as their exposure to risk may be constantly changing.

The CCC also determined whether a regulatory agency had in place a compliance program to target agencies with CSC, to ensure risks are identified, assessed and appropriately managed. The CCC was satisfied that the regulatory agency had in place proactive state-wide campaigns for specific industries or hazards, and a working *Queensland Code of Practice for Managing Risks of Hazardous Chemicals in the Workplace*. The CCC also noted that the regulatory agency continues to focus on campaign programs that relate to the safe storage and handling of hazardous chemicals in specific workplace categories, and this has been a major long-term undertaking. However it was identified that a few more prevention initiatives, such as security measures and inventory management, could be instituted to help agencies effectively manage chemical security risks.

Agencies are encouraged to review the CCC's findings, recommendations and suggested strategies to determine how risks can most effectively be managed and whether other changes are needed to improve overall governance and control within the organisation.

Introduction

The *Crime and Corruption Act 2001* (CC Act) recognises the responsibility of an agency's public official[1] to set and maintain proper standards of conduct for their staff and, by so doing, maintain public confidence in their agency. The CCC has a lead role in helping agencies to detect, manage and prevent corruption risks.

Each financial year the CCC conducts a program of audits to examine how agencies have responded to particular types of complaints and how robust their complaints management and corruption prevention frameworks are. The CCC also undertakes audits aimed at controlling the risks of corruption.

In 2017–18, the CCC conducted an audit examining how agencies were managing risks associated with chemicals of security concern in their laboratories and workplaces.

What is a chemical?

A chemical is any substance consisting of liquid, solid, or gas. It can be any mixture (a solution, compound or gas) or article.

Chemicals are common in a wide variety of workplaces. There are approximately 40,000 chemicals approved for use within Australia.

Chemicals of security concern (CSC)

Of these 40,000 chemicals, the Council of Australian Governments[2] has identified 96 chemicals of security concern (CSC) that require priority risk assessment because they are precursors to homemade explosives. Of the 96 chemicals, 15 have been assessed as being particularly high-risk. The 15 high-risk CSC contain 11 precursors to homemade explosives and four toxic chemicals that are considered to be high-risk because of possible use in a toxic device. A full list of the 15 high-risk CSC is at **Appendix A**.

The following is a sample of some high-risk CSC.

	Ammonium perchlorate is violently explosive and highly volatile. When ammonium perchlorate is mixed with a fuel (like a powdered aluminium), it can generate self-sustained combustion at far under atmospheric pressure (e.g. like a rocket taking off).
	Sodium cyanide is a white water-soluble solid, and is a poisonous substance. It is produced from the equally dangerous gas hydrogen cyanide in a simple process with sodium hydroxide. It is very toxic by inhalation, in contact with skin and if swallowed. Sodium cyanide can be fatal at amounts as little as five per cent of a teaspoon.
	Hydrogen peroxide itself acts as an explosive in high concentrations when placed in an absorbent. It is also used in the manufacture of methamphetamine.

Source: www.google.com.au

While some chemicals may be used to make homemade explosives or toxic devices, there are also chemicals that can be used to manufacture illicit drugs. The sale and distribution of illicit drugs remains the most pervasive form of organised crime in Queensland.[3] See **Appendix A** for some illicit drug precursors.

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1   A public official is defined in Schedule 2 of the CC Act.

2   The Council of Australian Governments (COAG) is the peak intergovernmental forum in Australia. The members of COAG are the Prime Minister, state and territory First Ministers and the President of the Australian Local Government Association. www.coag.gov.au

3   CCC's Illicit drugs in Queensland: 2015-16 intelligence assessment report. https://ccc.qld.gov.au/crime/how-the-ccc-fights-crime/drugs-in-queensland/illicit-drugs-in-queensland

Reasons for doing this audit

Australia's current threat level of terrorism is **Probable**.[4] The control of chemicals that could be used to make explosives and toxic devices needs to be considered in the context of possible attempts to undertake terrorist attacks in Australia.[5] The voluntary *National Code of Practice for Chemicals of Security Concern*[6] states that a small percentage of chemicals have been diverted from their lawful use to unlawful purposes, including terrorist-related activity. In addition to the devastating human cost of terrorism in terms of lives lost or injuries, terrorist acts may result in reputational damage to an agency if it is identified that chemicals used in a terrorist act were taken from that agency.

Preventing corruption is fundamental to the CCC's vision for safe communities supported by fair and ethical public institutions. Our corruption audits are one of the CCC's prevention initiatives designed to help agencies implement strategies addressing the corruption risk of chemical security. The crime area of the CCC also works with the Queensland Police Service and other law enforcement agencies to combat and prevent major crime, including possible terrorist activity.

Many CSC are used in agriculture, mining, scientific research and laboratory analysis in public sector agencies. The failure of an agency to control the risks relevant to managing these chemicals effectively and appropriately may constitute corrupt conduct. Further, failure to manage the risks may aid the diversion of chemicals for illicit purposes.

Agencies may have existing control measures that are focused on managing the chemical risks to human health and occupational safety, reflecting the Work Health and Safety Regulation, rather than on securing chemicals from illicit diversion. Some existing control measures may manage security risks, but may not be fully effective against all CSC. A product that contains a CSC that can easily be extracted is a greater security risk than a product from which the chemical is harder to extract, and will require more stringent security measures.

For these reasons strong coordination and cooperation between regulators, law enforcement agencies and organisations/businesses are essential to effectively contribute to controlling CSC and to share best practices and lessons learned.

Audit focus

The audit involved the following objectives:

- Undertake a detailed review of each agency's chemical management system, to reduce vulnerabilities and prevent corruption associated with CSC.
- Determine whether a regulatory agency has in place a compliance program to target agencies with CSC to ensure risks are identified, assessed, and appropriately managed.

Scope of the audit

This audit focused on the way in which four agencies in the department, university and public health sectors managed CSC. It also focused on the adequacy of agencies' chemical management frameworks and systems.

The audit also involved reviewing the regulatory agency's compliance and enforcement programs across Queensland.

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4   The National Terrorism Threat Advisory System is a scale of five levels to provide advice about the likelihood of an act of terrorism occurring on Australian soil. '**Probable**' is a third level indicating that individuals or groups are possessing the intent and capability to conduct a terrorist attack in Australia.

5   'Terrorism' is a broad term that refers to a specific set of activities defined in section 4 of the *Australian Security Intelligence Organisation Act 1979* (Cwlth) as 'politically motivated violence'.

6   The voluntary *National Code of Practice for Chemicals of Security Concern* has been developed by Australian governments in partnership with industry.

Selection of agencies

The agencies selected for participation are shown in the table below.

Sectors and participating agencies		
Department	**Universities**	**Public health**
• Department of Agriculture and Fisheries	• Queensland University of Technology • University of Queensland	• Metro North Hospital and Health Service
Regulatory agency		
• Workplace Health and Safety Queensland		

We selected Workplace Health and Safety Queensland, as the regulatory agency, to review their compliance and enforcement programs. All other agencies were selected on the basis of their potential use of CSC for scientific research and laboratory analysis, locality, and health activities.

Reviewing chemical management systems

To prevent the diversion of CSC into the illicit production of homemade explosives, toxic devices or drugs, the audit examined agencies' internal management systems covering, but not limited to:

- Chemical management policy, guidelines and procedures
- Education and training programs for staff and students in the storage and handling of CSC
- Security risk management of CSC – identifying, assessing and implementing control measures
- Regular review of access to restricted areas or locked storage facilities
- Purchases being appropriately authorised, and the amount of product/quantities ordered matching the amount received
- High inventory control measures to enable the effective monitoring and accounting for CSC
- All use and disposals being recorded, listing quantity, user and date
- Discrepancies being investigated and current controls reviewed
- Loss or theft being reported to appropriate authorities (e.g. National Security Hotline and the police).

Conducting on-site observations

A CCC officer randomly conducted observations on-site in relation to the storage and security of CSC. A total of eight sites overall were inspected by the CCC as part of this audit.

Reviewing regulatory compliance programs

To help agencies anticipate the risk and identify the existence of potential and actual incidents, the audit examined the regulatory agency's targeted programs to promote the security and management of CSC.

Exclusions

This audit did not include:

- The use, export, import, sale or transport of chemicals
- Explosives within the meaning of the *Explosives Act 1999 (Qld)*. For example, security sensitive ammonium nitrate (SSAN)
- The health and safety hazards from handling any particular chemicals. This includes air and health monitoring of chemical exposure
- Controlled substances (therapeutic goods and other matters) which affect areas that are dispensing substances (e.g. hospital and clinical veterinary situations)
- Veterinary chemical products within the meaning of the *Agricultural and Veterinary Chemicals Code Act 1994 (Cwlth)* – chemicals at the point of intentional administration to animals.

Findings from the audit

The CCC has communicated the findings of its audit to participating agencies, but for the purposes of this summary, the CCC does not identify which agencies were involved in each finding. The intent of this audit summary is to help public sector agencies and other Queensland businesses improve their outcomes.

The audit identified 12 areas for improvement for application within the various agencies. These areas for improvement are grouped to the five main issues of this audit, as described below:

1. Governance	4. Chemical security
2. Risk management	5. Regulatory
3. Purchasing and inventory management	

1. Governance (policy and people initiatives)

Area for improvement 1 – An overarching responsible officer

The audit found that three of the four agencies did not have an overarching responsible officer for governing CSC across the workplaces.

Every agency should have an officer who is identified as having an overarching responsibility for governing CSC. This responsible person should be the head or manager in one of the following disciplines:

- facility management
- business services
- health, safety and environment.

A relatively weak management governance poses serious risks to the agency, with potentially dangerous chemicals finding their way into the hands of adversaries.

> ### *Recommendation*
>
> Three of the four agencies to nominate an overarching responsible officer to implement and promote the effective integration of chemical security in the workplaces.
>
> *Note*: In responding to this audit, the three agencies acknowledged the recommendation and the importance of this key governance control. Two of the three agencies have either nominated an overarching responsible officer, or are working towards considering the role/position suitable to oversee the integration of chemical security in the workplaces.
>
> The third agency planned to identify an alternative governance control that would best address their agency's complexity of operations and organisational structure. They also planned to consider a long-term strategy of transitioning to a 'precinct' management model which may facilitate a single delivery point for CSC within the workplace.

Area for improvement 2 – Policies, procedures and guidelines

The same three agencies as mentioned above did not have sufficient policy, procedures and guidelines to support their governance, risk management and internal controls around CSC.

They all had in place policies and procedures to manage the risks to health and safety, however the policies and procedures did not consider the security risks (e.g. theft and diversion).

The CCC's view is that agencies should have chemical management policies and procedures that specifically address the security risks associated with the purchasing, storage and inventory management of CSC within the workplace.

The following is an overview of what information should be described in policy and procedures.

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Key overview of chemical management policy and procedures

Chemical management policy – sets out the agency's obligations to comply with relevant legislation, the agency's risk appetite and other requirements, and should cover as a minimum the following:

- Compliances with the *Work Health and Safety Act*, Regulation and Codes of Practice
- Adopt the *National Code of Practice for Chemicals of Security Concern*
- Adopt the *Code of Practice for Supply Diversion into Illicit Drug Manufacture*

- Identify and enforce education and training on CSC
- Identify and enforce document and data control activities
- Identify and enforce monitoring activities
- Clearly defined roles and responsibilities

Chemical management procedure – sets out the minimum and aligned process to support execution of duties and manage chemical risk for the agency, and should cover as a minimum the following:

- Training, induction and instructions
- What are 'CSC' and other high-risk chemicals?
- Chemical risk assessment (storage and activities)
- Procurement / acquisition of high-risk chemicals
- Inventory management
- Transfer / transit

- Storage (including security), handling and use
- Reporting suspicion of behaviours / activities, and investigating unaccounted discrepancies
- Communication and information activities
- Clearly defined roles and responsibilities

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Policies and procedures are a key source of information on how to manage CSC, and are highly influential on risk management implementation and outcomes for that reason. If they do not reflect all of the key information and steps, the agency's processes and security might not either.

> ### *Recommendation*
>
> Develop and implement a documented framework which reflects a systematic approach to the lifecycle management of chemical risks for the agency, as outlined above, and communicate this to all relevant staff. It should also cover the role and responsibilities of the overarching responsible officer.
>
> *Note*: One of the three agencies concerned had drafted policy and procedures for managing CSC and planned to incorporate further requirements, as noted in the CCC's findings. The other two agencies planned to initiate a project with a view to developing and implementing an overall chemical management system, including specific sections on CSC.

Area for improvement 3 – Chemical security awareness

Security incidents have the potential to impact an agency's reputation and credibility and staff should be made aware of these risks. In all three agencies mentioned previously, the CCC noted that awareness around chemical security was not sufficiently promoted to staff.

One agency was not aware of the *National Code of Practice for Chemicals of Security Concern* and the possible chemical security risks.

The other two agencies were aware of the National Code of Practice, however, no information about chemical security and reporting requirements was included in any of their training materials.

The following are some key points to increase awareness about CSC.

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Key points to consider in chemical security awareness

- Ensuring that staff are made aware of chemicals that are listed as chemicals of security concern
- Securely locking chemicals away and restricting access to them at all times
- Ensuring keys to lockable cabinets or stores are securely restricted
- Maintaining high inventory controls, including unusual movement and usage
- Sharing security incidents and controlling weaknesses
- Outlining indicators of suspicious behaviour/activity e.g. 'Red Flags' guide
- Reporting suspicious behaviour to the agency's overarching responsible officer, who in turn is to report to the National Security Hotline and law enforcement agencies.

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Recommendation

Develop training material and/or integrate security awareness into their team meetings to educate and train staff to be alert to warning signs and to report suspicious behaviours.

Note: The three agencies referred to above have indicated that they will increase general awareness of CSC, their chemical risks, and the *National Code of Practice for Chemicals of Security Concern*, and the requirements for their handling and use. Various methods are being proposed by the relevant agencies. Some of the examples were: online training, email messages, workplace health and safety network groups, performance development agreement, and intranet enhancements with a link to the national security video.

2. Risk management (process initiative)

Area for improvement 4 – Chemical risk assessment

The audit identified that two of the four agencies have not conducted a chemical risk assessment to evaluate the potential risks of what happens, or what might happen, in using and storing chemicals in a work area. This involved a review of the specific area or storage where chemicals would be stored, and an assessment of the risks of using the specific chemical, to determine what control measures were to be implemented.

The following case study demonstrates how the two agencies concerned were failing to determine security risks for CSC that may result in chemicals being taken for illicit purposes, which in turn puts Australians at high risk.

Case study – How the two agencies have conducted chemical risk assessments

Agency One:

- In agency one work area, the agency completed a chemical risk assessment subsequent to the CCC's site inspection. Therefore, this assessment and awareness of the risks of a new introduced chemical product into the workplace was not in existence between July 2017 and February 2018.
- The same agency's work area also did not outline how chemicals would be prevented from being accessed by members of the public (including staff) during the day when the work area was not restricted.
- In another work area within agency one, a chemical risk assessment for the high-risk chemical was not completed. The work area provided the CCC with a 'basic assessment' which does not provide an assessment of a particular workplace, area, job or task.

Agency Two:

- A number of work areas in agency two did not undertake sufficient chemical risk assessments for each chemical sighted by the CCC during site inspections. Some of the assessments were in relation to health risks. The majority of the chemicals were transferred into the agency from various old workplaces. This should have triggered chemical risk assessments so they were able to evaluate the potential risks in using and storing these chemicals in the new workplaces and work areas.

While a risk assessment is not mandatory under the Work Health and Safety Regulation, in many circumstances it will be the best way to determine what measures should be implemented to control health, safety and security risks.

In the CCC's view, the two agencies should strive to go above and beyond the regulatory requirements, keeping risks as low as reasonably practicable.

Recommendations

a) Remind staff to review the chemical risk assessment prior to purchasing CSC, and update it if required. The following topics must be considered in the risk assessment, but are not limited to:

- Store requirements
  - physical security risks
  - inventory risks
  - maximum quantities
  - compatibility
- Laboratory / work area
  - physical security risks
  - inventory risks
  - maximum quantities
  - compatibility
  - all activities taking place
- Waste disposal
- Health risks
- Safety risks
- Environment risks
- Regulatory requirements

b) Initiate a project to undertake chemical risk assessments for all CSC in their workplaces, stores and work areas. The above topics must be considered and included in the risk assessments.

c) Review chemical risk assessments at intervals commensurate to the level of risk associated with the use and storage of the CSC, or when there are changes that may alter the current controls.

Note: In responding to this audit, the two agencies referred to above planned to work towards reviewing existing, or developing, policies, procedures, education and current systems utilised with a view to improving systems pertaining to the management of CSC. We expect that the frequency of risk assessments will be increased and reporting will become more formalised and accountable within these two agencies.

3. Purchasing and inventory management (process initiative)

Area for improvement 5 – Purchasing approval and review of usage

In one of the four agencies the audit found that their purchasing and inventory management practices were not approved by a financial delegate which was deemed not optimal in managing potential chemical risks.

The case study below shows where stock replenishment was regularly carried out by a support unit under a service level agreement, however, was not appropriately accounted or managed.

Case study – Stock replenishment system

An imprest officer visits the work area twice weekly, the chemical product is scanned and ordered back up to agreed Periodic Automatic Replenishment (PAR) level. The PAR level is pre-determined and pre-approved by the agency's financial delegate.

The imprest team accesses the chemical product in the loading dock area of the workplace and checks over the chemical order, ensuring the correct amount of stock has arrived. They then dispatch the stock back to the work area.

It was found that neither the work area's team leader nor the manager reviewed the usage data reports which would help refine the agency's purchasing habits and set appropriate minimum and maximum PAR levels.

The CCC was concerned that:

- There was no approved minimum and maximum PAR levels set by the financial delegate for the chemical product in the work area.
- No review of stock replenishment was undertaken by the work area's team leader or manager.
- The monthly usage of the chemical was very inconsistent, as shown below.

Jul 17	Aug 17	Sep 17	Oct 17	Nov 17	Dec 17	Jan 18	Feb 18
60	0	120	44	108	180	96	160

- In one month 44 bottles were ordered, and in other months 160 and 180 bottles were ordered.

The agency work area may have been appropriately dispersing chemicals (i.e. services delivered) or the chemicals have been stolen or diverted for unlawful purposes.

Furthermore, the PAR level (maximum hold) was considered high and the restocking twice weekly was too often to manage the risk.

It is important to keep overall storage volumes to a minimum to match short-term demand, and to review usage for unusual purchasing habits.

These issues represent a deficiency in the agency's risk management strategy to address chemical purchasing and inventory management practices at the work area.

Recommendations

a) Request the imprest team to provide the work area with a regular usage report (e.g. every six months).

b) Ensure that the work area's team leader or manager regularly reviews the usage for optimal PAR levels and purchasing habits, commensurate to the health, safety and security risks posed by the chemicals.

c) Approve PAR levels for the Rapicide PA product (i.e. minimum and maximum levels).

d) Keep overall storage volumes to a minimum, to match short-term demand.

Note: The agency in this case study acknowledged the CCC's concerns about the current lack of PAR levels for identified chemicals. They identified that many areas within the organisation, due to the nature of procedures being delivered, have purchase levels that consistently fluctuate. The agency planned to look at alternative products to manage purchasing and usage reviews more effectively and appropriately.

Area for improvement 6 – Keeping track of chemicals

Existing inventory controls within three of the four agencies were not well suited to detecting chemical stock losses. The existing controls were such that timely information provision to the National Security Hotline and to law enforcement agencies would not occur because agencies would not be able to detect if CSC had been stolen.

We observed that the chemical inventory was set up on maximum quantity expected (e.g. for the specific storage location), rather than the total quantity at the start of a particular time period and at the end of a particular time period. One of the three agencies concerned had total quantities for each chemical but the inventory was not kept up to date to reflect the actual quantities in real-time. We were also unable to locate some chemicals, or cross check them against the chemical inventory for accuracy.

The following case study demonstrates where three of the four agencies' chemical inventory systems were poorly designed and implemented. We assessed this risk as 'High' and potentially concerning.

Case study – Some of the issues identified by the CCC in relation to chemical inventory

Agency One:

- CSC at multiple locations within agency one work area was not recorded in the chemical inventory. The quantities of chemicals at these locations was significant.
- A number of other CSC were no longer in existence in another work area (e.g. used up, obsolete or disposed), however, the chemical inventory was not kept up to date.
- The chemical inventory at agency one did not provide information about the product's classification, total quantities, physical states, concentration level, or the exact location of the product.

Agency Two:

- In agency two various chemicals housed in ChemStore belonging to a number of tenants, were difficult to locate due to the absence of barcoding or unique numbering systems. The tenants' labels were applied to the products but it did not mitigate the risk to stock identification.
- The units of measurement for certain CSC had 'litre' for maximum quantity and 'gram' for total quantity. These measurements were not the same, and the CCC was unable to locate these chemicals in the work area.
- CSC was recorded on the inventory list as being in certain rooms within the agency work areas, however, the CCC was unable to locate these chemicals. The agency advised that these could be in other rooms, which indicated that chemicals were not being tracked effectively in real-time.
- The quantities of most CSC on the inventory list could not be matched to the quantities in agency two work area, including the waste records. Therefore, this indicated that the chemicals may have gone missing.

Agency Three:

- A specific work area in agency three was utilising a barcoding system, however, other work areas recorded their chemicals manually into a chemical inventory system. Because the manual system was not regularly monitoring the stock inventory there was a risk that it was unable to provide real-time data to determine whether any chemicals had gone missing.

In the CCC's view, the three of the four agencies were failing to maintain high inventory controls of CSC – the discrepancies between the records in the chemical inventory and what were stored in the work areas indicated that chemicals may have gone missing.

It may have been possible that poor inventory management was a result of several factors including workload and time restraints, inadequate supervision/management, limited people with control/management of chemicals moving on (e.g. retirement and relocating). There was a lack of knowledge of the chemical inventory system and a reluctance by some to use it. A history of access problems and slowness of the system to generate information requested had resulted in a reluctance to utilise the system to its capacity.

Good chemical tracking helps an agency to understand their chemical risk profile and identify unexplained chemical losses, specifically precursor chemicals for homemade explosives, toxic devices and illicit drugs.

Recommendations

a) Initiate a project to look at ways to set up an inventory control system that:

- Identifies products containing CSC in relevant concentrations and forms.
- Pinpoints the <u>exact</u> location of each product container at any time (e.g. site, building, room, and then cabinet).
- Specifies the quantity of each product container at the <u>start</u> of a particular time period (e.g. acquisition and then at stocktake). Note: it is preferable to have a chemical inventory register for each product, rather than for all similar products with total quantities.
- Specifies the quantity of each product container at the <u>end</u> of a particular time period (e.g. waste and then at stocktake).

b) A specific agency in this audit to provide education and training on efficient Chemwatch[7] use (e.g. inventory functions) to relevant staff within their agency. The agency would then ensure business units are implementing correct purchasing protocols of CSC as required.

c) All Queensland agencies and businesses, especially those in research activities and handling high volumes of CSC, are highly recommended to initiate a project to maintain high inventory controls. The agencies should look at the benefits of a barcoding system, which would enable scan-in-scan-out and tracking of chemicals more effectively.

Note: In responding to this audit, three of the four agencies referred to above have accepted the findings and recommendations, and planned to work towards strengthening the inventory control system that is proportionate to the risk. This included a consideration of using a barcoding system. Education and training are also intended to be delivered to relevant staff by the agencies.

Area for improvement 7 – Chemical stocktake

The CCC was informed by three of the four agencies audited that inventory stocktakes had occurred, but these agencies were unable to provide sufficient evidence supporting these claims. In one of these agencies, the stocktake appeared to be inconsistent across the workplace.

The purpose of physical chemical inventory stocktake was to make sure the inventory reflected on the chemical register and in the inventory system actually existed, and that they included all chemicals housed in the stores, laboratories and work areas.

The following are examples of how these three agencies conducted stocktakes of their CSC, which was considered to be ineffective in detecting stock losses in a timely manner and found to be inconsistent across the three agencies work areas.

Case study – Stocktake of chemical inventory

<u>Agency One:</u>
- In agency one, a stocktake was carried out by the work area and the results, including new and old products, was communicated to the officer responsible for updating the inventory.
- One year later, during the CCC's site inspection, we identified chemical products in agency one work area that was not recorded in the inventory.
- We found that the officers responsible for updating the inventory and the work area, failed to follow through on the changes for accuracy and completeness.

<u>Agency Two:</u>
- In agency two, chemical inventories were updated at intervals determined by each work area and usually driven by change. For example, when a new chemical was acquired or chemicals were removed as waste.
- This agency did not have a policy or procedure in place requiring stocktake.

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7 Chemwatch is a software package developed by a vendor to cater for chemicals management on locations.

- A chemical that had been acquired may have gone missing without it being recorded as waste.

Agency Three:
- In agency three one work area completed stocktake in March 2018 and updated their inventory.
- A second work area did their last stocktake paperless (date unknown). An agency three laptop was used to open their inventory list and each chemical was checked against stock, and updated as required.
- The third work area in agency three completed its stocktake in July 2017.
- In the fourth agency three work area a stocktake/rationalisation was conducted in 2016 to determine which chemicals would be discarded. The stock listing was attached to the wall within the laboratory. The red strokes on the attached listing indicated an intention to discard.
- CCC's site inspections could not locate most of the chemicals from the inventory list. None of the above agency three work areas were able to provide evidence of their stocktake exercises.

It is important to know what chemicals are in the workplace, how they are classified and where they are stored. An up-to-date chemical inventory helps an agency to understand their chemical risk profile and identify unexplained chemical losses.

Recommendations

a) Ensure the chemical inventory register reflects actual stock quantities, in real-time.

b) Conduct regular chemical stock management (i.e. check and reconcile stock) for CSC, taking into account the chemical security risk profile. As a suggestion, agencies should conduct a full chemical stock count twice yearly:
   - Each July – identifies missing chemicals, and informs the chemical register and chemical manifest (for emergency purposes and Workplace Health and Safety Queensland reporting)
   - Each January – identifies missing chemicals.

c) The chemical stocktake should be performed by at least one person who does not control or maintain the chemical register or order chemicals for the work area.

d) The responsible governing officer for the agency is to be provided with assurance of stocktakes performed (e.g. certification, which is to be developed) and ensure discrepancies are checked and appropriately reported to the National Security Hotline and the Queensland Police Service.

e) Staff must maintain all records relevant to administering chemical stock management. All communication and documentation pertaining to the stocktake (including all requests, check marks and sign-off) should be maintained in a relevant file for management and audit reviews.

Note: Two of the three agencies this case study refers to have agreed that the frequency and accuracy of stocktake of CSC need to be improved. The third agency intended to consider the recommendations during the development of relevant policy and procedures for CSC.

4.   Chemical security (process initiative)

The following isolated issues were identified during audit inspections at eight sites of the four agencies, which shows that the security measures in place at some work areas were not effectively designed to prevent and deterrent access to the chemicals.

Area for improvement 8 – Ineffective security measures #1

A work area in one agency did not have adequate security measures implemented for CSC that are classified as high-risk under the *National Code of Practice for Chemicals of Security Concern*. While the chemicals were securely locked in cases, the key to access the cases were clearly visible on a hook attached to the wall near the chemicals. The agency had taken a proactive step to correct the security weakness.

At the time of the CCC's inspection we determined that the risk of accessing the CSC was still presented, even though access to the work area was restricted by a swipe card. The door itself was not suitable to prevent unauthorised access into the room.

The CCC discovered another work area within the same agency was in an unclean and untidy state, exposing health and safety, and security risks. The CCC officer had difficulty in locating CSC from the chemical inventory register. The agency had been aware of this work area and had been closely monitoring on a regular basis.

Recommendations

a) Conduct physical security risk management to reduce the likelihood of CSC being taken from the work area. In particular:

- assess security risk to the work area, and to the CSC
- make informed decisions about the security of the CSC
- implement cost-effective security measures.

b) In relation to the other work area, maintain a clean, safe and workable environment for staff, consistent with all other work areas within the agency. CSC should be secured in the store room when not in use by personnel.

Note: In responding to this audit, the agency mentioned in this issue planned to initiate corrective actions to address the ineffective security measures in the relevant work areas.

Area for improvement 9 – Ineffective security measures #2

In a different agency, two work areas had weak security measures that could have led to disastrous results for the agency involved.

In work area one, the chemicals were not locked in the cabinets which were located adjacent to a staff only internal corridor, but which was accessible by the public during the day. This agency's work area's chemical risk assessment stated that 'risk is present, but effectively controlled'. We disagreed with this assessment as chemicals must be locked up according to the manufacturer's safety data sheet (SDS)[8].

In work area two, the same agency did not have a chemical risk assessment completed for that location. The CCC discovered that the chemicals were stored in packaging boxes and sat on the floor in a small hallway between the access to the public hallway and the work room being used for handling chemicals. There was no restricted access and members of the public could have easily walked through if not carefully monitored.

Security measures do not have to be excessive, but should be reasonable and practical having regard to the agency's environment. Securely locking chemicals away and restricting access to them are two pivotal measures that will help prevent chemicals being stolen from work areas and corridors.

Recommendations

a) Complete a chemical storage risk assessment for each location where CSC are stored, and have it approved by the relevant work area's Team Leader. The risk assessment must then be communicated to staff who are involved in the use, handling and transporting of the chemical, to ensure they are aware of the risks, potential exposure and the security controls to be implemented.

   Note: This should extend to all locations within the agency that use CSC.

b) Prior to the purchase of CSC, the chemical storage risk assessment is to be reviewed to determine the specific storage required for the relevant location where chemicals are stored. It should also be regularly updated for currency.

c) Store CSC in a secure location with restricted access. This can be in a 24/7 lockable storage cabinet.

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8   A safety data sheet is an important information source for eliminating or minimising the risks associated with the use of hazardous chemicals in workplaces. Source: Workplace Health and Safety Queensland.

Area for improvement 10 – Ineffective security measures #3

The audit identified two work areas in a third agency where the chemicals were secured but the management of the security risk of the chemicals was lacking. These chemicals had been sitting idle in secured cabinets for many years unattended.

In work area one, the chemical was securely locked in a general cabinet outside the building, however the key to access the cabinet was on a hook on the wall within a workroom inside the locked building. The work site was only used when research work was needed. During the site inspection the agency advised that the chemical was no longer needed and would be disposed of.

In work area two, large quantities of CSC were securely locked in a specially designed store outside of the building. This work area was project-based and the CCC was informed that researchers who had previously worked on projects at this work area confirmed that the chemicals were no longer needed. The agency has worked with the responsible unit and the private company to have the chemicals disposed of.

We were concerned that researchers, when they completed a particular research work or project, did not ensure the safe transfer or disposal of the chemicals.

> *Recommendations*
>
> a) Ensure CSC is adequately secured by implementing a key compartment to hold keys. The CCC acknowledges that the CSC at a particular work area will be disposed of, however, should there be any future CSC, the agency is to design and implement adequate security measures.
>
> b) Ensure research work has a clear end with correct handover of information and responsibility associated with the chemicals. Pre-handover preparation and post-handover support form a key part of transition preparation, including effective management of the health, safety and security of chemicals by end-users.
>
>   Handover is to be defined and the process documented in procedures, and communicated to all relevant researchers/staff.
>
> *Note*: The agency mentioned above took corrective actions to relocate the keys to the chemical cabinets, to a secured area. The chemicals inspected by the CCC would be disposed of or returned to the relevant party. Their Health, Safety and Wellness Committee planned to enable and oversee the developed policy and procedures involving end of project disposal of all CSC on sites across the organisation.

Area for improvement 11 – Ineffective security measures #4

In the fourth agency, the audit identified that access to a CSC within the restricted work area was stored in a locked toxic cabinet, but the key to the cabinet was not secured to prevent unauthorised access to the chemical. Refer to the case study below.

Case study – A chemical was not adequately prevented from unauthorised personnel

During the CCC's site inspections, we were advised that staff required access to the toxic cabinet on a daily basis and the key on the hook helped to reduce the time taken to access the chemicals. The CCC was also advised that the laboratories were restricted by swipe access cards and only staff had access. Further, staff had been working with the agency for a long period of time.

At both locations audited by the CCC, the workplaces had similar levels of security with access restrictions for workers, volunteers, students and visitors including electronic swipe card and key only area access. Additionally there were security cameras monitoring the entrance and exit to the facility and individual block areas on a 24/7 basis.

There were no systems in place to identify or prevent a person from taking a CSC off-site should they wish, or indeed should a person wish to bring one into either facility.

After hours procedures required workers to sign-in and sign-out of the facility for the duration of their time at the workplace. The work associated with this could only be deemed low risk and was appropriately risk assessed and signed off by the person's supervisor, Senior Workplace Health and Safety Coordinator and the Facility Manager.

While we acknowledge these control measures reduce the security risk, the agency should not have ignored the risk that a trusted insider could have taken advantage of this knowledge to cause harm, for example by stealing, or helping an outsider to steal, the chemicals (an insider threat).

In another work area of the fourth agency, we found large quantities of a high-risk chemical at a concentration of 65-70 per cent. The quantities of the chemical at this location was significant. Some of the bottles were old and belonged to a work area within the agency. As a result of this audit it was identified and acknowledged by the work area managers that the chemical was seldom used and therefore they agreed with the CCC to decrease the volume of this chemical being kept onsite.

> *Recommendations*
>
> a) Implement an agency-wide chemical security management framework to ensure that the risks of chemical misuse are substantially mitigated to an acceptable level.
>
> b) Reduce the large volumes of a high-risk chemical. While this may be wasteful, the work area could contact other work areas across the agency to see if they are interested in this chemical for work use (e.g. free chemicals to transfer), providing that the chemicals are still in good condition. All documentation associated with the chemical should also be provided to the transferee.
>
>   Otherwise, the work area should look into disposing of the chemicals appropriately.
>
> *Note*: In responding to this audit, the agency accepted the findings and recommendations made by the CCC. They acknowledged that the high-risk chemical quantities were significant, and planned to work towards reducing the volumes via either chemical transfer to another agency, providing that the chemicals are still in good condition, or they planned to look into disposing of the chemicals appropriately via a waste disposal company.

5. Regulatory (oversighting initiative)

Area for improvement 12 – Enhance initiatives for regulatory impacts

The audit identified business improvement opportunities in a regulatory agency's governance and processes to oversee how effectively organisations[9] in Queensland are managing the risk of CSC. While the security of CSC is not specifically covered in Work Health and Safety Regulation, it does highlight the importance of managing security risks.

We have addressed this area for improvement in two parts, being that of:

- Regulatory efforts
- Code of Practice – Managing Risks of Hazardous Chemicals in the Workplace.

Regulatory efforts
The Work Health and Safety Regulation imposes requirements on agencies and businesses that are proportionate to the type and quantity of hazardous chemicals at the workplace. There are four escalating stages of regulation that focus on:

- workplaces with hazardous chemicals (low priority/risk)
- manifest quantity workplaces (medium priority/risk)
- potential major hazard facilities (high priority/risk)
- major hazard facilities (high priority/risk).

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9 We used 'organisations' to refer to a person conducting a business or undertaking, as referenced in section 5 of the *Work Health and Safety Act*.

The regulatory agency has been, and were, at the time of the CCC audit, conducting audits and site inspections of major hazard facilities by dedicated inspectors. Assessment of security arrangements were included in their compliance activities.

All other workplaces in the low to medium priority ranges were not included in compliance campaigns, however proactive compliance and enforcement activities have been undertaken in the past. Assessment of security arrangements were not included in these activities, but workplaces inspected were asked about their security arrangements in terms of preventing unauthorised access in general and they were referred to the *National Code of Practices for Chemicals of Security Concern*.

The regulatory agency had already commenced planning for a compliance and enforcement program for medium priority workplaces, with a particular focus on regulating them in a systematic and sustainable way. This was done to drive increased compliance with Part 7.1 Hazardous Chemicals of the Work Health and Safety Regulation, and therefore improving the safety of workers and the community. This was a major long-term program within a resource limited environment.

The CCC observed that the regulatory agency had not conducted any laboratory focused intervention programs, though inspectors may have visited as a result of incident notifications over the years. We recommended that the regulatory agency continued with their current program and included security arrangements in their compliance and enforcement activities to support national security.

We are of the view that other agencies and businesses may have similar issues and it is critically important for agencies in the medium priority risk category to have a well-designed chemical management framework, and processes implemented, to manage risks.

Code of Practice for Managing Risks of Hazardous Chemicals in the Workplace
The regulatory agency's codes of practice are based on a national model code of practice developed by Safe Work Australia as part of the harmonisation of work health and safety laws.

Government agencies are expected to support the Commonwealth government, including other states and territories, in keeping Australia safe. The CCC believed public sector agencies should do more than what was prescribed in the regulation as the 'minimum', including undertaking proactive initiatives.

The CCC acknowledged that the regulatory agency promotes chemical security on its website, and links with the Australian National Security website.

For these reasons, we encouraged the regulatory agency to consider updating their *Code of Practice for Managing Risks of Hazardous Chemicals in the Workplace* to support chemical security risks and other matters we raised in this report with participating agencies.

Recommendations
a) Continue developing their current compliance program targeting medium priority/risk workplaces.
b) Enhance the risk management and intelligence system to inform better decisions on targeting the industry types, workplaces and task activities (e.g. hazardous chemicals).
c) Review resourcing within the hazardous chemical unit to facilitate an appropriate level of monitoring and compliance assessment.
d) Note the audit findings the CCC have observed in agencies and work towards enhancing prevention initiatives, as part of the regulatory agency's capability building strategies of workplaces across Queensland. Examples of prevention initiatives are:
- progress audit findings and recommendations into the *Code of Practice for Managing Risks of Hazardous Chemicals in the Workplace*
- include a link to the CCC's public summary report on the regulatory agency's CSC webpage
- progress audit recommendations into future hazardous chemical training of inspectors and into assessment tools.

Note: In responding to this audit, the regulatory agency agreed that they are best placed with the support of the Commonwealth and the Queensland Police Service, to help organisations undertake chemical security risk assessment and implement prevention measures concerning CSC. The regulatory agency has demonstrated support for this in several ways and the CCC has acknowledged the activities undertaken by their agency. The regulatory agency intended to consider incorporating CSC related initiatives into future programs of work in a proportionate manner.

The regulatory agency acknowledged the benefits of including some of the CCC's audit findings raised with participating agencies, into the *Queensland Code of Practice for Managing Risks of Hazardous Chemicals in the Workplace*. Using the Code to further assist this initiative did appear to be reasonable, however, this approach may be problematic in the short term. Some examples are:

- The *Work Health and Safety Act* has recently been amended to change the status of the supporting Codes of Practice such that, from 1 July 2018 any persons conducting a business or undertaking were required to comply with an approved Code of Practice under the *Work Health and Safety Act*. Alternatively, duty holders can follow another method, such as a technical or an industry standard, to manage hazards and risks, as long as it provides an equivalent or higher standard of work health and safety to the standard required in the Code.

- Any additional new information incorporated into an approved code such as the Code of Practice referred to above, will need to be carefully considered and is generally expected to have a basis in Work Health and Safety legislation. Security is not a specific requirement under the Regulation but it will need to be considered further by policy-makers in terms of legality and suitability.

- Queensland's Code is based on the *National Model Code of Practice – Managing Risks of Hazardous Chemicals in the Workplace*, published by Safe Work Australia. Possible changes to this National Code to incorporate the CCC's audit recommendations will need to be in consultation with Safe Work Australia and other state jurisdictions.

The regulatory agency valued the contribution that this CCC initiative would make to chemical management in Queensland, and planned to work with the CCC on alternative approaches that may be more appropriate, in relation to revising the Code of Practice. The CCC is always happy to work in collaboration with the regulatory agency.

Conclusion

The CCC's audit focused on key elements that promote improved governance and management of high-risk chemicals, to significantly mitigate the diversion of CSC into homemade explosives, toxic devices and illicit drugs manufacturing.

Identifying chemical security risks involves generating a comprehensive list of threats and opportunities based on events that might enhance or prevent the achievement of anti-corruption objectives. It is important to scan the environment from time to time to identify new and emerging risks, as an agency's exposure to risk may be constantly changing.

At the conclusion of the audit, the CCC circulated our findings to the participating agencies, which have acknowledged the findings and recommendations. Their views have been considered in reaching our final report. This report represented the overall responses from the agencies. It is pleasing to see that agencies have already taken, or planned to take, steps to address the relevant issues and recommendations.

Public sector agencies and Queensland businesses should acknowledge the changing national security and criminal landscape, and its role in providing appropriate leadership in pursuit of the objectives of the voluntary *National Code of Practice for Chemicals of Security Concern*.

Summary guide – Strategies to manage corruption risks

Key facts

Agencies must help build a chemical security culture – *Know the chemicals. Know the risks. Know the code*[10], beginning with a chemical management framework. Such framework is directed towards:

- promoting the policy, procedures and processes in managing chemical security risks
- understanding each chemical that could potentially be used to make explosives, a toxic device or drugs
- undertaking risk assessments of CSC, using the AS/NZ ISO 31000 Risk management process
- implementing adequate internal controls and monitoring activities to mitigate the chemical risks.

Note the higher the overall risk rating, the greater the level of concern posed by that chemical. The overall risk rating should drive the implementation of control measures and should cover the key areas in the chemical lifecycle e.g. from procurement through to receipt, access, storage, security, inventory management, and disposal.

Guiding legislation

The *Work Health and Safety Act 2011 (Qld)* (WHS Act) is the main piece of legislation governing and guiding the use, handling and storage of hazardous chemicals at Queensland workplaces, specifically, Chapter 7 Hazardous chemicals and the Work Health and Safety Regulation 2011.

CSC can also fall within the ambit of other legislation and associated regulatory agencies, such as:

- The potential for use of ammonium nitrate as a component of explosives is subject to state regulations. In Queensland, this is the Explosives Inspectorate in the Department of Natural Resources and Mines. The Explosives Inspectorate is guided by the *Explosives Act 1999 (Qld)* and the Explosives Regulation 2017 (Qld).
- Some chemicals are classified as "chemical weapons" and are under the control of the *Chemical Weapons (Prohibition) Act 1994 (Cwlth)*. Permit and notification requirements will apply if an agency has any of these chemicals.

Strategies to manage risks

Knowing how to identify, manage and monitor the risks of chemical security is an effective way to prevent agencies from becoming a target for terrorists or drugs opportunists. Opportunists can target laboratories and workplaces that deal with CSC. They may use a trusted insider – or become one – to gain access to chemicals that they can use for terrorist activities, or to manufacture illicit drugs.

The CCC promotes a three-step process for implementing mechanisms that will assist an agency in managing the security of CSC. (**Note** that the following is not exhaustive and should be considered as a summary guide only.)
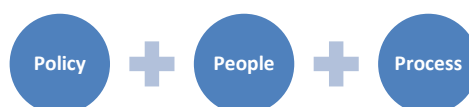
1 Policy

An agency should maintain strong, effective and efficient policies, procedures and guidelines which are clearly based on and linked to relevant legislation, official guidelines, and examples of best practice advice. A policy or procedures must also assign responsibilities for completing key components and

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10 Adapted from the Australian National Security. https://www.nationalsecurity.gov.au/Securityandyourcommunity/ChemicalSecurity

assign particular roles to those who are authorised and responsible for carrying out the management and monitoring activities.

A chemical security management framework should be developed to ensure that the risks of chemical misuse are substantially mitigated to an acceptable level. The framework should include information about processes to follow and control measures.

The following table is an example of what should be included in policy and procedures:

Topic	Include
Chemical risk management	Policy and procedures for chemical risk management.
Chemical security	Procedures for security are written and implemented.
Purchasing and receiving of chemicals	Policy and procedures for authorisation, prohibited and restricted chemicals, prescribed quantities, and segregation of duties.
Inventory controls	Procedures for inventory control movements, access, accounting and reconciliation.
Storage and use of chemicals	Procedures for storage levels, maximum amount, location, security, handling, and prescribed quantities per laboratory.
Disposal of chemicals	Procedures for chemical waste and authorisation.
Training	Policy to reinforce the development and delivery of education and training programs on chemical security awareness and management.
Reporting suspicion of activities	Procedures for reporting suspicion of activities, including 'red flags' and indicators.
Responding to incidents	Procedures for loss or theft to be reported, and to whom they will be reported including the National Security Hotline, investigation, and any prevention measures.

2 People

All managers, employees, and anyone working for the agency have an important role to play in preventing CSC falling into the wrong hands. They must help build a chemical security culture – *Know the chemicals. Know the risks. Know the code*.[11] Such 'people' initiatives should be directed towards:

Education and training	Chemical security awareness	Reporting suspicion activities and incidents
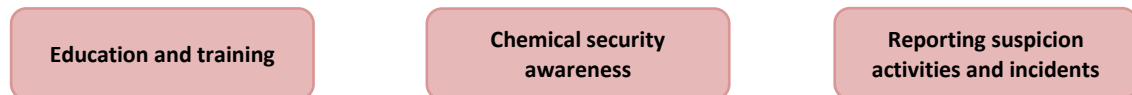
Education and training

Education and training programs for managers, supervisors, staff and students should be developed to help them with understanding the risks of CSC and preventing them from opportunists. The training programs should facilitate:

- Risk management and its principles: AS/NZS ISO 31000:2009: *Risk management – Principles and Guidelines* is a recommended source.

- What the agency needs from risk management: This should start with understanding how each chemical could pose a risk to the agency and individuals, where decisions are made and the risks taken. In fact, understanding who makes decisions and therefore takes the risk is critical to understanding how the risk is managed.

- What internal controls, particularly security measures, are in place to address the specific risks.

- Informing whether the security measure's design is adequate.

- Perform assurance testing of the security measures to determine that they are operating effectively as designed.

- Chemical security awareness and reporting of all suspicious activities and incidents within their agency. The role of the National Security Hotline should also be promoted.

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11 Adapted from the Australian National Security. https://www.nationalsecurity.gov.au

Chemical security awareness

It is important that an agency's Senior Executive Group maintains knowledge and understanding of chemical security risks, and ensures that chemical risk assessments are regularly conducted.

Furthermore, senior executives must be committed to understanding the management of chemical security risks and communicating these risks to all employees. In addition, ensuring the risk profiles exist, and that the profiled risks are communicated and managed effectively.

All other employees should be chemical security aware within their agency. They should consider the risks surrounding CSC, and contribute to strengthening internal control measures to help in reducing the chemical security risks to their agency.

Reporting suspicious activities and incidents

Employees must report all suspicious activities and incidents regarding chemicals to the relevant officer in the agency, who in turn reports these activities or incidents to the National Security Hotline on 1800 123 400. This practice should be part of all chemical management procedures.

3 Process

The "Process" step is considered the most important piece of the overall chemical management framework. An agency must lower the risk of chemicals being used for unlawful purposes. This can be achieved by:

- Identifying and assessing security risks
- Making informed decisions about the security of CSC
- Implementing cost-effective internal controls to manage the security risks
- Monitoring and reporting the ongoing effectiveness of internal controls.

Risk governance

The basis of risk governance is thorough risk assessment, sound decision-making, strict and consistent implementation of appropriate risk mitigation measures, monitoring, and reviewing. Chemical risk management should be founded on risk assessment.

Chemical security risk assessment

Security risk assessment should, at a minimum, include:

Identifying the risk	Analysing the risk	Evaluating the risk
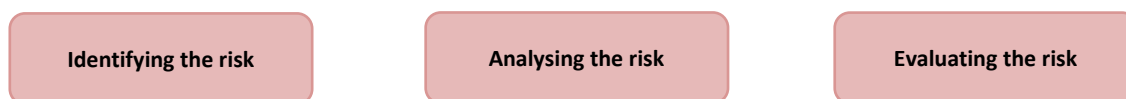
Identifying and analysing the risk

To provide some context, as defined by Kaplan and Garrick[12], risk assessment consists of answering three specific questions:

- What can happen?
- What is the chance that it will happen (e.g. the likelihood)?
- If it happens, what are the impacts (e.g. the consequences)?

A set of security scenarios should be developed that may be of concern to a laboratory or facility storing, or handling CSC. There are many scenarios an agency can come up with, including how an opportunist can gain access to CSC.

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12 Stanley Kaplan and B. John Garrick, 'On the Quantitative Definition of Risk', University College London, 1981.

The following are some examples of scenarios an agency could consider in their risk assessment:

Insider threat	Outsider threat
Physical and personnel accesses • The risk of an employee disclosing confidential security layouts of a laboratory or facility holding CSC to an adversary. • The risk of an employee with authorised access to the laboratory, storage, and to the chemicals, successfully taking chemicals and using them for unlawful purposes. • The risk of an employee (or student) accessing the laboratory, storage, and the chemicals, maliciously causing a release of the chemicals (sabotage).	**Physical and personnel accesses** • The risk of a terminated employee (or an outgoing student) still having access to the laboratory, storage, or to the chemicals. • The risk of an opportunist without access to the laboratory, storage, or to the chemicals, successfully taking chemicals and using them for unlawful purposes. • The risk of an opportunist without access to the laboratory, storage, or to the chemicals, maliciously causing a release of the chemicals (sabotage).
Purchasing and receipting • The risk that an employee is forced or bribed into ordering or diverting chemicals for adversaries (coercion). • The risk that the product ordered has not been authorised by a governing officer and then the financial delegate, or the ordering is in breach of the agency's policy (e.g. maximum quantity, prohibited and restricted products). • The risk that the amount of product ordered does not match the amount received (e.g. hijacking).	**Purchasing and receipting** • The risk that an adversary is impersonating an employee at the loading bay, receipting the chemicals, and successfully taking chemicals.
Inventory management • The risk of an employee with authorised access to an inventory control system manipulating the quantities and/or volumes of chemical stored in either the laboratory or storage holding. • The same risk as above, but without access to an inventory control system. • The risk that products containing CSC are not regularly checked and/or reconciled to the information in the inventory control system.	**Inventory management** • The risk that user access to the inventory control system is not regularly reviewed for currency (e.g. a terminated employee that still has authorised access to the system).

In this risk analysis, each chemical security risk is to be assessed as to the **likelihood** of targeting a chemical and the likelihood of successful theft of the chemical from the workplace (or laboratory) and the **consequences** of malicious release of the chemical.

Then, a more detailed analysis of risk will involve the mapping of current internal controls and an examination of the effectiveness of those controls in managing the risks identified.

At the end of the risk analysis, an overall risk rating is calculated.

Evaluating the risk

Determining whether the overall risk is acceptable, controllable, or unacceptable is part of facilitating decisions on whether a risk requires mitigating actions. The higher the overall risk rating, the more focus an agency should place on mitigating the possible future risk of high-risk chemicals being taken or diverted for unlawful purposes.

An agency may have outstanding mitigating actions that still need to be implemented. If so, the agency should evaluate what the expected overall risk will be once those outstanding actions are implemented.

If the expected overall risk is still not acceptable, the agency needs to make decisions on implementing new mitigating actions to achieve an overall risk rating that is acceptable.

There are several factors that can influence risk acceptance, such as considerations of the level of available resources and costs to mitigate or control the risks, the regulatory requirements overseeing the risk, the value of work to the community, and the public's general perception[13] regarding the risk.

The public perception of risk[14], the nature of the chemicals, and the incidents harm index are often driving factors in setting the priorities and the agendas of regulatory bodies. To this effect, the risks associated with public perception and the intrinsic value of chemicals to opportunists should not be ignored.

The following case study demonstrates how the public's perception of risk can influence an agency's risk acceptance. In determining that level of risk, an agency should ask and answer certain questions.

Case study – Public perception of chemical risk

Ask yourself these questions[15]:

- What is the public's confidence that the situation can be controlled?
- What is the national or global impact?
- What is the risk to future generations?
- What is the ability to mitigate the consequences, and did the impacted individuals voluntarily engage in the activity?

Your answers to these questions will help facilitate better decisions in mitigating the chemical security risks and, ultimately, achieving better outcomes.

Refer to **Appendix A** for considering the potential nature of the chemicals (that is, precursors to explosives, or used to make toxic devices and illicit drugs).

Chemical risk mitigation actions

Each agency needs to put security measures in place that mitigate its specific risks. This ensures there is a tailored approach to risk management where individual risks are appropriately mitigated. For example, managing the security of products that contain high concentrations of chemicals of security concern will be different to managing the security of products containing low concentrations of that chemical.

There are a number of areas where mitigating actions can be taken, subject to the agency's risk assessment of specific high-risk chemicals. These actions are:

- Employee, contractor and student checking
- Physical access controls
- Personnel access controls
- Purchasing and receipting control measures
- High inventory control measures
- Disposal (waste) control measures
- Supervisory control measures

- Theft and diversion prevention plan
- Responding to suspicion activities and incidents procedures
- Internal compliance program of monitoring and review (e.g. ensuring the designed processes and controls in place are operating effectively).

Each risk should be assigned to a responsible officer to manage and periodically report upon.

Monitoring and reviewing the risk

Monitoring and reviewing the risks involves the ongoing examination of the chemical security parameters and the management of chemical risks to determine whether the risk profile has changed and if new threats have since emerged. An agency should also conduct audits on the effectiveness of

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13 'Public perception' is what a fair and reasonable member of the public would believe when observing or being made aware of a situation, or the involvement of an agency or individual.

14 Paul Slovik, *Public Perception of Risk*, Science, 1997. Slovik is one of the world's leading analysts of risk, risk perception and risk management, to examine the gap between expert views of risk and public perceptions. The public's perception of risk is influenced by social, cultural, economic and political factors.

15 Adapted from Paul Slovik, *Public Perception of Risk*, Science, 1997.

security measures in place. These initiatives are imperative to ensure an agency's chemical security risks are relevant, comprehensive, and effective.

Further information and resources

The *National Code of Practice for Chemicals of Security Concern* provides valuable guidance on increasing security risk management, however, it is up to each agency to identify specific risks and vulnerabilities, and to make practical and informed decisions about how to prevent security issues as far as reasonably practicable.

Appendix A – High risk chemicals

Table 1 – 15 precursors to explosives or used to make toxic devices

Precursors to homemade explosives	
Chemical	**Concentration**
Ammonium perchlorate	a. in a water-based solution containing 10% or higher of ammonium perchlorate; or b. in a form other than a water-based solution, at a concentration of 65% or higher.
Hydrogen peroxide	a. in a water-based solution at any concentration; or b. in a form other than a water-based solution, at a concentration of 15% or higher.
Nitric acid	at a concentration of 30% or higher.
Nitromethane	at a concentration of 10% or higher.
Potassium chlorate	a. in a water-based solution containing 10% or higher of potassium chlorate; or b. in a form other than a water-based solution, at a concentration of 65% or higher.
Potassium nitrate	a. in a water-based solution containing 10% or higher of potassium nitrate; or b. in a form other than a water-based solution, at a concentration of 65% or higher.
Potassium perchlorate	a. in a water-based solution containing 10% or higher of potassium perchlorate; or b. in a form other than a water-based solution, at a concentration of 65% or higher.
Sodium azide	at a concentration of 95% or higher.
Sodium chlorate	a. in a water-based solution containing 10% or higher of sodium chlorate; or b. in a form other than a water-based solution, at a concentration of 65% or higher.
Sodium perchlorate	a. in a water-based solution containing 10% or higher of sodium perchlorate; or b. in a form other than a water-based solution, at a concentration of 65% or higher.
Sodium nitrate	a. in a water-based solution containing 10% or higher of sodium nitrate; or b. in a form other than a water-based solution, at a concentration of 65% or higher.
Used to make toxic devices	
Chemical	**Concentration**
Aluminium phosphide	at any concentration.
Chlorine (gas only)	at any concentration.
Potassium cyanide	at any concentration.
Sodium cyanide	at any concentration.

Source: *National Code of Practice for Chemicals of Security Concern*, Australian National Security
https://www.nationalsecurity.gov.au

Table 2 – Some precursors to illicit drugs

Precursors to illicit drugs	
Chemical	**Its other uses…**
Nitromethane	This chemical is also a precursor to homemade explosives. See Table 1 above.
Thionyl chloride	This chemical is also used in chemical weapons. Chemical weapons convention are legislated under the *Chemical Weapons (Prohibition) Act 1994 (Cwlth)*.
Phosphorus pentachloride	Its other uses are in chemical weapons.
Potassium cyanide	This chemical can also be used to make toxic devices.

Source: Code of Practice for Supply Diversion into Illicit Drug Manufacture, Chemistry Australia. Refer to this code of practice for a full list. https://chemistryaustralia.org.au/safety-environment/code_of_practice_for_supply_diversion_into_illicit_drug_manufacture

Crime and Corruption Commission

QUEENSLAND