

PROCEDURE: Procedure for Handling Hazards in the Collection

1.0 PURPOSE

This procedure is to ensure that staff are able to identify, assess and control foreseeable risks posed by potential hazards in the collection areas, or hazardous material within the collection itself, in order to minimise or prevent the likelihood of an injury or illness occurring to staff and/or harm to collection material.

2.0 SCOPE

The collections are known to contain specimens and objects which could potentially pose a risk to the health of staff and visitors and to other items in the collection. The risk management process outlined here will identify the risks; provide guidance on handling methods and a step by step set of options to ensure the most appropriate control measures are implemented.

3.0 DEFINITIONS

Acute Effects – Acute means of ‘rapid onset and short duration’. Usually the effect is felt immediately after a short exposure; however, it can result in chronic disease.

Chronic Effects – The definition for chronic is ‘of slow onset and long duration’. The exposure is repeated many times and adverse effects are only felt after an extended period of time. The delay between the time of exposure and signs of disease is the latency period.

Collection Material – Includes any object or specimen belonging to the organisation/venue.

Corrosive – A substance which will destroy or damage another substance (including living tissue) by chemical reaction. The most common form is acids.

Dangerous Goods – Can be identified as substances which when stored or transported in bulk present a hazard from explosion, fire, poisoning or corrosion on short term exposure. As stated in the National Occupational Health and Safety Commission’s (NOHSC). Guidance Notes, “Dangerous Goods may also be referred to as subsets of hazardous materials”. The NOHSC publications for hazardous substances also apply to all the substances under *the Australian Code for the Transport of Dangerous Goods by Road and Rail* (ADG Code) and substances that meet the classification criteria of the Code.

Dangerous Goods Class Labels – All dangerous goods are assigned class labels to assist identification and denote the hazard class of a particular substance. Class labels are represented by a diamond shaped warning sign and description of the principal hazard.

Class 1 - Explosives

Explosive substances can form an explosive atmosphere of gas, vapour or dust. The class also includes substances and articles produced for an explosive or pyrotechnic effect. (Includes substances such as fireworks or detonators).

Class 2 - Gases

Subdivision during transport is required and it is determined by the primary hazard of the gas. (Includes substances such as LP gas, butane, welding cylinders, ammonia etc).

Class 3 - Flammable Liquids

Liquids that can generate a vapour, forming a flammable mixture with air. The flash point is the lowest temperature at which a liquid generates vapour which will remain alight when a flame is applied. Examples: paints, varnishes, lacquers and solvent thinners. (Includes substances such as petrol, ethanol and paints).

Class 4 - Flammable Solids

Solid substances which are flammable in air and can sustain spontaneous combustion and emit flammable gases upon contact with water. (Includes materials such as firelighters).

Class 5 - Oxidising Agents,

Oxygen is generally provided in a reactive form or is liberated to cause an oxidation process. High reactivity may lead to explosion or fire if in contact with combustible materials. (Includes substances such as chemicals used in the agricultural industry).

Class 6 - Toxic and Infectious Substances

(Includes substances such as cyanide, some pesticides, viruses and bacteria).

Class 7 - Radioactive Materials

This class includes materials or combinations of these that can emit radiation spontaneously. (Includes substances such as Uranium).

Class 8 - Corrosive substances

Substances that may cause severe burns by chemical action when in contact with living tissue. (Includes substances such as pool chemicals).

Class 9 - Miscellaneous Dangerous Goods

Substances and articles that present a danger especially during transport, not covered by other dangerous goods classes. (Includes substances such as PCB's).

Hazardous Material – Means materials which, alone or in combination with others, are or could become toxic, irritant, explosive, flammable, corrosive, or noxious, and for which special precautions are required (Source *Standards Australia*).

Hazardous Substances – Are those which have a POTENTIAL for causing harm. These chemicals are found everywhere, not only in the workplace but also in the general environment – in the air, water and soil. Industrial settings may range from basic chemicals used in chemical or process applications, such as *chlorine*, *caustic soda* and *sulphuric acid*, to *complex dyes* and *bulk medicinals*. Others are used as *solvents*, intermediates in further chemical manufacture and as the basis for making *synthetic rubber*, *plastics* and *man-made fibres*. Significant exposure can also occur through general contact with the environment, for instance, from *exhaust emissions*, *insulating materials* and even *foods*.

Irreversible Effects – Are lasting and cause considerable damage to the body, even if exposure to that chemical is stopped. A potent example is carcinogens, which cause cells

to multiply and spread out of control. Mutagens (which affect sperm and egg cells) and Teratogens (which affect the development of the unborn child) are also in this category.

Reversible Effects – Occur when symptoms are experienced immediately after exposure but then cease rapidly.

Safety Data Sheet – Is the form containing data regarding the properties of a particular substance including procedures for handling or working with that substance in a safe manner.

Sensitisers – Can occur after prolonged exposure. A person may become sensitised to that chemical. This means they will mount an allergic response to it. Often only a very small dose is required.

4.0 ACTIONS

This procedure must be read in conjunction with the *Policy for Handling Hazards in the Collection*.

This process must be used to assess existing objects or specimens in the collection, as well as potential new acquisitions, in order to ensure staff are fully aware of any potential hazards before an object is acquired. (In some cases if the risk is too high or the mitigation requirements are too difficult or expensive to implement, a decision may be made not to acquire an object).

4.1 Risk determination and disposal:

- The relevant staff are responsible for ensuring all current and new staff, volunteers and researchers are trained in how to identify some of the known hazards in the collection, appropriate handling of material which may contain hazards, and what precautions are necessary to minimise risks.
- Ensure all waste material (used shelf liners, disposable gloves etc) are disposed of appropriately.
- Ensure that any Object or Specimen identified for disposal is disposed of in accordance with appropriate local authority or government guidelines. In the first instance seek assistance from the WHS and Risk Manager for guidance. Any disposal or deaccessioning should also be done in accordance with the the organisation/venue's procedures.

4.2 Handling Procedures

- Any Object or Specimen thought to contain a hazard must be handled as little as possible.
- Wash hands with soap and water before and after handling collection material.
- Wear lab coats when working with collection objects – remove when leaving the store and leave in a designated area.
- Use disposable nitrile gloves.
- Where necessary use appropriate Personal Protective Equipment such as respiratory mask and goggles.
- Keep hands away from face (eyes, mouth, nose).

- Wash hands thoroughly before smoking, applying lipstick or lip balm.
- Keep tetanus shots up-to-date.
- Wear enclosed shoes in the collection areas.
- Do not chew on pencils etc.
- Do not consume food or drink in collection areas to prevent contamination.
- Do not take or store personal items in the collection areas.

4.3 Documentation and storage

- Objects or Specimens containing a known hazard or suspected hazard should be labelled accordingly – directly on the item tag and on the storage unit in which it is contained. In addition, a Warning Flag or note should be added to the collection database record (if applicable).
- Wherever possible this material should be stored separately from non-hazardous collection material.
- If necessary the Object or Specimen should be stored in a specialised storage unit – such as a ‘Dangerous Goods’ or ‘Corrosives’ cabinet.
- The storage area should also have appropriate spill kits for the type of hazards stored there (e.g. Mercury spill kit).
- Ensure that any hazards are noted on the collection database object record and identify any display or exhibition restrictions – i.e. ‘Not for display’.
- Ensure any objects selected for Outward Loan are checked to ensure they are hazard free; or alternatively if the hazard remains present, that information regarding the appropriate handling and use of the item is provided to the borrower to ensure minimal risk.

At all times staff must utilise reasonable care and take all necessary precautions when handling collection material. If in doubt regarding whether or not a hazard is present, it is better to **err on the side of caution** and treat the object or specimen as if the hazard were confirmed. Further assistance should be sought either from the WHS and Risk Manager or the Senior Conservator in relation to identifying hazards and what the appropriate handling methods are, including any Personal Protective Equipment which might be necessary.

In order to establish a standard procedure for dealing with known hazards four management options have been identified:

Option 1 – Retention

- Objects or specimens which are deemed not to be a high risk or where the hazard is manageable by appropriate storage and handling will be retained.

Option 2 – Stabilisation

- Where the condition of an object or specimen has deteriorated, and therefore the risk of the hazard has increased, an object or specimen must be stabilised in order to continue to safely retain the item.

- Where staff require an object to be retained for historical, scientific or cultural reasons, but the object currently poses a risk, the item must be stabilised in order to continue to safely retain the item.
- Stabilisation relies on the available resources in order to conduct the work required. If that is not possible, an object or specimen may have to be disposed.

Option 3 – Decant / removal

- Where the contents of an object are deemed a hazard, but where they can be removed safely and resources are available to do this, then an object can be retained. This is only possible if the object can be completely flushed or the risk material completely removed leaving no traces of the problem substance.
- This will be performed by a professional or an external party; in accordance with appropriate local authority or government guidelines. Assistance for disposal options can also be sought from the WHS and Risk Manager.

Option 4 – Disposal

- Where an object or specimen poses a high risk or there is insufficient information to determine the risk (ie. unsealed containers, containers with no labels, insufficient accompanying documentation), or if the risk cannot be made safe, than an object or specimen must be disposed of by approved means.

It is possible for one or more management options to be identified for each specific hazard depending on the type of hazard, quantity of material, condition of object or specimen, degree of risk and so on.

In all cases, any object or specimen which is deemed no longer appropriate to remain as part of the Collection due to its high risk to staff and/or other collection material, must be disposed of in accordance with a policy for deaccessioning and a procedure for deaccessioning and disposal (if applicable). The only accepted method for disposal in this case would be via appropriate destruction. Objects are not to be returned to the original owner or transferred to any other area or external institution.

In the case of objects where the hazardous contents are removed for disposal but the main object is retained, it is important to document the contents prior to disposal for research purposes. This includes a physical description on the collection database object record and a digital image if possible. If the contents have not been separately registered, they may be considered unaccessioned and can be disposed of as such, therefore only requiring approval from the Manager rather than the Board.

All documentation associated with identified hazards must be scanned and attached to the relevant record in the collection database (where one exists) and hard copies must be kept in the appropriate file located in the Collections area in accordance with a collections and research record keeping procedure (if applicable).

In the event of any object or specimen being assessed for potential hazards, it is important to note on the object tag and database record (where one exists), what assessment was made, by whom and when; including what actions were taken. If the object or specimen was determined as safe, or if action was taken to render it safe, this also needs to be noted in the database record (where one exists) or in the object/specimen document files. This

will ensure that staff do not waste resources assessing objects or specimens more than once, and reassures people that a hazard is either not present or no longer present.

An alphabetic list of specific hazards which have already been found in the Collection is provided in **Appendix A** the list provides basic information including where the hazard may be found, what risk it poses, how to identify it, how to handle it and how to manage it. This list is not exhaustive and future work on the collections may well identify additional hazards.

4.4 RESPONSIBILITIES

- Collection Managers
- Curators
- Conservation staff
- WHS and Risk Manager
- Facilities Manager

5.0 REVIEW PROCESS

This document will be reviewed every 2 years and at other times if any significant new information or legislative or organisational change warrants a change to this document.

Once printed this document is no longer a controlled document.

Appendix A

Asbestos

Hazard alert code: Extreme

Poisons schedule: none

Found in:

- Naturally occurring in some mineral specimens.
- Insulating materials such as tiles, lagging, cement, brake lining, engines and boilers.
- 'Fire-proofed' materials such as clothing, curtains, blankets, ironing boards.
- Appliances with heating elements such as toasters, stoves, electric jugs, saucepans, hair dryers, foot warmers and ovens.

Hazard:

- If fibres are inhaled or ingested, they may cause cancer and asbestosis of the lungs.

Identification:

- Most asbestos is hard to identify, it may look like cement sheeting or a similar product.
- The only way to positively identify asbestos is through a laboratory test which can be conducted by a specialised company.

Handling method:

- Handle items suspected of containing asbestos with disposable nitrile gloves and appropriate respiratory equipment.
- Double seal in heavy plastic, inside a fume cupboard, to limit escape of fibres.
- Specimen or object labels should be secured to the outside of the sealed bag for ease of access rather than leaving them inside the sealed bag with the item.
- If an accidental release of asbestos occurs when handling objects this must be managed immediately and the Conservation Section must be notified asap for advice. The area must be thoroughly cleaned using a HEPA filter vacuum and wet wiping of the area. PPE must be used while cleaning the area. All PPE, wipes and cleanup material used in the cleanup must be double bagged, identified as containing asbestos and advice obtained on it's disposal.

Management options:

Option 1 – stabilize

- If the asbestos is compact and not friable and forms an integral part of an object (such as inside a heater, working model or boiler) it is preferable to leave it in place and stabilize it by consolidation and sealing – removal can cause disruption of the asbestos which can potentially release fibres into the surrounding atmosphere. The object must then be appropriately labelled with hazard warning signage and safe handling instructions – available from the Conservation Section.

Option 2 – disposal

- If the asbestos is in any way disturbed (crumbling and shedding fibres) and is not able to be stabilised or is not integral to an object, or the object is deemed to be of low significance, it must be disposed of following EPA and Work Health and Safety Codes of Practice. Amendments to Schedule 2 of the *National Regulations for the Control of Workplace Hazardous Substances (prohibition of asbestos) 2001* stipulates that all uses of asbestos are now prohibited and that no threshold or 'safe' limit of asbestos exposure has yet been determined.

Arsenic

Hazard alert code: Extreme
Poisons schedule: S7

Found in:

- Taxidermy specimens from the 1700's to the 1970's could potentially have been prepared with arsenic soap, which was applied to the inner side of the specimen skin to preserve it from bio-deterioration and insect attack. In some cases mercuric chloride was also used.
- Ethnographic collections prior to 1972 are also likely to have been treated with arsenic and / or mercury compounds as part of pest control measures, either by the original collector or by subsequent collecting institutions.
- Medical or chemical collections, and used as a herbicide, insecticide or rat poison.
- Some mineral samples (naturally occurring arsenic).

Hazard:

- Arsenic can cause acute allergic reactions and is also a carcinogenic. It can be inhaled, ingested, or absorbed through the skin.
- It is a Scheduled 7 Regulated Poison, determined as being high to extremely high in toxicity.

Identification:

- Taxidermy specimens can show visual signs of the presence of arsenic – powdery or crystalline deposits at the base of hairs and feathers, around eyes, in or at the base of ears, around mouths or bills and on foot pads.
- Arsenic compounds can be yellow, black or grey and be in powder or liquid form. Health tonics and medical applications may often be labelled with the word arsenic or a derivative of that name, indicating some arsenic content.
- There are a number of established tests for arsenic which could be done by Conservation Staff to ascertain risk levels.

Handling method:

- Taxidermy specimens suspected of containing arsenic are to be handled with disposable nitrile gloves and appropriate respiratory equipment.
- Other forms of arsenic need to be handled as little as possible, again using disposable nitrile gloves and respirators.

Management options:

Option 1 – retain

- Care in handling and storage should be sufficient to mitigate most risks from taxidermy specimens and ethnographic objects. Specimens or objects suspected or confirmed as having the presence of arsenic contamination must not be used for open displays and especially not for 'touch and feel' children's exhibits or touch trolleys. They must also be appropriately labelled with hazard warning signage and safe handling instructions – available from Conservation Staff.
- Mineral specimens are to be double bagged with the specimen labels housed in the second bag layer (to prevent the need to handle the specimen). The bags should be labelled with a hazard warning, and the drawer or shelf should have appropriate handling instructions and warning labels. They should not be placed on open display.

Option 2 – stabilize

- In the case of taxidermy specimens, vacuuming with a specialised High Efficiency Particulate Air (HEPA) filter can remove arsenic dust; however, arsenic may migrate

from the interior of the specimen over time. So testing and vacuuming will need to be done at regular intervals.

Option 3 – decant / removal

- In the case of chemical or medical containers, where it is possible to remove arsenic compounds without damaging the object or risking harm to staff, this is be considered in order to reduce future risks of contamination.

Option 4 – dispose

- In the case of chemical or medical containers where it is not possible to remove arsenic compounds without damage to the object or risk to staff, the object is be disposed of.

Batteries and corrosives

Hazard alert code: Extreme (Sulphuric acid) / High (Hydrochloric acid)

Poisons schedule: S6

Found in:

- Batteries will be the most common source of corrosives in the collection.
- Medical or chemistry supplies.

Hazard:

- Batteries can pose a number of hazards depending on their type and chemical constituents. They can release corrosive vapours and corroding salts, affecting the object itself and potentially other objects close by. Leaking chemicals (from ammonium chloride, mercuric oxide, potassium or sodium hydroxide, to sulphuric acid) can cause skin and respiratory irritation.
- Corrosives in general can adversely affect eyes, skin, respiratory and gastrointestinal tracts if they are inhaled or come in contact with the skin.

Identification:

- Historical batteries can come in the form of Leclanche dry cells, Ruben Mallory cells and many other types. Some will look similar to modern batteries others may look like large glass containers with metal components.

Handling method:

- Handle all batteries with appropriate disposable nitrile gloves and respiratory equipment.
- Store separately away from other objects, in a corrosives cabinet.

Management options:

Option 1 – decant / removal

- In all cases, where objects contain batteries (such as toys, radios etc), they should be removed to prevent future leakage and damage to the object.
- If it is possible to remove the corrosive substances from a battery (with respect to early types of batteries), or to remove the corrosive substance from the object, without damaging the object or staff in the process, then it is possible to retain the item without risk of further harm or deterioration from this source. (Conservation staff will be able to assess whether this removal can be done in-house or if an external contractor will need to be utilised.)

Option 1 – dispose

- If a battery is identified as containing harmful substances and/or the condition of the battery is such that the risk of contamination and release of vapours is high, the battery is to be disposed of in accordance with EPA (Environmental Protection Agency) guidelines (www.epa.qld.gov.au). (In the meantime the battery should be stored in an appropriate fume cupboard or corrosives cabinet. Again Conservation staff can advise.)

Biohazards – contaminated material / food and beverage products

Hazard alert code: needs individual determination

Poisons schedule: needs individual determination where applicable

Found in:

- Objects which have come in contact with biohazards because of their use in certain professions or businesses – such as medical, veterinary or dental implements (e.g., syringes, scalpels), tattooing or body piercing implements etc.
- Objects containing human hair, faeces, blood or other bodily fluids because of their domestic or personal use – such as brushes, combs, false teeth, toothbrushes, toiletry items.
- Objects containing foodstuffs or beverage products (such as tin cans, food cartons and packages, bottles, etc), which over time could potentially degrade into harmful substances.
- Human remains and associated burial goods may pose a biohazard, including skeletal remains, soft tissue, hair samples, mummy wrappings and so on.

Hazard:

- Biological hazards can include micro-organisms such as viruses, toxins, moulds and fungus, bacteria and other pathogens. All of which can potentially cause adverse reactions in staff if inhaled or absorbed through the skin.
- Food products can be contaminated with botulism, causing cans to swell and explode harming staff or other objects.

Identification:

- Most objects which could be a hazard can be relatively easy to identify based on their prior use – anything which has come into direct contact with bodily fluids should be considered a potential problem.
- It should also be relatively easy to tell whether or not food or beverage containers still have contents.

Handling method:

- Items that may be potentially hazardous must be handled with disposable nitrile gloves and appropriate respiratory equipment.
- Objects which pose a biohazard risk and are also a 'sharps' risk, must be handled with even more care, as the potential is high for any biohazard to enter the blood stream directly if a staff member cuts or pricks themselves.

Management options:

Option 1 – retain

- It is difficult to ascertain how long pathogens and other biological hazards may remain active in museum objects. Generally the older an object, the weaker the adverse affects are likely to be. In most cases, care in handling and storage is sufficient to mitigate most risks.

Option 2 – decant / removal

- If it is possible to safely remove food and beverage products from containers without causing damage to the object, then this is to be done as a precautionary measure.
- In some cases it may be possible to remove the contaminants by cleaning or freezing an object (as in the case of mould spores), which could be done by Conservation Staff. Recommendations on what can or cannot be removed are to be made by the Conservation Section, WHS Manager or an authorised body.

Option 3 – dispose

- If an object is determined to be highly contaminated and it is not possible to remove the hazard, it must be disposed of following established Queensland Health guidelines (www.health.qld.gov.au).

Chemicals, Drugs, Poisons, and Pharmaceuticals

Hazard alert code: needs individual determination

Poisons schedule: needs individual determination where applicable

Found in:

- Medical, veterinary, dental and chemistry collections.
- 'Beauty' treatments and toiletries
- Industrial or agricultural applications which might use these types of substances such as in pest control, lubricants, coolants, etc.

Hazard:

Drugs and Poisons

Due to the fact that scheduling of drugs and poisons only came into effect around 1966, historical material will not have details of the level of scheduling on the original labels. In order to determine the potential hazards and restrictions applicable to this material, additional research of the specific drug or poison and its components would be required.

Definitions of scheduled substances are as follows:

Schedule 1 (Defunct)

- No longer used

Schedule 2 (Pharmacy medicine)

- Substances and preparations for therapeutic use which are substantially safe

Schedule 3 (Pharmacist only medicine)

- Substantially safe, but requires professional advice for use.

Schedule 4 (Prescription only medicine)

- The safety or efficacy of which may require further evaluation.

Schedule 5 (Caution)

- Substances with low toxicity and are a low to moderate hazard, requiring caution in handling and storage.

Schedule 6 (Poison)

- Moderate to high toxicity which may cause death or severe injury if ingested, inhaled or in contact with the skin or eyes.

Schedule 7 (Dangerous poison)

- High to extremely high toxicity which can cause death or severe injury at low exposures, requiring special precautions in their handling and use.

Schedule 8 (Controlled drug)

- Substances which are dependence producing.
- Possession without authority or permit is illegal.

Schedule 9 (Prohibited substances)

- Substances which are strictly prohibited under the law.

The *Queensland Health (Drugs and Poisons) Regulations* sets out detailed requirements for the packaging, labelling and storage of substances schedule 4 and above. The full provisions of the legislation are complex but some key points include:

- Disposal of drugs and poisons must not endanger the safety of people or animals, contaminate food or medicines, or give access to the drugs to unauthorized persons.
- Drugs and poisons must be kept under lock and key at all times, Schedule 4 and over requires the equivalent storage provided by a vault or safe.
- Records of usage, access and storage (especially for Schedule 8 drugs, where specific quantities of each substance must be recorded), should be maintained and kept for at least 2 years.
- A designated, qualified person is required to monitor these substances, and they must keep up-to-date with all changes to the legislation and requirements.
- Possession of Scheduled drugs and poisons 4 and above requires a specialised permit from Queensland Health, renewable annually. Cyanide and Strychnine, require an additional permit due to their high toxicity.
- Scheduled drugs and poisons must not be stored in non-standard containers without appropriate labelling.
- Drugs and poisons Schedule 4 and above, due to the restrictions on access and level of risk, can not be placed on display or exhibition or transported for loan without appropriate levels of security and approval by Queensland Health.

It is recommended, that due to these restrictions, most drugs and poisons scheduled 4 and above not to be retained in the Collection.

Chemicals

Issues to bear in mind in relation to objects containing chemicals, drugs, poisons or pharmaceuticals:

- Even for substances that are relatively innocuous, staff that have pre-existing medical conditions, sensitivities and allergies may be at risk.
- The chemical concentrations of aged material can change due to evaporation, or the chemical nature of certain compounds can alter. The toxicity levels of many objects increases with age.
- Many of the early branded and patent medicines do not have their ingredients listed, so their chemical components are unknown without testing or further research.
- Some containers have no labels at all and the contents are unknown.
- Some materials are sealed in plastic bags and this can lead to a build up of hazardous vapours in a microenvironment.

Identification:

- Some containers may be labelled with contents, so that it is possible to identify hazardous materials – such as DDT (Dichlorodiphenyltrichloroethane), Cyanide, Strychnine, Opium, Morphine, Pethidine etc.
- Chemicals and poisons can be in the form of ointments, creams, liniments and rubs, tablets and capsules, suppositories, powders and liquids, face creams, make-up, soaps, hair balms and dental treatments.
- They can also be found in rat poisons, herbicides and insecticides

Handling method:

- All materials of this nature must be handled with great care until the actual components can be identified and risk levels determined. Disposable nitrile gloves and appropriate respiratory protection should be worn.

Management options:

Option 1 – retain

- If the chemical, poison or pharmaceutical component of the object can be identified as totally harmless, and poses no adverse affect to either the object, other objects in the collection or staff, the item can be retained. It must however, be labelled to identify the fact that it has been assessed and determined safe. This information must also be recorded on your collection database object record.

Option 2 – decant / remove

- If the chemical, poison or pharmaceutical component of the object is deemed unsafe, but is in the form of a self-contained item, which can easily and safely be disposed of without damaging the object or staff, such as in the case of tablets, capsules, ampoules or suppositories, or the container can be safely flushed, this material must be removed and disposed of. The rest of the object can be retained – i.e. box, packet, container. Recommendations on what can or cannot be removed are to be made by Conservation staff.

Option 3 – dispose

- If the contents are deemed unsafe and cannot be removed without destroying the object in question or posing a threat to staff, then the whole item is to be disposed of via an authorised body. Recommendations on what can or cannot be made safe are to be made by Conservation Staff or WHS Manager.

Blades and Sharps

Hazard alert code: none

Poisons schedule: needs individual determination where applicable

Found in:

- Weapons such as swords, daggers, knives, spears, arrows and prison shanks.
- Domestic implements such as knives, razors, and needles
- Medical, dental or veterinary implements such as scalpels and syringes.
- Agricultural implements and tools such as axes, saws, rakes and harvesting equipment.

Hazard:

- Sometimes the hazard may be exposed, but in many cases due to poor storage techniques, items can be piled up or bagged and the hazard may not be obvious.
- Any puncture or cut to the skin is potentially problematic, as collection material can be rusty, dirty, contaminated with biohazards or even poisons, increasing the risk of infection.

Identification:

- Any item which has a blade, point or sharp edge should be considered a hazard.

Handling method:

- All blades and sharps should be handled with care to avoid accidental cuts or puncture wounds.
- Staff should keep tetanus shots up to date and follow appropriate First Aid advice in the event the skin is punctured (i.e., flush wound, apply antiseptic and seek medical advice if required).

Management options:

Option 1 – retain

- In all cases, any objects with a blade, point or sharp edge should be stored in a way to highlight the risk to staff whilst minimising the potential risks. Foam rod can be used to cover blades or points, and objects should be laid out in a single layer in drawers or on shelves allowing clear visibility without necessarily the need to handle them.
- Swords, daggers and knives should not be stored where it is necessary to use a ladder to access them. Wherever possible they should be stored at ground level in storage units which are easy to access.

Electrical equipment (with power plug still attached)

Hazard alert code: none

Poisons schedule: none

Found in:

- Domestic objects such as toasters, kettles, hair dryers, radios, TV's, washing machines etc.
- Industrial or professional objects such as production equipment, computers, printers etc.

Hazard:

- If an electrical object still has a power plug attached, there is always the potential risk that someone may plug the object in to a power point in order to operate it. Unless an object has been certified by a qualified electrician within the past 12 months, there is no guarantee that the cabling is safe, and there is the potential for electrocution.
- Attempting to operate an object that has not been certified may also put the object at risk of overheating, burning out motors, or damaging cables etc. Creating a fire risk is a major concern.

Identification:

- Any object which potentially could be plugged into a power supply.

Handling method:

- Do not attempt to operate any electrical device, which is part of the Collection, by plugging it into a power supply.

Management options:

Option 1 – retain

- In order to ensure electrical objects are not operated, it is necessary to attach a "DO NOT OPERATE" danger tag to the object nearest to the plug.
- If an object is required to be maintained in working order, it must be certified by a qualified electrician every 12 months and an authorised certification label must be attached to the plug. These must be checked to ensure it is valid before the object is operated.

Ethnography / Anthropology / Archaeology Collections

Hazard alert code: needs individual determination

Poisons schedule: needs individual determination where applicable

Found in:

- Poisonous seeds and plant materials may be used as decoration on clothing and in body ornamentation.
- Spears, arrows and blow darts may be coated with poisons. Other items used to kill animals also contain potential hazards such as fish poisons.
- Grave goods can sometimes be coloured with red or white lead or cinnabar and other toxic minerals and pigments.
- Objects contaminated with pathogens or biological hazards such as hair, blood or other bodily fluids.
- Ethnographic collections prior to 1972 are also likely to have been treated with arsenic and / or mercury compounds as part of pest control measures, either by the original collector or by subsequent collecting institutions (see section on *Arsenic* and / or *Mercury*).

Hazard:

- Poisons, viruses, moulds or bacteria could be present in this type of material – all of which potentially pose a threat to staff well being, either through inhalation or in contact with the skin.

Identification:

- It may be difficult to tell if a potential hazard exists or not – collection documentation may provide additional information.

Handling method:

- If there is concern that an item might be contaminated with a potentially hazardous substance, disposable nitrile gloves should be worn instead of the usual white gloves, and also appropriate respiratory equipment.

Management options:

Option 1 – retain

- It is difficult to ascertain how long poisons and pathogens may remain active in museum objects. The older an object, the weaker the adverse affects are likely to be. In most cases, care in handling and storage is sufficient to mitigate most risks.
- Some poisoned arrows and blow darts may remain a risk and these must be stored separately and handled as little as possible. They must be appropriately labelled with hazard warning signage and safe handling instructions – available from Conservation staff.

Film stock

Hazard alert code: Extreme (cellulose Nitrate) / Low (cellulose acetate)

Poisons schedule: none

Found in:

- Film, negative and X-ray sheets in the form of cellulose nitrate, utilised prior to the early 1950's.
- Film and negative in the form of cellulose acetate, utilised from the late 1930's onwards.

Hazard:

- Cellulose nitrate film upon deterioration emits nitrogen oxide gases, which are lung irritants and repeated exposures may result in chronic symptoms. In conditions of elevated or fluctuating temperature, cellulose nitrate films can spontaneously combust. A cellulose nitrate fire can release carbon monoxide, nitrogen peroxide and other very toxic gases. It does not require oxygen in the air to keep burning.
- Cellulose acetate films emit acetic acid that can cause irritation to the upper respiratory tract and have adverse affects on neighbouring collection objects.

Identification:

- Cellulose nitrate film emits a sweet odour when breaking down, can become sticky or tacky, or show signs of bubbling or blistering.
- Cellulose acetate film emits acetic acid when breaking down, which smells vinegary (known as 'Vinegar Syndrome'); it can also become brittle and form crystals.

Handling method:

- Appropriate respiratory equipment, gloves and goggles must be used when handling these materials.

Management options:

Option 1 – stabilize

- Cellulose acetate film can be maintained for around 100 years from date of manufacture if stored in appropriate cold room temperatures. This will slow the rate of deterioration substantially. However, the film will continue to degrade and therefore alternative options must be considered in the future. The film is to be appropriately labelled with hazard warning signage and safe handling instructions.

Option 2 – decant / removal

- If the film has not decomposed too much, it may be possible to have the images transferred to an alternative media, but this would have to be done through a specialised service provider and the cost would have to be weighed against the significance of the material in question.

Option 3 – dispose

- Due to the high risk of combustion and toxicity of the gases given off, cellulose nitrate film must not be retained if at all possible.
- If cellulose acetate film has degraded beyond the point that it can be viewed or transferred to alternative media, it must be considered for disposal, due to the nature of the gases given off during the advanced stages of decomposition.

Fire extinguishers (and other pressurised containers)

Hazard alert code: needs individual determination

Poisons schedule: needs individual determination where applicable

Found in:

- Fire extinguishers can be pressurised along with aerosol cans used for delivering insecticides, deodorants or paints, and gas cylinders for things such as camp stoves or lights.

Hazard:

- Pressurised containers can be a hazard due to the unpredictable nature of the contents, which could cause the unit to explode.
- The contents of fire extinguishers can be hazardous; they can contain anything from sulphuric and hydrochloric acid, carbon tetrachloride (Hazard alert code: High / Poisons schedule: S7), methyl bromide (Hazard alert code: High / Poisons schedule: S7) to ammonium phosphate powders (Hazard alert code: Moderate / Poisons schedule: none).

Identification:

- Most 'pressurised' containers are easily identifiable, and it is possible to tell if the container is still pressurised if it still retains any contents. If the container is empty it should no longer be in a pressurised state, as all the gas would have been expended when the contents were released.
- Fire extinguishers can range from early glass globes containing various chemicals, to brass cylinders, hand pumps and pressurised containers holding foams or liquids.

Handling method:

- If a container is suspected of being 'pressurised', the appropriate authority (this might be the local fire brigade) must be contacted immediately, to assist with object handling and de-pressurising.

Management options:

Option 1 – decant / removal

- In all cases the contents of the container must be removed by the appropriate authority, and the container de-pressurised. The object should then be labelled to indicate that it is now safe.

Geoscience Specimens

Hazard alert code: needs individual determination

Poisons schedule: needs individual determination where applicable

Found in:

- Geoscience specimens may contain a range of naturally occurring potential hazards including Asbestos and Radioactivity (dealt with in more detail on pages 8 and 32)
- They may also contain toxic minerals which can include elements such as Arsenic, Mercury, Lead (dealt with in more detail on pages 9, 25 and 23), antimony, barium, bismuth, copper, fluorine, uranium, zinc, thallium and boron.

Hazard:

- Some specimens can breakdown over time, and in uncontrolled storage environments can lead to the production of toxic dust.
- Some may pose significant fire dangers, emitting toxic gases in a fire.
- Some can also be affected by steam and light creating toxic dust/gas.
- Some minerals can also be toxic by repeated skin contact.

Identification:

- Identification of naturally occurring hazards as well as the various elements within specific specimens is very difficult without expert knowledge; the appropriate subject specialists are best placed to do this.

Handling method:

- All specimens that might pose a potential risk must be double bagged; handling them subsequently should not pose a significant risk.
- In the event of a fire the appropriate respirator would need to be worn, to prevent inhalation of toxic gas/dust.
- Handwashing after all handling of specimens (even bagged) and before eating or drinking is required.

Management options:

Option 1 – retain

- Care in handling and storage should be sufficient to mitigate most risks. Specimens are to be double bagged with the specimen labels housed in the second bag layer (to prevent the need to handle the specimen). The bags should be labelled with a hazard warning, and the drawer or shelf should have appropriate handling instructions and warning labels. They should not be placed on open display.

Lead

Hazard alert code: Moderate

Poisons schedule: none

Found in:

- Radiation shield, for example, occurring in items associated with X-rays.
- Pipes, flashing, solder, guttering and roofing, toys, paint, batteries and food cans.
- Munitions, including bullets and shot.
- Naturally occurring in some mineral specimens.

Hazard:

- All forms of lead are poisonous and can be absorbed through the skin or ingested. It is also a cumulative poison, so prolonged contact is to be avoided.
- Mineral specimens can breakdown over time, and in uncontrolled storage environments can lead to the production of toxic dust.

Identification:

- Metallic lead is usually identifiable by its heavy weight, flat grey colour and malleability.
- Lead also corrodes rapidly forming a white powder.
- Identification of the lead within specific geoscience specimens is very difficult without expert knowledge; the appropriate subject specialists are best placed to do this.

Handling method:

- All items suspected of containing lead should be handled using disposable nitrile gloves.
- If the lead is friable appropriate respiratory equipment is to be worn and the item is to be sealed in a plastic bag to prevent the dust from being inhaled.
- In the case of mineral specimens they must be double bagged; handling them subsequently should not then pose a significant risk.
- Handwashing after all handling of specimens (even bagged) and before eating drinking is required.

Management options:

Option 1 – retain

- If the lead is solid and not friable or dusty the object must be appropriately labelled with hazard warning signage and safe handling instructions. So long as it is only handled using disposable nitrile gloves there should be minimal risk to staff or volunteers.
- In the case of mineral specimens, care in handling and storage should be sufficient to mitigate most risks. Specimens are to be double bagged with the specimen labels housed in the second bag layer (to prevent the need to handle the specimen). The bags should be labelled with a hazard warning, and the drawer or shelf should have appropriate handling instructions and warning labels. They should not be placed on open display.

Option 2 – stabilize

- If the lead is friable or dusty then it poses a risk through inhalation. It is to be stabilized by consolidation and boxed separately. The object is then to be appropriately labelled with hazard warning signage and safe handling instructions.

Matches

Hazard alert code: Extreme (white phosphorous)

Poisons schedule: S7 (white phosphorous)

Found in:

- Standard style matchboxes or matchbooks, cardboard being the most recent types, and thus are easily identifiable. However, early matchboxes could be very ornate and made from metals such as silver – less obvious than modern day matchboxes.

Hazard:

- Early yellow or white head matches can ignite due to friction, giving off toxic fumes
- The phosphorous content of these matches is also highly toxic and can produce severe skin irritation. Phosphorous is considered a S7 regulated poison.
- The red heads and safety matches are less toxic but still an ignition risk.

Identification:

- Even early matches are similar in appearance to the matches we use today, so should be easy to identify.

Handling method:

- All matches must be handled with care to avoid inadvertent ignition.

Management options:

Option 1 – retain

- Yellow, white, red head and safety matches (brown heads) can be retained if stored in a flameproof container, in a cool, friction and oxygen free environment. Preferably boxed separately and stored in a *Flammables Cabinet* with oxygen scavengers. The objects must then be appropriately labelled with hazard warning signage and safe handling instructions.

Mercury

Hazard alert code: Extreme

Poisons schedule: S7

Found in:

- Expansive metal in thermometers, barometers and other scientific equipment (it is in liquid form at room temperature).
- Mercury vapour lamps, arc lamps, fluorescent lamps and switches.
- Munitions and explosives.
- Taxidermy specimens, in the form of mercuric chloride.
- Ethnographic collections prior to 1972 are also likely to have been treated with arsenic and / or mercury compounds as part of pest control measures, either by the original collector or by subsequent collecting institutions.
- Pharmaceuticals such as face creams, antiseptics, in fungicides, preservatives and rat poisons. It can be made into a pigment or paint and also a coating for the back of mirrors.
- Naturally occurring in some mineral specimens.

Hazard:

- Mercury can be absorbed through the skin and can be a severe irritant causing a burning sensation. It can have harmful effects on the brain and kidneys.

Identification:

- Mercury is a shiny liquid-like substance which tends to form droplets or small beads when released. It is also identifiable as a very heavy liquid for its volume.
- Identification of mercury within specific geoscience specimens is very difficult without expert knowledge; the appropriate subject specialists are best placed to do this.

Handling method:

- If mercury is released, for example in a situation where an object is broken, an approved Mercury Spill Kit is to be used to contain the spillage and appropriate methods for disposal are utilised.
- Disposable nitrile gloves should be used at all times to handle early taxidermy specimens or ethnographic objects.
- In the case of mineral specimens they must be double bagged; handling them subsequently should not then pose a significant risk.

Management options:

Option 1 – retain

- If the mercury is contained in a secure manner (such as inside a thermometer) the object poses a minimal risk. It is to be appropriately labelled with hazard warning signage and safe handling instructions, and boxed separately from other objects. There must also be information attached warning people what to do in the event an object is accidentally broken and the mercury released.
- Care in handling and storage should be sufficient to mitigate most risks from taxidermy specimens and ethnographic objects. Specimens or objects suspected or confirmed as having the presence of mercury contamination must not be used for open displays and especially not for 'touch and feel' children's exhibits or touch trolleys.
- In the case of mineral specimens, care in handling and storage should be sufficient to mitigate most risks. Specimens are to be double bagged with the specimen labels housed in the second bag layer (to prevent the need to handle the specimen). The bags should be labelled with a hazard warning, and the drawer or shelf should have appropriate handling instructions and warning labels. They should not be placed on open display.

Option 2 – dispose

- If the mercury is contained in an object which is unstable (such as a glass container which is cracked – especially if large quantities of mercury are involved), the object must be placed into a container sufficiently large to contain the mercury in the event that it is accidentally released. If the object were to give way without warning or whilst unattended there is a potential risk of the mercury coming in contact with skin or the vapour being inhaled. The object must then be disposed of according to local authority guidelines.

Munitions

Hazard alert code: High (gunpowder)

Poisons schedule: none

Found in:

- Bullets, grenades, shells, cartridges and mortars.
- Gunpowder can also be contained in powder flasks, toy gun caps and fireworks.

Hazard:

- Live munitions and gunpowder can be explosive and a fire hazard. Older materials can be more unstable and corroded munitions can also have an unpredictable nature.

Identification:

- Most munitions are easily identifiable, although it is often very hard to tell if an item is inert or live.
- Gunpowder is a black granular substance with a distinctive smell.

Handling method:

- It is best to assume all munitions are live and therefore treat with extreme caution, avoid dropping items and keep away from naked flames.

Management options:

Option 1 – retain

- If the munitions have been assessed by an authorised body (e.g. Australian Defence Force) and deemed to be inert then the objects can be retained. It is important to mark the database accordingly and label the object “inert” to ensure no confusion in the future.

Option 2 – decant / remove

- If an object contains gunpowder (such as a powder flask) this material is to be removed and disposed of by an authorised body (e.g. Australian Defence Force). Certain munitions can also be emptied, cleaned with a solvent and rendered inert – but this is only to be done by a recognised authority and certified as such. These objects are then to be labelled as for option 1.

Option 3 – dispose

- If the object cannot be rendered inert without destroying the object in question then the item is to be disposed of via an authorised body. Recommendations on what can or cannot be rendered inert and what therefore must be disposed of is to be made by the authorised body.

Pest control products

Hazard alert code: needs individual determination

Poisons schedule: needs individual determination where applicable

Found in:

- Collection material in the past has been treated by Museums and collectors with numerous chemical pesticides and insecticides – many of which may not have been recorded or documented. Examples could include DDT (Dichlorodiphenyltrichloroethane) (Hazard alert code: High / Poisons schedule: S6), methyl bromide (Hazard alert code: High / Poisons schedule: S7), arsenic (Hazard alert code: Extreme / Poisons schedule: S7), and mercury compounds (Hazard alert code: Extreme / Poisons schedule: S7).
- Certain products still utilised may be hazardous to health such as Naphthalene (Hazard alert code: High / Poisons schedule: S6).

Hazard:

- Most of these substances are no longer utilised due to their toxic nature and adverse effects on staff, including allergic skin reactions and respiratory problems. Most are also now known to be carcinogenic. Arsenic and methyl bromide are both S7 regulated poisons.
- Naphthalene may be a possible carcinogen which can cause anaemia in some risk groups (babies particularly of Asian, African, Middle Eastern or Mediterranean descent). Prolonged exposure should be avoided where possible.

Identification:

- It may be very difficult to tell if objects have been treated in the past, tell-tale signs may be traces of powders, strange smells or residues.

Handling method:

- If an object or specimen is suspected of containing a potential hazard it should be handled with disposal nitrile gloves and an appropriate respirator should be worn.
- In the case of Naphthalene, the above precautions should be taken in addition it is recommended that staff limit their risks and exposure by taking allocated rest breaks outside of the collection areas where Naphthalene vapours are evident.

Management options:

Option 1 – retain

- It is difficult to ascertain how long these hazards may remain active in museum objects and what level of risk they still pose. The older an object, the weaker the adverse affects are likely to be. In most cases, care in handling and storage is sufficient to mitigate most risks.

Option 2 – stabilize

- Some substances can be removed using High Efficiency Particulate Air (HEPA) filter vacuum cleaners. Advice is to be on what substances can be removed and how.

Option 3 – dispose

- There may be cases when a high risk substance can not be removed from the object or specimen without further risk, the item is to be removed from the collection and disposed of in accordance with appropriate guidelines.

PCBs (Polychlorinated Biphenyls)

Hazard alert code: High

Poisons schedule: S7

Found in:

- Cooling and insulating fluids for industrial transformers and capacitors, also as a stabilising additive in flexible Polyvinyl Chloride (PVC) coatings of electrical wiring and electronic components.

Hazard:

- Exposure can cause allergic reactions and skin rashes, and may lead to some forms of cancer. The substance is accumulative within the body and is stored in the fat cells.

Identification:

- PCB's are colourless but highly viscose liquids which can easily penetrate the skin. Their use was banned in the 1970's.

Handling method:

- PCB's can penetrate latex so disposable nitrile gloves should be worn.

Management options:

Option 1 - dispose

- In most cases it is not possible to remove the contamination of PCB's as they are very difficult to destroy or breakdown and the continued risk of contamination is usually very high. Wherever possible it is recommended that the object be disposed of in accordance with Environmental Protection Agency (EPA) approved methods (www.epa.qld.gov.au).

Preserving fluids (Ethanol / Formalin)

Hazard alert code: High (Ethanol 70-75% solution) / Extreme (Formalin not less than 25% solution)

Poisons schedule: S6 (Formalin)

Found in:

- In most Biodiversity Collections there are some specimens that are preserved in fluids rather than stored as 'dry' specimens. The fluid generally used is 70% Ethanol but some specimens are also preserved in Formalin.

Hazard:

- Formalin is poisonous with highly irritating fumes, it may also be carcinogenic.
- Ethanol is a poison which can be absorbed through the skin or inhaled. It can be a serious irritant to eyes, mucous membranes and the respiratory tract.

Identification:

- Both substances are colourless liquids.

Handling method:

- Both substances should be utilised only for the purposes of specimen preservation in accordance with the Natural Environments Program requirements.
- Risk assessments must be conducted before the use of hazardous substances.
- Appropriate protection should be worn and work should be conducted in a fume cupboard whenever possible.

Management options:

Option 1 – retain

- Appropriate care in handling and storage is sufficient to mitigate most risks. Specimens must be appropriately labelled with hazard warning signage and safe handling instructions, and preferably stored at all times in the designated 'Wet store' which is specifically designed for storage of this type of material.
- There must also be information available warning people what to do in the event of a spill, and appropriate spill kits on hand.

Radioactive material

Hazard alert code: needs individual determination

Poisons schedule: needs individual determination where applicable

Found in:

- Objects painted with 'glow in the dark' paint, including clocks, watches, compasses, instrument panels (including those inside aeroplanes), light switches, doorknobs, religious statuary and chamber pot lids.
- Any health cures with RAD or RADI in the title could potentially contain radioactive material.
- Certain ceramic glazes contain radioactive minerals as part of their pigmentation.
- Certain minerals, ores and fossils have naturally occurring high levels of radioactivity.

Hazard:

- Alpha radiation is not considered a great health hazard, beta radiation is slightly more problematic and gamma radiation is the most serious and most easily absorbed. Radium produces gamma rays and was the material used in luminous paints – so exposed dials especially with flaking paint, should be taken seriously as the radioactive component can be inhaled.
- Radiation can cause cell problems and may lead to certain types of cancer.

Identification:

- Objects painted with luminous paint between 1898 and the 1970's could potentially contain radioactive particles.
- The easiest method of detecting radioactivity and determining whether or not it may be harmful is by seeking the assistance of outside experts with appropriate testing equipment.

Handling method:

- If objects or specimens are suspected of containing radiation they should be stored away from other material and labelled accordingly. They should be assessed as soon as possible by an expert such as the Radiation Safety Section of Queensland Health, so that levels can be assessed and risks determined.

Management options:

Option 1 – retain

- If radiation emissions are well within acceptable ranges (as determined by the Radiation Section of Queensland Health), the objects or specimens can be retained, although appropriate handling, labelling and storage requirements must be established.

Option 2 – dispose

- If the radiation emissions are determined to be outside acceptable ranges the objects or specimens must be disposed of in accordance with established regulations for disposal of radioactive material.