

Managing old sheep dip and footbath sites: a guideline for landowners

In New Zealand, sheep have been dipped in solutions of insecticide to protect against keds, ticks, lice and fly-strike since around 1850. Between 1908 and 1993, annual sheep dipping or spraying was compulsory under various Acts of Parliament. Footbaths were also used to prevent footrot, often in a separate location to the sheep dip sites.

A number of different chemicals have been used in sheep dips and footbaths. Sheep dip chemicals were arsenic-based until the 1950s, with organochlorine (eg dieldrin, lindane and DDT) and organophosphate (eg diazinon) insecticides used after this. More recently, synthetic pyrethroids and IGRs - insect growth regulators - have been, and still are, used. Disposal of spent dipping solutions, spillage and splashes of these chemicals have left toxic residues in soil, which may have leached into groundwater around dip and bath sites, draining platforms and holding pens.

Some of these chemicals persist in soil for many years. Arsenic does not degrade or break down over time at all.

Many of the chemicals that have been used in sheep dips are hazardous to humans, animals and the wider environment. People exposed to arsenic and other insecticides like dieldrin and lindane over a long period of time (for example, through drinking contaminated water, skin contact with contaminated soil, eating food grown in contaminated soil) may not become immediately sick, but over a lifetime may be predisposed to cancer and other serious illnesses.

Stock exposed to toxic chemicals may become sick in the same way, and meat and dairy products may contain pesticide residues that could limit their sale to export markets.



Old sheep baths can still be found on many farms

LIMS and PIMS

All sheep dip and footbath sites should be registered on regional and local databases and information made available on Land and Project Information Memoranda (LIMs and PIMs). You can contact your local and regional councils for more information about the databases. Be aware that currently many of these databases are not complete and any land that has historically farmed

sheep, or held sheep (eg sales yards), may have a sheep dip or bath site (or the remains of these), even if this is not noted in the LIM.

Thousands of sheep dip and bath sites exist in New Zealand. Many of these sites are small and evidence suggests that contamination associated with them is localised. But by having their location listed on LIMs and PIMs, potential buyers will be able to make informed decisions relating to these sites.



Right: Sheep dipping,
Mid-Canterbury, 1890s.
Wheeler & Son
photograph,
Canterbury Museum

A New Zealand-wide issue

Environment Canterbury has prepared this fact sheet to assist owners to identify and manage the risks associated with old dips and footbaths as a result of its recent work on sheep dip sites in the Canterbury region.

Production of a document called 'Guidelines for the Management of Contaminated Sheep Dip Sites'

is a current project sponsored by the Ministry for the Environment's Sustainable Management Fund. These national guidelines should be available in early 2004. Once they have been prepared they will provide more detail on the management of sheep dip sites than this fact sheet, and should be adopted by everyone who owns a property with a sheep dip or footbath site.

Is there a problem on your property?

If your property has a sheep dip or footbath (or the remains of these) that was used before 1980 (when less toxic and persistent insecticides were introduced), it is likely that soil and/or water in the vicinity will be contaminated at levels unacceptable for residential or agricultural land use (based on Ministry for the Environment and Ministry of Health guidelines¹).

A site investigation can help you find out the extent of any contamination. Your local or regional council can supply a list of consultants. An investigation is necessary in some situations where animals graze, or people live or work in close proximity to the sites, and particularly if redevelopment (subdivision or building work) is planned.

If you are unsure if sheep were dipped or footbaths used on your land, it is worth talking to the previous owners or

neighbours to help locate the historic sheep dip, draining platform or footbath structures. Previous owners may have filled in dip sites or broken up concrete bunding. However, there may be remains or signs of past activities. Common evidence includes broken concrete rubble, depressions in the ground (where plunge dips might have been filled in), and large concrete pads set in the ground.

Soil contamination

In sampling studies at former sheep dip sites in Canterbury, arsenic concentrations of up to 4,390 mg/kg were recorded,

¹MoH/MfE 1997: Health and Environmental Guidelines for Selected Timber Treatment Chemicals. This document contains the soil acceptance criteria for arsenic. It is available from the Ministry for the Environment, or relevant sections can be obtained from Environment Canterbury.

OSH 1994: Health and Safety Guidelines on the Cleanup of Contaminated Sites.

MoH 2000: Drinking Water Standards for New Zealand.

decreasing with distance from the dip to normal soil background concentrations, generally within 15 – 25 metres from the dip site.

However, at one site, soil samples 50 metres from the sheep yard area had arsenic concentrations of 52 mg/kg (ie still elevated above background levels, and above the soil acceptance value). Raised arsenic concentrations were also found beneath sheep dips. In the sampling studies, a concentration of 489 mg/kg was recorded at one site at a depth of 2.4 metres below ground surface.

By way of comparison, the nationally adopted soil acceptance value¹ for arsenic is 30 mg/kg for agricultural and residential use.

All of the sites that were sampled in the Canterbury study had some results that exceeded the soil acceptance value for arsenic indicating that contamination from dip and bath sites must not be ignored. Results that exceed the soil acceptance value are relevant in situations where the contaminated soil may come into contact with people or the environment. This may occur in situations where people plan to live on or near the old dip or bath site, when livestock grazes or crops are grown in this area, or when drinking water is obtained from groundwater in the vicinity of the dip/bath site.

Although only arsenic was included in the Canterbury sampling studies, it is anticipated that other chemicals used for dipping sheep at these sites, such as dieldrin and lindane, may also be present.

Water contamination

Groundwater sampled for arsenic beneath three dipping sites in Canterbury had total arsenic concentrations ranging from 0.15 to 2.42 mg/litre, when the maximum acceptable value for a drinkable (potable) water supply is 0.01 mg/litre (MoH 2000).

Groundwater from wells located within 50 m (in any direction) or 200 m downgradient (“downstream”) of an old site should not be used for drinking water until proven safe by testing. Additionally:

1. Any wells used for drinking by humans or livestock which fall within a 50 metre radius of a dip or bath site, or within 200 metres downgradient of a site, should have their water tested for arsenic, copper (bath sites only) and insecticides. To get well water tested, contact your environmental health officer at your local district or city council (see next page).
2. Do not install groundwater wells within the zone outlined above.

Above right: Sheep dipping, Canterbury, J N Taylor photograph, Founders' Society collection, Canterbury Museum

Below: Broken remains of an old sheep dip site



Managing historic sheep dips and footbath sites

Depending on its location, there are different ways to manage contamination associated with sheep dips or footbaths:

- 1 Excluding human and animal access:** Appropriate when the site is remote from human activity, and the size of the affected area is known.
 - The contaminated area around the sheep dip, including the draining platform and any hollows where drainage water may have ponded, can be securely fenced off to prevent direct contact with the soil by animals and people. No foodstuffs should ever be grown or animals grazed in this zone. The size of the zone should cover historic structures, including the draining platform, any areas used for disposal of spent dipping solution, and a safety distance around the structures and platform – just to make sure all the possibly contaminated land is restricted. It should be sign-posted to warn others of the reason for its exclusion from the surrounding land.
 - A barrier, for example concrete or asphalt, or at least half a metre of clean soil may be placed over the area. If you choose to do this, lay a filter fabric or non-biodegradable plastic hazard tape above the contaminated soil horizon as a marker for future excavations.
 - Other management options are currently being evaluated through work involved in production of national guidelines for the management of sheep dip sites – contact Environment Canterbury if you would like more information about this.

- 2 Removing contamination:** Appropriate when the site is close to human activity, or development is proposed in the area.

- You may decide to remove the contaminated soil and replace it with clean soil. If so, it is necessary to get specialist help. This is because the site will need to be investigated to ‘map-out’ the contamination that needs to be removed. Environment Canterbury can provide more details about investigations. A resource consent will also be required for removal of the contaminated soil, which needs to be disposed of to an approved landfill. “Validation testing” of the remaining soil has to be performed afterwards, to ensure all material contaminated above acceptance levels has been collected. Again, contact relevant staff at Environment Canterbury, who will be able to provide you with names of some organisations to help you do this.

- 3 General issues of safety**

- When working with contaminated soil, workers need to be protected from skin contact, inhaling or eating the soil. This can be done by using gloves, overalls, footwear, eye protection, dust masks, and thoroughly showering after leaving the area. Clothing and equipment exposed to chemical residues must be thoroughly washed or disposed with the soil. Refer to ‘Health and Safety Guidelines on the Clean-up of Contaminated Sites’ (OSH 1994) for further details. Any washwater needs to be disposed of to a sewer or into the excavation.

For more information

For [general inquiries](#), Helen Davies or Dave Clancey, Senior Contaminated Sites Officers, Environment Canterbury, 03 365 3828, email helen.davies@ecan.govt.nz, or dave.clancey@ecan.govt.nz

For [health inquiries](#), speak to Geoff O’Brien, Health Protection Officer, Crown Public Health, Christchurch, 03 3799 480 ext 743, or email geoff.obrien@cph.co.nz

For [information on national policy and management issues](#), Howard Ellis at the Ministry for the Environment, 04 917 7437, email howard.ellis@mfe.govt.nz

If you want to have your well water tested, please contact your local district or city council and speak to the Environmental Health Officer.

Kaikoura District Council	03 319 7026
Hurunui District Council	03 314 8816
Waimakariri District Council	03 313 6136
Selwyn District Council	03 324 8080
Christchurch City Council	03 379 1660
Banks Peninsula District Council	03 328 8065
Ashburton District Council	03 308 5139
Timaru District Council	03 684 8199
Mackenzie District Council	03 685 8514
Waimate District Council	03 689 8079
Waitaki District Council	03 434 8060