FEEDLOT DESIGN AND CONSTRUCTION

39. Agricultural and veterinary chemical storage

AUTHORS: Orla Keane and Peter Watts

Introduction

Agricultural and veterinary chemicals used in a feedlot must be stored in a way that maintains product integrity, prevents environmental harm and protects worker safety. Risks associated with agricultural and veterinary chemical storage include leakage, spills and fires; they also arise from accidents and spillage when opening containers and handling or mixing chemicals.

The exposure or physical risks to any person close to the incident may be high while environmental risks from escaping chemicals may be considerable. These risks can be controlled by reducing the likelihood of an incident occurring, and establishing emergency procedures to reduce its severity should it occur. Some chemicals are classified as dangerous goods and specific requirements apply if quantities stored are above certain limits.

Shipping containers make an excellent storage facility for chemicals. Note the drain at the front of the container and shower on the left.

Design objectives

A suitable agricultural and veterinary chemical storage area for 'minor storage' should

- be situated in a suitable location that provides a buffer to sensitive locations
- be structurally robust and secure
- maintain the integrity of the agricultural and veterinary chemicals in storage
- provide a safe working environment
- prevent unnecessary contact between livestock and agricultural and veterinary chemicals
- protect against any environmental harm
- provide adequate storage of agricultural and veterinary chemicals to meet practical needs.

Mandatory requirements

There are various mandatory requirements for agricultural and veterinary chemicals storage, summarised as follows.

- *Duty of care* under common law means that activities must be carried out in a safe manner so as not to cause harm or injury to the user, other people, animals or the environment. A breach of a duty of care may amount to negligence.
- Chemical storage must comply with the requirements of the Dangerous Goods Act (1998) and the Dangerous Goods Regulations (1998). These regulations detail the dangerous goods licensing exemption limits. The amount of a chemical that can be held in storage without licence (minor storage) depends on its classification.
- The standards for 'minor' storage cover quantities of chemicals up to 1000 litres or 1000 kilograms in total. For larger quantities, extra precautions are required to satisfy the Dangerous Goods Act (1998) and the Dangerous Goods (General) Regulations (1998).
- Storage facilities must meet Australian Standard (AS) 2507-1998 and be approved by Workplace Standards before a licence

is granted for dangerous goods. Generally, chemicals must be stored in a secure, dry and well-ventilated area out of direct sunlight. Some veterinary chemicals require refrigeration. Chemicals should not be stored with fertilisers, seeds, food, stock feed or personal protective equipment. Containers should be frequently checked for leaks or signs of deterioration.

- The Workplace Health and Safety Regulations require that a register of hazardous substances be kept and maintained at the storage area. This must be readily available to any employee who may be exposed to the hazardous substance.
- The Poisons Act (1997) requires clear 'Poison' labelling and secure storage of all dangerous poisons.
- The storage for restricted veterinary chemicals (listed in Schedule 4 of the Poisons Act (1971)) must not be accessible by the public. Veterinary chemicals must also be kept in a separate area and apart from other goods that are suitable for human or animal consumption.
- The Work Health and Safety Act (2011) and the Work Health and Safety Regulations (2011) include requirements for chemical storage and use.
- There are variations across Australian states in the extent to which agricultural and veterinary chemicals are classified as a waste; for example, in New South Wales (hazardous waste), Queensland (regulated waste) and South Australia (listed waste).
- Local Authority approval may be needed for bunds used to contain chemicals in the event of a spill.
- Compliance with the National Feedlot Accreditation Scheme (AUS-MEAT, 2014) as applicable to agricultural and veterinary chemical storage.
- Compliance with the National Guidelines for Beef Cattle Feedlots in Australia (MLA, 2012a) as applicable to agricultural and veterinary chemical storage.
- Compliance with the National Beef Cattle Feedlot Environmental Code of Practice (MLA, 2012b) as applicable to agricultural and veterinary chemical storage.

Cool storage for veterinary chemicals

Large cool room storage for veterinary chemicals

Technical requirements

A risk assessment should be conducted for all stored chemicals. The key hazards and risks are indicated by the dangerous goods classification on the label of the container.

For all chemicals, the following should be considered

- the quantity of chemical to be stored and the type of containers (i.e. in packages or in bulk)
- the duration of storage
- the dangerous goods class, packing group and other characteristics of the chemicals with respect to toxicity, stability and compatibility (see the Material Safety Data Sheet (MSDS) or supplier)
- the separation of chemicals from other classes of dangerous goods
- spillage control (for liquids)

Appropriate signage should be clearly visible on the exterior of the storage facility.

- fire rating of the storage structure and walls
- ventilation
- emergency procedures and equipment needed in the store (consult the MSDS for information on fires and other emergencies)
- the need for control of potential ignition and heat sources
- separation from other stores of chemicals, fuels or combustible materials
- separation distances from other activities and accommodation.

Separation distances, the isolation of spills and suitable emergency procedures are important control measures even when small quantities of chemicals are stored for short periods.

Site selection

Chemical storages should be located

- in a practical location e.g. veterinary chemical storages could be provided at or near the induction and hospital areas
- in a clear, open area
- at least 15m from the property boundary
- at least 5m from watercourses, dams, drainage or sewage lines
- at least 3m from stored flammable liquids
- well above the maximum flood level
- near a clean and reliable water supply to allow for tank filling and emergency use.

Structural requirements

The chemical storage should be a designated lockable area that is not used for any other purpose. It may be

- a roofed outdoor area with a security fence
- a freestanding, roofed building
- a building attached to another building
- a room, enclosure or area within a building.

Emergency shower and hand basin located outside of chemical store.

It must be a physically robust, fire-resistant structure with a floor of non-slip, sealed concrete or other easily cleaned, impermeable material. It should provide clear access and outward opening doors or gates, be well ventilated and have good light for reading labels. A clean and reliable water supply should be close to the chemical storage for product mixing and emergency use.

Separate storage areas nearby should be provided for

- first aid kit
- personal protective equipment (PPE) (e.g. overalls, waterproof pants and coat, gumboots, rubber gloves, respirator gloves, face shield, PVC apron, hat)
- mop-up materials (e.g. sand, soil or drysorb and hydrated lime)
- cleanup equipment (e.g. shovels, brooms, heavy duty bags, bins)
- dry powder extinguisher.
- An outside shower and eye wash can be installed for personnel to wash off major spills of toxic chemicals.

Protecting the environment

Spills and leaks of chemicals from containers pose an environmental risk. The risk can be mitigated by providing a roof and impervious floor, and bunding or walls to prevent seepage and contain spills. The contained area may confine the whole storage facility or just the part where chemicals are physically kept (e.g. exclude walkways).

The bunded area should be able to hold at least 25% of the total volume of stored chemicals. For flammable liquids, the bunded area should have a capacity of at least 133% of the capacity of the largest container. More capacity will be needed if part of the bunded containment capacity will be displaced by the containers or storage infrastructure.

If an automatic fire sprinkler system is installed in/over the bunded area, the containment capacity should be increased by the volume of 20 minutes of sprinkler output, or up to 133% of the capacity of the largest container.

If chemicals are to be handled or mixed outside the storage, this should also occur in a bunded, impermeable area. The floor of the bunded area may slope so that spills accumulate up one end for ease of management and disposal.

The floor and walls of bunded areas should be built from materials impervious to the chemicals being stored. These should be of sufficient strength and structural integrity to ensure that the bund is unlikely to burst or leak in ordinary use. Reinforced concrete is recommended.

The chemical storage area needs to be structurally robust and vermin proof.

Maintaining product integrity

The storage facility should provide a cool, dry place for chemicals. It should have wall and floor insulation. Any shelving should be located on the coolest side of the storage and away from direct sunlight or radiant heating.

Different classes of chemicals should be stored separately. Liquids should be stored below dry chemicals.

Providing a safe working environment

The chemical storage must be kept locked when not in use. Signs on the entry should carry the following information:

- 'Chemical store – keep out – authorised staff only'
- 'No smoking or naked flames'

A 'No smoking' sign should also be placed inside, along with one indicating the location of the spill kit.

A first aid kit needs to be available near the chemical storage. Depending on the chemicals used, a shower and eye wash could also be considered. This should be located outside the chemical storage. The shower water supply must be able to provide at least 15 minutes of full water flow.

Material Safety Data Sheets (MSDS) must be kept for all chemicals in storage and in a space that is clearly visible and accessible to all trained employees.

Security - The chemical store must be kept locked to prevent unauthorised entry, with windows and vents designed to keep out children or others.

Clearly signed fire extinguishers on the outside of storage

Storing empty chemical containers.

Drums, other packages and containers marked 'returnable' should be stored securely until they can be returned to the supplier or sent to a drumMUSTER.

http://www.drummuster.com.au/

Inappropriate storage of chemicals in an unsecured shed.

Preventing chemical contact with livestock

To prevent livestock and animal contact with chemicals, the storage should have solid walls and/or security fencing and a roof.

Providing adequate storage to meet needs

The stores must provide enough space, and be of the right configuration, to store the chemicals used at the feedlot. Some chemicals such as scheduled poisons, veterinary chemicals and flammables, need to be segregated from other products. Ideally, liquid chemicals should be stored at ground level but otherwise underneath and separate from dry chemicals.

If shelving is used, it should be

- located on the coolest side of the storage and away from direct sunlight, electrical and heat sources
- sufficient to avoid stacking containers on top of each other and to allow ease of access
- sturdy and made of non-absorbent materials (e.g. plastic or metal).

A fridge may be needed to store some veterinary chemicals.

Quick tips

- Chemical storages should be situated in a practical location.
- Chemical storages should be designated, lockable areas that are not used for any other purpose.
- Chemical storages should provide a cool, dry, well-ventilated environment.
- Chemical storages should have impermeable flooring with bunding to contain spills and leaks.
- Separate storage areas should be provided nearby for first aid kit, PPE, mop up materials and equipment and a fire extinguisher.
- Consider storage needs when planning the design of the storage so there is enough space, and the right configuration, to store the chemicals that will be used. A fridge may be needed to store some veterinary chemicals.
- To provide a second level of containment in case of a spill, all chemical storage units should be located within the controlled drainage area of the feedlot.

Further reading

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