Department of Primary Industries
primefact

Arsenic and DDT residues at cattle dip yards

July 2017, Primefact 1371, third edition
Animal Biosecurity and Welfare, NSW DPI

Introduction

Soil at many cattle tick dip sites is contaminated due to past use of arsenic and DDT. Arsenic was used as the tickicide in the dip solution up until 1955 when the ticks became resistant to it. DDT, an organochlorine (OC) was then used until it too became ineffective in 1962. Since 1962 other much less persistent tickicides have been used to dip cattle. The use of DDT was banned in 1985

Arsenic and DDT can still be found at high levels in the soil beside many dip baths today because they are very persistent compounds.

There are 1,648 dip sites scattered throughout the far North Coast of NSW, with a few dotted along the Qld border. Of these 1648 dips, 254 have been demolished over the years with 29 of those sites having residences built over them. To assist in the recognition of these old dip sites, whether they remain standing, are dilapidated or have been destroyed, a register of known cattle dip sites in that region is maintained by the NSW DPI. This information is shared with all relevant Local Government councils.

Where is the contamination?

The highest residues are found:

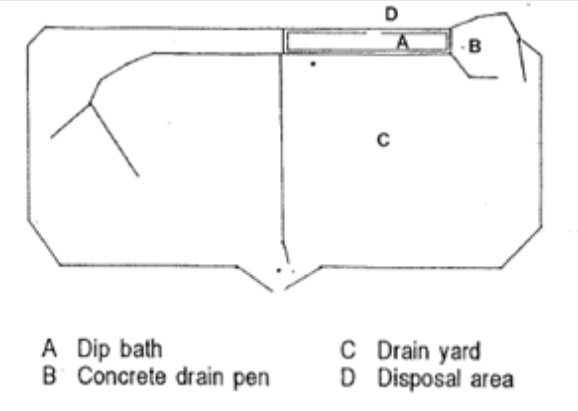
- close to the dip bath
- around the concrete drain pen

During dipping, cattle splashed dip fluid from the bath leaving residues in the surrounding soil. At some yards, fluid surged down the race. Fluid also dripped into the area around the drain pen and the yard where cattle were held after dipping.

Scooping of sediment from the bath into the fenced area outside the dip yard has deposited residues in this area.

In 1955, when the arsenic dips were changed to DDT, the arsenic was first separated from the dip bath fluid by adding lime. An insoluble arsenic compound settled to the bottom of the bath, the liquid was pumped out and the solid arsenic compound buried beside the dip bath. At some yards, the arsenic dipping fluid was pumped into the yard. In 1962, similar procedures were used for DDT disposal.

Figure 1. Plan of a typical dip site.



Why do residues remain?

Arsenic and DDT are very persistent and in soil, arsenic forms compounds that are strongly bound to soil particles. This stops it from leaching out through the soil. Most soils contain a small amount of natural arsenic, in the range of 3-15 parts per million (ppm). At cattle dipping yards where arsenic has been used, soil arsenic greatly exceeds this range, especially near the dipping bath.

DDT is a synthetic compound composed of carbon, hydrogen and chlorine. It binds strongly to soils and doesn't readily leach out. DDT can eventually breakdown to harmless substances, but its structure makes it very stable and it breaks down very slowly. In soil, this breakdown process is helped by soil micro-organisms.

It is worth noting that the soil half-life of DDT can range from between 3 and 10 years depending on the location, climate, soil type etc.

Can the residues spread?

DDT and arsenic are bound to soil particles at dip yards. By managing the area to eliminate erosion, the spread of contaminated soil can be prevented. It is important to identify the boundaries of the dip site accurately to assess the extent of possible contamination so that a fence might be erected to exclude grazing animals.

Residue uptake by plants and animals

Some vegetables may accumulate arsenic or DDT residues by absorbing them from soil (eg, carrots, potatoes) or by soil remaining on the skin.

Fruit from trees, palms or vines are unlikely to contain residues.

Animals such as cattle, goats and sheep may acquire residues by eating soils containing arsenic or DDT during their grazing. Cattle consume large quantities of soil whilst grazing, they can eat up to 1.5kgs soil per day and in doing so; will ingest OC's if these are present in the soils.

Arsenic is rapidly excreted by animals but DDT residues can accumulate in fat deposits over time. As a result milk, eggs or meat may contain DDT residues.

Should cattle accumulate more than minimal residues of DDT they will be rejected by markets.

Reducing the risk of organochlorine chemicals in beef

- Maintain a good, dense grass cover over the soil. The better the cover, the lower the likelihood of animals acquiring residues
- Don't plant trees or erect any shading structure that may encourage cattle to camp near the site
- Don't place water or feed troughs near dip sites
- Don't wean or handfeed cattle within 30 metres of a dip site. Any intensive livestock activity near a dip site poses an unacceptable risk of animals acquiring DDT residues. You may need to exclude these activities from an area more than 30 metres on the lower side of the dip if there is any possibility of contaminated soil having eroded downslope.

The National Organochlorine Residue Monitoring (NORM) program is a joint initiative between the beef industry and State and Commonwealth governments. It was introduced in 1995 to minimise the risk of cattle with organochlorine (OC) residues above the Australian MRL (Maximum Residue Limit) being slaughtered for human consumption. The program was in response to overseas market concerns about OC in the food chain and public health risk. If you believe you have a contaminated site such as a redundant dip tank/yards, contact your District veterinarian at your Local Land Services (LLS) office. They can help you minimise the risk of stock contamination e.g. by soil testing to assess where stock proof exclusion fences with appropriate signage should be placed. They can also assist in developing a Property Management Plan to ensure that you can continue to be a quality stock producer with minimal risk of OC contamination.

Human health risks

For information on the potential effects on human health of Arsenic and other heavy metals, and Organochlorines, see the following NSW Health link: http://www.health.nsw.gov.au/phb/Documents/2002-9-10.pdf.

Is the NORM program working?

Since NORM was introduced in the nineties, residue detection for OC's decreased rapidly from a high of 0.41% recorded above the MRL to zero in 2009 when the last OC detection was made. Clearly, the NORM program is a continuing success story. Nevertheless, because OC contamination persists for so long, we must remain vigilant in keeping stock away from any source of OC's.

More information

Biosecurity general enquiries on 1800 680 244

For updates go to www.dpi.nsw.gov.au/biosecurity/animal

ISSN 1832 6668

INT16/155457