NSW GOVERNMENT Department of Primary Industries

primefact

Management of organochlorine and related residues

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Animal Biosecurity and Welfare, NSW DPI

Introduction

Management of persistent chemicals in soil is an important issue for modern-day graziers. It is one of the key points addressed by livestock industry quality assurance programs such as Livestock Production Assurance (LPA), LPA QA (including Cattlecare and Flockcare) and the National Feedlot Accreditation Scheme (NFAS).

For example, the LPA QA Code of Practice requires accredited producers to: identify any part of the property that may be contaminated by persistent chemicals; manage those areas to prevent stock being exposed to contamination; and identify and manage any stock exposed to contamination.

Organochlorine (OC) pesticides are the main concern of these industry programs as these chemicals can persist in the soil for decades. Aldrin, BHC, chlordane, DDT, dieldrin, HCB and heptachlor have all been found as residues in livestock.

The use of these OCs to control pests in crops such as potatoes, corn, cotton, lucerne, bananas and sugarcane is no longer permitted. Use of OCs for termite control ceased in July 1995. Chemicals from this group were used to control external parasites on sheep and cattle until 1962.

Registration of Endosulfan, another member of the OC group was cancelled by the APVMA in 2010 and it is no longer used in Australia.

Organochlorines are not water-soluble. They bond strongly to soil particles and move only when the soil is displaced. OC levels in soil generally decline very slowly. The rate of decline varies depending on ph, climate, soil type etc.

In many cases, sites which were used for storage or disposal of these compounds in the past, have proven to be a problem.

Stock can become contaminated if they have access to localised areas of contamination or old chemical containers.

Stock may also become contaminated with OC residues if they are permitted to graze on previously treated land. Grazing animals take in variable amounts of soil as they feed and any OC residues in soil accumulate in the animal's body fat. Factors such as pasture length, grazing species, and density affect the amount of soil consumed. Cattle consume much more soil than sheep and are therefore more likely to become contaminated.

Similarly, mud splash and dust on fodder increases soil uptake by livestock.

Polychlorinated biphenyls (PCBs) are another group of OC chemicals. These oily liquids were added to transformer oils and some hydraulic oils as a fire retardant. PCBs can be very persistent in soil and stock.

Most PCB residues in stock have come from direct access to old leaking electrical equipment, or from grazing areas where old PCB oils have been spilt.

Maximum residue limits

Residue tolerance levels, which are called maximum residue limits (MRLs), are set for various chemicals in different commodities. MRLs are based on good agricultural practice and scientific evidence that the MRL does not represent a health risk to consumers.

There is no legal use for any of the persistent OC pesticides.

MRLs can vary between different commodities and from country to country. For example, the Australian MRL for dieldrin in beef fat is 0.20 mg/kg (1 part in 5 million) while the MRL for cereal grains is 0.02 mg/kg (1 part in 50 million).

By comparison, the United States has a slightly higher MRL for dieldrin in fat of meat (0.3 mg/kg). Similarly, Australia, Japan and the USA have a DDT MRL of 5 mg/kg, while the EU and Canada have 1 mg/kg.

Meat processors and government agencies carry out extensive residue monitoring on meat from slaughter stock. Any carcase with a residue above the Australian MRL is condemned for human consumption. The producer receives no payment for condemned carcases.

Fluctuations in cattle OC residue levels

OC residue levels in cattle change with time, depending on factors such as:

- residue intake rate;
- dilution or concentration due to changes in body weight; and
- loss through lactation.

For example, dieldrin levels in mature dry cattle are expected to halve every 3-4 months if there is no further exposure to the chemical and the cattle are maintaining or gaining body weight. In comparison, PCB residues break down very slowly. As a result, high PCB levels in fat mature cattle will not generally decline to below MRL.

Suckling calves can absorb OC residues from their mother's milk. Residue levels in suckling calves can be many times those found in their dam's fat.

Lactation, however, helps reduce residue levels in cows as chemicals are removed from their body in the milk. Provided they are not exposed to further contamination, residues which suckling calves gain from their dam can fall rapidly as the calves grow and lay down body fat after weaning.

Property risk management process

Obtain monitoring history

Since the mid-1970s, residue results from field and abattoir testing have been recorded against Property Identification Codes (PICs) on the NSW Department of Primary Industries chemical residue database. Reports of abattoir results recorded against your registered PIC can be obtained from the District Veterinarian (DV) at your Local Land Services (LLS).

The DV protects the confidentiality of the information by ensuring the report only lists results for the inquirer's registered PICs.

In most cases where OC residues above half the MRL are detected, a field investigation is done to determine the source of the residues and the management processes needed to control them.

In 1996 a new program called the National Organochlorine Residue Management (NORM) Program began, with funding from producer levies. It aims to reduce OC residues in beef through improved management of contaminated land and close monitoring of cattle from at-risk properties. The last detection of OC in meat in NSW was one case in 2009, despite thousands of tests having been undertaken. The program which aims to protect the food chain and maintain Australia's trade access to overseas markets, is clearly a success.

Assess the risk of OC residues

Participants in industry quality assurance programs are required to complete a comprehensive property risk assessment for persistent chemicals and to maintain a record of the assessment process.

This approach is strongly recommended for all properties producing livestock for human consumption, irrespective of past monitoring results.

Examples of OC risk areas in NSW include:

- Land used for growing potatoes, corn, bananas, sugarcane, tobacco and lucerne before 1986
- Land used for orchards before 1988 and vegetable production before 1986
- Cotton growing areas before 1982 (DDT)
- Sheep dip sites used before 1963
- Old containers or chemicals in farm rubbish dumps
- Sheds containing old OC chemicals or OC-fortified fertilisers
- Cattle tick dip sites in the north-eastern NSW cattle tick control area
- Buildings, yards, fences, stumps, bridges, power poles treated with OC chemicals for termite control
- Silos treated with OC chemicals for termite or weevil control
- Old pickled seed grain treated with HCB to control bunt
- Sites below leaking electrical transformers
- Land treated with OC chemicals for Argentine ants in the Sydney area
- Chemical storage, mixing and disposal sites
- Lawn clippings from OC contaminated areas.

Identify any likely risk areas on your property. Gather all available information on past OC use, including information from previous owners.

Assess the potential for these sites to cause contamination of stock. Soil sampling may be required to determine if contamination is present and the level of any such contamination.

To discuss this, contact your local Local Land Services office.

See also Primefact 320 *Testing soils for residues of persistent chemicals*

Manage contaminated sites

Obtain professional advice from Local Land Services veterinarians on managing risk sites. A properly documented property management plan records the problems identified and their solutions. District Veterinarians at Local Land Services can help you develop these plans.

Management strategies can include the following:

- Exclusion – it may be possible to remove potential risks simply by fencing risk areas to exclude grazing stock and ensure adequate signage on the fence.
- Removal – for small areas, excavate and replace with clean soil, with guidance from the appropriate environment authorities.
- Grazing management – control and document grazing of risk areas to ensure that slaughter stock residues do not exceed MRL standards.

In many cases, property management plans will already be in place under the NORM program.

On-farm fat sampling of stock (via biopsy) may be necessary to ensure the effectiveness of the management plan, while avoiding the risk of carcases being condemned at abattoirs. It is the producer's responsibility to ensure that all stock offered for sale meet market standards.

Failure to do so may leave the vendor liable to legal action.

Is there a problem?	Find out from	Action
Have OC residues ever been found in stock from your property?	Local Land Services (LLS) District Veterinarians. Previous owners.	Get the best history possible and keep accurate records.
Were OCs used on your property for agricultural crops such as potatoes, lucerne, maize, sugarcane, bananas, orchards, market gardens, cotton or tobacco?	Previous owners. Neighbours. Soil tests.	Property management plans to: • Prevent or restrict grazing on contaminated land. • Reduce contaminated soil intake by stock from short or muddy pasture, or hand-feeding off the ground.
Were OCs used on your property: in sheep or cattle dips; to treat yards, fences or buildings; or to treat silos, feed storages or seed grain?	Previous owners. Neighbours. Soil and surface tests.	• Exclude stock or remove contaminated soil/timber to secure storage. • Keep feeds out of OC-treated storages. • Never feed pickled seed grain to stock.
Were OCs ever used on your property to treat power poles for white ants, or have PCBs leaked from electricity transformers, electric motors or hydraulic equipment?	Electricity supply authorities. Previous owners. Soil tests.	Identify any OC hot spots, exclude stock or remove contaminated soil/timber to secure storage.
Was your land ever treated for Argentine ant infestation (applies mostly in the County of Cumberland)?	LLS District Veterinarians. Previous owners. Neighbours. Soil tests.	Exclude stock from treated areas.
Is there any contamination from poor on-farm disposal of old chemicals and 'empty' drums; or spillage at chemical storage, loading, or wash-down sites?	Inspection of rubbish dumps and sheds. Previous owners. Soil tests.	• Exclude stock from rubbish dumps, farm sheds, chemical storage and mixing areas. • Remove or cover contamination.

Obtain advice from the Office of Environment and Heritage (OEH) before attempting clean-up of contaminated areas or disposing of unwanted chemicals. Phone the OEH Information Line on 131 555.
The line is STD toll free and staffed from 8.30 am to 5 pm, Monday to Friday.

Unwanted persistent chemicals

Use of OC chemicals is banned in Australia. Old stocks of OC chemicals were disposed of during amnesty collections in 1987–88 or, more recently, through the Commonwealth and State Government ChemCollect program. Any remaining unwanted chemicals should be stored securely until permanent disposal can be arranged. Storage areas must be securely fenced to prevent stock access.

Old chemicals should be placed in a secure, leak-proof container, which will not corrode or decay and is properly labelled. Contact the Office of Environment and Heritage(OEH) Information Line on 131 555 for further information on the disposal of waste chemicals.

Producers must only dispose of unwanted chemicals in accordance with OEH directions.

Feedlot and feeding sites

Take particular care with any site where stock are being held or fed. Ensure it was not an old sheep or cattle dip site or the site of previous OC treatments. If in doubt, have the soil tested. Livestock confined in feedlots or fed in yards or off the ground are very likely to pick up residues if the site is contaminated with OCs.

The Cattlecare and National Feedlot Accreditation Scheme (NFAS) Codes of Practice provide for extra measures, such as soil tests or fat testing of cattle, to confirm that feedlot sites are not contaminated by persistent chemicals.

Other OC residue sources

Purchased stock food

Although uncommon now, there have been serious problems in the past with OC-contaminated stock food. Contamination usually occurred in grains or hay that were stored in OC treated silos or sheds. The OC chemicals slowly vaporise and are absorbed into the feed. This can occur many years after an OC treatment. Fodders harvested from OC contaminated land may also contain unacceptable OC residues if significant amounts of soil get into the cut feed. It is essential to minimise the pickup of soil when cutting fodder crops grown on OC contaminated land. This can be done by raising the cutting height and, wherever possible, harvesting the material directly, rather than raking and baling. Problems have arisen with fodders such as cane tops and forage sorghum cut from OC contaminated land.

Grain grown on OC contaminated land should not contain any significant OC residues unless it is unusually contaminated by soil.

Purchasers of stockfoods should seek vendor declarations regarding the OC residue status of land from which fodders have been cut (refer Primefact 315. Buying Stockfeed – Minimising Chemical residue risks). Also, ask about the stock food's chemical treatments and exposure to spray drift. If indicated, appropriate residue tests should be done before using the feeds. Particular care must be taken with materials which are not produced primarily for use as stockfeed.

Purchased Stock

OC residues can persist in cattle for a long time. Buyers should always require vendor declarations covering possible OC exposure of purchased stock, especially during the previous six months. Vendors should always supply an accurately completed National Vendor Declaration (NVD) when selling cattle.

More information

Contact Animal Biosecurity on 1800 680 244

For updates go to www.dpi.nsw.gov.au/factsheets

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